

# Documentation 5.2

ZABBIX

30.04.2024

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# Zabbix Manual

Welcome to the user manual for Zabbix software. These pages are created to help users successfully manage their monitoring tasks with Zabbix, from the simple to the more complex ones.

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## 1. Introduction

Please use the sidebar to access content in the Introduction section.

### 1 Manual structure

#### Structure

The content of this Zabbix 5.2 manual is divided into sections and subsections to provide easy access to particular subjects of interest.

When you navigate to respective sections, make sure that you expand section folders to reveal full content of what is included in subsections and individual pages.

Cross-linking between pages of related content is provided as much as possible to make sure that relevant information is not missed by the users.

#### Sections

**Introduction** provides general information about current Zabbix software. Reading this section should equip you with some good reasons to choose Zabbix.

**Zabbix concepts** explain the terminology used in Zabbix and provides details on Zabbix components.

**Installation** and **Quickstart** sections should help you to get started with Zabbix. **Zabbix appliance** is an alternative for getting a quick taster of what it is like to use Zabbix.

**Configuration** is one of the largest and more important sections in this manual. It contains loads of essential advice about how to set up Zabbix to monitor your environment, from setting up hosts to getting essential data to viewing data to configuring notifications and remote commands to be executed in case of problems.

**IT services** section details how to use Zabbix for a high-level overview of your monitoring environment.

**Web monitoring** should help you learn how to monitor the availability of web sites.

**Virtual machine monitoring** presents a how-to for configuring VMware environment monitoring.

**Maintenance**, **Regular expressions**, **Event acknowledgment** and **XML export/import** are further sections that reveal how to use these various aspects of Zabbix software.

**Discovery** contains instructions for setting up automatic discovery of network devices, active agents, file systems, network interfaces, etc.

**Distributed monitoring** deals with the possibilities of using Zabbix in larger and more complex environments.

**Encryption** helps explaining the possibilities of encrypting communications between Zabbix components.

**Web interface** contains information specific for using the web interface of Zabbix.

**API** section presents details of working with Zabbix API.

Detailed lists of technical information are included in **Appendixes**. This is where you will also find a FAQ section.

## 2 What is Zabbix

### Overview

Zabbix was created by Alexei Vladishev, and currently is actively developed and supported by Zabbix SIA.

Zabbix is an enterprise-class open source distributed monitoring solution.

Zabbix is software that monitors numerous parameters of a network and the health and integrity of servers, virtual machines, applications, services, databases, websites, the cloud and more. Zabbix uses a flexible notification mechanism that allows users to configure e-mail based alerts for virtually any event. This allows a fast reaction to server problems. Zabbix offers excellent reporting and data visualization features based on the stored data. This makes Zabbix ideal for capacity planning.

Zabbix supports both polling and trapping. All Zabbix reports and statistics, as well as configuration parameters, are accessed through a web-based frontend. A web-based frontend ensures that the status of your network and the health of your servers can be assessed from any location. Properly configured, Zabbix can play an important role in monitoring IT infrastructure. This is equally true for small organizations with a few servers and for large companies with a multitude of servers.

Zabbix is free of cost. Zabbix is written and distributed under the GPL General Public License version 2. It means that its source code is freely distributed and available for the general public.

[Commercial support](#) is available and provided by Zabbix Company and its partners around the world.

Learn more about [Zabbix features](#).

### Users of Zabbix

Many organizations of different size around the world rely on Zabbix as a primary monitoring platform.

## 3 Zabbix features

### Overview

Zabbix is a highly integrated network monitoring solution, offering a multiplicity of features in a single package.

#### Data gathering

- availability and performance checks
- support for SNMP (both trapping and polling), IPMI, JMX, VMware monitoring
- custom checks
- gathering desired data at custom intervals
- performed by server/proxy and by agents

#### Flexible threshold definitions

- you can define very flexible problem thresholds, called triggers, referencing values from the backend database

#### Highly configurable alerting

- sending notifications can be customized for the escalation schedule, recipient, media type
- notifications can be made meaningful and helpful using macro variables
- automatic actions include remote commands

#### Real-time graphing

- monitored items are immediately graphed using the built-in graphing functionality

#### Web monitoring capabilities

- Zabbix can follow a path of simulated mouse clicks on a web site and check for functionality and response time

#### Extensive visualization options

- ability to create custom graphs that can combine multiple items into a single view
- network maps
- custom screens and slide shows for a dashboard-style overview
- reports
- high-level (business) view of monitored resources

#### Historical data storage

- data stored in a database
- configurable history
- built-in housekeeping procedure

### Easy configuration

- add monitored devices as hosts
- hosts are picked up for monitoring, once in the database
- apply templates to monitored devices

### Use of templates

- grouping checks in templates
- templates can inherit other templates

### Network discovery

- automatic discovery of network devices
- agent autoregistration
- discovery of file systems, network interfaces and SNMP OIDs

### Fast web interface

- a web-based frontend in PHP
- accessible from anywhere
- you can click your way through
- audit log

### Zabbix API

- Zabbix API provides programmable interface to Zabbix for mass manipulations, 3rd party software integration and other purposes.

### Permissions system

- secure user authentication
- certain users can be limited to certain views

### Full featured and easily extensible agent

- deployed on monitoring targets
- can be deployed on both Linux and Windows

### Binary daemons

- written in C, for performance and small memory footprint
- easily portable

### Ready for complex environments

- remote monitoring made easy by using a Zabbix proxy

## 4 Zabbix overview

### Architecture

Zabbix consists of several major software components, the responsibilities of which are outlined below.

#### Server

**Zabbix server** is the central component to which agents report availability and integrity information and statistics. The server is the central repository in which all configuration, statistical and operational data are stored.

#### Database storage

All configuration information as well as the data gathered by Zabbix is stored in a database.

#### Web interface

For an easy access to Zabbix from anywhere and from any platform, the web-based interface is provided. The interface is part of Zabbix server, and usually (but not necessarily) runs on the same physical machine as the one running the server.

#### Proxy

**Zabbix proxy** can collect performance and availability data on behalf of Zabbix server. A proxy is an optional part of Zabbix deployment; however, it may be very beneficial to distribute the load of a single Zabbix server.

## Agent

Zabbix agents are deployed on monitoring targets to actively monitor local resources and applications and report the gathered data to Zabbix server. Since Zabbix 4.4, there are two types of agents available: the **Zabbix agent** (lightweight, supported on many platforms, written in C) and the **Zabbix agent 2** (extra-flexible, easily extendable with plugins, written in Go).

## Data flow

In addition it is important to take a step back and have a look at the overall data flow within Zabbix. In order to create an item that gathers data you must first create a host. Moving to the other end of the Zabbix spectrum you must first have an item to create a trigger. You must have a trigger to create an action. Thus if you want to receive an alert that your CPU load is too high on Server X you must first create a host entry for Server X followed by an item for monitoring its CPU, then a trigger which activates if the CPU is too high, followed by an action which sends you an email. While that may seem like a lot of steps, with the use of templating it really isn't. However, due to this design it is possible to create a very flexible setup.

## 5 What's new in Zabbix 5.2.0

**Trigger functions for long-term analytics** New trigger functions have been added allowing to compare data from absolute periods (hour, day, week, month, year) and notify user if there is a significant difference. The new functions are:

- `trendavg` - average of trend values for period
- `trendcount` - count of trend values for period
- `trenddelta` - delta of min/max trend values for period
- `trendmax` - maximum of trend values for period
- `trendmin` - minimum of trend values for period
- `trendsum` - sum of trend values for period

Note that the new functions return a result based on trend values, not history.

For example, you may want to know if there was a significant increase of server load last month (a 10% increase over the previous month):

```
{Server:system.cpu.load.trendavg(1M,now/M)}>1.1*{Server:system.cpu.load.trendavg(1M,now/M-1M)}
```

You may also use the new "Event name" parameter in trigger configuration to build a meaningful alert message, for example to receive something like:

```
"Load of Exchange server increased by 24% in July (0.69) comparing to June (0.56)"
```

The new expression macros and new macro functions ('fmttime' and 'fmtnum') are used to build this message. For more details on configuring the event name, see a [trigger configuration example](#).

See also:

- [Supported trigger functions](#)
- [Trigger configuration](#)
- [Macro functions](#)
- [Supported macros](#)

**New Script item type** A new Script item type has been introduced allowing to collect data by executing a user-defined JavaScript code with the ability to retrieve data over HTTP/HTTPS. This item type may be useful in data collection scenarios that require multiple steps or complex logic. As an example, a Script item can be configured to make an HTTP call, then process the data received in the first step in some way, and pass transformed value to the second HTTP call.



Item **Preprocessing**

\* Name

Type

\* Key  Set

Parameters	Name	Value	Action
	<input type="text" value="host"/>	<input type="text" value="{HOST.CONN}"/>	<a href="#">Remove</a>
	<input type="text" value="endpoint"/>	<input type="text" value="{\$ENDPOINT}"/>	<a href="#">Remove</a>
	<a href="#">Add</a>		

\* Script  Edit

\* Timeout

For more details see [Script](#) item type.

**Time zone definition** The frontend time zone, previously set by the 'date.timezone' setting of php.ini, now can be set globally in the frontend and adjusted for individual users.

The default global time zone:

- can be set manually when [installing](#) the frontend
- can be modified in Administration → General → [GUI](#)

User-level time zone:

- can be set when [configuring/updating](#) a user
- can be set by each user in their [user profile](#):

User **Media 1** **Messaging**

Password

Language

**Time zone**

See also: [Time zones](#)

**Storage of secrets** It is now possible to store some sensitive information from Zabbix secretly in HashiCorp Vault KV Secrets Engine - Version 2. Secrets can be saved for:

- user macro values
- database access credentials

Zabbix provides read-only access to the secrets in Vault.

See also: [Storage of secrets](#)

**User roles** It is now possible to define **user roles** for granular control on what parts of UI, which API methods, and which functionality (such as the ability to acknowledge problems) are available to end-users.

**Active agent checks from multiple hosts** Active agent checks can now be requested from multiple Zabbix hosts, by specifying these hosts in the Hostname agent **parameter** as a comma-delimited list. This is useful, for example, when several Zabbix hosts exist for one physical host.

Hostname=Host1, Host2, Host3

Note that if several host names are specified in the Hostname parameter, active agent autoregistration will also create all of these hosts. In network discovery, however, only the first host listed in the Hostname parameter will be considered.

The same changes also apply to the content returned by the Hostnameitem parameter.

**Modbus support** Zabbix now supports Modbus out-of-the-box using the new **modbus.get[]** agent and agent 2 item.

See also:

- Zabbix agent **item keys**
- Zabbix agent 2 **plugins**
- Modbus **plugin documentation**

**MQTT support** Zabbix now supports receiving values of MQTT topics using the new **mqtt.get[]** agent 2 item.

See also:

- Zabbix agent 2 **item keys**
- Zabbix agent 2 **plugins**
- MQTT **plugin documentation**

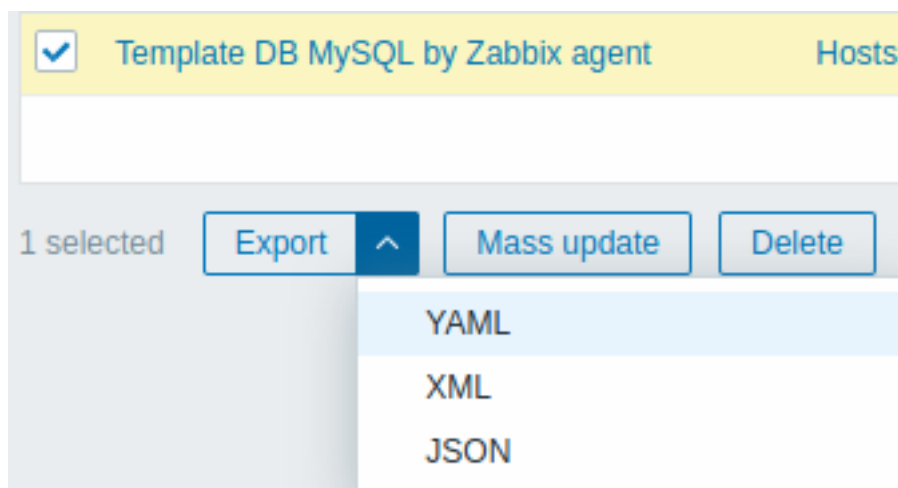
**Digest authentication for HTTP agent** Digest authentication is now supported for **HTTP agent** items and in **web scenarios**.

**Template screens converted to dashboards** Host screens configured on the template level have been converted to host dashboards.

See also:

- **Host dashboards**
- **Upgrade notes**

**Export to YAML** Zabbix configuration elements now can also be **exported** and imported in the YAML format, which is easy to read and edit.



**Custom handling for item errors** Custom handling for item errors has been introduced in the new version on the basis of an individual item. If previously any item error resulted in the item becoming unsupported, now it is possible to use a new **preprocessing rule** called "Check for not supported value" to handle this situation. This preprocessing rule has standard Custom on fail options allowing to:

- discard the value
- set new value (in this case the item becomes supported and the value can be used in triggers)
- set another error message

This preprocessing step can be used only once and it makes sense to have it as the first preprocessing step.

The main use cases for this functionality are as follows:

- you may want some items to never go unsupported, for example, in case of transient problems
- you may want to be notified when checking some service (HTML, for example) fails using standard trigger alerting functionality (this can be accomplished by setting the new value to something like '-1')
- you may want to use items as a kind of "ping" for availability of services, and be able to configure alerting if the service is not available

**Host prototypes** Two new options can now be set on a **host prototype** level, making low-level discovery even more flexible.

Custom interfaces

Host prototype configuration form now allows to select with which interfaces a discovered host should be created:

- Inherit (default) - the hosts will be created with the interface of a host the Discovery rule belongs to. If a host prototype is configured on the template level, then discovered hosts will inherit the interface of a host to which the template is linked to.
- Custom - the hosts will be created with a specified interface (or several interfaces). All four interface types are supported: Zabbix agent, IPMI, JMX, SNMP. If Custom is set, but no interfaces have been specified - the hosts will be created without interfaces.

Type	IP address	DNS name	Connect to	Port	Default
Agent		{#LLDMACRO}	IP DNS	10050	<input checked="" type="radio"/>

Tags

Additionally, support of tags with a possibility to use LLD macros as tag values has been added to the host prototypes. This functionality allows assigning each discovered host own set of tags with valuable information (datacenter, instance type, resource type, etc.), which can be useful, for example, in the discovery of cloud resources.

**Agent configuration parameter for default search path** A new optional parameter **UserParameterDir** has been added to the Zabbix **agent** and **agent 2** configuration files. The parameter specifies a custom directory to execute UserParameter commands from. If UserParameterDir is present, the agent will change its working directory to the one specified by this parameter before executing a UserParameter command. Thereby UserParameter commands can have a relative ./ prefix instead of a full path.

Example:

```
UserParameterDir=/opt/myscripts  
UserParameter=check_cpu,./custom_script.sh
```

**SNMP item testing** When **testing** SNMP items, it is now possible to specify version-specific details:

New fields in SNMPv2 item testing:

Test item

Get value from host

\* Host address

SNMP version

\* SNMP community

New fields in SNMPv3 item testing:

Test item

Get value from host

\* Host address

SNMP version

Context name

Security name

Security level

Authentication protocol  MD5  SHA

Authentication passphrase

Privacy protocol  DES  AES

Privacy passphrase

This is useful because, when testing SNMP items, problems are often associated with a wrong SNMPv2 community or SNMPv3 security credentials.

The values of these fields are pre-filled by the values of the corresponding SNMP interface as defined on the host. Note that if the field value is a macro with a text value, the field will be filled with the resolved macro value, however, if the value (or part of the value) is a secret or Vault macro, the field will be empty and will need to be filled manually. To be able to tell that a secret macro value is hidden, the following warning message will be displayed: "Item contains user-defined macros with secret values. Values of these macros should be entered manually."

SNMP items can be tested as an item, a low-level discovery rule and an item prototype. All these entities can be tested on template level as well.

**Refreshing unsupported items** A separate setting for refreshing unsupported items has been removed from Administration → General → Other. Instead, the item update interval is now used for each unsupported item. This has been done to remove a potential performance bottleneck in the scenario when a lot of items turn unsupported and the global refresh interval has been set to a short value.

## Macros

- `{ITEM.LOG.*}` macros are now also supported in:
  - trigger names, operational data, URLs and descriptions;
  - event tags and values.
- User macros are now supported in item and low-level discovery rule descriptions.
- User macro length limit has been increased from 255 to 2048 characters.
- New macros have been added:
  - `{ITEM.DESCRPTION.ORIG<1-9>}` resolves to the item description without macros expanded.
  - `{LLDRULE.DESCRPTION.ORIG}` resolves to the low-level discovery rule description without macros expanded.

**Frontend** Minimum required PHP version

The minimum required PHP version has been upped from 7.2.0 to 7.2.5.

## Informative tabs

Tabs in many frontend forms now indicate the number of defined elements or if the functionality is enabled. To illustrate let's compare a host configuration form with two linked templates, one host tag, one host-level macro, enabled inventory and two-way encryption enabled now and before:

|<| |<| |<| |<|

Informative tabs allow to debug problems easier, for example, when an item has preprocessing steps defined they are now clearly indicated with a number even when the tab is not opened:



Informative tabs have been added to the configuration forms for:

- Hosts and host prototypes
- Templates
- Items and item prototypes
- Triggers and trigger prototypes
- Discovery rules
- Web scenarios
- Actions
- Services
- Proxies
- Authentication
- Users and user groups
- Media types
- Graph widgets
- Maps
- User settings

## Session stored in cookie

Zabbix session data is now stored in a user cookie.

## Ability to change the default language

It is now possible to choose the default language for the Zabbix frontend during the **installation** process. After the installation, the system default language can be changed in the Administration→General→GUI section. If a user has not specified another language in the profile settings, the system-wide setting is used. Login page for all users is displayed in the chosen default language.

## New configuration parameters

Several parameters, that previously could only be modified through editing `defines.inc.php` file, can now be configured directly via the frontend. This makes Zabbix frontend configuration more flexible and ensures that custom changes will be preserved after an upgrade.

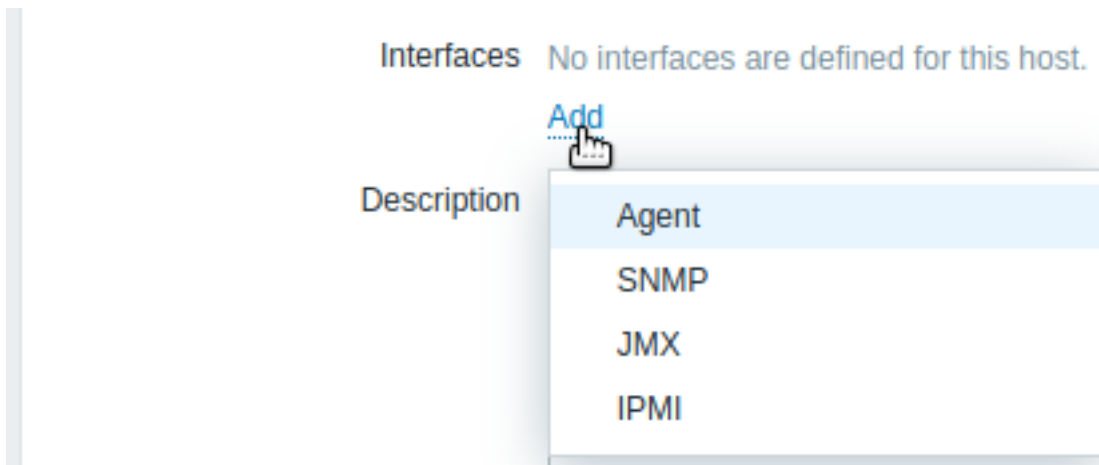
Administration → General **frontend section** has been modified to accommodate more parameters:

- General → GUI page now
  - includes Working hours field (used to be on a separate page);
  - contains new parameters: Max number of columns and rows in overview tables, Show technical errors, Max history display period, Default period (for graphs and dashboards), Max period (for graphs and dashboards).
- Working time page has been removed.
- Trigger severities page is moved to Trigger displaying options.
- Other page now includes three additional parameter groups:
  - Authorization, which allows to set number of failed login attempts and period of blocking login page after exceeding this limit;
  - Security, which allows to set URI scheme validation rules, X-Frame-Options HTTP header, and custom iframe sandboxing restrictions;
  - Communication with Zabbix server, which allows to customize timeout limits.

## Adding hosts without interfaces

It is now possible to add a host without interfaces, which may be useful for hosts with only trapper items or web checks.

For a new host now no interfaces are defined by default. To add a new interface, click on Add in the Interfaces block and select the interface type from a dropdown.



#### Dashboard navigation and details

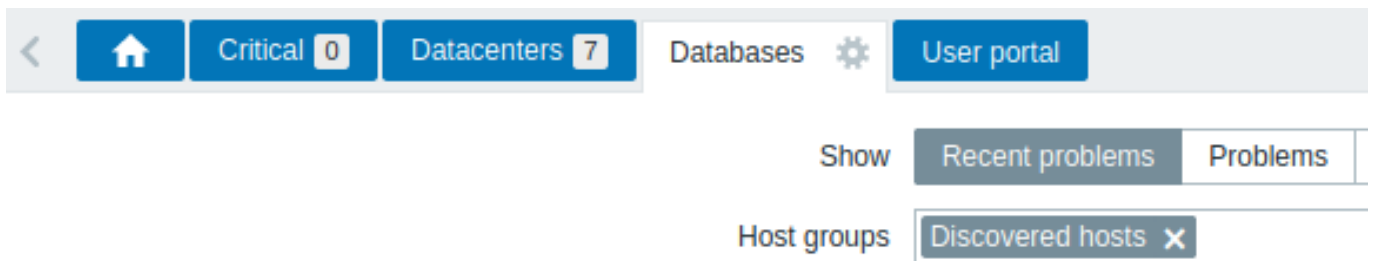
Switching to the required **dashboard** has become easier with these new features:

- List of all dashboards now has a filter, allowing to search for dashboards by name and to switch between displaying all dashboards and dashboards created by the current user.
- Dashboards created by the current user have a tag "My" next to a name

Additionally, it is now immediately visible, which dashboards are shared with other users. If a dashboard is public or is privately shared with any user or user group - a tag "Shared" next to the dashboard name will indicate that.

#### Tabs for favorite filters

In Monitoring→Hosts and Monitoring→Problems sections, it is now possible to **save multiple filters** and switch between saved sets of filter parameters in a single click, similar to the way of switching tabs in web browsers.



#### Simplified maintenance periods form

The **Maintenance periods** configuration form now has a simpler single-tab look. All configuration parameters previously located on the tabs Periods and Hosts and groups have been moved to the primary tab.

#### Miscellaneous

- A Timeout field has been added in the mass update for HTTP items.

## 6 What's new in Zabbix 5.2.1

#### New templates

The following templates are now available for out-of-the-box monitoring:

- Apache Cassandra by JMX - see [setup instructions](#) for JMX templates.
- Apache Kafka by JMX - see [setup instructions](#) for JMX templates.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

## 7 What's new in Zabbix 5.2.2

### Disabled autocomplete attribute for sensitive fields

To avoid potential exposure of data, the autocomplete attribute is now turned off for many fields containing sensitive information, such as a user's password for logging into Zabbix, pre-shared keys (PSK), usernames and passwords used for data collection by various items and hosts, SNMPv3 authentication and privacy passphrases, passwords for media types; SSL key password and HTTP proxy fields used in web scenarios and HTTP items; usernames, passwords and key passphrases in remote commands. This setting shall prevent most browsers from using autocompletion in the affected fields.

### Systemd discovery based on unit state

**Zabbix agent 2** item **systemd.unit.discovery** now also returns the current enablement status of unit files under the `{#UNIT.UNITFILESTATE}` **low-level discovery macro**. As a use case example, these data may be used in the discovery rule filter to filter out all disabled systemd units and discover only enabled ones.

### Protection against user enumeration attacks

To make sure an attacker may not guess valid user names because temporary account blocking after consecutive failed login attempts is only applied to existing user names, the account blocking is now also enforced if non-existing user names are used.

To further obscure the possibility of such attacks, a unified generic message is now displayed for all problems related to incorrect login:

```
Incorrect user name or password or account is temporarily blocked.
```

### iTOP webhook integration

A new integration is available allowing to use the **webhook** media type for pushing Zabbix notifications to [iTop](#).

### New templates

The following templates are now available for out-of-the-box monitoring:

#### Apache projects

- Hadoop by HTTP - monitoring of Apache Hadoop using HTTP agent -- see [HTTP templates](#) for setup instructions.
- ZooKeeper by HTTP - monitoring of Apache ZooKeeper using HTTP agent -- see [HTTP templates](#) for setup instructions.

#### Aranet Cloud

- Aranet Cloud - Aranet Cloud monitoring using [Script items](#).

#### Morningstar

- Morningstar ProStar MPPT SNMP - monitoring of ProStar MPPT solar charge controller via SNMP;
- Morningstar ProStar PWM SNMP - monitoring of ProStar pulse width modulation (PWM) solar charge controller via SNMP;
- Morningstar SunSaver MPPT SNMP - monitoring of SunSaver MPPT solar charge controller via SNMP;
- Morningstar SureSine SNMP - monitoring of SureSine pure sine wave inverter via SNMP;
- Morningstar TriStar MPPT 600V SNMP - monitoring of TriStar MPPT 600V solar charge controller via SNMP;
- Morningstar TriStar MPPT SNMP - monitoring of TriStar MPPT solar charge controller via SNMP;
- Morningstar TriStar PWM SNMP - monitoring of TriStar PWM solar charge controller via SNMP.

These templates are specifically designed for monitoring Morningstar devices; a step-by-step [User guide](#) to setting up Zabbix monitoring of the Morningstar products is also available.

#### Virtual machines

VMware FQDN - agent-less monitoring of VMware vCenter and ESX hypervisor. The new template uses FQDN data to fill in macro values, opposed to UUID data used by standard VMware template. See [Virtual machine monitoring](#) for additional info.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

#### Updated items

- **vmware.vm.discovery** item, used for virtual machine discovery, now returns additional fields `{#VM.DNS}`, `{#VM.GUESTFAMILY}`, `{#VM.GUESTFULLNAME}`, `{#VM.IP}`;
- **vmware.hv.discovery** item, used for hypervisor discovery, now returns an additional field `{#HV.IP}`.

## 8 What's new in Zabbix 5.2.3

### Items

A new `systemd.unit.get[<unit name>,<interface>]` item allows to retrieve all properties of a systemd unit. This item is supported by Zabbix agent 2 on Linux platforms only.

### Time zone selection

Time zone selection fields have been improved in the following way:

- The selection fields now have modern design
- Time relative to UTC is prepended before the time zone name
- 'System default' and 'System' options now also display full details (time relative to UTC and time zone name)

For example:

Time zone labels now	Time zone labels before
(UTC+02:00) Europe/Riga	Europe/Riga
System default: (UTC+02:00) Europe/Riga	System default
System: (UTC+02:00) Europe/Riga	System

### GitLab monitoring template

The following template is now available for out-of-the-box monitoring:

- GitLab by HTTP - see [setup instructions](#) for HTTP templates.

You can get this template:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

### Java gateway property file

A new `zabbix.propertiesFile` configuration parameter allows to specify a property file, which can be used to set additional properties in such a way that they are not visible on a command line or to overwrite existing ones.

### Zabbix agent 2 plugins

Parameter structure for Zabbix agent 2 plugins has been updated:

- For Ceph, Docker, Memcached, MySQL, Oracle, and Redis plugins, a Uri can now only be specified as a named session parameter.
- For PostgreSQL plugin a Uri and Database name can now only be specified as a named session parameter.
- For Uri parameters, specifying a scheme is no longer mandatory.

See also: [Zabbix agent 2 \(UNIX\)](#), [Zabbix agent 2 \(Windows\)](#)

### Miscellaneous

- Max period GUI parameter has been renamed to Max period for time selector. This parameter is set in the Administration → General → GUI [frontend section](#) and determines the maximum available time period for graphs and dashboards.
- Custom multiplier [preprocessing step](#) now accepts strings with macros (a macro must resolve as an integer or a floating-point number).
- Zabbix agent for Windows now substitutes SIDs with account name and domain name in event log messages.

## 9 What's new in Zabbix 5.2.4

### Testing preprocessing steps

It is now possible to test item value preprocessing steps with an unsupported value.



**Test item**

Get value from host

Value

Not supported

This is useful for testing the Check for not supported value preprocessing step.

See also: [Preprocessing steps](#), [Testing preprocessing steps](#)

#### New templates

The following templates are now available for out-of-the-box monitoring:

- Apache ActiveMQ by JMX - see [setup instructions](#) for JMX templates;
- HashiCorp Vault by HTTP - see [setup instructions](#) for HTTP templates;
- Microsoft Exchange Server 2016 by Zabbix agent, Microsoft Exchange Server 2016 by Zabbix agent active - see [setup instructions](#) for Zabbix agent templates;
- NetApp FAS3220 SNMP - monitoring of NetApp FAS3220 via SNMP.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

#### Host dashboard navigation

**Host dashboards** now display the navigation menu under the dashboard name, which contains the following sections:

- All hosts - a link to the Monitoring → Hosts section;
- Host name - non-clickable name of the dashboard host;
- Dashboard name - the name of the currently open dashboard as a hyperlink to current page.

## Zabbix server health



#### Webhook integrations

- New integration is available allowing to use the **webhook** media type for pushing Zabbix notifications to [Rocket.Chat](#).
- In the Microsoft Teams webhook, hardcoded `teams_endpoint` check has been removed to prevent URL syntax error.

#### PostgreSQL plugin

- PostgreSQL **plugin** for Zabbix agent 2 now supports custom queries;
- Unix socket support has

### 10 What's new in Zabbix 5.2.5

## S.M.A.R.T. plugin for agent 2

A [plugin](#) for S.M.A.R.T. monitoring has been added out-of-the-box to Zabbix agent 2.

## New templates

The following templates are now available for out-of-the-box monitoring:

- Ignite by JMX - see [setup instructions](#) for JMX templates;
- Jenkins by HTTP - see [setup instructions](#) for HTTP templates.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

## New VMware items

New [VMware items](#) have been added:

- `vmware.hv.cpu.usage.perf[<url>,<uuid>]`
- `vmware.hv.cpu.utilization[<url>,<uuid>]`
- `vmware.hv.datastore.multipath[<url>,<uuid>,<datastore>,<partitionid>]`
- `vmware.hv.power[<url>,<uuid>,<max>]`
- `vmware.vm.cpu.latency[<url>,<uuid>]`
- `vmware.vm.cpu.readiness[<url>,<uuid>,<instance>]`
- `vmware.vm.cpu.swapwait[<url>,<uuid>,<instance>]`
- `vmware.vm.cpu.usage.perf[<url>,<uuid>]`
- `vmware.vm.guest.memory.size.swapped[<url>,<uuid>]`
- `vmware.vm.guest.osuptime[<url>,<uuid>]`
- `vmware.vm.memory.size.consumed[<url>,<uuid>]`
- `vmware.vm.memory.usage[<url>,<uuid>]`
- `vmware.vm.net.if.usage[<url>,<uuid>,<instance>]`
- `vmware.vm.storage.readio[<url>,<uuid>,<instance>]`
- `vmware.vm.storage.totalreadlatency[<url>,<uuid>,<instance>]`
- `vmware.vm.storage.totalwritelatency[<url>,<uuid>,<instance>]`
- `vmware.vm.storage.writeio[<url>,<uuid>,<instance>]`

Additionally:

- `vmware.datastore.discovery[ ]` now returns a `{#DATASTORE.EXTENT}` macro with the list of extents
- `vmware.hv.datastore.discovery[ ]` now returns:
  - a `{#MULTIPATH.COUNT}` macro with the registered number of datastore paths
  - a `{#MULTIPATH.PARTITION.COUNT}` macro with the number of available disk partitions

## Updated macros

- `{ITEM.KEY.ORIG}` macro is now supported in HTTP agent type and Script type items, item prototypes, and discovery rules;
- `{ITEM.ID}` and `{ITEM.KEY}` macros are now supported in Script type item, item prototype, and discovery rule.

For more details, see [Macros supported by location](#)

## VictorOps webhook integration

A new integration is available allowing to use the [webhook](#) media type for pushing Zabbix notifications to [VictorOps](#).

## HTTP authentication in webhooks and script items

HTTP authentication is now possible in webhooks and script items using the new `SetHttpAuth(bitmask, username, password)` method in the `CurlHttpRequest` [object](#) of the JavaScript code.

## JavaScript functions for MD5 and SHA256 calculation

The functions for MD5 and SHA256 hash calculation have been added to global JavaScript [functions](#).

## JavaScript memory limit

The memory limit available for JavaScript scripts has been raised from 10MB to 64MB.

## 11 What's new in Zabbix 5.2.6

### MongoDB monitoring

MongoDB monitoring is now available via the Zabbix agent 2 with a new MongoDB plugin and [monitoring templates](#). For more information, see:

- [Plugin configuration](#)
- Description of supported [item keys](#)

### brevis.one webhook integration

A new integration is available allowing to use the [webhook](#) media type for pushing Zabbix notifications to [brevis.one](#).

### New templates

The following templates are now available for out-of-the-box monitoring:

#### APC UPS

- APC UPS SNMP - monitoring of APC UPS Symmetra LX by Zabbix SNMP agent.

#### Cisco Catalyst 3750 Series

- Cisco Catalyst 3750V2-24FS SNMP
- Cisco Catalyst 3750V2-24PS SNMP
- Cisco Catalyst 3750V2-24TS SNMP
- Cisco Catalyst 3750V2-48TS SNMP
- Cisco Catalyst 3750V2-48TS SNMP

See also: [Standardized templates for network devices](#).

#### Huawei Oceanstor

Huawei OceanStor 5300 V5 SNMP - monitoring of SAN Huawei OceanStor 5300 V5 by Zabbix SNMP agent.

#### Microsoft SharePoint

Microsoft SharePoint by HTTP - see [setup instructions](#) for HTTP templates.

#### MongoDB

- MongoDB cluster by Zabbix agent 2
- MongoDB node by Zabbix agent 2

See [setup instructions](#) for Zabbix agent 2 templates.

#### NetApp

NetApp AFF A700 by HTTP - see [setup instructions](#) for HTTP templates.

#### S.M.A.R.T. monitoring system

- SMART by Zabbix agent 2
- SMART by Zabbix agent 2 active

See [setup instructions](#) for Zabbix agent 2 templates.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

#### VMware templates update

New metrics have been added to the VMware and VMware FQDN templates for enhanced monitoring of CPU and memory usage, disk requests, power usage, etc. Additionally, the templates will now monitor the number of available datastore paths and send a trigger alert if the multipath count changes.

#### Real-time export

It is now possible to specify entity types to export in real-time export, using the new `ExportType` server [parameter](#).

#### Server protected against proxy data overload

Additional protection has been added to Zabbix server against overloading by proxy data, for example, after a server downtime. This is achieved by rotating proxies during the fetching of historical data and updating the history cache.

#### Timescale DB 2.X

Timescale DB 2.X versions are now officially supported in addition to Timescale DB 1.X. Please note, that Timescale DB 2.X works only with PostgreSQL 11 or newer.

## 15 What's new in Zabbix 5.2.7

#### Improved Slack webhook

JavaScript in Slack webhook has been updated to ensure the correct work of the webhook. Additionally, proxy support has been added, and the [webhook's documentation](#) has been updated and now describes an up-to-date Slack integration setup procedure.

#### Web scenario fields

The maximum field size has been increased from 255 to 2000 characters in the web scenario variables and web scenario step variables and post fields.

#### New templates

The following templates are now available for out-of-the-box monitoring:

##### APC UPS

- APC UPS Galaxy 3500 SNMP - monitoring of APC UPS Galaxy 3500 by Zabbix SNMP agent LX by Zabbix SNMP agent;
- APC Smart-UPS 2200 RM SNMP - monitoring of APC Smart-UPS 2200 RM by Zabbix SNMP agent;
- APC Smart-UPS 3000 XLM SNMP - monitoring of APC Smart-UPS 3000 XLM by Zabbix SNMP agent;
- APC Smart-UPS RT 1000 RM XL SNMP - monitoring of APC Smart-UPS RT 1000 RM XL by Zabbix SNMP agent;
- APC Smart-UPS RT 1000 XL SNMP - monitoring of APC Smart-UPS RT 1000 XL by Zabbix SNMP agent;
- APC Smart-UPS SRT 5000 SNMP - monitoring of APC Smart-UPS SRT 5000 by Zabbix SNMP agent;
- APC Smart-UPS SRT 8000 SNMP - monitoring of APC Smart-UPS SRT 8000 by Zabbix SNMP agent;
- APC UPS SNMP - monitoring of APC UPS with NMC by Zabbix SNMP agent;
- APC UPS Symmetra RM SNMP - monitoring of APC UPS Symmetra RM by Zabbix SNMP agent;
- APC UPS Symmetra RX SNMP - monitoring of APC UPS Symmetra RX by Zabbix SNMP agent.

The template APC UPS SNMP introduced in Zabbix 5.2.6 for monitoring APC UPS Symmetra LX has been renamed to APC UPS Symmetra LX SNMP and updated with new metrics, triggers, a discovery rule, etc., which allow to monitor battery capacity and phase output voltage and load.

##### PingCAP TiDB

- TiDB by HTTP - monitoring of TiDB server of TiDB cluster via HTTP;
- TiDB PD by HTTP - monitoring of PD server of TiDB cluster via HTTP;
- TiDB TiKV by HTTP - monitor TiKV server of TiDB cluster via HTTP.

See [setup instructions](#) for HTTP templates.

You can get these templates:

- In Configuration → Templates in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in Configuration → Templates you can import them manually into Zabbix.

#### Value cache performance

The value cache performance has been improved by replacing mutexes with read-write locks in the processing logic. The expected benefit of this change is reduced history syncer usage in heavy parallel workloads.

#### Diagnostic information

Diagnostic information about preprocessing has been improved to include the oldest values in queue and the totals to include done, queued, processing and pending.

#### Real-time export

Severity is now exported for trigger events in [real-time export](#).

#### VMware discovery

The **vmware.vm.discovery** item, used for virtual machine discovery, now returns an additional field {#VM.FOLDER} with the chain of virtual machine parent folders.

## 2. Definitions

**Overview** In this section you can learn the meaning of some terms commonly used in Zabbix.

### Definitions **host**

- a networked device that you want to monitor, with IP/DNS.

### **host group**

- a logical grouping of hosts; it may contain hosts and templates. Hosts and templates within a host group are not in any way linked to each other. Host groups are used when assigning access rights to hosts for different user groups.

### **item**

- a particular piece of data that you want to receive off of a host, a metric of data.

### **value preprocessing**

- a transformation of received metric value before saving it to the database.

### **trigger**

- a logical expression that defines a problem threshold and is used to "evaluate" data received in items.

When received data are above the threshold, triggers go from 'Ok' into a 'Problem' state. When received data are below the threshold, triggers stay in/return to an 'Ok' state.

### **event**

- a single occurrence of something that deserves attention such as a trigger changing state or a discovery/agent autoregistration taking place.

### **event tag**

- a pre-defined marker for the event. It may be used in event correlation, permission granulation, etc.

### **event correlation**

- a method of correlating problems to their resolution flexibly and precisely.

For example, you may define that a problem reported by one trigger may be resolved by another trigger, which may even use a different data collection method.

### **problem**

- a trigger that is in "Problem" state.

### **problem update**

- problem management options provided by Zabbix, such as adding comment, acknowledging, changing severity or closing manually.

### **action**

- a predefined means of reacting to an event.

An action consists of operations (e.g. sending a notification) and conditions (when the operation is carried out)

### **escalation**

- a custom scenario for executing operations within an action; a sequence of sending notifications/executing remote commands.

### **media**

- a means of delivering notifications; delivery channel.

### **notification**

- a message about some event sent to a user via the chosen media channel.

### **remote command**

- a pre-defined command that is automatically executed on a monitored host upon some condition.

### **template**

- a set of entities (items, triggers, graphs, screens, applications, low-level discovery rules, web scenarios) ready to be applied to one or several hosts.

The job of templates is to speed up the deployment of monitoring tasks on a host; also to make it easier to apply mass changes to monitoring tasks. Templates are linked directly to individual hosts.

### **application**

- a grouping of items in a logical group.

### **web scenario**

- one or several HTTP requests to check the availability of a web site.

### **frontend**

- the web interface provided with Zabbix.

### **dashboard**

- customizable section of the web interface displaying summaries and visualizations of important information in visual units called widgets.

### **widget**

- visual unit displaying information of a certain kind and source (a summary, a map, a graph, the clock, etc), used in the dashboard.

### **Zabbix API**

- Zabbix API allows you to use the JSON RPC protocol to create, update and fetch Zabbix objects (like hosts, items, graphs and others) or perform any other custom tasks.

### **Zabbix server**

- a central process of Zabbix software that performs monitoring, interacts with Zabbix proxies and agents, calculates triggers, sends notifications; a central repository of data.

### **Zabbix proxy**

- a process that may collect data on behalf of Zabbix server, taking some processing load off of the server.

### **Zabbix agent**

- a process deployed on monitoring targets to actively monitor local resources and applications.

### **Zabbix agent 2**

- a new generation of Zabbix agent to actively monitor local resources and applications, allowing to use custom plugins for monitoring.

#### **Attention:**

Because Zabbix agent 2 shares much functionality with Zabbix agent, the term "Zabbix agent" in documentation stands for both - Zabbix agent and Zabbix agent 2, if the functional behavior is the same. Zabbix agent 2 is only specifically named where its functionality differs.

### **encryption**

- support of encrypted communications between Zabbix components (server, proxy, agent, zabbix\_sender and zabbix\_get utilities) using Transport Layer Security (TLS) protocol.

### **network discovery**

- automated discovery of network devices.

### **low-level discovery**

- automated discovery of low-level entities on a particular device (e.g. file systems, network interfaces, etc).

### **low-level discovery rule**

- set of definitions for automated discovery of low-level entities on a device.

### **item prototype**

- a metric with certain parameters as variables, ready for low-level discovery. After low-level discovery the variables are automatically substituted with the real discovered parameters and the metric automatically starts gathering data.

### trigger prototype

- a trigger with certain parameters as variables, ready for low-level discovery. After low-level discovery the variables are automatically substituted with the real discovered parameters and the trigger automatically starts evaluating data.

Prototypes of some other Zabbix entities are also in use in low-level discovery - graph prototypes, host prototypes, host group prototypes, application prototypes.

### agent autoregistration

- automated process whereby a Zabbix agent itself is registered as a host and started to monitor.

## 3. Zabbix processes

Please use the sidebar to access content in the Zabbix process section.

### 1 Server

#### Overview

Zabbix server is the central process of Zabbix software.

The server performs the polling and trapping of data, it calculates triggers, sends notifications to users. It is the central component to which Zabbix agents and proxies report data on availability and integrity of systems. The server can itself remotely check networked services (such as web servers and mail servers) using simple service checks.

The server is the central repository in which all configuration, statistical and operational data is stored, and it is the entity in Zabbix that will actively alert administrators when problems arise in any of the monitored systems.

The functioning of a basic Zabbix server is broken into three distinct components; they are: Zabbix server, web frontend and database storage.

All of the configuration information for Zabbix is stored in the database, which both the server and the web frontend interact with. For example, when you create a new item using the web frontend (or API) it is added to the items table in the database. Then, about once a minute Zabbix server will query the items table for a list of the items which are active that is then stored in a cache within the Zabbix server. This is why it can take up to two minutes for any changes made in Zabbix frontend to show up in the latest data section.

#### Running server

If installed as package

Zabbix server runs as a daemon process. The server can be started by executing:

```
shell> service zabbix-server start
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
shell> /etc/init.d/zabbix-server start
```

Similarly, for stopping/restarting/viewing status, use the following commands:

```
shell> service zabbix-server stop
shell> service zabbix-server restart
shell> service zabbix-server status
```

#### Start up manually

If the above does not work you have to start it manually. Find the path to the zabbix\_server binary and execute:

```
shell> zabbix_server
```

You can use the following command line parameters with Zabbix server:

```
-c --config <file>           path to the configuration file (default is /usr/local/etc/zabbix_server.conf)
-f --foreground              run Zabbix server in foreground
-R --runtime-control <option> perform administrative functions
```

-h --help                                   give this help  
 -V --version                               display version number

**Note:**  
 Runtime control is not supported on OpenBSD and NetBSD.

Examples of running Zabbix server with command line parameters:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf
shell> zabbix_server --help
shell> zabbix_server -V
```

Runtime control

Runtime control options:

Option	Description	Target
config_cache_reload	Reload configuration cache. Ignored if cache is being currently loaded.	
diagninfo[=<target>]	Gather diagnostic information in the server log file.	<b>historycache</b> - history cache statistics <b>valuecache</b> - value cache statistics <b>preprocessing</b> - preprocessing manager statistics <b>alerting</b> - alert manager statistics <b>lld</b> - LLD manager statistics <b>locks</b> - list of mutexes
secrets_reload	Reload secrets from Vault.	
snmp_cache_reload	Reload SNMP cache, clear the SNMP properties (engine time, engine boots, engine id, credentials) for all hosts.	
housekeeper_execute	Start the housekeeping procedure. Ignored if the housekeeping procedure is currently in progress.	
log_level_increase[=<target>]	Increase log level, affects all processes if target is not specified.	<b>process type</b> - All processes of specified type (e.g., poller) See all <b>server process types</b> . <b>process type,N</b> - Process type and number (e.g., poller,3) <b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.
log_level_decrease[=<target>]	Decrease log level, affects all processes if target is not specified.	

Example of using runtime control to reload the server configuration cache:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R config_cache_reload
```

Examples of using runtime control to gather diagnostic information:

Gather all available diagnostic information in the server log file:

```
shell> zabbix_server -R diagninfo
```

Gather history cache statistics in the server log file:

```
shell> zabbix_server -R diagninfo=historycache
```

Example of using runtime control to reload the SNMP cache:

```
shell> zabbix_server -R snmp_cache_reload
```

Example of using runtime control to trigger execution of housekeeper:



```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R housekeeper_execute
```

Examples of using runtime control to change log level:

Increase log level of all processes:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase
```

Increase log level of second poller process:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase=poller,2
```

Increase log level of process with PID 1234:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase=1234
```

Decrease log level of all http poller processes:

```
shell> zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_decrease="http poller"
```

### Process user

Zabbix server is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run server as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be **present** on your system. You can only run server as 'root' if you modify the 'AllowRoot' parameter in the server configuration file accordingly.

If Zabbix server and **agent** are run on the same machine it is recommended to use a different user for running the server than for running the agent. Otherwise, if both are run as the same user, the agent can access the server configuration file and any Admin level user in Zabbix can quite easily retrieve, for example, the database password.

### Configuration file

See the **configuration file** options for details on configuring zabbix\_server.

### Start-up scripts

The scripts are used to automatically start/stop Zabbix processes during system's start-up/shutdown. The scripts are located under directory misc/init.d.

### Server process types

- **alert manager** - alert queue manager
- **alert syncer** - alert DB writer
- **alerter** - process for sending notifications
- **configuration syncer** - process for managing in-memory cache of configuration data
- **discoverer** - process for discovery of devices
- **escalator** - process for escalation of actions
- **history syncer** - history DB writer
- **housekeeper** - process for removal of old historical data
- **http poller** - web monitoring poller
- **icmp pinger** - poller for icmping checks
- **ipmi manager** - IPMI poller manager
- **ipmi poller** - poller for IPMI checks
- **java poller** - poller for Java checks
- **lld manager** - manager process of low-level discovery tasks
- **lld worker** - worker process of low-level discovery tasks
- **poller** - normal poller for passive checks
- **preprocessing manager** - manager of preprocessing tasks
- **preprocessing worker** - process for data preprocessing
- **proxy poller** - poller for passive proxies
- **self-monitoring** - process for collecting internal server statistics
- **snmp trapper** - trapper for SNMP traps
- **task manager** - process for remote execution of tasks requested by other components (e.g. close problem, acknowledge problem, check item value now, remote command functionality)
- **timer** - timer for processing maintenances
- **trapper** - trapper for active checks, traps, proxy communication
- **unreachable poller** - poller for unreachable devices
- **vmware collector** - VMware data collector responsible for data gathering from VMware services

The server log file can be used to observe these process types.

Various types of Zabbix server processes can be monitored using the **zabbix[process,<type>,<mode>,<state>]** internal **item**.

## Supported platforms

Due to the security requirements and mission-critical nature of server operation, UNIX is the only operating system that can consistently deliver the necessary performance, fault tolerance and resilience. Zabbix operates on market leading versions.

Zabbix server is tested on the following platforms:

- Linux
- Solaris
- AIX
- HP-UX
- Mac OS X
- FreeBSD
- OpenBSD
- NetBSD
- SCO Open Server
- Tru64/OSF1

### Note:

Zabbix may work on other Unix-like operating systems as well.

## Locale

Note that the server requires a UTF-8 locale so that some textual items can be interpreted correctly. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

## 2 Agent

### Overview

Zabbix agent is deployed on a monitoring target to actively monitor local resources and applications (hard drives, memory, processor statistics etc).

The agent gathers operational information locally and reports data to Zabbix server for further processing. In case of failures (such as a hard disk running full or a crashed service process), Zabbix server can actively alert the administrators of the particular machine that reported the failure.

Zabbix agents are extremely efficient because of use of native system calls for gathering statistical information.

### Passive and active checks

Zabbix agents can perform passive and active checks.

In a **passive check** the agent responds to a data request. Zabbix server (or proxy) asks for data, for example, CPU load, and Zabbix agent sends back the result.

**Active checks** require more complex processing. The agent must first retrieve a list of items from Zabbix server for independent processing. Then it will periodically send new values to the server.

Whether to perform passive or active checks is configured by selecting the respective monitoring **item type**. Zabbix agent processes items of type 'Zabbix agent' or 'Zabbix agent (active)'.

### Supported platforms

Zabbix agent is supported for:

- Linux
- IBM AIX
- FreeBSD
- NetBSD
- OpenBSD
- HP-UX
- Mac OS X
- Solaris: 9, 10, 11
- Windows: all desktop and server versions since XP

### Agent on UNIX-like systems

Zabbix agent on UNIX-like systems is run on the host being monitored.

## Installation

See the [package installation](#) section for instructions on how to install Zabbix agent as package.

Alternatively see instructions for [manual installation](#) if you do not want to use packages.

### Attention:

In general, 32bit Zabbix agents will work on 64bit systems, but may fail in some cases.

If installed as package

Zabbix agent runs as a daemon process. The agent can be started by executing:

```
shell> service zabbix-agent start
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
shell> /etc/init.d/zabbix-agent start
```

Similarly, for stopping/restarting/viewing status of Zabbix agent, use the following commands:

```
shell> service zabbix-agent stop
shell> service zabbix-agent restart
shell> service zabbix-agent status
```

Start up manually

If the above does not work you have to start it manually. Find the path to the `zabbix_agentd` binary and execute:

```
shell> zabbix_agentd
```

Agent on Windows systems

Zabbix agent on Windows runs as a Windows service.

Preparation

Zabbix agent is distributed as a zip archive. After you download the archive you need to unpack it. Choose any folder to store Zabbix agent and the configuration file, e. g.

```
C:\zabbix
```

Copy `bin\zabbix_agentd.exe` and `conf\zabbix_agentd.conf` files to `c:\zabbix`.

Edit the `c:\zabbix\zabbix_agentd.conf` file to your needs, making sure to specify a correct "Hostname" parameter.

Installation

After this is done use the following command to install Zabbix agent as Windows service:

```
C:\> c:\zabbix\zabbix_agentd.exe -c c:\zabbix\zabbix_agentd.conf -i
```

Now you should be able to configure "Zabbix agent" service normally as any other Windows service.

See [more details](#) on installing and running Zabbix agent on Windows.

Other agent options

It is possible to run multiple instances of the agent on a host. A single instance can use the default configuration file or a configuration file specified in the command line. In case of multiple instances each agent instance must have its own configuration file (one of the instances can use the default configuration file).

The following command line parameters can be used with Zabbix agent:

Parameter	Description
<b>UNIX and Windows agent</b>	
<code>-c --config &lt;config-file&gt;</code>	Path to the configuration file. You may use this option to specify a configuration file that is not the default one. On UNIX, default is <code>/usr/local/etc/zabbix_agentd.conf</code> or as set by <a href="#">compile-time</a> variables <code>--sysconfdir</code> or <code>--prefix</code> On Windows, default is <code>c:\zabbix_agentd.conf</code>
<code>-p --print</code>	Print known items and exit. Note: To return <a href="#">user parameter</a> results as well, you must specify the configuration file (if it is not in the default location).

Parameter	Description
-t --test <item key>	Test specified item and exit. Note: To return <b>user parameter</b> results as well, you must specify the configuration file (if it is not in the default location).
-h --help	Display help information
-V --version	Display version number
<b>UNIX agent only</b>	
-R --runtime-control <option>	Perform administrative functions. See <b>runtime control</b> .
<b>Windows agent only</b>	
-m --multiple-agents	Use multiple agent instances (with -i,-d,-s,-x functions). To distinguish service names of instances, each service name will include the Hostname value from the specified configuration file.
<b>Windows agent only (functions)</b>	
-i --install	Install Zabbix Windows agent as service
-d --uninstall	Uninstall Zabbix Windows agent service
-s --start	Start Zabbix Windows agent service
-x --stop	Stop Zabbix Windows agent service

Specific **examples** of using command line parameters:

- printing all built-in agent items with values
- testing a user parameter with "mysql.ping" key defined in the specified configuration file
- installing a "Zabbix Agent" service for Windows using the default path to configuration file c:\zabbix\_agentd.conf
- installing a "Zabbix Agent [Hostname]" service for Windows using the configuration file zabbix\_agentd.conf located in the same folder as agent executable and make the service name unique by extending it by Hostname value from the config file

```
shell> zabbix_agentd --print
shell> zabbix_agentd -t "mysql.ping" -c /etc/zabbix/zabbix_agentd.conf
shell> zabbix_agentd.exe -i
shell> zabbix_agentd.exe -i -m -c zabbix_agentd.conf
```

Runtime control

With runtime control options you may change the log level of agent processes.

Option	Description	Target
log_level_increase[=<target>]	Increase log level. If target is not specified, all processes are affected.	Target can be specified as: <b>process type</b> - all processes of specified type (e.g., listener) See all <b>agent process types</b> . <b>process type,N</b> - process type and number (e.g., listener,3) <b>pid</b> - process identifier (1 to 65535). For larger values specify target as 'process-type,N'.
log_level_decrease[=<target>]	Decrease log level. If target is not specified, all processes are affected.	

Examples:

- increasing log level of all processes
- increasing log level of the third listener process
- increasing log level of process with PID 1234
- decreasing log level of all active check processes

```
shell> zabbix_agentd -R log_level_increase
shell> zabbix_agentd -R log_level_increase=listener,3
shell> zabbix_agentd -R log_level_increase=1234
shell> zabbix_agentd -R log_level_decrease="active checks"
```

**Note:**

Runtime control is not supported on OpenBSD, NetBSD and Windows.

#### Agent process types

- `active_checks` - process for performing active checks
- `collector` - process for data collection
- `listener` - process for listening to passive checks

The agent log file can be used to observe these process types.

#### Process user

Zabbix agent on UNIX is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run agent as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be present on your system. You can only run agent as 'root' if you modify the 'AllowRoot' parameter in the agent configuration file accordingly.

#### Configuration file

For details on configuring Zabbix agent see the configuration file options for `zabbix_agentd` or `Windows agent`.

#### Locale

Note that the agent requires a UTF-8 locale so that some textual agent items can return the expected content. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

#### Exit code

Before version 2.2 Zabbix agent returned 0 in case of successful exit and 255 in case of failure. Starting from version 2.2 and higher Zabbix agent returns 0 in case of successful exit and 1 in case of failure.

### 3 Agent 2

#### Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent. Zabbix agent 2 has been developed to:

- reduce the number of TCP connections
- have greater check concurrency
- be easily extendible with plugins. A plugin should be able to:
  - provide trivial checks consisting of only a few simple lines of code
  - provide complex checks consisting of long-running scripts and standalone data gathering with periodic sending back of the data
- be a drop-in replacement for Zabbix agent (in that it supports all the previous functionality)

Agent 2 is written in Go (with some C code of Zabbix agent reused). A configured [Go](#) version 1.13+ environment is required for building Zabbix agent 2.

Agent 2 does not support daemonization on Linux; it can be run as a `Windows service`.

Passive checks work similarly to Zabbix agent. Active checks support scheduled/flexible intervals and check concurrency within one active server.

**\*\* Check concurrency \*\***

Checks from different plugins can be executed concurrently. The number of concurrent checks within one plugin is limited by the plugin capacity setting. Each plugin may have a hardcoded capacity setting (100 being default) that can be lowered using the `Plugins.<Plugin name>.Capacity=N` setting in the Plugins configuration `parameter`.

#### Supported platforms

Agent 2 is supported for Linux and Windows platforms.

If installing from packages, Agent 2 is supported on:

- RHEL/CentOS 6, 7, 8
- SLES 15 SP1+
- Debian 9, 10

- Ubuntu 18.04, 20.04

On Windows Agent 2 is supported on:

- Windows Server 2008 R2 and later
- Windows 7 and later

### Installation

Zabbix agent 2 is available in pre-compiled Zabbix packages. To compile Zabbix agent 2 from sources you have to specify the `--enable-agent2` configure option.

### Options

The following command line parameters can be used with Zabbix agent 2:

Parameter	Description
<code>-c --config &lt;config-file&gt;</code>	Path to the configuration file. You may use this option to specify a configuration file that is not the default one. On UNIX, default is <code>/usr/local/etc/zabbix_agent2.conf</code> or as set by <code>compile-time</code> variables <code>--sysconfdir</code> or <code>--prefix</code>
<code>-f --foreground</code>	Run Zabbix agent in foreground (default: true).
<code>-p --print</code>	Print known items and exit. Note: To return <code>user parameter</code> results as well, you must specify the configuration file (if it is not in the default location).
<code>-t --test &lt;item key&gt;</code>	Test specified item and exit. Note: To return <code>user parameter</code> results as well, you must specify the configuration file (if it is not in the default location).
<code>-h --help</code>	Print help information and exit.
<code>-v --verbose</code>	Print debugging information. Use this option with <code>-p</code> and <code>-t</code> options.
<code>-V --version</code>	Print agent version number and exit.
<code>-R --runtime-control &lt;option&gt;</code>	Perform administrative functions. See <code>runtime control</code> .

Specific **examples** of using command line parameters:

- print all built-in agent items with values
- test a user parameter with "mysql.ping" key defined in the specified configuration file

```
shell> zabbix_agent2 --print
shell> zabbix_agent2 -t "mysql.ping" -c /etc/zabbix/zabbix_agentd.conf
```

### Runtime control

Runtime control provides some options for remote control.

Option	Description
<code>log_level_increase</code>	Increase log level.
<code>log_level_decrease</code>	Decrease log level.
<code>metrics</code>	List available metrics.
<code>version</code>	Display agent version.
<code>help</code>	Display help information on runtime control.

Examples:

- increasing log level for agent 2
- print runtime control options

```
shell> zabbix_agent2 -R log_level_increase
shell> zabbix_agent2 -R help
```

### Configuration file

The configuration parameters of agent 2 are mostly compatible with Zabbix agent with some exceptions.

New parameters	Description
ControlSocket	The runtime control socket path. Agent 2 uses a control socket for <b>runtime commands</b> .
EnablePersistentBuffer, PersistentBufferFile, PersistentBufferPeriod Plugins	These parameters are used to configure persistent storage on agent 2 for active items.  Plugins may have their own parameters, in the format <code>Plugins.&lt;Plugin name&gt;.&lt;Parameter&gt;=&lt;value&gt;</code> . A common plugin parameter is Capacity, setting the limit of checks that can be executed at the same time.
StatusPort	The port agent 2 will be listening on for HTTP status request and display of a list of configured plugins and some internal parameters
Dropped parameters AllowRoot, User	Description Not supported because daemonization is not supported.
LoadModule, LoadModulePath StartAgents	Loadable modules are not supported. This parameter was used in Zabbix agent to increase passive check concurrency or disable them. In Agent 2, the concurrency is configured at a plugin level and can be limited by a capacity setting. Whereas disabling passive checks is not currently supported.
HostInterface, HostInterfaceltem	Not yet supported.

For more details see the configuration file options for [zabbix\\_agent2](#).

Exit codes

Starting from version 4.4.8 Zabbix agent 2 can also be compiled with older OpenSSL versions (1.0.1, 1.0.2).

In this case Zabbix provides mutexes for locking in OpenSSL. If a mutex lock or unlock fails then an error message is printed to the standard error stream (STDERR) and Agent 2 exits with return code 2 or 3, respectively.

## 4 Proxy

Overview

Zabbix proxy is a process that may collect monitoring data from one or more monitored devices and send the information to the Zabbix server, essentially working on behalf of the server. All collected data is buffered locally and then transferred to the Zabbix server the proxy belongs to.

Deploying a proxy is optional, but may be very beneficial to distribute the load of a single Zabbix server. If only proxies collect data, processing on the server becomes less CPU and disk I/O hungry.

A Zabbix proxy is the ideal solution for centralized monitoring of remote locations, branches and networks with no local administrators.

Zabbix proxy requires a separate database.

### Attention:

Note that databases supported with Zabbix proxy are SQLite, MySQL and PostgreSQL. Using Oracle is at your own risk and may contain some limitations as, for example, in **return values** of low-level discovery rules.

See also: [Using proxies in a distributed environment](#)

Running proxy

If installed as package

Zabbix proxy runs as a daemon process. The proxy can be started by executing:

```
shell> service zabbix-proxy start
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
shell> /etc/init.d/zabbix-proxy start
```

Similarly, for stopping/restarting/viewing status of Zabbix proxy, use the following commands:

```
shell> service zabbix-proxy stop
shell> service zabbix-proxy restart
shell> service zabbix-proxy status
```

Start up manually

If the above does not work you have to start it manually. Find the path to the zabbix\_proxy binary and execute:

```
shell> zabbix_proxy
```

You can use the following command line parameters with Zabbix proxy:

```
-c --config <file>          path to the configuration file
-f --foreground             run Zabbix proxy in foreground
-R --runtime-control <option> perform administrative functions
-h --help                  give this help
-V --version                display version number
```

**Note:**

Runtime control is not supported on OpenBSD and NetBSD.

Examples of running Zabbix proxy with command line parameters:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf
shell> zabbix_proxy --help
shell> zabbix_proxy -V
```

Runtime control

Runtime control options:

Option	Description	Target
config_cache_reload	Reload configuration cache. Ignored if cache is being currently loaded. Active Zabbix proxy will connect to the Zabbix server and request configuration data.	
diaginfo[=<target>]	Gather diagnostic information in the proxy log file.	<b>historycache</b> - history cache statistics <b>preprocessing</b> - preprocessing manager statistics <b>locks</b> - list of mutexes
snmp_cache_reload	Reload SNMP cache, clear the SNMP properties (engine time, engine boots, engine id, credentials) for all hosts.	
housekeeper_execute	Start the housekeeping procedure. Ignored if the housekeeping procedure is currently in progress.	
log_level_increase[=<target>]	Increase log level, affects all processes if target is not specified.	<b>process type</b> - All processes of specified type (e.g., poller) See all <b>proxy process types</b> . <b>process type,N</b> - Process type and number (e.g., poller,3) <b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.
log_level_decrease[=<target>]	Decrease log level, affects all processes if target is not specified.	

Example of using runtime control to reload the proxy configuration cache:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R config_cache_reload
```



Examples of using runtime control to gather diagnostic information:

Gather all available diagnostic information in the proxy log file:

```
shell> zabbix_proxy -R diaginfo
```

Gather history cache statistics in the proxy log file:

```
shell> zabbix_proxy -R diaginfo=historycache
```

Example of using runtime control to reload the SNMP cache:

```
shell> zabbix_proxy -R snmp_cache_reload
```

Example of using runtime control to trigger execution of housekeeper

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R housekeeper_execute
```

Examples of using runtime control to change log level:

Increase log level of all processes:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase
```

Increase log level of second poller process:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase=poller,2
```

Increase log level of process with PID 1234:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase=1234
```

Decrease log level of all http poller processes:

```
shell> zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_decrease="http poller"
```

Process user

Zabbix proxy is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run proxy as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be present on your system. You can only run proxy as 'root' if you modify the 'AllowRoot' parameter in the proxy configuration file accordingly.

Configuration file

See the [configuration file](#) options for details on configuring zabbix\_proxy.

Proxy process types

- `configuration syncer` - process for managing in-memory cache of configuration data
- `data sender` - proxy data sender
- `discoverer` - process for discovery of devices
- `heartbeat sender` - proxy heartbeat sender
- `history syncer` - history DB writer
- `housekeeper` - process for removal of old historical data
- `http poller` - web monitoring poller
- `icmp pinger` - poller for icmping checks
- `ipmi manager` - IPMI poller manager
- `ipmi poller` - poller for IPMI checks
- `java poller` - poller for Java checks
- `poller` - normal poller for passive checks
- `preprocessing manager` - manager of preprocessing tasks
- `preprocessing worker` - process for data preprocessing
- `self-monitoring` - process for collecting internal server statistics
- `snmp trapper` - trapper for SNMP traps
- `task manager` - process for remote execution of tasks requested by other components (e.g. close problem, acknowledge problem, check item value now, remote command functionality)
- `trapper` - trapper for active checks, traps, proxy communication
- `unreachable poller` - poller for unreachable devices
- `vmware collector` - VMware data collector responsible for data gathering from VMware services

The proxy log file can be used to observe these process types.

Various types of Zabbix proxy processes can be monitored using the `zabbix[process,<type>,<mode>,<state>]` internal [item](#).

Supported platforms

Zabbix proxy runs on the same list of [server#supported platforms](#) as Zabbix server.

## Locale

Note that the proxy requires a UTF-8 locale so that some textual items can be interpreted correctly. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

## 5 Java gateway

### Overview

Native support for monitoring JMX applications exists in the form of a Zabbix daemon called "Zabbix Java gateway", available since Zabbix 2.0. Zabbix Java gateway is a daemon written in Java. To find out the value of a particular JMX counter on a host, Zabbix server queries Zabbix Java gateway, which uses the [JMX management API](#) to query the application of interest remotely. The application does not need any additional software installed, it just has to be started with `-Dcom.sun.management.jmxremote` option on the command line.

Java gateway accepts incoming connection from Zabbix server or proxy and can only be used as a "passive proxy". As opposed to Zabbix proxy, it may also be used from Zabbix proxy (Zabbix proxies cannot be chained). Access to each Java gateway is configured directly in Zabbix server or proxy configuration file, thus only one Java gateway may be configured per Zabbix server or Zabbix proxy. If a host will have items of type **JMX agent** and items of other type, only the **JMX agent** items will be passed to Java gateway for retrieval.

When an item has to be updated over Java gateway, Zabbix server or proxy will connect to the Java gateway and request the value, which Java gateway in turn retrieves and passes back to the server or proxy. As such, Java gateway does not cache any values.

Zabbix server or proxy has a specific type of processes that connect to Java gateway, controlled by the option **StartJavaPollers**. Internally, Java gateway starts multiple threads, controlled by the **START\_POLLERS** option. On the server side, if a connection takes more than **Timeout** seconds, it will be terminated, but Java gateway might still be busy retrieving value from the JMX counter. To solve this, there is the **TIMEOUT** option in Java gateway that allows to set timeout for JMX network operations.

Zabbix server or proxy will try to pool requests to a single JMX target together as much as possible (affected by item intervals) and send them to the Java gateway in a single connection for better performance.

It is suggested to have **StartJavaPollers** less than or equal to **START\_POLLERS**, otherwise there might be situations when no threads are available in the Java gateway to service incoming requests; in such a case Java gateway uses `ThreadPoolExecutor.CallerRunsPolicy`, meaning that the main thread will service the incoming request and temporarily will not accept any new requests.

### Getting Java gateway

You can install Java gateway either from the sources or packages downloaded from [Zabbix website](#).

Using the links below you can access information how to get and run Zabbix Java gateway, how to configure Zabbix server (or Zabbix proxy) to use Zabbix Java gateway for JMX monitoring, and how to configure Zabbix items in Zabbix frontend that correspond to particular JMX counters.

Installation from	Instructions	Instructions
Sources	<a href="#">Installation</a>	<a href="#">Setup</a>
RHEL/CentOS packages	<a href="#">Installation</a>	<a href="#">Setup</a>
Debian/Ubuntu packages	<a href="#">Installation</a>	<a href="#">Setup</a>

### 1 Setup from sources

#### Overview

If [installed](#) from sources, the following information will help you in setting up Zabbix [Java gateway](#).

#### Overview of files

If you obtained Java gateway from sources, you should have ended up with a collection of shell scripts, JAR and configuration files under `$PREFIX/sbin/zabbix_java`. The role of these files is summarized below.

`bin/zabbix-java-gateway-$VERSION.jar`

Java gateway JAR file itself.

```
lib/logback-core-0.9.27.jar
lib/logback-classic-0.9.27.jar
lib/slf4j-api-1.6.1.jar
lib/android-json-4.3_r3.1.jar
```

Dependencies of Java gateway: [Logback](#), [SLF4J](#), and [Android JSON](#) library.

```
lib/logback.xml
lib/logback-console.xml
```

Configuration files for Logback.

```
shutdown.sh
startup.sh
```

Convenience scripts for starting and stopping Java gateway.

```
settings.sh
```

Configuration file that is sourced by startup and shutdown scripts above.

Configuring and running Java gateway

By default, Java gateway listens on port 10052. If you plan on running Java gateway on a different port, you can specify that in settings.sh script. See the description of [Java gateway configuration file](#) for how to specify this and other options.

**Warning:**

Port 10052 is not [IANA registered](#).

Once you are comfortable with the settings, you can start Java gateway by running the startup script:

```
$ ./startup.sh
```

Likewise, once you no longer need Java gateway, run the shutdown script to stop it:

```
$ ./shutdown.sh
```

Note that unlike server or proxy, Java gateway is lightweight and does not need a database.

Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying JavaGateway and JavaGatewayPort parameters in the [server configuration file](#). If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the [proxy configuration file](#) instead.

```
JavaGateway=192.168.3.14
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

Debugging Java gateway

In case there are any problems with Java gateway or an error message that you see about an item in the frontend is not descriptive enough, you might wish to take a look at Java gateway log file.

By default, Java gateway logs its activities into /tmp/zabbix\_java.log file with log level "info". Sometimes that information is not enough and there is a need for information at log level "debug". In order to increase logging level, modify file lib/logback.xml and change the level attribute of <root> tag to "debug":

```
<root level="debug">
  <appender-ref ref="FILE" />
</root>
```

Note that unlike Zabbix server or Zabbix proxy, there is no need to restart Zabbix Java gateway after changing logback.xml file - changes in logback.xml will be picked up automatically. When you are done with debugging, you can return the logging level to "info".

If you wish to log to a different file or a completely different medium like database, adjust logback.xml file to meet your needs. See [Logback Manual](#) for more details.

Sometimes for debugging purposes it is useful to start Java gateway as a console application rather than a daemon. To do that, comment out PID\_FILE variable in settings.sh. If PID\_FILE is omitted, startup.sh script starts Java gateway as a console application and makes Logback use lib/logback-console.xml file instead, which not only logs to console, but has logging level "debug" enabled as well.

Finally, note that since Java gateway uses SLF4J for logging, you can replace Logback with the framework of your choice by placing an appropriate JAR file in lib directory. See [SLF4J Manual](#) for more details.

JMX monitoring

See [JMX monitoring](#) page for more details.

## 2 Setup from RHEL/CentOS packages

Overview

If **installed** from RHEL/CentOS packages, the following information will help you in setting up Zabbix **Java gateway**.

Configuring and running Java gateway

Configuration parameters of Zabbix Java gateway may be tuned in the file:

```
/etc/zabbix/zabbix_java_gateway.conf
```

For more details, see Zabbix Java gateway configuration [parameters](#).

To start Zabbix Java gateway:

```
# service zabbix-java-gateway restart
```

To automatically start Zabbix Java gateway on boot:

RHEL 7 and later:

```
# systemctl enable zabbix-java-gateway
```

RHEL prior to 7:

```
# chkconfig --level 12345 zabbix-java-gateway on
```

Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying JavaGateway and JavaGatewayPort parameters in the [server configuration file](#). If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the [proxy configuration file](#) instead.

```
JavaGateway=192.168.3.14
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

Debugging Java gateway

Zabbix Java gateway log file is:

```
/var/log/zabbix/zabbix_java_gateway.log
```

If you like to increase the logging, edit the file:

```
/etc/zabbix/zabbix_java_gateway_logback.xml
```

and change level="info" to "debug" or even "trace" (for deep troubleshooting):

```
<configuration scan="true" scanPeriod="15 seconds">
[... ]
  <root level="info">
    <appender-ref ref="FILE" />
  </root>

</configuration>
```

## JMX monitoring

See [JMX monitoring](#) page for more details.

### 3 Setup from Debian/Ubuntu packages

#### Overview

If **installed** from Debian/Ubuntu packages, the following information will help you in setting up Zabbix **Java gateway**.

#### Configuring and running Java gateway

Java gateway configuration may be tuned in the file:

```
/etc/zabbix/zabbix_java_gateway.conf
```

For more details, see Zabbix Java gateway configuration [parameters](#).

To start Zabbix Java gateway:

```
# service zabbix-java-gateway restart
```

To automatically start Zabbix Java gateway on boot:

```
# systemctl enable zabbix-java-gateway
```

#### Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying `JavaGateway` and `JavaGatewayPort` parameters in the [server configuration file](#). If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the [proxy configuration file](#) instead.

```
JavaGateway=192.168.3.14
```

```
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

#### Debugging Java gateway

Zabbix Java gateway log file is:

```
/var/log/zabbix/zabbix_java_gateway.log
```

If you like to increase the logging, edit the file:

```
/etc/zabbix/zabbix_java_gateway_logback.xml
```

and change `level="info"` to `"debug"` or even `"trace"` (for deep troubleshooting):

```
<configuration scan="true" scanPeriod="15 seconds">
[...]  
    <root level="info">  
        <appender-ref ref="FILE" />  
    </root>  
  
</configuration>
```

## JMX monitoring

See [JMX monitoring](#) page for more details.

### 6 Sender

#### Overview

Zabbix sender is a command line utility that may be used to send performance data to Zabbix server for processing.

The utility is usually used in long running user scripts for periodical sending of availability and performance data.

For sending results directly to Zabbix server or proxy, a **trapper item** type must be configured.

Running Zabbix sender

An example of running Zabbix UNIX sender:

```
shell> cd bin
shell> ./zabbix_sender -z zabbix -s "Linux DB3" -k db.connections -o 43
```

where:

- z - Zabbix server host (IP address can be used as well)
- s - technical name of monitored host (as registered in Zabbix frontend)
- k - item key
- o - value to send

**Attention:**

Options that contain whitespaces, must be quoted using double quotes.

Zabbix sender can be used to send multiple values from an input file. See the [Zabbix sender manpage](#) for more information.

If a configuration file is specified, Zabbix sender uses all addresses defined in the agent ServerActive configuration parameter for sending data. If sending to one address fails, the sender tries sending to the other addresses. If sending of batch data fails to one address, the following batches are not sent to this address.

Zabbix sender accepts strings in UTF-8 encoding (for both UNIX-like systems and Windows) without byte order mark (BOM) first in the file.

Zabbix sender on Windows can be run similarly:

```
zabbix_sender.exe [options]
```

Since Zabbix 1.8.4, zabbix\_sender realtime sending scenarios have been improved to gather multiple values passed to it in close succession and send them to the server in a single connection. A value that is not further apart from the previous value than 0.2 seconds can be put in the same stack, but maximum pooling time still is 1 second.

**Note:**

Zabbix sender will terminate if invalid (not following parameter=value notation) parameter entry is present in the specified configuration file.

## 7 Get

Overview

Zabbix get is a command line utility which can be used to communicate with Zabbix agent and retrieve required information from the agent.

The utility is usually used for the troubleshooting of Zabbix agents.

Running Zabbix get

An example of running Zabbix get under UNIX to get the processor load value from the agent:

```
shell> cd bin
shell> ./zabbix_get -s 127.0.0.1 -p 10050 -k system.cpu.load[all,avg1]
```

Another example of running Zabbix get for capturing a string from a website:

```
shell> cd bin
shell> ./zabbix_get -s 192.168.1.1 -p 10050 -k "web.page.regex[www.zabbix.com,,,\"USA: ([a-zA-Z0-9.-]+)\\""
```

Note that the item key here contains a space so quotes are used to mark the item key to the shell. The quotes are not part of the item key; they will be trimmed by the shell and will not be passed to Zabbix agent.

Zabbix get accepts the following command line parameters:

- |                                  |   |
|----------------------------------|---|
| -s --host <host name or IP>      | Specify host name or IP address of a host.                          |
| -p --port <port number>          | Specify port number of agent running on the host. Default is 10050. |
| -I --source-address <IP address> | Specify source IP address.  |
| -k --key <item key>              | Specify key of item to retrieve value of.                           |

```
-h --help          Give this help.
-V --version       Display version number.
```

See also [Zabbix get manpage](#) for more information.

Zabbix get on Windows can be run similarly:

```
zabbix_get.exe [options]
```

## 8 JS

### Overview

`zabbix_js` is a command line utility that can be used for embedded script testing.

This utility will execute a user script with a string parameter and print the result. Scripts are executed using the embedded Zabbix scripting engine.

In case of compilation or execution errors `zabbix_js` will print the error in `stderr` and exit with code 1.

### Usage

```
zabbix_js -s script-file -p input-param [-l log-level] [-t timeout]
zabbix_js -s script-file -i input-file [-l log-level] [-t timeout]
zabbix_js -h
zabbix_js -V
```

`zabbix_js` accepts the following command line parameters:

<code>-s, --script script-file</code>	Specify the file name of the script to execute. If '-' is specified as f
<code>-i, --input input-file</code>	Specify the file name of the input parameter. If '-' is specified as f
<code>-p, --param input-param</code>	Specify the input parameter.
<code>-l, --loglevel log-level</code>	Specify the log level.
<code>-t, --timeout timeout</code>	Specify the timeout in seconds.
<code>-h, --help</code>	Display help information.
<code>-V, --version</code>	Display the version number.

Example:

```
zabbix_js -s script-file.js -p example
```

## 4. Installation

Please use the sidebar to access content in the Installation section.

### 1 Getting Zabbix

#### Overview

There are four ways of getting Zabbix:

- Install it from the [distribution packages](#)
- Download the latest source archive and [compile it yourself](#)
- Install it from the [containers](#)
- Download the [virtual appliance](#)

To download the latest distribution packages, pre-compiled sources or the virtual appliance, go to the [Zabbix download page](#), where direct links to latest versions are provided.

#### Getting Zabbix source code

There are several ways of getting Zabbix source code:

- You can [download](#) the released stable versions from the official Zabbix website
- You can [download](#) nightly builds from the official Zabbix website developer page

- You can get the latest development version from the Git source code repository system:
  - The primary location of the full repository is at <https://git.zabbix.com/scm/zbx/zabbix.git>
  - Master and supported releases are also mirrored to Github at <https://github.com/zabbix/zabbix>

A Git client must be installed to clone the repository. The official commandline Git client package is commonly called **git** in distributions. To install, for example, on Debian/Ubuntu, run:

```
sudo apt-get update
sudo apt-get install git
```

To grab all Zabbix source, change to the directory you want to place the code in and execute:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
```

## 2 Requirements

### Hardware

#### Memory

Zabbix requires both physical and disk memory. 128 MB of physical memory and 256 MB of free disk space could be a good starting point. However, the amount of required disk memory obviously depends on the number of hosts and parameters that are being monitored. If you're planning to keep a long history of monitored parameters, you should be thinking of at least a couple of gigabytes to have enough space to store the history in the database. Each Zabbix daemon process requires several connections to a database server. Amount of memory allocated for the connection depends on configuration of the database engine.

**Note:**

The more physical memory you have, the faster the database (and therefore Zabbix) works!

#### CPU

Zabbix and especially Zabbix database may require significant CPU resources depending on number of monitored parameters and chosen database engine.

#### Other hardware

A serial communication port and a serial GSM modem are required for using SMS notification support in Zabbix. USB-to-serial converter will also work.

#### Examples of hardware configuration

The table provides several examples of hardware configurations:

Name	Platform	CPU/Memory	Database	Monitored hosts
Small	CentOS	Virtual Appliance	MySQL InnoDB	100
Medium	CentOS	2 CPU cores/2GB	MySQL InnoDB	500
Large	RedHat Enterprise Linux	4 CPU cores/8GB	RAID10 MySQL InnoDB or PostgreSQL	>1000
Very large	RedHat Enterprise Linux	8 CPU cores/16GB	Fast RAID10 MySQL InnoDB or PostgreSQL	>10000

**Note:**

Actual configuration depends on the number of active items and refresh rates very much (see [database size](#) section of this page for details). It is highly recommended to run the database on a separate box for large installations.

### Supported platforms

Due to security requirements and the mission-critical nature of the monitoring server, UNIX is the only operating system that can consistently deliver the necessary performance, fault tolerance and resilience. Zabbix operates on market-leading versions.

Zabbix components are available and tested for the following platforms:



Platform	Server	Agent	Agent2
Linux	x	x	x
IBM AIX	x	x	-
FreeBSD	x	x	-
NetBSD	x	x	-
OpenBSD	x	x	-
HP-UX	x	x	-
Mac OS X	x	x	-
Solaris	x	x	-
Windows	-	x	x

**Note:**

Zabbix server/agent may work on other Unix-like operating systems as well. Zabbix agent is supported on all Windows desktop and server versions since XP.

**Attention:**

Zabbix disables core dumps if compiled with encryption and does not start if system does not allow disabling of core dumps.

Required software

Zabbix is built around modern web servers, leading database engines, and PHP scripting language.

Database management system

Software	Version	Comments
MySQL	5.5.62 - 8.0.x	Required if MySQL is used as Zabbix backend database. InnoDB engine is required. MariaDB (10.0.37 or later) also works with Zabbix. We recommend using the <a href="#">MariaDB Connector/C</a> library for building server/proxy regardless of whether you use a MySQL or MariaDB database server.
Oracle	11.2 or later	Required if Oracle is used as Zabbix backend database.
PostgreSQL	9.2.24 or later	Required if PostgreSQL is used as Zabbix backend database. It is suggested to use at least PostgreSQL 8.3, which <a href="#">introduced much better VACUUM performance</a> .
TimescaleDB	For Zabbix 5.2.0-5.2.5: 1.X, OSS (free) version Since Zabbix 5.2.6: 1.x, 2.x	Required if TimescaleDB is used as Zabbix backend database. Make sure to install the distribution of TimescaleDB with the compression supported.
SQLite	3.3.5 or later	SQLite is only supported with Zabbix proxies. Required if SQLite is used as Zabbix proxy database.

Frontend

The minimum supported screen width for Zabbix frontend is 1200px.

Software	Version	Comments
Apache	1.3.12 or later	
PHP	7.2.5 or later	PHP 8.0 is not supported.
PHP extensions:		

Software	Version	Comments
gd	2.0.28 or later	PHP GD extension must support PNG images (--with-png-dir), JPEG (--with-jpeg-dir) images and FreeType 2 (--with-freetype-dir).
bcmath		php-bcmath (--enable-bcmath)
ctype		php-ctype (--enable-ctype)
libXML	2.6.15 or later	php-xml, if provided as a separate package by the distributor.
xmlreader		php-xmlreader, if provided as a separate package by the distributor.
xmlwriter		php-xmlwriter, if provided as a separate package by the distributor.
session		php-session, if provided as a separate package by the distributor.
sockets		php-net-socket (--enable-sockets). Required for user script support.
mbstring		php-mbstring (--enable-mbstring)
gettext		php-gettext (--with-gettext). Required for translations to work.
ldap		php-ldap. Required only if LDAP authentication is used in the frontend.
openssl		php-openssl. Required only if SAML authentication is used in the frontend.
mysqli		Required if MySQL is used as Zabbix backend database.
oci8		Required if Oracle is used as Zabbix backend database.
pgsql		Required if PostgreSQL is used as Zabbix backend database.

**Note:**

Zabbix may work on previous versions of Apache, MySQL, Oracle, and PostgreSQL as well.

**Attention:**

For other fonts than the default DejaVu, PHP function [imagerotate](#) might be required. If it is missing, these fonts might be rendered incorrectly when a graph is displayed. This function is only available if PHP is compiled with bundled GD, which is not the case in Debian and other distributions.

Web browser on client side

Cookies and Java Script must be enabled.

Latest stable versions of Google Chrome, Mozilla Firefox, Microsoft Edge, Apple Safari and Opera are supported.

**Warning:**

The same origin policy for IFrames is implemented, which means that Zabbix cannot be placed in frames on a different domain.

Still, pages placed into a Zabbix frame will have access to Zabbix frontend (through JavaScript) if the page that is placed in the frame and Zabbix frontend are on the same domain. A page like <http://secure-zabbix.com/cms/page.html>, if placed into screens or dashboards on <http://secure-zabbix.com/zabbix/>, will have full JS access to Zabbix.

Server

Mandatory requirements are needed always. Optional requirements are needed for the support of the specific function.

Requirement	Status	Description
libpcre	Mandatory	PCRE library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support. The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. Note that you need exactly PCRE (v8.x); PCRE2 (v10.x) library is not used.
libevent		Required for bulk metric support and IPMI monitoring. Version 1.4 or higher. Note that for Zabbix proxy this requirement is optional; it is needed for IPMI monitoring support.
libpthread		Required for mutex and read-write lock support.
zlib		Required for compression support.
OpenIPMI	Optional	Required for IPMI support.
libssh2 or libssh		Required for <a href="#">SSH checks</a> . Version 1.0 or higher (libssh2); 0.6.0 or higher (libssh). libssh is supported since Zabbix 4.4.6.
fping		Required for <a href="#">ICMP ping items</a> .
libcurl		Required for web monitoring, VMware monitoring, SMTP authentication, <code>web.page.* Zabbix agent items</code> , HTTP agent items and Elasticsearch (if used). Version 7.28.0 or higher is recommended. Libcurl version requirements: - SMTP authentication: version 7.20.0 or higher - Elasticsearch: version 7.28.0 or higher
libxml2		Required for VMware monitoring and XML XPath preprocessing.
net-snmp		Required for SNMP support. Version 5.3.0 or higher.
GnuTLS, OpenSSL or LibreSSL		Required when using <a href="#">encryption</a> .

## Agent

Requirement	Status	Description
libpcre	Mandatory	PCRE library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support. The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. Note that you need exactly PCRE (v8.x); PCRE2 (v10.x) library is not used.
GnuTLS, OpenSSL or LibreSSL	Optional	Required when using <a href="#">encryption</a> . On Microsoft Windows systems OpenSSL 1.1.1 or later is required.

### Note:

Starting from version 5.0.3, Zabbix agent will not work on AIX platforms below versions 6.1 TL07 / AIX 7.1 TL01.

## Agent 2

Requirement	Status	Description
libpcre	Mandatory	PCRE library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support. The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. Note that you need exactly PCRE (v8.x); PCRE2 (v10.x) library is not used.
OpenSSL	Optional	Required when using encryption. OpenSSL 1.0.1 or later is required on UNIX platforms. The OpenSSL library must have PSK support enabled. LibreSSL is not supported. On Microsoft Windows systems OpenSSL 1.1.1 or later is required.

#### Java gateway

If you obtained Zabbix from the source repository or an archive, then the necessary dependencies are already included in the source tree.

If you obtained Zabbix from your distribution's package, then the necessary dependencies are already provided by the packaging system.

In both cases above, the software is ready to be used and no additional downloads are necessary.

If, however, you wish to provide your versions of these dependencies (for instance, if you are preparing a package for some Linux distribution), below is the list of library versions that Java gateway is known to work with. Zabbix may work with other versions of these libraries, too.

The following table lists JAR files that are currently bundled with Java gateway in the original code:

Library	License	Website	Comments
logback-core-1.2.3.jar	EPL 1.0, LGPL 2.1	<a href="http://logback.qos.ch/">http://logback.qos.ch/</a>	Tested with 0.9.27, 1.0.13, 1.1.1 and 1.2.3.
logback-classic-1.2.3.jar	EPL 1.0, LGPL 2.1	<a href="http://logback.qos.ch/">http://logback.qos.ch/</a>	Tested with 0.9.27, 1.0.13, 1.1.1 and 1.2.3.
slf4j-api-1.7.30.jar	MIT License	<a href="http://www.slf4j.org/">http://www.slf4j.org/</a>	Tested with 1.6.1, 1.6.6, 1.7.6 and 1.7.30.
android-json-4.3_r3.1.jar	Apache License 2.0	<a href="https://android.googlesource.com/platform/libcore/+master/json">https://android.googlesource.com/platform/libcore/+master/json</a>	Tested with 2.3.3_r1.1 and 4.3_r3.1. See <a href="#">src/zabbix_java/lib/README</a> for instructions on creating a JAR file.

Java gateway can be built using either Oracle Java or open-source OpenJDK (version 1.6 or newer). Packages provided by Zabbix are compiled using OpenJDK. The table below provides information about OpenJDK versions used for building Zabbix packages by distribution:

Distribution	OpenJDK version
RHEL/CentOS 8	1.8.0
RHEL/CentOS 7	1.8.0
SLES 15	11.0.4
SLES 12	1.8.0
Debian 10	11.0.8
Ubuntu 20.04	11.0.8
Ubuntu 18.04	11.0.8

#### Database size

Zabbix configuration data require a fixed amount of disk space and do not grow much.

Zabbix database size mainly depends on these variables, which define the amount of stored historical data:

- Number of processed values per second

This is the average number of new values Zabbix server receives every second. For example, if we have 3000 items for monitoring with refresh rate of 60 seconds, the number of values per second is calculated as  $3000/60 = 50$ .

It means that 50 new values are added to Zabbix database every second.

- Housekeeper settings for history

Zabbix keeps values for a fixed period of time, normally several weeks or months. Each new value requires a certain amount of disk space for data and index.

So, if we would like to keep 30 days of history and we receive 50 values per second, total number of values will be around  $(30*24*3600)* 50 = 129.600.000$ , or about 130M of values.

Depending on the database engine used, type of received values (floats, integers, strings, log files, etc), the disk space for keeping a single value may vary from 40 bytes to hundreds of bytes. Normally it is around 90 bytes per value for numeric items<sup>2</sup>. In our case, it means that 130M of values will require  $130M * 90 \text{ bytes} = 10.9GB$  of disk space.

**Note:**

The size of text/log item values is impossible to predict exactly, but you may expect around 500 bytes per value.

- Housekeeper setting for trends

Zabbix keeps a 1-hour max/min/avg/count set of values for each item in the table **trends**. The data is used for trending and long period graphs. The one hour period can not be customized.

Zabbix database, depending on database type, requires about 90 bytes per each total. Suppose we would like to keep trend data for 5 years. Values for 3000 items will require  $3000*24*365* 90 = 2.2GB$  per year, or **11GB** for 5 years.

- Housekeeper settings for events

Each Zabbix event requires approximately 250 bytes of disk space<sup>1</sup>. It is hard to estimate the number of events generated by Zabbix daily. In the worst case scenario, we may assume that Zabbix generates one event per second.

For each recovered event an event\_recovery record is created. Normally most of events will be recovered so we can assume one event\_recovery record per event. That means additional 80 bytes per event.

Optionally events can have tags, each tag record requiring approximately 100 bytes of disk space<sup>1</sup>. The number of tags per event (#tags) depends on configuration. So each will need an additional #tags \* 100 bytes of disk space.

It means that if we want to keep 3 years of events, this would require  $3*365*24*3600* (250+80+ \#tags*100) = \sim 30GB + \#tags*100B$  disk space<sup>2</sup>.

**Note:**

<sup>1</sup> More when having non-ASCII event names, tags and values.

<sup>2</sup> The size approximations are based on MySQL and might be different for other databases.

The table contains formulas that can be used to calculate the disk space required for Zabbix system:

Parameter	Formula for required disk space (in bytes)
Zabbix configuration	Fixed size. Normally 10MB or less.
History	$days*(items/refresh \text{ rate})*24*3600*bytes$ items : number of items days : number of days to keep history refresh rate : average refresh rate of items bytes : number of bytes required to keep single value, depends on database engine, normally ~90 bytes.
Trends	$days*(items/3600)*24*3600*bytes$ items : number of items days : number of days to keep history bytes : number of bytes required to keep single trend, depends on database engine, normally ~90 bytes.
Events	$days*events*24*3600*bytes$ events : number of event per second. One (1) event per second in worst case scenario. days : number of days to keep history bytes : number of bytes required to keep single trend, depends on database engine, normally ~330 + average number of tags per event * 100 bytes.

So, the total required disk space can be calculated as:

### **Configuration + History + Trends + Events**

The disk space will NOT be used immediately after Zabbix installation. Database size will grow then it will stop growing at some point, which depends on housekeeper settings.

### Time synchronization

It is very important to have precise system time on server with Zabbix running. [ntpd](#) is the most popular daemon that synchronizes the host's time with the time of other machines. It's strongly recommended to maintain synchronized system time on all systems Zabbix components are running on.

## **Best practices for secure Zabbix setup**

### Overview

This section contains best practices that should be observed in order to set up Zabbix in a secure way.

The practices contained here are not required for the functioning of Zabbix. They are recommended for better security of the system.

### Principle of least privilege

The principle of least privilege should be used at all times for Zabbix. This principle means that user accounts (in Zabbix frontend) or process user (for Zabbix server/proxy or agent) have only those privileges that are essential to perform intended functions. In other words, user accounts at all times should run with as few privileges as possible.

#### **Attention:**

Giving extra permissions to 'zabbix' user will allow it to access configuration files and execute operations that can compromise the overall security of infrastructure.

When implementing the least privilege principle for user accounts, Zabbix **frontend user types** should be taken into account. It is important to understand that while a "Admin" user type has less privileges than "Super Admin" user type, it has administrative permissions that allow managing configuration and execute custom scripts.

#### **Note:**

Some information is available even for non-privileged users. For example, while Administration → Scripts is not available for non-Super Admins, scripts themselves are available for retrieval by using Zabbix API. Limiting script permissions and not adding sensitive information (like access credentials, etc) should be used to avoid exposure of sensitive information available in global scripts.

### Secure user for Zabbix agent

In the default configuration, Zabbix server and Zabbix agent processes share one 'zabbix' user. If you wish to make sure that the agent cannot access sensitive details in server configuration (e.g. database login information), the agent should be run as a different user:

1. Create a secure user
2. Specify this user in the agent **configuration file** ('User' parameter)
3. Restart the agent with administrator privileges. Privileges will be dropped to the specified user.

### UTF-8 encoding

UTF-8 is the only encoding supported by Zabbix. It is known to work without any security flaws. Users should be aware that there are known security issues if using some of the other encodings.

### Setting up SSL for Zabbix frontend

On RHEL/Centos, install `mod_ssl` package:

```
yum install mod_ssl
```

Create directory for SSL keys:

```
mkdir -p /etc/httpd/ssl/private  
chmod 700 /etc/httpd/ssl/private
```

Create SSL certificate:

```
openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/httpd/ssl/private/apache-selfsigned.key -
```

Fill out the prompts appropriately. The most important line is the one that requests the Common Name. You need to enter the domain name that you want to be associated with your server. You can enter the public IP address instead if you do not have a domain name. We will use example.com in this article.

```
Country Name (2 letter code) [XX]:
State or Province Name (full name) []:
Locality Name (eg, city) [Default City]:
Organization Name (eg, company) [Default Company Ltd]:
Organizational Unit Name (eg, section) []:
Common Name (eg, your name or your server's hostname) []:example.com
Email Address []:
```

Edit Apache SSL configuration:

```
/etc/httpd/conf.d/ssl.conf
```

```
DocumentRoot "/usr/share/zabbix"
ServerName example.com:443
SSLCertificateFile /etc/httpd/ssl/apache-selfsigned.crt
SSLCertificateKeyFile /etc/httpd/ssl/private/apache-selfsigned.key
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

Enabling Zabbix on root directory of URL

Add a virtual host to Apache configuration and set permanent redirect for document root to Zabbix SSL URL. Do not forget to replace example.com with the actual name of the server.

```
/etc/httpd/conf/httpd.conf
```

#Add lines

```
<VirtualHost *:*>
    ServerName example.com
    Redirect permanent / https://example.com
</VirtualHost>
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

Enabling HTTP Strict Transport Security (HSTS) on the web server

To protect Zabbix frontend against protocol downgrade attacks, we recommend to enable [HSTS](#) policy on the web server.

For example, to enable HSTS policy for your Zabbix frontend in Apache configuration, open

```
/etc/httpd/conf/httpd.conf
```

and add the following directive to your virtual host's configuration:

```
<VirtualHost *:443>
    Header set Strict-Transport-Security "max-age=31536000"
</VirtualHost>
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

Enabling Content Security Policy (CSP) on the web server

To protect Zabbix frontend against Cross Site Scripting (XSS), data injection, and some other attacks of a similar type, we recommend enabling Content Security Policy on the web server. To do so, you need to configure the web server to return the [Content-Security-Policy](#) HTTP header.

To enable CSP for your Zabbix frontend in Apache configuration, edit:

```
/etc/httpd/conf/httpd.conf
```

For example, if it is planned that all content will come from the site's origin (excluding subdomains), you can add the following directive to your virtual host's configuration:

```
<VirtualHost *:*>
  Header set Content-Security-Policy "default-src 'self';"
</VirtualHost>
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

Disabling web server information exposure

It is recommended to disable all web server signatures as part of the web server hardening process. The web server is exposing software signature by default:

```
▼ Response Headers    view source
  Cache-Control: no-store, no-cache, must-revalidate
  Connection: Keep-Alive
  Content-Encoding: gzip
  Content-Length: 1160
  Content-Type: text/html; charset=UTF-8
  Keep-Alive: timeout=5, max=100
  Pragma: no-cache
  Server: Apache/2.4.18 (Ubuntu)
```

The signature can be disabled by adding two lines to the Apache (used as an example) configuration file:

```
ServerSignature Off
ServerTokens Prod
```

PHP signature (X-Powered-By HTTP header) can be disabled by changing the php.ini configuration file (signature is disabled by default):

```
expose_php = Off
```

Web server restart is required for configuration file changes to be applied.

Additional security level can be achieved by using the mod\_security (package libapache2-mod-security2) with Apache. mod\_security allows to remove server signature instead of only removing version from server signature. Signature can be altered to any value by changing "SecServerSignature" to any desired value after installing mod\_security.

Please refer to documentation of your web server to find help on how to remove/change software signatures.

Disabling default web server error pages

It is recommended to disable default error pages to avoid information exposure. Web server is using built-in error pages by default:

# Not Found

The requested URL /custom-text was not found on this server.

---

*Apache/2.4.18 (Ubuntu) Server at localhost Port 80*

Default error pages should be replaced/removed as part of the web server hardening process. The "ErrorDocument" directive can be used to define a custom error page/text for Apache web server (used as an example).

Please refer to documentation of your web server to find help on how to replace/remove default error pages.

Removing web server test page

It is recommended to remove the web server test page to avoid information exposure. By default, web server webroot contains a test page called index.html (Apache2 on Ubuntu is used as an example):





ubuntu

## Apache2 Ubuntu Default Page

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should replace this file (located at /var/www/html/index.html) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

The test page should be removed or should be made unavailable as part of the web server hardening process.

### Zabbix settings

By default, Zabbix is configured with X-Frame-Options HTTP response header set to SAMEORIGIN, meaning that content can only be loaded in a frame that has the same origin as the page itself.

Zabbix frontend elements that pull content from external URLs (namely, the URL `dashboard widget/screen element`) display retrieved content in a sandbox with all sandboxing restrictions enabled.

These settings enhance the security of the Zabbix frontend and provide protection against XSS and clickjacking attacks. Super Admins can `modify` iframe sandboxing and X-Frame-Options HTTP response header parameters as needed. Please carefully weigh the risks and benefits before changing default settings. Turning sandboxing or X-Frame-Options off completely is not recommended.

### Zabbix Windows agent with OpenSSL

Zabbix Windows agent compiled with OpenSSL will try to reach the SSL configuration file in `c:\openssl-64bit`. The "openssl-64bit" directory on disk C: can be created by non-privileged users.

So for security hardening, it is required to create this directory manually and revoke write access from non-admin users.

Please note that the directory names will be different on 32-bit and 64-bit versions of Windows.

## 3 Installation from sources

You can get the very latest version of Zabbix by compiling it from the sources.

A step-by-step tutorial for installing Zabbix from the sources is provided here.

### 1 Installing Zabbix daemons

#### 1 Download the source archive

Go to the [Zabbix download page](#) and download the source archive. Once downloaded, extract the sources, by running:

```
$ tar -zxvf zabbix-5.2.0.tar.gz
```

#### Note:

Enter the correct Zabbix version in the command. It must match the name of the downloaded archive.

#### 2 Create user account

For all of the Zabbix daemon processes, an unprivileged user is required. If a Zabbix daemon is started from an unprivileged user account, it will run as that user.

However, if a daemon is started from a 'root' account, it will switch to a 'zabbix' user account, which must be present. To create such a user account (in its own group, "zabbix"),

on a RedHat-based system, run:

```
groupadd --system zabbix
useradd --system -g zabbix -d /usr/lib/zabbix -s /sbin/nologin -c "Zabbix Monitoring System" zabbix
```

on a Debian-based system, run:

```
addgroup --system --quiet zabbix
adduser --quiet --system --disabled-login --ingroup zabbix --home /var/lib/zabbix --no-create-home zabbix
```

**Attention:**

Zabbix processes do not need a home directory, which is why we do not recommend creating it. However, if you are using some functionality that requires it (e. g. store MySQL credentials in `$HOME/.my.cnf`) you are free to create it using the following commands.

```
On RedHat-based systems, run:
mkdir -m u=rwx,g=rwx,o= -p /usr/lib/zabbix
chown zabbix:zabbix /usr/lib/zabbix
On Debian-based systems, run:
mkdir -m u=rwx,g=rwx,o= -p /var/lib/zabbix
chown zabbix:zabbix /var/lib/zabbix
```

A separate user account is not required for Zabbix frontend installation.

If Zabbix **server** and **agent** are run on the same machine it is recommended to use a different user for running the server than for running the agent. Otherwise, if both are run as the same user, the agent can access the server configuration file and any Admin level user in Zabbix can quite easily retrieve, for example, the database password.

**Attention:**

Running Zabbix as `root`, `bin`, or any other account with special rights is a security risk.

### 3 Create Zabbix database

For Zabbix **server** and **proxy** daemons, as well as Zabbix frontend, a database is required. It is not needed to run Zabbix **agent**.

SQL **scripts are provided** for creating database schema and inserting the dataset. Zabbix proxy database needs only the schema while Zabbix server database requires also the dataset on top of the schema.

Having created a Zabbix database, proceed to the following steps of compiling Zabbix.

### 4 Configure the sources

When configuring the sources for a Zabbix server or proxy, you must specify the database type to be used. Only one database type can be compiled with a server or proxy process at a time.

To see all of the supported configuration options, inside the extracted Zabbix source directory run:

```
./configure --help
```

To configure the sources for a Zabbix server and agent, you may run something like:

```
./configure --enable-server --enable-agent --with-mysql --enable-ipv6 --with-net-snmp --with-libcurl --with-
```

To configure the sources for a Zabbix server (with PostgreSQL etc.), you may run:

```
./configure --enable-server --with-postgresql --with-net-snmp
```

To configure the sources for a Zabbix proxy (with SQLite etc.), you may run:

```
./configure --prefix=/usr --enable-proxy --with-net-snmp --with-sqlite3 --with-ssh2
```

To configure the sources for a Zabbix agent, you may run:

```
./configure --enable-agent
```

or, for Zabbix agent 2:

```
./configure --enable-agent2
```

**Note:**

**Go version 1.13** or later is required for compiling Zabbix agent 2. See [golang.org](http://golang.org) for installation instructions.

Notes on compilation options:

- Command-line utilities `zabbix_get` and `zabbix_sender` are compiled if `--enable-agent` option is used.

- `--with-libcurl` and `--with-libxml2` configuration options are required for virtual machine monitoring; `--with-libcurl` is also required for SMTP authentication and web .page . \* Zabbix agent [items](#). Note that cURL 7.20.0 or higher is [required](#) with the `--with-libcurl` configuration option.
- Zabbix always compiles with the PCRE library (since version 3.4.0); installing it is not optional. `--with-libpcre=[DIR]` only allows pointing to a specific base install directory, instead of searching through a number of common places for the libpcre files.
- You may use the `--enable-static` flag to statically link libraries. If you plan to distribute compiled binaries among different servers, you must use this flag to make these binaries work without required libraries. Note that `--enable-static` does not work in [Solaris](#).
- Using `--enable-static` option is not recommended when building server. In order to build the server statically you must have a static version of every external library needed. There is no strict check for that in configure script.
- Add optional path to the MySQL configuration file `--with-mysql=/path\_to\_the\_file/mysql_config` to select the desired MySQL client library when there is a need to use one that is not located in the default location. It is useful when there are several versions of MySQL installed or MariaDB installed alongside MySQL on the same system.
- Use `--with-oracle` flag to specify location of the OCI API.

#### Attention:

If `./configure` fails due to missing libraries or some other circumstance, please see the `config.log` file for more details on the error. For example, if `libssl` is missing, the immediate error message may be misleading:

```
checking for main in -lmysqlclient... no
configure: error: Not found mysqlclient library
While config.log has a more detailed description:
/usr/bin/ld: cannot find -lssl
/usr/bin/ld: cannot find -lcrypto
```

See also:

- [Compiling Zabbix with encryption support](#) for encryption support
- [Known issues](#) with compiling Zabbix agent on HP-UX

## 5 Make and install everything

#### Note:

If installing from [Zabbix Git repository](#), it is required to run first:

```
$ make dbschema
```

```
make install
```

This step should be run as a user with sufficient permissions (commonly 'root', or by using `sudo`).

Running `make install` will by default install the daemon binaries (`zabbix_server`, `zabbix_agentd`, `zabbix_proxy`) in `/usr/local/sbin` and the client binaries (`zabbix_get`, `zabbix_sender`) in `/usr/local/bin`.

#### Note:

To specify a different location than `/usr/local`, use a `--prefix` key in the previous step of configuring sources, for example `--prefix=/home/zabbix`. In this case daemon binaries will be installed under `<prefix>/sbin`, while utilities under `<prefix>/bin`. Man pages will be installed under `<prefix>/share`.

## 6 Review and edit configuration files

- edit the Zabbix agent configuration file **`/usr/local/etc/zabbix_agentd.conf`**

You need to configure this file for every host with `zabbix_agentd` installed.

You must specify the Zabbix server **IP address** in the file. Connections from other hosts will be denied.

- edit the Zabbix server configuration file **`/usr/local/etc/zabbix_server.conf`**

You must specify the database name, user and password (if using any).

The rest of the parameters will suit you with their defaults if you have a small installation (up to ten monitored hosts). You should change the default parameters if you want to maximize the performance of Zabbix server (or proxy) though. See the [performance tuning](#) section for more details.

- if you have installed a Zabbix proxy, edit the proxy configuration file **`/usr/local/etc/zabbix_proxy.conf`**

You must specify the server IP address and proxy hostname (must be known to the server), as well as the database name, user and password (if using any).

**Note:**

With SQLite the full path to database file must be specified; DB user and password are not required.

## 7 Start up the daemons

Run `zabbix_server` on the server side.

```
shell> zabbix_server
```

**Note:**

Make sure that your system allows allocation of 36MB (or a bit more) of shared memory, otherwise the server may not start and you will see "Cannot allocate shared memory for <type of cache>." in the server log file. This may happen on FreeBSD, Solaris 8.

See the "[See also](#)" section at the bottom of this page to find out how to configure shared memory.

Run `zabbix_agentd` on all the monitored machines.

```
shell> zabbix_agentd
```

**Note:**

Make sure that your system allows allocation of 2MB of shared memory, otherwise the agent may not start and you will see "Cannot allocate shared memory for collector." in the agent log file. This may happen on Solaris 8.

If you have installed Zabbix proxy, run `zabbix_proxy`.

```
shell> zabbix_proxy
```

## 2 Installing Zabbix web interface

### Copying PHP files

Zabbix frontend is written in PHP, so to run it a PHP supported webserver is needed. Installation is done by simply copying the PHP files from the `ui` directory to the webserver HTML documents directory.

Common locations of HTML documents directories for Apache web servers include:

- `/usr/local/apache2/htdocs` (default directory when installing Apache from source)
- `/srv/www/htdocs` (OpenSUSE, SLES)
- `/var/www/html` (Debian, Ubuntu, Fedora, RHEL, CentOS)

It is suggested to use a subdirectory instead of the HTML root. To create a subdirectory and copy Zabbix frontend files into it, execute the following commands, replacing the actual directory:

```
mkdir <htdocs>/zabbix
cd ui
cp -a . <htdocs>/zabbix
```

If planning to use any other language than English, see [Installation of additional frontend languages](#) for instructions.

### Installing frontend

Please see [Web interface installation](#) page for information about Zabbix frontend installation wizard.

## 3 Installing Java gateway

It is required to install Java gateway only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

To install from sources, first [download](#) and extract the source archive.

To compile Java gateway, run the `./configure` script with `--enable-java` option. It is advisable that you specify the `--prefix` option to request installation path other than the default `/usr/local`, because installing Java gateway will create a whole directory tree, not just a single executable.

```
$ ./configure --enable-java --prefix=$PREFIX
```

To compile and package Java gateway into a JAR file, run `make`. Note that for this step you will need `javac` and `jar` executables in your path.

```
$ make
```

Now you have a `zabbix-java-gateway-$VERSION.jar` file in `src/zabbix_java/bin`. If you are comfortable with running Java gateway from `src/zabbix_java` in the distribution directory, then you can proceed to instructions for configuring and running [Java gateway](#). Otherwise, make sure you have enough privileges and run `make install`.

```
$ make install
```

Proceed to [setup](#) for more details on configuring and running Java gateway.

## See also

1. [How to configure shared memory for Zabbix daemons](#)

## Building Zabbix agent 2 on Windows

### Overview

This section demonstrates how to build Zabbix agent 2 (Windows) from sources.

### Installing MinGW Compiler

1. Download MinGW-w64 with SJLJ (set jump/long jump) Exception Handling and Windows threads (for example `x86_64-8.1.0-release-win32-sjlj-rt_v6-rev0.7z`)
2. Extract and move to `c:\mingw`
3. Setup environmental variable

```
@echo off
set PATH=%PATH%;c:\bin\mingw\bin
cmd
```

When compiling use Windows prompt instead of MSYS terminal provided by MinGW

### Compiling PCRE development libraries

The following instructions will compile and install 64-bit PCRE libraries in `c:\dev\pcre` and 32-bit libraries in `c:\dev\pcre32`:

1. Download PCRE library version 8.XX from [pcre.org](http://pcre.org) (<ftp://ftp.pcre.org/pub/pcre/>) and extract
2. Open cmd and navigate to the extracted sources

### Build 64bit PCRE

1. Delete old configuration/cache if exists:

```
del CMakeCache.txt
rmdir /q /s CMakeFiles
```

2. Run `cmake` (CMake can be installed from <https://cmake.org/download/>):

```
cmake -G "MinGW Makefiles" -DCMAKE_C_COMPILER=gcc -DCMAKE_C_FLAGS="-O2 -g" -DCMAKE_CXX_FLAGS="-O2 -g" -DCM
```

3. Next, run:

```
mingw32-make clean
mingw32-make install
```

### Build 32bit PCRE

1. Run:

```
mingw32-make clean
```

2. Delete `CMakeCache.txt`:

```
del CMakeCache.txt
rmdir /q /s CMakeFiles
```

3. Run `cmake`:

```
cmake -G "MinGW Makefiles" -DCMAKE_C_COMPILER=gcc -DCMAKE_C_FLAGS="-m32 -O2 -g" -DCMAKE_CXX_FLAGS="-m32 -C
```

4. Next, run:

```
mingw32-make install
```

## Installing OpenSSL development libraries

1. Download 32 and 64 bit builds from <https://bintray.com/vszakats/generic/openssl/1.1.1d>
2. Extract files into c:\dev\openssl32 and c:\dev\openssl directories accordingly.
3. After that remove extracted \*.dll.a (dll call wrapper libraries) as MinGW prioritizes them before static libraries.

## Compiling Zabbix agent 2

### 32 bit

Open MinGW environment (Windows command prompt) and navigate to build/mingw directory in the Zabbix source tree.

Run:

```
mingw32-make clean
mingw32-make ARCH=x86 PCRE=c:\dev\pcre32 OPENSSSL=c:\dev\openssl32
```

### 64 bit

Open MinGW environment (Windows command prompt) and navigate to build/mingw directory in the Zabbix source tree.

Run:

```
mingw32-make clean
mingw32-make PCRE=c:\dev\pcre OPENSSSL=c:\dev\openssl
```

#### Note:

Both 32- and 64- bit versions can be built on a 64-bit platform, but only a 32-bit version can be built on a 32-bit platform. When working on the 32-bit platform, follow the same steps as for 64-bit version on 64-bit platform.

## Building Zabbix agent on macOS

### Overview

This section demonstrates how to build Zabbix macOS agent binaries from sources with or without TLS.

### Prerequisites

You will need command line developer tools (Xcode is not required), Automake, pkg-config and PCRE (v8.x). If you want to build agent binaries with TLS, you will also need OpenSSL or GnuTLS.

To install Automake and pkg-config, you will need a Homebrew package manager from <https://brew.sh/>. To install it, open terminal and run the following command:

```
$ /usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"
```

Then install Automake and pkg-config:

```
$ brew install automake
$ brew install pkg-config
```

Preparing PCRE, OpenSSL and GnuTLS libraries depends on the way how they are going to be linked to the agent.

If you intend to run agent binaries on a macOS machine that already has these libraries, you can use precompiled libraries that are provided by Homebrew. These are typically macOS machines that use Homebrew for building Zabbix agent binaries or for other purposes.

If agent binaries will be used on macOS machines that don't have the shared version of libraries, you should compile static libraries from sources and link Zabbix agent with them.

### Building agent binaries with shared libraries

Install PCRE:

```
$ brew install pcre
```

When building with TLS, install OpenSSL and/or GnuTLS:

```
$ brew install openssl
$ brew install gnutls
```

Download Zabbix source:

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
```

Build agent without TLS:

```
$ cd zabbix
$ ./bootstrap.sh
$ ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6
$ make
$ make install
```

Build agent with OpenSSL:

```
$ cd zabbix
$ ./bootstrap.sh
$ ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-openssl=/usr/local/opt
$ make
$ make install
```

Build agent with GnuTLS:

```
$ cd zabbix-source/
$ ./bootstrap.sh
$ ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-gnutls=/usr/local/opt
$ make
$ make install
```

Building agent binaries with static libraries without TLS

Let's assume that PCRE static libraries will be installed in `$HOME/static-libs`. We will use PCRE 8.42.

```
$ PCRE_PREFIX="$HOME/static-libs/pcre-8.42"
```

Download and build PCRE with Unicode properties support:

```
$ mkdir static-libs-source
$ cd static-libs-source
$ curl --remote-name https://ftp.pcre.org/pub/pcre/pcre-8.42.tar.gz
$ tar xf pcre-8.42.tar.gz
$ cd pcre-8.42
$ ./configure --prefix="$PCRE_PREFIX" --disable-shared --enable-static --enable-unicode-properties
$ make
$ make check
$ make install
```

Download Zabbix source and build agent:

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
$ cd zabbix
$ ./bootstrap.sh
$ ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre="$PCRE_PREFIX
$ make
$ make install
```

Building agent binaries with static libraries with OpenSSL

When building OpenSSL, it's recommended to run `make test` after successful building. Even if building was successful, tests sometimes fail. If this is the case, problems should be researched and resolved before continuing.

Let's assume that PCRE and OpenSSL static libraries will be installed in `$HOME/static-libs`. We will use PCRE 8.42 and OpenSSL 1.1.1a.

```
$ PCRE_PREFIX="$HOME/static-libs/pcre-8.42"
$ OPENSSL_PREFIX="$HOME/static-libs/openssl-1.1.1a"
```

Let's build static libraries in `static-libs-source`:

```
$ mkdir static-libs-source
$ cd static-libs-source
```

Download and build PCRE with Unicode properties support:

```
$ curl --remote-name https://ftp.pcre.org/pub/pcre/pcre-8.42.tar.gz
$ tar xf pcre-8.42.tar.gz
$ cd pcre-8.42
$ ./configure --prefix="$PCRE_PREFIX" --disable-shared --enable-static --enable-unicode-properties
```

```
$ make
$ make check
$ make install
$ cd ..
```

Download and build OpenSSL:

```
$ curl --remote-name https://www.openssl.org/source/openssl-1.1.1a.tar.gz
$ tar xf openssl-1.1.1a.tar.gz
$ cd openssl-1.1.1a
$ ./Configure --prefix="$OPENSSL_PREFIX" --openssldir="$OPENSSL_PREFIX" --api=1.1.0 no-shared no-capieng n
$ make
$ make test
$ make install_sw
$ cd ..
```

Download Zabbix source and build agent:

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
$ cd zabbix
$ ./bootstrap.sh
$ ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre="$PCRE_PREFIX
$ make
$ make install
```

Building agent binaries with static libraries with GnuTLS

GnuTLS depends on the Nettle crypto backend and GMP arithmetic library. Instead of using full GMP library, this guide will use mini-gmp which is included in Nettle.

When building GnuTLS and Nettle, it's recommended to run `make check` after successful building. Even if building was successful, tests sometimes fail. If this is the case, problems should be researched and resolved before continuing.

Let's assume that PCRE, Nettle and GnuTLS static libraries will be installed in `$HOME/static-libs`. We will use PCRE 8.42, Nettle 3.4.1 and GnuTLS 3.6.5.

```
$ PCRE_PREFIX="$HOME/static-libs/pcre-8.42"
$ NETTLE_PREFIX="$HOME/static-libs/nettle-3.4.1"
$ GNUTLS_PREFIX="$HOME/static-libs/gnutls-3.6.5"
```

Let's build static libraries in `static-libs-source`:

```
$ mkdir static-libs-source
$ cd static-libs-source
```

Download and build Nettle:

```
$ curl --remote-name https://ftp.gnu.org/gnu/nettle/nettle-3.4.1.tar.gz
$ tar xf nettle-3.4.1.tar.gz
$ cd nettle-3.4.1
$ ./configure --prefix="$NETTLE_PREFIX" --enable-static --disable-shared --disable-documentation --disable
$ make
$ make check
$ make install
$ cd ..
```

Download and build GnuTLS:

```
$ curl --remote-name https://www.gnupg.org/ftp/gcrypt/gnutls/v3.6/gnutls-3.6.5.tar.xz
$ tar xf gnutls-3.6.5.tar.xz
$ cd gnutls-3.6.5
$ PKG_CONFIG_PATH="$NETTLE_PREFIX/lib/pkgconfig" ./configure --prefix="$GNUTLS_PREFIX" --enable-static --d
$ make
$ make check
$ make install
$ cd ..
```

Download Zabbix source and build agent:

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
$ cd zabbix
```



```

$ ./bootstrap.sh
$ CFLAGS="-Wno-unused-command-line-argument -framework Foundation -framework Security" \
> LIBS="-lgnutls -lhogweed -lnettle" \
> LDFLAGS="-L$GNUTLS_PREFIX/lib -L$NETTLE_PREFIX/lib" \
> ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre="$PCRE_PREFIX" \
$ make
$ make install

```

## Building Zabbix agent on Windows

### Overview

This section demonstrates how to build Zabbix Windows agent binaries from sources with or without TLS.

### Compiling OpenSSL

The following steps will help you to compile OpenSSL from sources on MS Windows 10 (64-bit).

- For compiling OpenSSL you will need on Windows machine:
  - C compiler (e.g. VS 2017 RC),
  - NASM (<https://www.nasm.us/>),
  - Perl (e.g. Strawberry Perl from <http://strawberryperl.com/>),
  - Perl module Text::Template (cpan Text::Template).
- Get OpenSSL sources from <https://www.openssl.org/>. OpenSSL 1.1.1 is used here.
- Unpack OpenSSL sources, for example, in E:\openssl-1.1.1.
- Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 RC.
- Go to the OpenSSL source directory, e.g. E:\openssl-1.1.1.
  - Verify that NASM can be found:

```
e:\openssl-1.1.1> nasm --version      NASM version 2.13.01 compiled
on May  1 2017
```
- Configure OpenSSL, for example:

```
e:\openssl-1.1.1> perl E:\openssl-1.1.1\Configure VC-WIN64A no-shared
no-capieng no-srp no-gost no-dgram no-dtls1-method no-dtls1_2-method --api=1.1.0 --prefix=C:\OpenSSL
--opendir=C:\OpenSSL-Win64-111-static
```

  - Note the option 'no-shared': if 'no-shared' is used then the OpenSSL static libraries libcrypto.lib and libssl.lib will be 'self-sufficient' and resulting Zabbix binaries will include OpenSSL in themselves, no need for external OpenSSL DLLs. Advantage: Zabbix binaries can be copied to other Windows machines without OpenSSL libraries. Disadvantage: when a new OpenSSL bugfix version is released, Zabbix agent needs to be recompiled and reinstalled.
  - If 'no-shared' is not used, then the static libraries libcrypto.lib and libssl.lib will be using OpenSSL DLLs at runtime. Advantage: when a new OpenSSL bugfix version is released, probably you can upgrade only OpenSSL DLLs, without recompiling Zabbix agent. Disadvantage: copying Zabbix agent to another machine requires copying OpenSSL DLLs, too.
- Compile OpenSSL, run tests, install:

```
e:\openssl-1.1.1> nmake      e:\openssl-1.1.1> nmake test      ...
All tests successful.      Files=152, Tests=1152, 501 wallclock secs ( 0.67 usr +  0.61 sys
= 1.28 CPU)      Result: PASS      e:\openssl-1.1.1> nmake install_sw\install_sw' installs only software
components (i.e. libraries, header files, but no documentation). If you want everything, use "nmake install".
```

### Compiling PCRE

- Download PCRE library (mandatory library since Zabbix 4.0) from [pcre.org](http://pcre.org), version 8.XX; not pcre2 (<ftp://ftp.csx.cam.ac.uk/pub/software/8.41.zip>)
- Extract to directory E:\pcre-8.41
- Install CMake from <https://cmake.org/download/>, during install select: and ensure that cmake\bin is on your path (tested version 3.9.4).
- Create a new, empty build directory, preferably a subdirectory of the source dir. For example, E:\pcre-8.41\build.
- Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 and from that shell environment run cmake-gui. Do not try to start Cmake from the Windows Start menu, as this can lead to errors.
- Enter E:\pcre-8.41 and E:\pcre-8.41\build for the source and build directories, respectively.
- Hit the "Configure" button.
- When specifying the generator for this project select "NMake Makefiles".
- Create a new, empty install directory. For example, E:\pcre-8.41-install.
- The GUI will then list several configuration options. Make sure the following options are selected:
  - PCRE\_SUPPORT\_UNICODE\_PROPERTIES** ON
  - PCRE\_SUPPORT\_UTF** ON
  - CMAKE\_INSTALL\_PREFIX** E:\pcre-8.41-install
- Hit "Configure" again. The adjacent "Generate" button should now be active.
- Hit "Generate".

13. In the event that errors occur, it is recommended that you delete the CMake cache before attempting to repeat the CMake build process. In the CMake GUI, the cache can be deleted by selecting "File > Delete Cache".
14. The build directory should now contain a usable build system - Makefile.
15. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 and navigate to the Makefile mentioned above.
16. Run NMake command: `E:\pcre-8.41\build> nmake install`

#### Compiling Zabbix

The following steps will help you to compile Zabbix from sources on MS Windows 10 (64-bit). When compiling Zabbix with/without TLS support the only significant difference is in step 4.

1. On a Linux machine check out the source from git:
 

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
$ cd zabbix      $ ./bootstrap.sh      $ ./configure --enable-agent --enable-ipv6 --prefix=`pwd`
$ make dbschema  $ make dist
```
2. Copy and unpack the archive, e.g. `zabbix-4.4.0.tar.gz`, on a Windows machine.
3. Let's assume that sources are in `e:\zabbix-4.4.0`. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 RC. Go to `E:\zabbix-4.4.0\build\win32\project`.
4. Compile `zabbix_get`, `zabbix_sender` and `zabbix_agent`.
  - without TLS: `E:\zabbix-4.4.0\build\win32\project> nmake /K PCREINCDIR=E:\pcre-8.41-install\include PCRELIBDIR=E:\pcre-8.41-install\lib`
  - with TLS: `E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile_get TLS=openssl TLSINCDIR=C:\OpenSSL-Win64-111-static\include PCRELIBDIR=C:\OpenSSL-Win64-111-static\lib PCREINCDIR=E:\pcre-8.41-install\include PCRELIBDIR=E:\pcre-8.41-install\lib`
  - `E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile_sender TLS=openssl TLSINCDIR="C:\OpenSSL-Win64-111-static\include" PCRELIBDIR="C:\OpenSSL-Win64-111-static\lib" PCREINCDIR=E:\pcre-8.41-install\include PCRELIBDIR=E:\pcre-8.41-install\lib`
  - `E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile_agent TLS=openssl TLSINCDIR=C:\OpenSSL-Win64-111-static\include TLSLIBDIR=C:\OpenSSL-Win64-111-static\lib PCREINCDIR=E:\pcre-8.41-install\include PCRELIBDIR=E:\pcre-8.41-install\lib`
5. New binaries are located in `e:\zabbix-4.4.0\bin\win64`. Since OpenSSL was compiled with 'no-shared' option, Zabbix binaries contain OpenSSL within themselves and can be copied to other machines that do not have OpenSSL.

#### Compiling Zabbix with LibreSSL

The process is similar to compiling with OpenSSL, but you need to make small changes in files located in the `build\win32\project` directory:

\* In `'Makefile_tls'` delete `'/DHAVE_OPENSSL_WITH_PSK'`. i.e. find `<code>`

`CFLAGS = $(CFLAGS) /DHAVE_OPENSSL /DHAVE_OPENSSL_WITH_PSK</code> and replace it with CFLAGS = $(CFLAGS) /DHAVE_OPENSSL`

\* In `'Makefile_common.inc'` add `'/NODEFAULTLIB:LIBCMT'` i.e. find `<code>`

`/MANIFESTUAC:"level='asInvoker' uiAccess='false'" /DYNAMICBASE:NO /PDB:$(TARGETDIR)\$(TARGETNAME).pdb</code> and replace it with /MANIFESTUAC:"level='asInvoker' uiAccess='false'" /DYNAMICBASE:NO /PDB:$(TARGETDIR)\$(TARGETNAME).pdb /NODEFAULTLIB:LIBCMT`

## 4 Installation from packages

From Zabbix official repository

Zabbix SIA provides official RPM and DEB packages for:

- [Red Hat Enterprise Linux/CentOS](#)
- [Debian/Ubuntu/Raspbian](#)
- [SUSE Linux Enterprise Server](#)

Package files for yum/dnf, apt and zypper repositories for various OS distributions are available at [repo.zabbix.com](https://repo.zabbix.com).

Note, that though some OS distributions (in particular, Debian-based distributions) provide their own Zabbix packages, these packages are not supported by Zabbix. Zabbix packages provided by 3rd parties can be out of date and may lack the latest features and bug fixes. It is recommended to use only official packages from [repo.zabbix.com](https://repo.zabbix.com). If you have previously used unofficial Zabbix packages, see notes about [upgrading Zabbix packages from OS repositories](#).

### 1 Red Hat Enterprise Linux/CentOS

Overview

Official Zabbix packages are available for:

[RHEL 8, CentOS 8 and Oracle Linux 8](#) [Download](#)

Packages are available with either MySQL/PostgreSQL database and Apache/Nginx webserver support.

Zabbix agent packages and utilities Zabbix get and Zabbix sender are available for [RHEL 7](#), [RHEL 6](#) and [RHEL 5](#) as well.

Zabbix official repository provides `fping` and `libssh2` packages as well. These packages are located in the [non-supported](#) directory.

Notes on installation

See [installation instructions](#) per platform in the download page for:

- installing the repository
- installing server/agent/frontend
- creating initial database, importing initial data
- configuring database for Zabbix server
- configuring PHP for Zabbix frontend
- starting server/agent processes
- configuring Zabbix frontend

If you want to run Zabbix agent as root, see [Running agent as root](#).

Importing data with Timescale DB

With TimescaleDB, in addition to the import command for PostgreSQL, also run:

```
# zcat /usr/share/doc/zabbix-server-pgsql*/timescaledb.sql.gz | sudo -u zabbix psql zabbix
```

**Warning:**

TimescaleDB is supported with Zabbix server only.

PHP 7.2

Zabbix frontend requires PHP version **7.2 or newer** starting with Zabbix 5.0.

SELinux configuration

Having SELinux status enabled in enforcing mode, you need to execute the following commands to enable communication between Zabbix frontend and server:

RHEL 7 and later:

```
# setsebool -P httpd_can_connect_zabbix on
```

If the database is accessible over network (including 'localhost' in case of PostgreSQL), you need to allow

```
# setsebool -P httpd_can_network_connect_db on
```

RHEL prior to 7:

```
# setsebool -P httpd_can_network_connect on
```

```
# setsebool -P zabbix_can_network on
```

After the frontend and SELinux configuration is done, restart the Apache web server:

```
# service httpd restart
```

Proxy installation

Once the required repository is added, you can install Zabbix proxy by running:

```
# dnf install zabbix-proxy-mysql
```

Substitute 'mysql' in the commands with 'pgsql' to use PostgreSQL, or with 'sqlite3' to use SQLite3 (proxy only).

Creating database

**Create** a separate database for Zabbix proxy.

Zabbix server and Zabbix proxy cannot use the same database. If they are installed on the same host, the proxy database must have a different name.

Importing data

Import initial schema:

```
# zcat /usr/share/doc/zabbix-proxy-mysql*/schema.sql.gz | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL (or SQLite):

```
# zcat /usr/share/doc/zabbix-proxy-pgsql*/schema.sql.gz | sudo -u zabbix psql zabbix
```

```
# zcat /usr/share/doc/zabbix-proxy-sqlite3*/schema.sql.gz | sqlite3 zabbix.db
```

Configure database for Zabbix proxy

Edit zabbix\_proxy.conf:

```
# vi /etc/zabbix/zabbix_proxy.conf
```

```
DBHost=localhost
```

```
DBName=zabbix
```

```
DBUser=zabbix
```

```
DBPassword=<password>
```

In DBName for Zabbix proxy use a separate database from Zabbix server.

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix. See [SELinux configuration](#) for instructions.

Starting Zabbix proxy process

To start a Zabbix proxy process and make it start at system boot:

```
# service zabbix-proxy start
```

```
# systemctl enable zabbix-proxy
```

Frontend configuration

A Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

Java gateway installation

It is required to install [Java gateway](#) only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

Once the required repository is added, you can install Zabbix Java gateway by running:

```
# dnf install zabbix-java-gateway
```

Proceed to [setup](#) for more details on configuring and running Java gateway.

Installing debuginfo packages

Debuginfo packages are currently available for RHEL/CentOS versions 7, 6 and 5. ::: To enable debuginfo repository edit /etc/yum.repos.d/zabbix.repo file. Change enabled=0 to enabled=1 for zabbix-debuginfo repository.

```
[zabbix-debuginfo]
```

```
name=Zabbix Official Repository debuginfo - $basearch
```

```
baseurl=http://repo.zabbix.com/zabbix/5.2/rhel/7/$basearch/debuginfo/
```

```
enabled=0
```

```
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-ZABBIX-A14FE591
```

```
gpgcheck=1
```

This will allow you to install the zabbix-debuginfo package.

```
# yum install zabbix-debuginfo
```

This single package contains debug information for all binary Zabbix components.

## 2 Debian/Ubuntu/Raspbian

Overview

Official Zabbix packages are available for:

---

Debian 10 (Buster)	<a href="#">Download</a>
Debian 9 (Stretch)	<a href="#">Download</a>
Debian 8 (Jessie)	<a href="#">Download</a>
Ubuntu 20.04 (Focal Fossa) LTS	<a href="#">Download</a>
Ubuntu 18.04 (Bionic Beaver) LTS	<a href="#">Download</a>

---

Ubuntu 16.04 (Xenial Xerus) LTS	<a href="#">Download</a>
Ubuntu 14.04 (Trusty Tahr) LTS	<a href="#">Download</a>
Raspbian (Buster)	<a href="#">Download</a>
Raspbian (Stretch)	<a href="#">Download</a>

---

Packages are available with either MySQL/PostgreSQL database and Apache/Nginx webserver support.

Notes on installation

See the [installation instructions](#) per platform in the download page for:

- installing the repository
- installing server/agent/frontend
- creating initial database, importing initial data
- configuring database for Zabbix server
- configuring PHP for Zabbix frontend
- starting server/agent processes
- configuring Zabbix frontend

If you want to run Zabbix agent as root, see [Running agent as root](#).

Importing data with Timescale DB

With TimescaleDB, in addition to the import command for PostgreSQL, also run:

```
# zcat /usr/share/doc/zabbix-server-pgsql*/timescaledb.sql.gz | sudo -u zabbix psql zabbix
```

**Warning:**

TimescaleDB is supported with Zabbix server only.

PHP 7.2

Zabbix frontend requires PHP version **7.2 or newer** starting with Zabbix 5.0.

See [instructions](#) for installing Zabbix frontend on distributions with PHP versions below 7.2.

SELinux configuration

See [SELinux configuration](#) for RHEL/CentOS.

After the frontend and SELinux configuration is done, restart the Apache web server:

```
# service apache2 restart
```

Proxy installation

Once the required repository is added, you can install Zabbix proxy by running:

```
# apt install zabbix-proxy-mysql
```

Substitute 'mysql' in the command with 'pgsql' to use PostgreSQL, or with 'sqlite3' to use SQLite3.

Creating database

**Create** a separate database for Zabbix proxy.

Zabbix server and Zabbix proxy cannot use the same database. If they are installed on the same host, the proxy database must have a different name.

Importing data

Import initial schema:

```
# zcat /usr/share/doc/zabbix-proxy-mysql/schema.sql.gz | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL (or SQLite):

```
# zcat /usr/share/doc/zabbix-proxy-pgsql/schema.sql.gz | sudo -u zabbix psql zabbix
# zcat /usr/share/doc/zabbix-proxy-sqlite3/schema.sql.gz | sqlite3 zabbix.db
```

Configure database for Zabbix proxy

Edit zabbix\_proxy.conf:

```
# vi /etc/zabbix/zabbix_proxy.conf
DBHost=localhost
DBName=zabbix
DBUser=zabbix
DBPassword=<password>
```

In DBName for Zabbix proxy use a separate database from Zabbix server.

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix. Refer to the [respective section](#) for RHEL/CentOS for instructions.

Starting Zabbix proxy process

To start a Zabbix proxy process and make it start at system boot:

```
# systemctl restart zabbix-proxy
# systemctl enable zabbix-proxy
```

Frontend configuration

A Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

Java gateway installation

It is required to install [Java gateway](#) only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

Once the required repository is added, you can install Zabbix Java gateway by running:

```
# apt install zabbix-java-gateway
```

Proceed to [setup](#) for more details on configuring and running Java gateway.

### 3 SUSE Linux Enterprise Server

Overview

Official Zabbix packages are available for:

---

SUSE Linux Enterprise Server 15	<a href="#">Download</a>
SUSE Linux Enterprise Server 12 SP4+	<a href="#">Download</a>

---

Adding Zabbix repository

Install the repository configuration package. This package contains yum (software package manager) configuration files.

SLES 15:

```
# rpm -Uvh --nosignature https://repo.zabbix.com/zabbix/5.2/sles/15/x86_64/zabbix-release-5.2-1.sles15.noarch.rpm
# zypper --gpg-auto-import-keys refresh 'Zabbix Official Repository'
```

SLES 12:

```
# rpm -Uvh --nosignature https://repo.zabbix.com/zabbix/5.2/sles/12/x86_64/zabbix-release-5.2-1.sles12.noarch.rpm
# zypper --gpg-auto-import-keys refresh 'Zabbix Official Repository'
```

Server/frontend/agent installation

To install Zabbix server/frontend/agent with MySQL support:

```
# zypper install zabbix-server-mysql zabbix-web-mysql zabbix-apache-conf zabbix-agent
```

Substitute 'apache' in the command with 'nginx' if using the package for Nginx web server. See also: [Nginx setup for Zabbix on SLES 12/15](#).

Substitute 'zabbix-agent' with 'zabbix-agent2' in these commands if using Zabbix agent 2 (only SLES 15 SP1+).

To install Zabbix proxy with MySQL support:

```
# zypper install zabbix-proxy-mysql
```

Substitute 'mysql' in the commands with 'pgsql' to use PostgreSQL.

Creating database

For Zabbix **server** and **proxy** daemons a database is required. It is not needed to run Zabbix **agent**.

**Warning:**

Separate databases are needed for Zabbix server and Zabbix proxy; they cannot use the same database. Therefore, if they are installed on the same host, their databases must be created with different names!

Create the database using the provided instructions for **MySQL** or **PostgreSQL**.

Importing data

Now import initial schema and data for the **server** with MySQL:

```
# zcat /usr/share/doc/packages/zabbix-server-mysql*/create.sql.gz | mysql -uzabbix -p zabbix
```

You will be prompted to enter your newly created database password.

With PostgreSQL:

```
# zcat /usr/share/doc/packages/zabbix-server-pgsql*/create.sql.gz | sudo -u <username> psql zabbix
```

With TimescaleDB, in addition to the previous command, also run:

```
# zcat /usr/share/doc/packages/zabbix-server-pgsql*/timescaledb.sql.gz | sudo -u <username> psql zabbix
```

**Warning:**

TimescaleDB is supported with Zabbix server only.

For **proxy**, import initial schema:

```
# zcat /usr/share/doc/packages/zabbix-proxy-mysql*/schema.sql.gz | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL:

```
# zcat /usr/share/doc/packages/zabbix-proxy-pgsql*/schema.sql.gz | sudo -u <username> psql zabbix
```

Configure database for Zabbix server/proxy

Edit /etc/zabbix/zabbix\_server.conf (and zabbix\_proxy.conf) to use their respective databases. For example:

```
# vi /etc/zabbix/zabbix_server.conf
DBHost=localhost
DBName=zabbix
DBUser=zabbix
DBPassword=<password>
```

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix.

Zabbix frontend configuration

Depending on the web server used (Apache/Nginx) edit the corresponding configuration file for Zabbix frontend:

- For Apache the configuration file is located in /etc/apache2/conf.d/zabbix.conf. Some PHP settings are already configured. But it's necessary to uncomment the "date.timezone" setting and [set the right timezone](#) for you.

```
php_value max_execution_time 300
php_value memory_limit 128M
php_value post_max_size 16M
php_value upload_max_filesize 2M
php_value max_input_time 300
php_value max_input_vars 10000
php_value always_populate_raw_post_data -1
# php_value date.timezone Europe/Riga
```

- The zabbix-nginx-conf package installs a separate Nginx server for Zabbix frontend. Its configuration file is located in /etc/nginx/conf.d/zabbix.conf. For Zabbix frontend to work, it's necessary to uncomment and set listen and/or server\_name directives.

```
# listen 80;
# server_name example.com;
```

- Zabbix uses its own dedicated php-fpm connection pool with Nginx:

Its configuration file is located in `/etc/php7/fpm/php-fpm.d/zabbix.conf`. Some PHP settings are already configured. But it's necessary to set the right `date.timezone` setting for you.

```
php_value[max_execution_time] = 300
php_value[memory_limit] = 128M
php_value[post_max_size] = 16M
php_value[upload_max_filesize] = 2M
php_value[max_input_time] = 300
php_value[max_input_vars] = 10000
; php_value[date.timezone] = Europe/Riga
```

Now you are ready to proceed with **frontend installation steps** which will allow you to access your newly installed Zabbix.

Note that a Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

Starting Zabbix server/agent process

Start Zabbix server and agent processes and make it start at system boot.

With Apache web server:

```
# systemctl restart zabbix-server zabbix-agent apache2 php-fpm
# systemctl enable zabbix-server zabbix-agent apache2 php-fpm
```

Substitute 'apache2' with 'nginx' for Nginx web server.

Installing debuginfo packages

To enable debuginfo repository edit `/etc/zypp/repos.d/zabbix.repo` file. Change `enabled=0` to `enabled=1` for zabbix-debuginfo repository.

```
[zabbix-debuginfo]
name=Zabbix Official Repository debuginfo
type=rpm-md
baseurl=http://repo.zabbix.com/zabbix/5.2/sles/15/x86_64/debuginfo/
gpgcheck=1
gpgkey=http://repo.zabbix.com/zabbix/5.2/sles/15/x86_64/debuginfo/repokey/repodata/repomd.xml.key
enabled=0
update=1
```

This will allow you to install zabbix-**<component>**-debuginfo packages.

## 4 Windows agent installation from MSI

Overview

Zabbix Windows agent can be installed from Windows MSI installer packages (32-bit or 64-bit) available for [download](#).

A 32-bit package cannot be installed on a 64-bit Windows.

All packages come with TLS support, however, configuring TLS is optional.

Both UI and command-line based installation is supported.

Installation steps

To install, double-click the downloaded MSI file.





**ZABBIX**

The Enterprise-class  
Monitoring Solution  
for Everyone

[www.zabbix.com](http://www.zabbix.com)

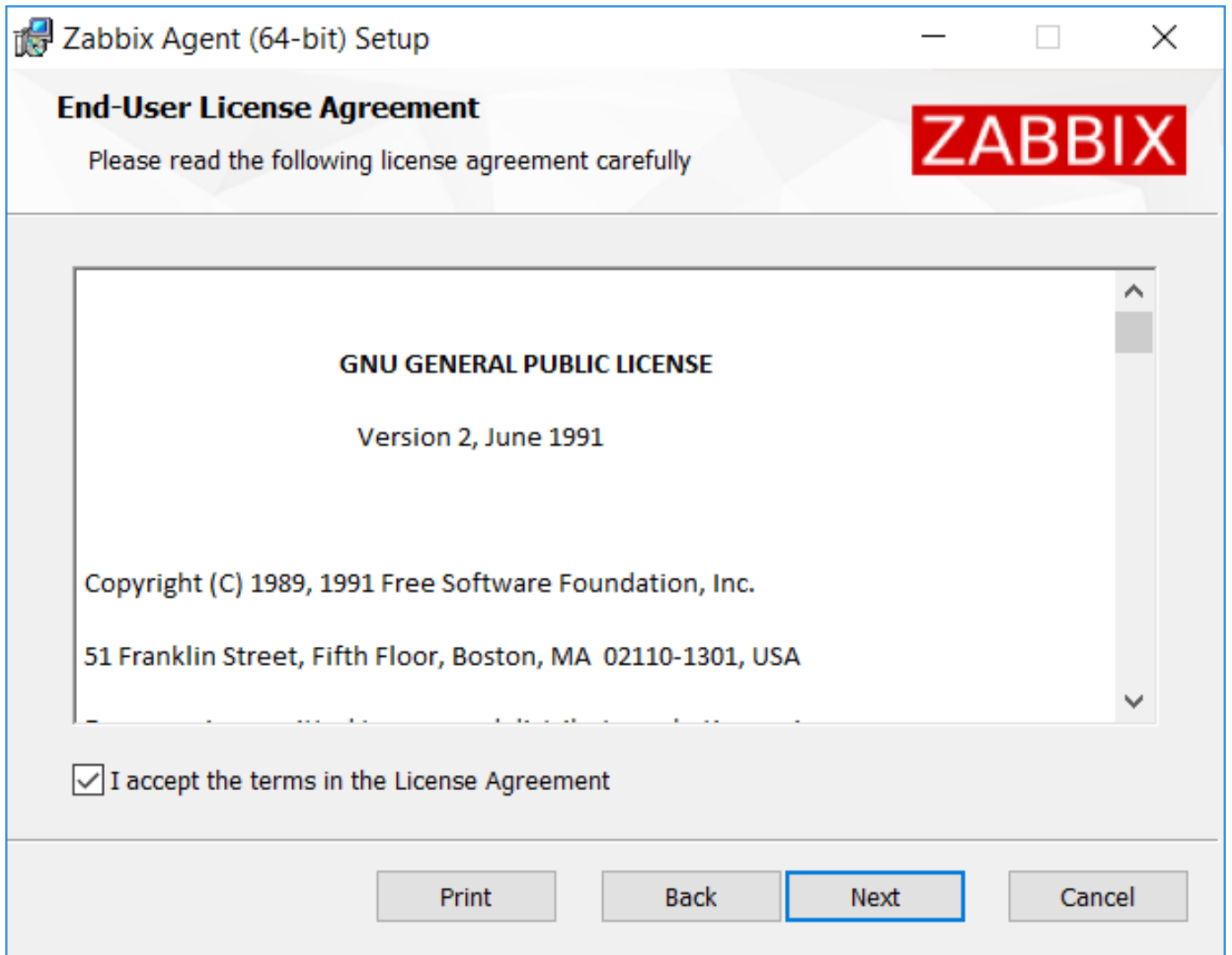
## Welcome to the Zabbix Agent (64-bit) Setup Wizard

The Setup Wizard will install Zabbix Agent (64-bit) on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

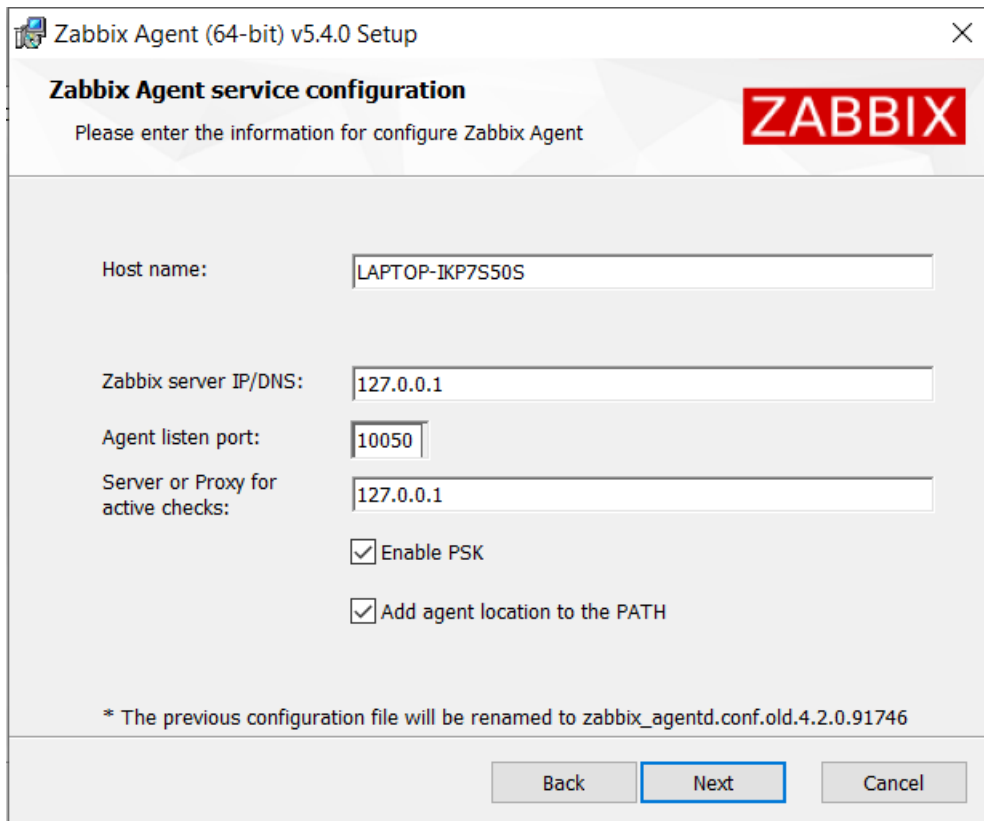
Back

Next

Cancel




Accept the license to proceed to the next step.



Specify the following parameters.

Parameter	Description
Host name	Specify host name.
Zabbix server IP/DNS	Specify IP/DNS of Zabbix server.
Agent listen port	Specify agent listen port (10050 by default).
Server or Proxy for active checks	Specify IP/DNS of Zabbix server/proxy for active agent checks.
Enable PSK	Mark the checkbox to enable TLS support via pre-shared keys.
Add agent location to the PATH	Add agent location to the PATH variable.

**Zabbix Agent (64-bit) PSK Setup**

**Zabbix Agent pre-shared key configuration** 

Please enter the PSK information for configure Zabbix Agent

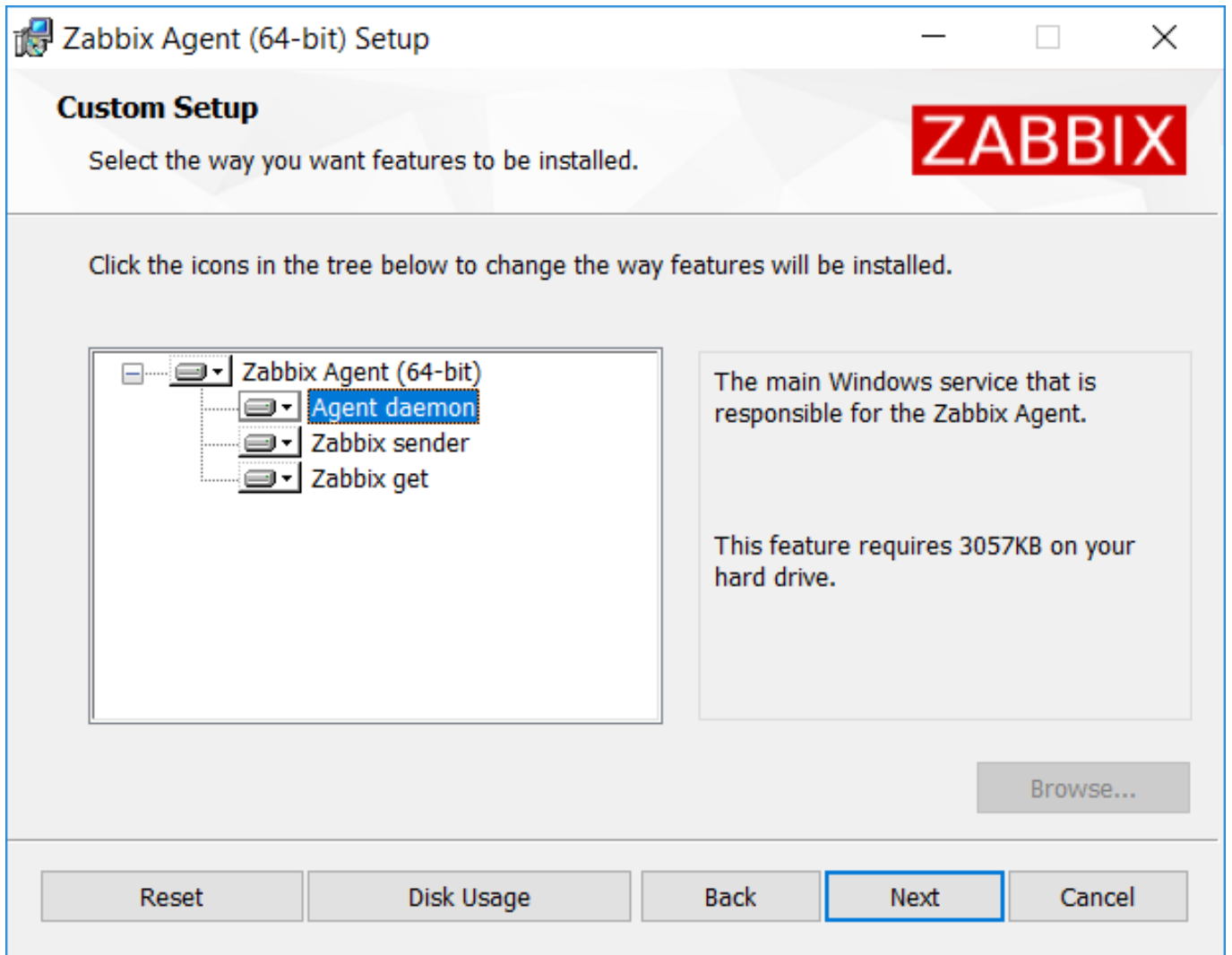
Pre-shared key identity:

Pre-shared key value:

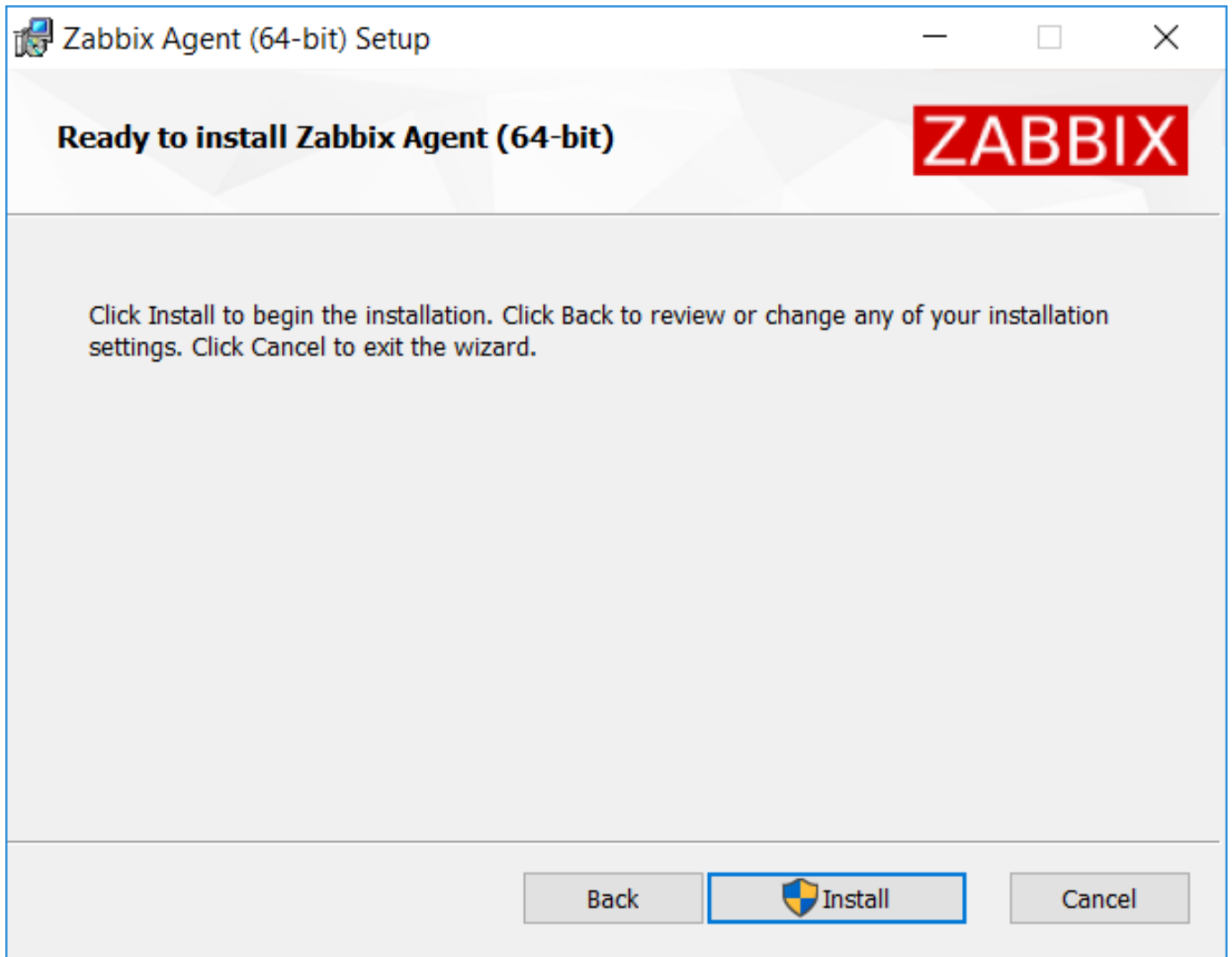
Please, set minimum required permission to access the psk.key file

Back Next Cancel

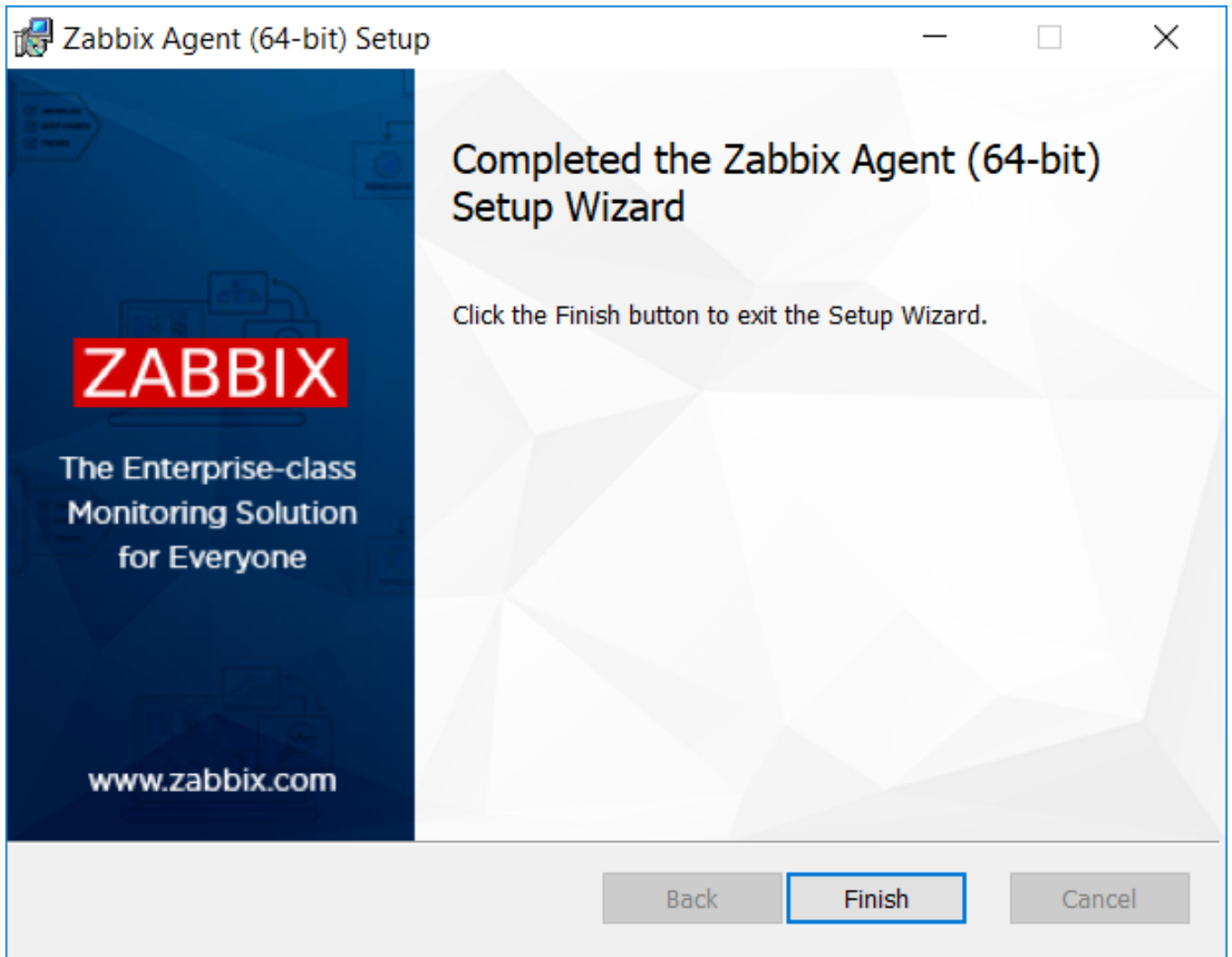
Enter pre-shared key identity and value. This step is only available if you checked Enable PSK in the previous step.



Select Zabbix components to install - Zabbix agent daemon, Zabbix sender, Zabbix get.



Zabbix components along with the configuration file will be installed in a Zabbix Agent folder in Program Files. zabbix\_agentd.exe will be set up as Windows service with automatic startup.



Command-line based installation

Supported parameters

The following set of parameters is supported by created MSIs:

Number	Parameter	Description
1	LOGTYPE	
2	LOGFILE	
3	SERVER	
4	LISTENPORT	
5	SERVERACTIVE	
6	HOSTNAME	
7	TIMEOUT	
8	TLSCONNECT	
9	TLSACCEPT	
10	TLSPSKIDENTITY	
11	TLSPSKFILE	
12	TLSPSKVALUE	
13	TLSCAFILE	
14	TLSCRLFILE	
15	TLSSERVERCERTISSUER	
16	TLSSERVERCERTSUBJECT	
17	TLSCERTFILE	
18	TLSKEYFILE	
19	INSTALLFOLDER	
20	ENABLEPATH	
21	SKIP	SKIP=fw - do not install firewall exception rule

To install you may run, for example:

```
SET INSTALLFOLDER=C:\Program Files\za

msiexec /l*v log.txt /i zabbix_agent-4.0.6-x86.msi /qn^
LOGTYPE=file^
LOGFILE="%INSTALLFOLDER%\za.log"^
SERVER=192.168.6.76^
LISTENPORT=12345^
SERVERACTIVE=:1^
HOSTNAME=myHost^
TLSCONNECT=psk^
TLSACCEPT=psk^
TLSPSKIDENTITY=MyPSKID^
TLSPSKFILE="%INSTALLFOLDER%\mykey.psk"^
TLSCAFILE="c:\temp\f.txt1"^
TLSCRLFILE="c:\temp\f.txt2"^
TLSSERVERCERTISSUER="My CA"^
TLSSERVERCERTSUBJECT="My Cert"^
TLCERTFILE="c:\temp\f.txt5"^
TLSKEYFILE="c:\temp\f.txt6"^
ENABLEPATH=1^
INSTALLFOLDER="%INSTALLFOLDER%"
SKIP=fw
```

or

```
msiexec /l*v log.txt /i zabbix_agent-4.4.0-x86.msi /qn^
SERVER=192.168.6.76^
TLSCONNECT=psk^
TLSACCEPT=psk^
TLSPSKIDENTITY=MyPSKID^
TLSPSKVALUE=1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952
```

## 6 Mac OS agent installation from PKG

### Overview

Zabbix Mac OS agent can be installed from PKG installer packages available for [download](#). Versions with or without encryption are available.

### Installing agent

The agent can be installed using the graphical user interface or from the command line, for example:

```
sudo installer -pkg zabbix_agent-5.2.0-macos-amd64-openssl.pkg -target /
```

Make sure to use the correct Zabbix package version in the command. It must match the name of the downloaded package.

### Running agent

The agent will start automatically after installation or restart.

You may edit the configuration file at `/usr/local/etc/zabbix/zabbix_agentd.conf` if necessary.

To start the agent manually, you may run:

```
sudo launchctl start com.zabbix.zabbix_agentd
```

To stop the agent manually:

```
sudo launchctl stop com.zabbix.zabbix_agentd
```

During upgrade, the existing configuration file is not overwritten. Instead a new `zabbix_agentd.conf.NEW` file is created to be used for reviewing and updating the existing configuration file, if necessary. Remember to restart the agent after manual changes to the configuration file.

### Troubleshooting and removing agent

This section lists some useful commands that can be used for troubleshooting and removing Zabbix agent installation.

See if Zabbix agent is running:

```
ps aux | grep zabbix_agentd
```

See if Zabbix agent has been installed from packages:

```
$ pkgutil --pkgs | grep zabbix
com.zabbix.pkg.ZabbixAgent
```

See the files that were installed from the installer package (note that the initial / is not displayed in this view):

```
$ pkgutil --only-files --files com.zabbix.pkg.ZabbixAgent
Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist
usr/local/bin/zabbix_get
usr/local/bin/zabbix_sender
usr/local/etc/zabbix/zabbix_agentd/userparameter_examples.conf.NEW
usr/local/etc/zabbix/zabbix_agentd/userparameter_mysql.conf.NEW
usr/local/etc/zabbix/zabbix_agentd.conf.NEW
usr/local/sbin/zabbix_agentd
```

Stop Zabbix agent if it was launched with launchctl:

```
sudo launchctl unload /Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist
```

Remove files (including configuration and logs) that were installed with installer package:

```
sudo rm -f /Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist
sudo rm -f /usr/local/sbin/zabbix_agentd
sudo rm -f /usr/local/bin/zabbix_get
sudo rm -f /usr/local/bin/zabbix_sender
sudo rm -rf /usr/local/etc/zabbix
sudo rm -rf /var/log/zabbix
```

Forget that Zabbix agent has been installed:

```
sudo pkgutil --forget com.zabbix.pkg.ZabbixAgent
```

## 5 Installation from containers

**Docker** Zabbix provides [Docker](#) images for each Zabbix component as portable and self-sufficient containers to speed up deployment and update procedure.

Zabbix components come with MySQL and PostgreSQL database support, Apache2 and Nginx web server support. These images are separated into different images.

Docker base images

Zabbix components are provided on Ubuntu, Alpine Linux and CentOS base images:

Image	Version
<a href="#">alpine</a>	3.12
<a href="#">ubuntu</a>	20.04 (focal)
<a href="#">centos</a>	8

All images are configured to rebuild latest images if base images are updated.

Docker file sources

Everyone can follow Docker file changes using the Zabbix [official repository](#) on [github.com](#). You can fork the project or make your own images based on official Docker files.

Structure

All Zabbix components are available in the following Docker repositories:

- Zabbix agent - [zabbix/zabbix-agent](#)
- Zabbix server
  - Zabbix server with MySQL database support - [zabbix/zabbix-server-mysql](#)
  - Zabbix server with PostgreSQL database support - [zabbix/zabbix-server-pgsql](#)
- Zabbix web-interface



- Zabbix web-interface based on Apache2 web server with MySQL database support - [zabbix/zabbix-web-apache-mysql](#)
- Zabbix web-interface based on Apache2 web server with PostgreSQL database support - [zabbix/zabbix-web-apache-pgsq](#)
- Zabbix web-interface based on Nginx web server with MySQL database support - [zabbix/zabbix-web-nginx-mysql](#)
- Zabbix web-interface based on Nginx web server with PostgreSQL database support - [zabbix/zabbix-web-nginx-pgsq](#)
- Zabbix proxy
  - Zabbix proxy with SQLite3 database support - [zabbix/zabbix-proxy-sqlite3](#)
  - Zabbix proxy with MySQL database support - [zabbix/zabbix-proxy-mysql](#)
- Zabbix Java Gateway - [zabbix/zabbix-java-gateway](#)

Additionally there is SNMP trap support. It is provided as additional repository ([zabbix/zabbix-snmptaps](#)) based on Ubuntu Trusty only. It could be linked with Zabbix server and Zabbix proxy.

## Versions

Each repository of Zabbix components contains the following tags:

- `latest` - latest stable version of a Zabbix component based on Alpine Linux image
- `alpine-latest` - latest stable version of a Zabbix component based on Alpine Linux image
- `ubuntu-latest` - latest stable version of a Zabbix component based on Ubuntu image
- `alpine-5.2-latest` - latest minor version of a Zabbix 5.2 component based on Alpine Linux image
- `ubuntu-5.2-latest` - latest minor version of a Zabbix 5.2 component based on Ubuntu image
- `alpine-5.2.*` - different minor versions of a Zabbix 5.2 component based on Alpine Linux image, where `*` is the minor version of Zabbix component
- `ubuntu-5.2.*` - different minor versions of a Zabbix 5.2 component based on Ubuntu image, where `*` is the minor version of Zabbix component

## Usage

### Environment variables

All Zabbix component images provide environment variables to control configuration. These environment variables are listed in each component repository. These environment variables are options from Zabbix configuration files, but with different naming method. For example, `ZBX_LOGSLOWQUERIES` is equal to `LogSlowQueries` from Zabbix server and Zabbix proxy configuration files.

#### Attention:

Some of configuration options are not allowed to change. For example, `PIDFile` and `LogType`.

Some of components have specific environment variables, which do not exist in official Zabbix configuration files:

Variable	Components	Description
<code>DB_SERVER_HOST</code>	Server Proxy Web interface	This variable is IP or DNS name of MySQL or PostgreSQL server. By default, value is <code>mysql-server</code> or <code>postgres-server</code> for MySQL or PostgreSQL respectively
<code>DB_SERVER_PORT</code>	Server Proxy Web interface	This variable is port of MySQL or PostgreSQL server. By default, value is <code>'3306'</code> or <code>'5432'</code> respectively.
<code>MYSQL_USER</code>	Server Proxy Web-interface	MySQL database user. By default, value is <code>'zabbix'</code> .
<code>MYSQL_PASSWORD</code>	Server Proxy Web interface	MySQL database password. By default, value is <code>'zabbix'</code> .
<code>MYSQL_DATABASE</code>	Server Proxy Web interface	Zabbix database name. By default, value is <code>'zabbix'</code> for Zabbix server and <code>'zabbix_proxy'</code> for Zabbix proxy.
<code>POSTGRES_USER</code>	Server Web interface	PostgreSQL database user. By default, value is <code>'zabbix'</code> .
<code>POSTGRES_PASSWORD</code>	Server Web interface	PostgreSQL database password. By default, value is <code>'zabbix'</code> .

POSTGRES_DB	Server Web interface	Zabbix database name. By default, value is 'zabbix' for Zabbix server and 'zabbix_proxy' for Zabbix proxy.
PHP_TZ	Web-interface	Timezone in PHP format. Full list of supported timezones are available on <a href="http://php.net">php.net</a> . By default, value is 'Europe/Riga'.
ZBX_SERVER_NAME	Web interface	Visible Zabbix installation name in right top corner of the web interface. By default, value is 'Zabbix Docker'
ZBX_JAVAGATEWAY_ENABLE	Server Proxy	Enables communication with Zabbix Java gateway to collect Java related checks. By default, value is "false"
ZBX_ENABLE_SNMP_TRAPS	Server Proxy	Enables SNMP trap feature. It requires <b>zabbix-snmptraps</b> instance and shared volume /var/lib/zabbix/snmptraps to Zabbix server or Zabbix proxy.

## Volumes

The images allow to use some mount points. These mount points are different and depend on Zabbix component type:

Volume	Description
<b>Zabbix agent</b>	
/etc/zabbix/zabbix_agentd.d	The volume allows to include *.conf files and extend Zabbix agent using the <code>UserParameter</code> feature
/var/lib/zabbix/modules	The volume allows to load additional modules and extend Zabbix agent using the <code>LoadModule</code> feature
/var/lib/zabbix/enc	The volume is used to store TLS-related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables
<b>Zabbix server</b>	
/usr/lib/zabbix/alertscripts	The volume is used for custom alert scripts. It is the <code>AlertScriptsPath</code> parameter in <code>zabbix_server.conf</code>
/usr/lib/zabbix/externalscripts	The volume is used by <code>external checks</code> . It is the <code>ExternalScripts</code> parameter in <code>zabbix_server.conf</code>
/var/lib/zabbix/modules	The volume allows to load additional modules and extend Zabbix server using the <code>LoadModule</code> feature
/var/lib/zabbix/enc	The volume is used to store TLS related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables
/var/lib/zabbix/ssl/certs	The volume is used as location of SSL client certificate files for client authentication. It is the <code>SSLCertLocation</code> parameter in <code>zabbix_server.conf</code>
/var/lib/zabbix/ssl/keys	The volume is used as location of SSL private key files for client authentication. It is the <code>SSLKeyLocation</code> parameter in <code>zabbix_server.conf</code>
/var/lib/zabbix/ssl/ssl_ca	The volume is used as location of certificate authority (CA) files for SSL server certificate verification. It is the <code>SSLCALocation</code> parameter in <code>zabbix_server.conf</code>
/var/lib/zabbix/snmptraps	The volume is used as location of <code>snmptraps.log</code> file. It could be shared by <code>zabbix-snmptraps</code> container and inherited using the <code>volumes_from</code> Docker option while creating a new instance of Zabbix server. SNMP trap processing feature could be enabled by using shared volume and switching the <code>ZBX_ENABLE_SNMP_TRAPS</code> environment variable to 'true'

---

<code>/var/lib/zabbix/mibs</code>	The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>
<b>Zabbix proxy</b>	
<code>/usr/lib/zabbix/externalscripts</code>	The volume is used by <code>external checks</code> . It is the <code>ExternalScripts</code> parameter in <code>zabbix_proxy.conf</code>
<code>/var/lib/zabbix/modules</code>	The volume allows to load additional modules and extend Zabbix server using the <code>LoadModule</code> feature
<code>/var/lib/zabbix/enc</code>	The volume is used to store TLS related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables
<code>/var/lib/zabbix/ssl/certs</code>	The volume is used as location of SSL client certificate files for client authentication. It is the <code>SSLCertLocation</code> parameter in <code>zabbix_proxy.conf</code>
<code>/var/lib/zabbix/ssl/keys</code>	The volume is used as location of SSL private key files for client authentication. It is the <code>SSLKeyLocation</code> parameter in <code>zabbix_proxy.conf</code>
<code>/var/lib/zabbix/ssl/ssl_ca</code>	The volume is used as location of certificate authority (CA) files for SSL server certificate verification. It is the <code>SSLCALocation</code> parameter in <code>zabbix_proxy.conf</code>
<code>/var/lib/zabbix/snmptraps</code>	The volume is used as location of <code>snmptraps.log</code> file. It could be shared by the <code>zabbix-snmptraps</code> container and inherited using the <code>volumes_from</code> Docker option while creating a new instance of Zabbix server. SNMP trap processing feature could be enabled by using shared volume and switching the <code>ZBX_ENABLE_SNMP_TRAPS</code> environment variable to 'true'
<code>/var/lib/zabbix/mibs</code>	The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>
<b>Zabbix web interface based on Apache2 web server</b>	
<code>/etc/ssl/apache2</code>	The volume allows to enable HTTPS for Zabbix web interface. The volume must contain the two <code>ssl.crt</code> and <code>ssl.key</code> files prepared for Apache2 SSL connections
<b>Zabbix web interface based on Nginx web server</b>	
<code>/etc/ssl/nginx</code>	The volume allows to enable HTTPS for Zabbix web interface. The volume must contain the two <code>ssl.crt</code> , <code>ssl.key</code> files and <code>dhparam.pem</code> prepared for Nginx SSL connections
<b>Zabbix snmptraps</b>	
<code>/var/lib/zabbix/snmptraps</code>	The volume contains the <code>snmptraps.log</code> log file named with received SNMP traps
<code>/var/lib/zabbix/mibs</code>	The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>

---

For additional information use Zabbix official repositories in Docker Hub.

#### Usage examples

##### \*\* Example 1 \*\*

The example demonstrates how to run Zabbix server with MySQL database support, Zabbix web interface based on the Nginx web server and Zabbix Java gateway.

1. Create network dedicated for Zabbix component containers:

```
# docker network create --subnet 172.20.0.0/16 --ip-range 172.20.240.0/20 zabbix-net
```

2. Start empty MySQL server instance

```
# docker run --name mysql-server -t \
  -e MYSQL_DATABASE="zabbix" \
  -e MYSQL_USER="zabbix" \
  -e MYSQL_PASSWORD="zabbix_pwd" \
  -e MYSQL_ROOT_PASSWORD="root_pwd" \
```

```
--network=zabbix-net \  
-d mysql:8.0 \  
--restart unless-stopped \  
--character-set-server=utf8 --collation-server=utf8_bin \  
--default-authentication-plugin=mysql_native_password
```

### 3. Start Zabbix Java gateway instance

```
# docker run --name zabbix-java-gateway -t \  
  --network=zabbix-net \  
  --restart unless-stopped \  
  -d zabbix/zabbix-java-gateway:alpine-5.2-latest
```

### 4. Start Zabbix server instance and link the instance with created MySQL server instance

```
# docker run --name zabbix-server-mysql -t \  
  -e DB_SERVER_HOST="mysql-server" \  
  -e MYSQL_DATABASE="zabbix" \  
  -e MYSQL_USER="zabbix" \  
  -e MYSQL_PASSWORD="zabbix_pwd" \  
  -e MYSQL_ROOT_PASSWORD="root_pwd" \  
  -e ZBX_JAVAGATEWAY="zabbix-java-gateway" \  
  --network=zabbix-net \  
  -p 10051:10051 \  
  --restart unless-stopped \  
  -d zabbix/zabbix-server-mysql:alpine-5.2-latest
```

#### Note:

Zabbix server instance exposes 10051/TCP port (Zabbix trapper) to host machine.

### 5. Start Zabbix web interface and link the instance with created MySQL server and Zabbix server instances

```
# docker run --name zabbix-web-nginx-mysql -t \  
  -e ZBX_SERVER_HOST="zabbix-server-mysql" \  
  -e DB_SERVER_HOST="mysql-server" \  
  -e MYSQL_DATABASE="zabbix" \  
  -e MYSQL_USER="zabbix" \  
  -e MYSQL_PASSWORD="zabbix_pwd" \  
  -e MYSQL_ROOT_PASSWORD="root_pwd" \  
  --network=zabbix-net \  
  -p 80:8080 \  
  --restart unless-stopped \  
  -d zabbix/zabbix-web-nginx-mysql:alpine-5.2-latest
```

#### Note:

Zabbix web interface instance exposes 80/TCP port (HTTP) to host machine.

#### \*\* Example 2 \*\*

The example demonstrates how to run Zabbix server with PostgreSQL database support, Zabbix web interface based on the Nginx web server and SNMP trap feature.

### 1. Create network dedicated for Zabbix component containers:

```
# docker network create --subnet 172.20.0.0/16 --ip-range 172.20.240.0/20 zabbix-net
```

### 2. Start empty PostgreSQL server instance

```
# docker run --name postgres-server -t \  
  -e POSTGRES_USER="zabbix" \  
  -e POSTGRES_PASSWORD="zabbix_pwd" \  
  -e POSTGRES_DB="zabbix" \  
  --network=zabbix-net \  
  --restart unless-stopped \  
  -d postgres:latest
```

### 3. Start Zabbix snmptraps instance

```
# docker run --name zabbix-snmptests -t \
  -v /zbx_instance/snmptests:/var/lib/zabbix/snmptests:rw \
  -v /var/lib/zabbix/mibs:/usr/share/snmp/mibs:ro \
  --network=zabbix-net \
  -p 162:1162/udp \
  --restart unless-stopped \
  -d zabbix/zabbix-snmptests:alpine-5.2-latest
```

**Note:**

Zabbix snmptest instance exposes the 162/UDP port (SNMP traps) to host machine.

4. Start Zabbix server instance and link the instance with created PostgreSQL server instance

```
# docker run --name zabbix-server-pgsql -t \
  -e DB_SERVER_HOST="postgres-server" \
  -e POSTGRES_USER="zabbix" \
  -e POSTGRES_PASSWORD="zabbix_pwd" \
  -e POSTGRES_DB="zabbix" \
  -e ZBX_ENABLE_SNMP_TRAPS="true" \
  --network=zabbix-net \
  -p 10051:10051 \
  --volumes-from zabbix-snmptests \
  --restart unless-stopped \
  -d zabbix/zabbix-server-pgsql:alpine-5.2-latest
```

**Note:**

Zabbix server instance exposes the 10051/TCP port (Zabbix trapper) to host machine.

5. Start Zabbix web interface and link the instance with created PostgreSQL server and Zabbix server instances

```
# docker run --name zabbix-web-nginx-pgsql -t \
  -e ZBX_SERVER_HOST="zabbix-server-pgsql" \
  -e DB_SERVER_HOST="postgres-server" \
  -e POSTGRES_USER="zabbix" \
  -e POSTGRES_PASSWORD="zabbix_pwd" \
  -e POSTGRES_DB="zabbix" \
  --network=zabbix-net \
  -p 443:8443 \
  -p 80:8080 \
  -v /etc/ssl/nginx:/etc/ssl/nginx:ro \
  --restart unless-stopped \
  -d zabbix/zabbix-web-nginx-pgsql:alpine-5.2-latest
```

**Note:**

Zabbix web interface instance exposes the 443/TCP port (HTTPS) to host machine.

Directory /etc/ssl/nginx must contain certificate with required name.

**\*\* Example 3 \*\***

The example demonstrates how to run Zabbix server with MySQL database support, Zabbix web interface based on the Nginx web server and Zabbix Java gateway using podman on Red Hat 8.

1. Create new pod with name zabbix and exposed ports (web-interface, Zabbix server trapper):

```
podman pod create --name zabbix -p 80:8080 -p 10051:10051
```

2. (optional) Start Zabbix agent container in zabbix pod location:

```
podman run --name zabbix-agent \
  -eZBX_SERVER_HOST="127.0.0.1,localhost" \
  --restart=always \
  --pod=zabbix \
  -d registry.connect.redhat.com/zabbix/zabbix-agent-50:latest
```

3. Create ./mysql/ directory on host and start Oracle MySQL server 8.0:

```
podman run --name mysql-server -t \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
-v ./mysql/:/var/lib/mysql/:Z \
--restart=always \
--pod=zabbix \
-d mysql:8.0 \
--character-set-server=utf8 --collation-server=utf8_bin \
--default-authentication-plugin=mysql_native_password
```

3. Start Zabbix server container:

```
podman run --name zabbix-server-mysql -t \
-e DB_SERVER_HOST="127.0.0.1" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
-e ZBX_JAVAGATEWAY="127.0.0.1" \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-server-mysql-50
```

4. Start Zabbix Java Gateway container:

```
podman run --name zabbix-java-gateway -t \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-java-gateway-50
```

5. Start Zabbix web-interface container:

```
podman run --name zabbix-web-mysql -t \
-e ZBX_SERVER_HOST="127.0.0.1" \
-e DB_SERVER_HOST="127.0.0.1" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-web-mysql-50
```

**Note:**

Pod zabbix exposes 80/TCP port (HTTP) to host machine from 8080/TCP of zabbix-web-mysql container.

**Docker Compose** Zabbix provides compose files also for defining and running multi-container Zabbix components in Docker. These compose files are available in Zabbix docker official repository on github.com: <https://github.com/zabbix/zabbix-docker>. These compose files are added as examples, they are overloaded. For example, they contain proxies with MySQL and SQLite3 support.

There are a few different versions of compose files:

File name	Description
docker-compose_v3_alpine_mysql_latest.yaml	The compose file runs the latest version of Zabbix 5.2 components on Alpine Linux with MySQL database support.
docker-compose_v3_alpine_mysql_local.yaml	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on Alpine Linux with MySQL database support.
docker-compose_v3_alpine_pgsqllatest.yaml	The compose file runs the latest version of Zabbix 5.2 components on Alpine Linux with PostgreSQL database support.

---

<code>docker-compose_v3_alpine_pgsql_local.yaml</code>	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on Alpine Linux with PostgreSQL database support.
<code>docker-compose_v3_centos_mysql_latest.yaml</code>	The compose file runs the latest version of Zabbix 5.2 components on CentOS 8 with MySQL database support.
<code>docker-compose_v3_centos_mysql_local.yaml</code>	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on CentOS 8 with MySQL database support.
<code>docker-compose_v3_centos_pgsql_latest.yaml</code>	The compose file runs the latest version of Zabbix 5.2 components on CentOS 8 with PostgreSQL database support.
<code>docker-compose_v3_centos_pgsql_local.yaml</code>	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on CentOS 8 with PostgreSQL database support.
<code>docker-compose_v3_ubuntu_mysql_latest.yaml</code>	The compose file runs the latest version of Zabbix 5.2 components on Ubuntu 20.04 with MySQL database support.
<code>docker-compose_v3_ubuntu_mysql_local.yaml</code>	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on Ubuntu 20.04 with MySQL database support.
<code>docker-compose_v3_ubuntu_pgsql_latest.yaml</code>	The compose file runs the latest version of Zabbix 5.2 components on Ubuntu 20.04 with PostgreSQL database support.
<code>docker-compose_v3_ubuntu_pgsql_local.yaml</code>	The compose file locally builds the latest version of Zabbix 5.2 and runs Zabbix components on Ubuntu 20.04 with PostgreSQL database support.

---

**Attention:**

Available Docker compose files support version 3 of Docker Compose.

### Storage

Compose files are configured to support local storage on a host machine. Docker Compose will create a `zbx_env` directory in the folder with the compose file when you run Zabbix components using the compose file. The directory will contain the same structure as described above in the **Volumes** section and directory for database storage.

There are also volumes in read-only mode for `/etc/localtime` and `/etc/timezone` files.

### Environment files

In the same directory with compose files on github.com you can find files with default environment variables for each component in compose file. These environment files are named like `.env_<type of component>`.

### Examples

**\*\* Example 1 \*\***

```
# git checkout 5.2
# docker-compose -f ./docker-compose_v3_alpine_mysql_latest.yaml up -d
```

The command will download latest Zabbix 5.2 images for each Zabbix component and run them in detach mode.

**Attention:**

Do not forget to download `.env_<type of component>` files from github.com official Zabbix repository with compose files.

**\*\* Example 2 \*\***

```
# git checkout 5.2
# docker-compose -f ./docker-compose_v3_ubuntu_mysql_local.yaml up -d
```

The command will download base image Ubuntu 20.04 (focal), then build Zabbix 5.2 components locally and run them in detach mode.

## 6 Web interface installation

This section provides step-by-step instructions for installing Zabbix web interface. Zabbix frontend is written in PHP, so to run it a PHP supported webserver is needed.

### Welcome screen

Open Zabbix frontend URL in the browser. If you have installed Zabbix from packages, the URL is:

- for Apache: `http://<server_ip_or_name>/zabbix`
- for Nginx: `http://<server_ip_or_name>`

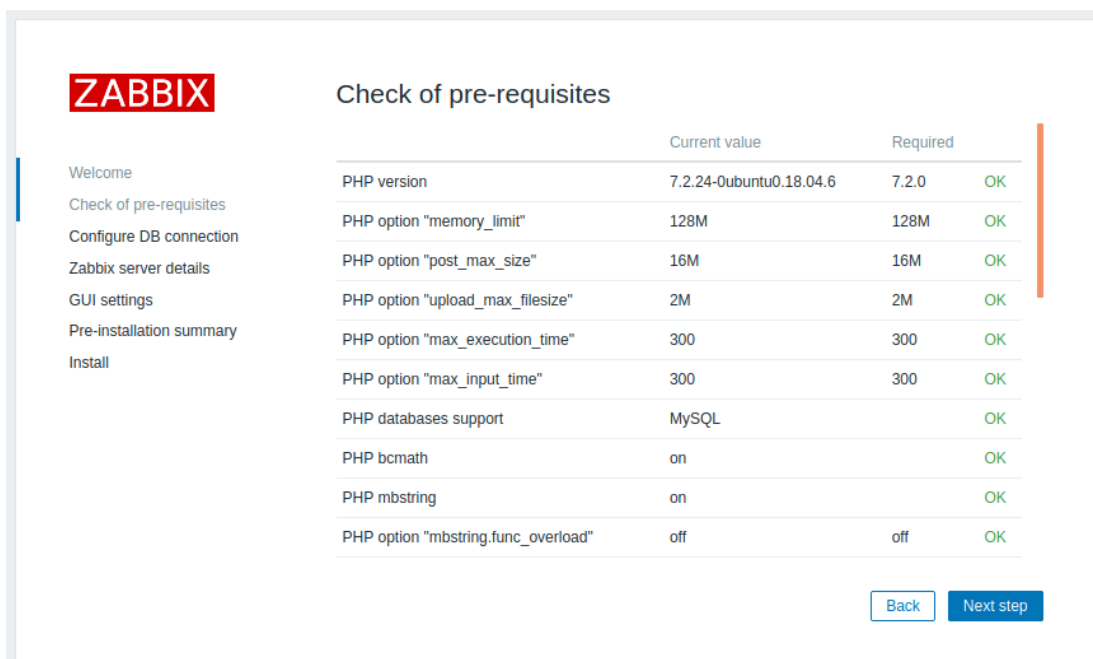
You should see the first screen of the frontend installation wizard.

Use the Default language drop-down menu to change system default language and continue the installation process in the selected language (optional). For more information, see [Installation of additional frontend languages](#).



### Check of pre-requisites

Make sure that all software prerequisites are met.



Pre-requisite	Minimum value	Description
PHP version	7.2.5	
PHP memory_limit option	128MB	In php.ini: memory_limit = 128M



Pre-requisite	Minimum value	Description
PHP post_max_size option	16MB	In php.ini: post_max_size = 16M
PHP upload_max_filesize option	2MB	In php.ini: upload_max_filesize = 2M
PHP max_execution_time option	300 seconds (values 0 and -1 are allowed)	In php.ini: max_execution_time = 300
PHP max_input_time option	300 seconds (values 0 and -1 are allowed)	In php.ini: max_input_time = 300
PHP session.auto_start option	must be disabled	In php.ini: session.auto_start = 0
Database support	One of: MySQL, Oracle, PostgreSQL.	One of the following modules must be installed: mysql, oci8, pgsq
bcmath		php-bcmath
mbstring		php-mbstring
PHP mbstring.func_overload option	must be disabled	In php.ini: mbstring.func_overload = 0
sockets		php-net-socket. Required for user script support.
gd	2.0.28	php-gd. PHP GD extension must support PNG images (--with-png-dir), JPEG (--with-jpeg-dir) images and FreeType 2 (--with-freetype-dir).
libxml	2.6.15	php-xml
xmlwriter		php-xmlwriter
xmlreader		php-xmlreader
ctype		php-ctype
session		php-session
gettext		php-gettext Since Zabbix 2.2.1, the PHP gettext extension is not a mandatory requirement for installing Zabbix. If gettext is not installed, the frontend will work as usual, however, the translations will not be available.

Optional pre-requisites may also be present in the list. A failed optional prerequisite is displayed in orange and has a Warning status. With a failed optional pre-requisite, the setup may continue.

**Attention:**

If there is a need to change the Apache user or user group, permissions to the session folder must be verified. Otherwise Zabbix setup may be unable to continue.

Configure DB connection

Enter details for connecting to the database. Zabbix database must already be created.

**ZABBIX**

### Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database type:

Database host:

Database port:  0 - use default port

Database name:

Store credentials in:  Plain text  HashiCorp Vault

User:

Password:

Database TLS encryption:  *Connection will not be encrypted because it uses a socket file (on Unix) or shared memory (Windows).*

If the Database TLS encryption option is checked, then additional fields for **configuring the TLS connection** to the database appear in the form (MySQL or PostgreSQL only).

If HashiCorp Vault option is selected for storing credentials, additional fields are available for specifying the Vault API endpoint, secret path and authentication token:

**ZABBIX**

### Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database type:

Database host:

Database port:  0 - use default port

Database name:

Store credentials in:  Plain text  HashiCorp Vault

Vault API endpoint:

Vault secret path:

Vault authentication token:

Database TLS encryption:

#### Zabbix server details

Enter Zabbix server details.

**ZABBIX**

### Zabbix server details

Please enter the host name or host IP address and port number of the Zabbix server, as well as the name of the installation (optional).

Host

Port

Name

[Back](#) [Next step](#)

Entering a name for Zabbix server is optional, however, if submitted, it will be displayed in the menu bar and page titles.

### GUI settings

Set the default **time zone** and theme for the frontend.

**ZABBIX**

### GUI settings

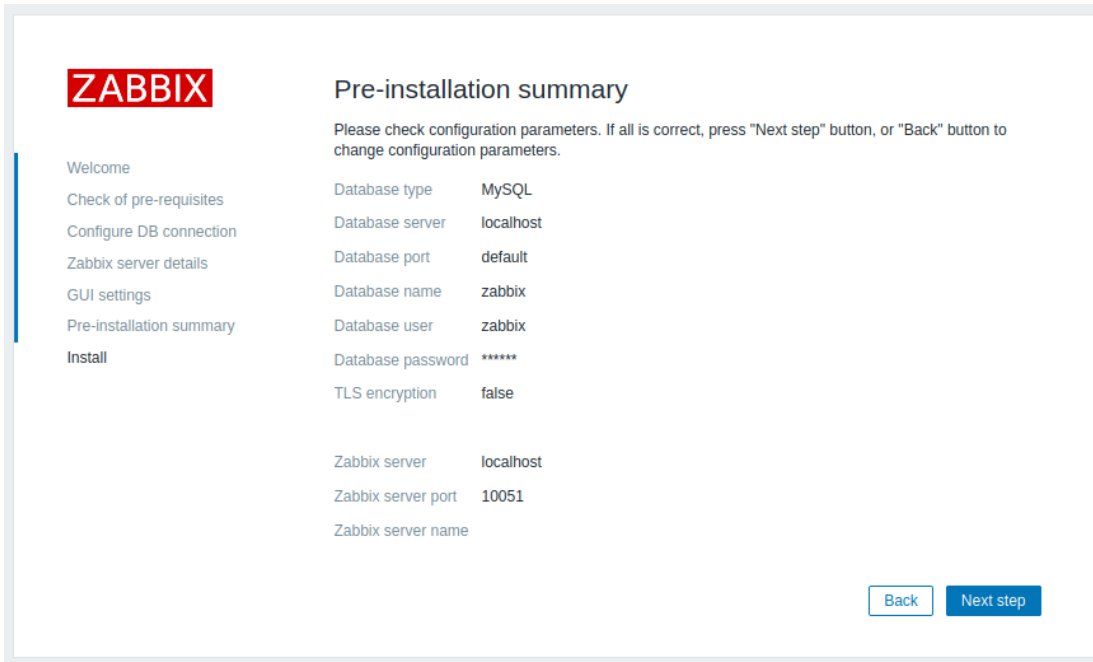
Default time zone

Default theme

[Back](#) [Next step](#)

### Pre-installation summary

Review a summary of settings.



**ZABBIX**

**Pre-installation summary**

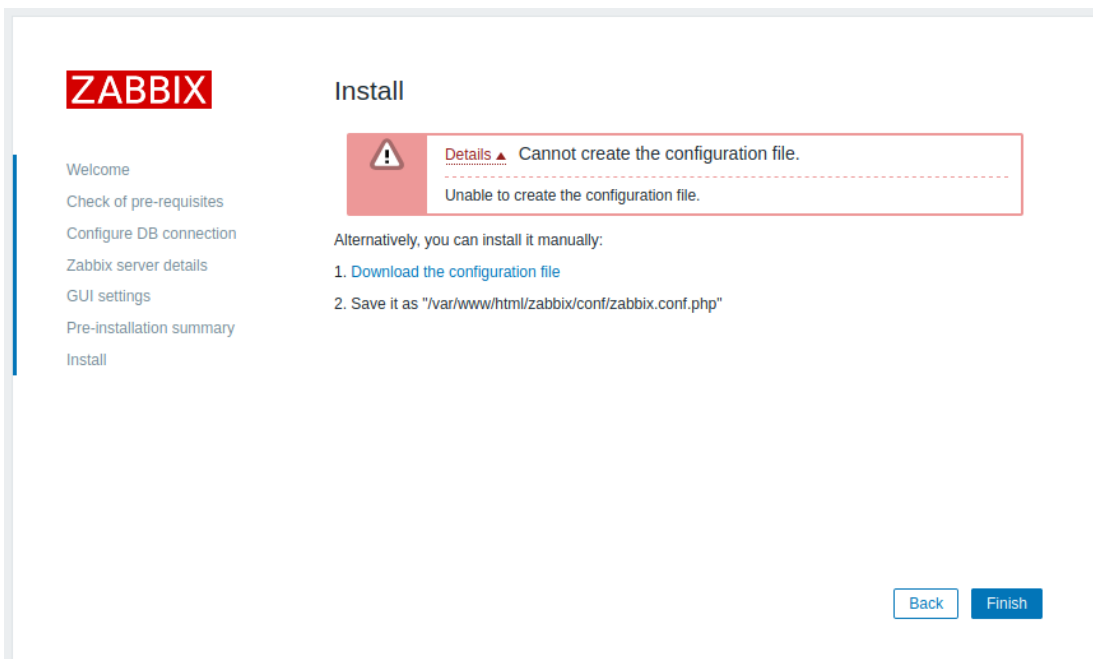
Please check configuration parameters. If all is correct, press "Next step" button, or "Back" button to change configuration parameters.

- Database type: MySQL
- Database server: localhost
- Database port: default
- Database name: zabbix
- Database user: zabbix
- Database password: \*\*\*\*\*
- TLS encryption: false
- Zabbix server: localhost
- Zabbix server port: 10051
- Zabbix server name:

Buttons: Back, Next step

## Install

If installing Zabbix from sources, download the configuration file and place it under conf/ in the webserver HTML documents subdirectory where you copied Zabbix PHP files to.



**ZABBIX**

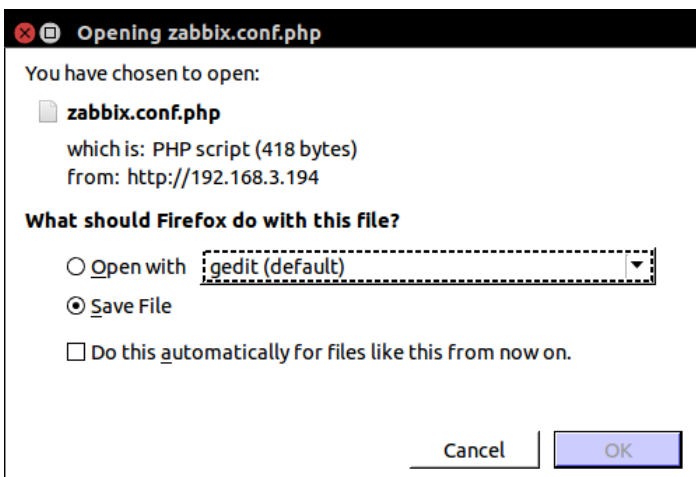
**Install**

**Cannot create the configuration file.**  
Unable to create the configuration file.

Alternatively, you can install it manually:

1. [Download the configuration file](#)
2. Save it as "/var/www/html/zabbix/conf/zabbix.conf.php"

Buttons: Back, Finish



Opening zabbix.conf.php

You have chosen to open:

- zabbix.conf.php which is: PHP script (418 bytes) from: http://192.168.3.194

What should Firefox do with this file?

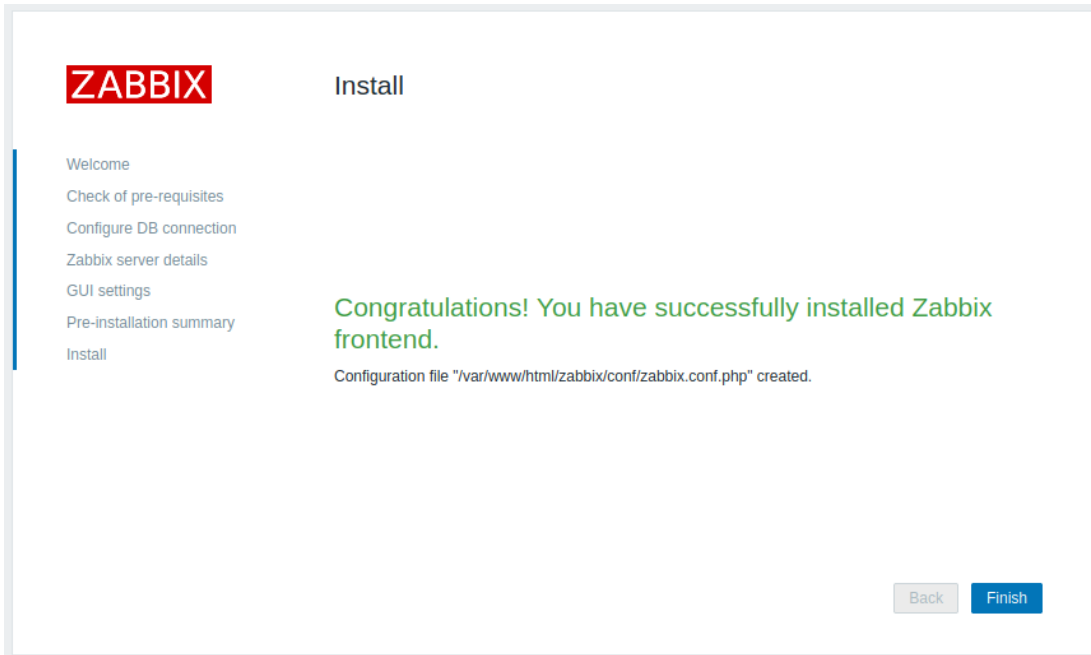
- Open with gedit (default)
- Save File
- Do this automatically for files like this from now on.

Buttons: Cancel, OK

**Note:**

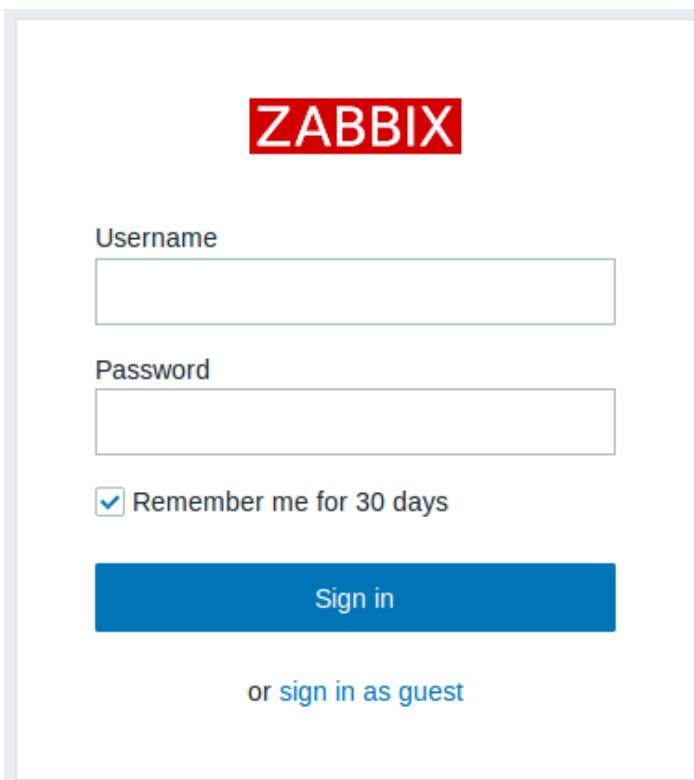
Providing the webservice user has write access to conf/ directory the configuration file would be saved automatically and it would be possible to proceed to the next step right away.

Finish the installation.



Log in

Zabbix frontend is ready! The default user name is **Admin**, password **zabbix**.



Proceed to [getting started with Zabbix](#).

**Debian/Ubuntu frontend installation**

Overview

Starting from version 5.0, Zabbix frontend requires PHP version 7.2 or later. Unfortunately, older versions of Debian & Ubuntu provide only PHP versions below 7.2.

Supported PHP versions by distribution

Distribution	PHP Version
Debian 10 (buster)	7.3
Debian 9 (stretch)	7.0
Debian 8 (jessie)	5.6
Ubuntu 20.04 (focal)	7.4
Ubuntu 18.04 (bionic)	7.2
Ubuntu 16.04 (xenial)	7.0
Ubuntu 14.04 (trusty)	5.5
Raspbian 10 (buster)	7.3
Raspbian 8 (stretch)	7.0

On stretch, jessie, xenial and trusty distributions, PHP 7.2 dependency is not available, and therefore Zabbix frontend 5.0 or newer cannot be easily installed. Considering this, `zabbix-frontend-php` package has been replaced with `zabbix-frontend-php-deprecated` package on aforementioned distributions.

The main difference is absence of direct dependencies on any php or web-server packages. Thus, the user can (and must) provide these dependencies on their own. In other words, installing `zabbix-frontend-php-deprecated` package on its own will not give you a working frontend. A web server as well as PHP 7.2 with its modules have to be installed manually (use PPAs / build PHP from source). We don't endorse any particular method.

**Note:**

The official way of getting PHP 7.2 or later on older versions of Debian/Ubuntu is to upgrade to buster/bionic.

PHP modules required for Zabbix frontend are `php-gd`, `php-bcmath`, `php-mbstring`, `php-xml`, `php-ldap` and `php-json`.

## 7 Upgrade procedure

### Overview

This section provides upgrade information for Zabbix **5.2**:

- using packages:
  - for [Red Hat Enterprise Linux/CentOS](#)
  - for [Debian/Ubuntu](#)
- using [sources](#)

Direct upgrade to Zabbix 5.2.x is possible from Zabbix **5.0.x**, **4.4.x**, **4.2.x**, **4.0.x**, **3.4.x**, **3.2.x**, **3.0.x**, **2.4.x**, **2.2.x** and **2.0.x**. For upgrading from earlier versions consult Zabbix documentation for 2.0 and earlier.

### Upgrade from packages

#### Overview

This section provides the steps required for a successful **upgrade** using official RPM and DEB packages provided by Zabbix for:

- [Red Hat Enterprise Linux/CentOS](#)
- [Debian/Ubuntu](#)

Zabbix packages from OS repositories

Often, OS distributions (in particular, Debian-based distributions) provide their own Zabbix packages.

Note, that these packages are not supported by Zabbix, they are typically out of date and lack the latest features and bug fixes. Only the packages from [repo.zabbix.com](http://repo.zabbix.com) are officially supported.

If you are upgrading from packages provided by OS distributions (or had them installed at some point), follow this procedure to switch to official Zabbix packages:

1. Always uninstall the old packages first.
2. Check for residual files that may have been left after deinstallation.

3. Install official packages following [installation instructions](#) provided by Zabbix.

Never do a direct update, as this may result in a broken installation.

## 1 Red Hat Enterprise Linux/CentOS

### Overview

This section provides the steps required for a successful **upgrade** from Zabbix **5.0.x** to Zabbix **5.2.x** using official Zabbix packages for Red Hat Enterprise Linux/CentOS.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the **same major version**. Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running during server upgrade no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 5.2 may take a long time.

#### **Warning:**

Before the upgrade make sure to read the relevant **upgrade notes!**

The following upgrade notes are available:

Upgrade from	Read full upgrade notes	Most important changes between versions
5.0.x	For: Zabbix <a href="#">5.2</a>	Minimum required PHP version upped from 7.2.0 to 7.2.5.
4.4.x	For: Zabbix <a href="#">5.0</a> Zabbix <a href="#">5.2</a>	Support of IBM DB2 dropped; Minimum required PHP version upped from 5.4.0 to 7.2.0. Minimum required database versions upped; Changed Zabbix PHP file directory.
4.2.x	For: Zabbix <a href="#">4.4</a> Zabbix <a href="#">5.0</a> Zabbix <a href="#">5.2</a>	Jabber, Ez Texting media types removed.
4.0.x LTS	For: Zabbix <a href="#">4.2</a> Zabbix <a href="#">4.4</a> Zabbix <a href="#">5.0</a> Zabbix <a href="#">5.2</a>	Older proxies no longer can report data to an upgraded server; Newer agents no longer will be able to work with an older Zabbix server.
3.4.x	For: Zabbix <a href="#">4.0</a> Zabbix <a href="#">4.2</a> Zabbix <a href="#">4.4</a> Zabbix <a href="#">5.0</a> Zabbix <a href="#">5.2</a>	'libpthread' and 'zlib' libraries now mandatory; Support for plain text protocol dropped and header is mandatory; Pre-1.4 version Zabbix agents are no longer supported; The Server parameter in passive proxy configuration now mandatory.
3.2.x	For: Zabbix <a href="#">3.4</a> Zabbix <a href="#">4.0</a> Zabbix <a href="#">4.2</a> Zabbix <a href="#">4.4</a> Zabbix <a href="#">5.0</a> Zabbix <a href="#">5.2</a>	SQLite support as backend database dropped for Zabbix server/frontend; Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended; 'libpcre' and 'libevent' libraries mandatory for Zabbix server; Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts; Zabbix Java gateway has to be upgraded to support new functionality.

Upgrade from	Read full upgrade notes	Most important changes between versions
3.0.x LTS	For: <a href="#">Zabbix 3.2</a> <a href="#">Zabbix 3.4</a> <a href="#">Zabbix 4.0</a> <a href="#">Zabbix 4.2</a> <a href="#">Zabbix 4.4</a> <a href="#">Zabbix 5.0</a> <a href="#">Zabbix 5.2</a>	Database upgrade may be slow, depending on the history table size.

You may also want to check the [requirements](#) for 5.2.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

### Upgrade procedure

#### 1 Stop Zabbix processes

Stop Zabbix server to make sure that no new data is inserted into database.

```
# systemctl stop zabbix-server
```

If upgrading the proxy, stop proxy too.

```
# systemctl stop zabbix-proxy
```

**Attention:**

It is no longer possible to start the upgraded server and have older, yet unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled when upgrading to 5.0 (or later) from any version before 4.4, as the server will ignore data from unupgraded proxies.

#### 2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

#### 3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

Configuration files:

```
# mkdir /opt/zabbix-backup/
# cp /etc/zabbix/zabbix_server.conf /opt/zabbix-backup/
# cp /etc/httpd/conf.d/zabbix.conf /opt/zabbix-backup/
```

PHP files and Zabbix binaries:

```
# cp -R /usr/share/zabbix/ /opt/zabbix-backup/
# cp -R /usr/share/doc/zabbix-* /opt/zabbix-backup/
```

#### 4 Update repository configuration package

To proceed with the upgrade your current repository package has to be updated.

```
# rpm -Uvh https://repo.zabbix.com/zabbix/5.2/rhel/8/x86_64/zabbix-release-5.2-1.el8.noarch.rpm
```

#### 5 Upgrade Zabbix components

To upgrade Zabbix components you may run something like:

```
# yum upgrade zabbix-server-mysql zabbix-web-mysql zabbix-agent
```

If using PostgreSQL, substitute `mysql` with `pgsql` in the command. If upgrading the proxy, substitute `server` with `proxy` in the command. If upgrading the agent 2, substitute `zabbix-agent` with `zabbix-agent2` in the command.

To upgrade the web frontend with Apache **on RHEL 8** correctly, also run:



```
# yum install zabbix-apache-conf
```

and make the necessary **changes** to this file.

To upgrade the web frontend **on RHEL 7** follow **distribution-specific instructions** (extra steps are required to install PHP 7.2 or newer).

6 Review component configuration parameters

See the upgrade notes for details on **mandatory changes**.

7 Start Zabbix processes

Start the updated Zabbix components.

```
# systemctl start zabbix-server
# systemctl start zabbix-proxy
# systemctl start zabbix-agent
# systemctl start zabbix-agent2
```

8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

Upgrade between minor versions

It is possible to upgrade between minor versions of 5.2.x (for example, from 5.2.1 to 5.2.3). Upgrading between minor versions is easy.

To execute Zabbix minor version upgrade it is required to run:

```
$ sudo yum upgrade 'zabbix-*
```

To execute Zabbix server minor version upgrade run:

```
$ sudo yum upgrade 'zabbix-server-*
```

To execute Zabbix agent minor version upgrade run:

```
$ sudo yum upgrade 'zabbix-agent-*
```

or, for Zabbix agent 2:

```
$ sudo yum upgrade 'zabbix-agent2-*
```

Note that you may also use 'update' instead of 'upgrade' in these commands. While 'upgrade' will delete obsolete packages, 'update' will preserve them.

## 2 Debian/Ubuntu

### Overview

This section provides the steps required for a successful **upgrade** from Zabbix **5.0.x** to Zabbix **5.2.x** using official Zabbix packages for Debian/Ubuntu.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the **same major version**. Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running during server upgrade no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 5.2 may take a long time.

#### **Warning:**

Before the upgrade make sure to read the relevant **upgrade notes!**

The following upgrade notes are available:

Upgrade from	Read full upgrade notes	Most important changes between versions
5.0.x	For: Zabbix 5.2	Minimum required PHP version upped from 7.2.0 to 7.2.5.
4.4.x	For: Zabbix 5.0 Zabbix 5.2	Support of IBM DB2 dropped; Minimum required PHP version upped from 5.4.0 to 7.2.0; Minimum required database versions upped; Changed Zabbix PHP file directory.
4.2.x	For: Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Jabber, Ez Texting media types removed.
4.0.x LTS	For: Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Older proxies no longer can report data to an upgraded server; Newer agents no longer will be able to work with an older Zabbix server.
3.4.x	For: Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	'libpthread' and 'zlib' libraries now mandatory; Support for plain text protocol dropped and header is mandatory; Pre-1.4 version Zabbix agents are no longer supported; The Server parameter in passive proxy configuration now mandatory.
3.2.x	For: Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	SQLite support as backend database dropped for Zabbix server/frontend; Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended; 'libpcre' and 'libevent' libraries mandatory for Zabbix server; Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts; Zabbix Java gateway has to be upgraded to support new functionality.
3.0.x LTS	For: Zabbix 3.2 Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Database upgrade may be slow, depending on the history table size.

You may also want to check the [requirements](#) for 5.2.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

Upgrade procedure

1 Stop Zabbix processes

Stop Zabbix server to make sure that no new data is inserted into database.

```
# service zabbix-server stop
```

If upgrading Zabbix proxy, stop proxy too.

```
# service zabbix-proxy stop
```

2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

### 3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

Configuration files:

```
# mkdir /opt/zabbix-backup/  
# cp /etc/zabbix/zabbix_server.conf /opt/zabbix-backup/  
# cp /etc/apache2/conf-enabled/zabbix.conf /opt/zabbix-backup/
```

PHP files and Zabbix binaries:

```
# cp -R /usr/share/zabbix/ /opt/zabbix-backup/  
# cp -R /usr/share/doc/zabbix-* /opt/zabbix-backup/
```

### 4 Update repository configuration package

To proceed with the update your current repository package has to be uninstalled.

```
# rm -Rf /etc/apt/sources.list.d/zabbix.list
```

Then install the new repository configuration package.

On **Debian 10** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/debian/pool/main/z/zabbix-release/zabbix-release_5.2-1+debian10_  
# dpkg -i zabbix-release_5.2-1+debian10_all.deb
```

On **Debian 9** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/debian/pool/main/z/zabbix-release/zabbix-release_5.2-1+debian9_a  
# dpkg -i zabbix-release_5.2-1+debian9_all.deb
```

On **Debian 8** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/debian/pool/main/z/zabbix-release/zabbix-release_5.2-1+debian8_a  
# dpkg -i zabbix-release_5.2-1+debian8_all.deb
```

On **Ubuntu 20.04** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.2-1+ubuntu20.  
# dpkg -i zabbix-release_5.2-1+ubuntu20.04_all.deb
```

On **Ubuntu 18.04** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.2-1+ubuntu18.  
# dpkg -i zabbix-release_5.2-1+ubuntu18.04_all.deb
```

On **Ubuntu 16.04** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.2-1+ubuntu16.  
# dpkg -i zabbix-release_5.2-1+ubuntu16.04_all.deb
```

On **Ubuntu 14.04** run:

```
# wget https://repo.zabbix.com/zabbix/5.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.2-1+ubuntu14.  
# dpkg -i zabbix-release_5.2-1+ubuntu14.04_all.deb
```

Update the repository information.

```
# apt-get update
```

### 5 Upgrade Zabbix components

To upgrade Zabbix components you may run something like:

```
# apt-get install --only-upgrade zabbix-server-mysql zabbix-frontend-php zabbix-agent
```

If using PostgreSQL, substitute mysql with pgsq in the command. If upgrading the proxy, substitute server with proxy in the command. If upgrading the Zabbix agent 2, substitute zabbix-agentwith zabbix-agent2in the command.

Then, to upgrade the web frontend with Apache correctly, also run:

```
# apt-get install zabbix-apache-conf
```

Distributions **prior to Debian 10 (buster) / Ubuntu 18.04 (bionic) / Raspbian 10 (buster)** do not provide PHP 7.2 or newer, which is required for Zabbix frontend 5.0. See [information](#) about installing Zabbix frontend on older distributions.

### 6 Review component configuration parameters

See the upgrade notes for details on [mandatory changes](#).

For new optional parameters, see the [What's new](#) section.

## 7 Start Zabbix processes

Start the updated Zabbix components.

```
# service zabbix-server start
# service zabbix-proxy start
# service zabbix-agent start
# service zabbix-agent2 start
```

## 8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

### Upgrade between minor versions

It is possible to upgrade minor versions of 5.2.x (for example, from 5.2.1 to 5.2.3). It is easy.

To upgrade Zabbix minor version please run:

```
$ sudo apt install --only-upgrade 'zabbix.*'
```

To upgrade Zabbix server minor version please run:

```
$ sudo apt install --only-upgrade 'zabbix-server.*'
```

To upgrade Zabbix agent minor version please run:

```
$ sudo apt install --only-upgrade 'zabbix-agent.*'
```

or, for Zabbix agent 2:

```
$ sudo apt install --only-upgrade 'zabbix-agent2.*'
```

## Upgrade from sources

### Overview

This section provides the steps required for a successful [upgrade](#) from Zabbix **5.0.x** to Zabbix **5.2.x** using official Zabbix sources.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the [same major version](#). Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

#### Attention:

It is no longer possible to start the upgraded server and have older, yet unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled when upgrading to 5.2 (or later) from any version before 5.2, as the server will ignore data from unupgraded proxies.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 5.2 may take a long time.

#### Warning:

Before the upgrade make sure to read the relevant [upgrade notes](#)!

The following upgrade notes are available:

Upgrade from	Read full upgrade notes	Most important changes between versions
5.0.x	For: <a href="#">Zabbix 5.2</a>	Minimum required PHP version upped from 7.2.0 to 7.2.5.
4.4.x	For: <a href="#">Zabbix 5.0</a> <a href="#">Zabbix 5.2</a>	Support of IBM DB2 dropped; Minimum required PHP version upped from 5.4.0 to 7.2.0; Minimum required database versions upped; Changed Zabbix PHP file directory.

Upgrade from	Read full upgrade notes	Most important changes between versions
4.2.x	For: Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Jabber, Ez Texting media types removed.
4.0.x LTS	For: Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Older proxies no longer can report data to an upgraded server; Newer agents no longer will be able to work with an older Zabbix server.
3.4.x	For: Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	'libpthread' and 'zlib' libraries now mandatory; Support for plain text protocol dropped and header is mandatory; Pre-1.4 version Zabbix agents are no longer supported; The Server parameter in passive proxy configuration now mandatory.
3.2.x	For: Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	SQLite support as backend database dropped for Zabbix server/frontend; Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended; 'libpcre' and 'libevent' libraries mandatory for Zabbix server; Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts; Zabbix Java gateway has to be upgraded to support new functionality.
3.0.x LTS	For: Zabbix 3.2 Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Database upgrade may be slow, depending on the history table size.
2.4.x	For: Zabbix 3.0 Zabbix 3.2 Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Minimum required PHP version upped from 5.3.0 to 5.4.0 LogFile agent parameter must be specified
2.2.x LTS	For: Zabbix 2.4 Zabbix 3.0 Zabbix 3.2 Zabbix 3.4 Zabbix 4.0 Zabbix 4.2 Zabbix 4.4 Zabbix 5.0 Zabbix 5.2	Node-based distributed monitoring removed

Upgrade from	Read full upgrade notes	Most important changes between versions
2.0.x	For: <a href="#">Zabbix 2.2</a> <a href="#">Zabbix 2.4</a> <a href="#">Zabbix 3.0</a> <a href="#">Zabbix 3.2</a> <a href="#">Zabbix 3.4</a> <a href="#">Zabbix 4.0</a> <a href="#">Zabbix 4.2</a> <a href="#">Zabbix 4.4</a> <a href="#">Zabbix 5.0</a> <a href="#">Zabbix 5.2</a>	Minimum required PHP version upped from 5.1.6 to 5.3.0; Case-sensitive MySQL database required for proper server work; character set utf8 and utf8_bin collation is required for Zabbix server to work properly with MySQL database. See <a href="#">database creation scripts</a> . 'mysqli' PHP extension required instead of 'mysql'

You may also want to check the [requirements](#) for 5.2.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

Server upgrade process

1 Stop server

Stop Zabbix server to make sure that no new data is inserted into database.

2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

4 Install new server binaries

Use these [instructions](#) to compile Zabbix server from sources.

5 Review server configuration parameters

See the upgrade notes for details on [mandatory changes](#).

For new optional parameters, see the [What's new](#) section.

6 Start new Zabbix binaries

Start new binaries. Check log files to see if the binaries have started successfully.

Zabbix server will automatically upgrade the database. When starting up, Zabbix server reports the current (mandatory and optional) and required database versions. If the current mandatory version is older than the required version, Zabbix server automatically executes the required database upgrade patches. The start and progress level (percentage) of the database upgrade is written to the Zabbix server log file. When the upgrade is completed, a "database upgrade fully completed" message is written to the log file. If any of the upgrade patches fail, Zabbix server will not start. Zabbix server will also not start if the current mandatory database version is newer than the required one. Zabbix server will only start if the current mandatory database version corresponds to the required mandatory version.

```
8673:20161117:104750.259 current database version (mandatory/optional): 03040000/03040000
8673:20161117:104750.259 required mandatory version: 03040000
```

Before you start the server:

- Make sure the database user has enough permissions (create table, drop table, create index, drop index)
- Make sure you have enough free disk space.

7 Install new Zabbix web interface

The minimum required PHP version is 7.2.5. Update if needed and follow [installation instructions](#).

8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

#### Proxy upgrade process

##### 1 Stop proxy

Stop Zabbix proxy.

##### 2 Back up configuration files and Zabbix proxy binaries

Make a backup copy of the Zabbix proxy binary and configuration file.

##### 3 Install new proxy binaries

Use these [instructions](#) to compile Zabbix proxy from sources.

##### 4 Review proxy configuration parameters

There are no mandatory changes in this version to proxy [parameters](#).

##### 5 Start new Zabbix proxy

Start the new Zabbix proxy. Check log files to see if the proxy has started successfully.

Zabbix proxy will automatically upgrade the database. Database upgrade takes place similarly as when starting [Zabbix server](#).

#### Agent upgrade process

**Attention:**

Upgrading agents is not mandatory. You only need to upgrade agents if it is required to access the new functionality.

The upgrade procedure described in this section may be used for upgrading both the Zabbix agent and the Zabbix agent 2.

##### 1 Stop agent

Stop Zabbix agent.

##### 2 Back up configuration files and Zabbix agent binaries

Make a backup copy of the Zabbix agent binary and configuration file.

##### 3 Install new agent binaries

Use these [instructions](#) to compile Zabbix agent from sources.

Alternatively, you may download pre-compiled Zabbix agents from the [Zabbix download page](#).

##### 4 Review agent configuration parameters

There are no mandatory changes in this version neither to [agent](#) nor to [agent 2](#) parameters.

##### 5 Start new Zabbix agent

Start the new Zabbix agent. Check log files to see if the agent has started successfully.

#### Upgrade between minor versions

When upgrading between minor versions of 5.2.x (for example from 5.2.1 to 5.2.3) it is required to execute the same actions for server/proxy/agent as during the upgrade between major versions. The only difference is that when upgrading between minor versions no changes to the database are made.

## 8 Known issues

#### Version compatibility

Compatibility with older Zabbix agents 2 is broken in Zabbix 5.2.0. Fixed in Zabbix 5.2.1 (see [ZBX-18591](#) for details).

#### Proxy startup with MySQL 8.0.0-8.0.17

zabbix\_proxy on MySQL versions 8.0.0-8.0.17 fails with the following "access denied" error:

```
[Z3001] connection to database 'zabbix' failed: [1227] Access denied; you need (at least one of) the SUPER
```

That is due to MySQL 8.0.0 starting to enforce special permissions for setting session variables. However, in 8.0.18 this behavior was removed: [As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation.](#)

The workaround is based on granting additional privileges to the zabbix user:

For MySQL versions 8.0.14 - 8.0.17:

```
grant SESSION_VARIABLES_ADMIN on *.* to 'zabbix'@'localhost';
```

For MySQL versions 8.0.0 - 8.0.13:

```
grant SYSTEM_VARIABLES_ADMIN on *.* to 'zabbix'@'localhost';
```

#### Timescale DB

PostgreSQL versions 9.6-12 use too much memory when updating tables with a large number of partitions ([see problem report](#)). This issue manifests itself when Zabbix updates trends on systems with TimescaleDB if trends are split into relatively small (e.g. 1 day) chunks. This leads to hundreds of chunks present in the trends tables with default housekeeping settings - the condition where PostgreSQL is likely to run out of memory.

The issue has been resolved since Zabbix 5.0.1 for new installations with TimescaleDB, but if TimescaleDB was set up with Zabbix before that, please see [ZBX-16347](#) for the migration notes.

#### Upgrade with MariaDB 10.2.1 and before

Upgrading Zabbix may fail if database tables were created with MariaDB 10.2.1 and before, because in those versions the default row format is compact. This can be fixed by changing the row format to dynamic (see also [ZBX-17690](#)).

#### Database TLS connection with MariaDB

Database TLS connection is not supported with the 'verify\_ca' option for the DBTLSConnect [parameter](#) if MariaDB is used.

#### Global event correlation

Events may not get correlated correctly if the time interval between the first and second event is very small, i.e. half a second and less.

#### Numeric (float) data type range with PostgreSQL 11 and earlier

PostgreSQL 11 and earlier versions only support floating point value range of approximately -1.34E-154 to 1.34E+154.

#### NetBSD 8.0 and newer

Various Zabbix processes may randomly crash on startup on the NetBSD versions 8.X and 9.X. That is due to the too small default stack size (4MB), which must be increased by running:

```
ulimit -s 10240
```

For more information, please see the related problem report: [ZBX-18275](#).

#### IPMI checks

IPMI checks will not work with the standard OpenIPMI library package on Debian prior to 9 (stretch) and Ubuntu prior to 16.04 (xenial). To fix that, recompile OpenIPMI library with OpenSSL enabled as discussed in [ZBX-6139](#).

#### SSH checks

Some Linux distributions like Debian, Ubuntu do not support encrypted private keys (with passphrase) if the libssh2 library is installed from packages. Please see [ZBX-4850](#) for more details.

When using libssh 0.9.x on CentOS 8 with OpenSSH 8 SSH checks may occasionally report "Cannot read data from SSH server". This is caused by a libssh [issue \(more detailed report\)](#). The error is expected to have been fixed by a stable libssh 0.9.5 release. See also [ZBX-17756](#) for details.

#### ODBC checks

- MySQL unixODBC driver should not be used with Zabbix server or Zabbix proxy compiled against MariaDB connector library and vice versa, if possible it is also better to avoid using the same connector as the driver due to an [upstream bug](#). Suggested setup:

PostgreSQL, SQLite or Oracle connector → MariaDB or MySQL unixODBC driver

MariaDB connector → MariaDB unixODBC driver

MySQL connector → MySQL unixODBC driver

Please see [ZBX-7665](#) for more information and available workarounds.

- XML data queried from Microsoft SQL Server may get truncated in various ways on Linux and UNIX systems.



- It has been observed that using ODBC checks on CentOS 8 for monitoring Oracle databases using Oracle Instant Client for Linux 11.2.0.4.0 causes the Zabbix server to crash. The issue can be solved by upgrading Oracle Instant Client to 12.1.0.2.0, 12.2.0.1.0, 18.5.0.0.0 or 19. See also [ZBX-18402](#).

Incorrect request method parameter in items

The request method parameter, used only in HTTP checks, may be incorrectly set to '1', a non-default value for all items as a result of upgrade from a pre-4.0 Zabbix version. For details on how to fix this situation, see [ZBX-19308](#).

HTTPS checks

Web scenarios and HTTP agent items using the https protocol, Zabbix agent checks `net.tcp.service[https...]` and `net.tcp.service.perf[https...]` may fail if the target server is configured to disallow TLS v1.0 protocol or below. Please see [ZBX-9879](#) for more information and available workarounds.

Web monitoring and HTTP agent

Zabbix server leaks memory on CentOS 6, CentOS 7 and possibly other related Linux distributions due to an [upstream bug](#) when "SSL verify peer" is enabled in web scenarios or HTTP agent. Please see [ZBX-10486](#) for more information and available workarounds.

Simple checks

There is a bug in **fping** versions earlier than v3.10 that mishandles duplicate echo replay packets. This may cause unexpected results for `icmpping`, `icmppingloss`, `icmppingsec` items. It is recommended to use the latest version of **fping**. Please see [ZBX-11726](#) for more details.

SNMP checks

If the OpenBSD operating system is used, a use-after-free bug in the Net-SNMP library up to the 5.7.3 version can cause a crash of Zabbix server if the SourceIP parameter is set in the Zabbix server configuration file. As a workaround, please do not set the SourceIP parameter. The same problem applies also for Linux, but it does not cause Zabbix server to stop working. A local patch for the net-snmp package on OpenBSD was applied and will be released with OpenBSD 6.3.

SNMP data spikes

Spikes in SNMP data have been observed that may be related to certain physical factors like voltage spikes in the mains. See [ZBX-14318](#) more details.

SNMP traps

The "net-snmp-perl" package, needed for SNMP traps, has been removed in RHEL/CentOS 8.0-8.2; re-added in RHEL 8.3.

So if you are using RHEL 8.0-8.2, the best solution is to upgrade to RHEL 8.3; if you are using CentOS 8.0-8.2, you may wait for CentOS 8.3 or use a package from EPEL.

Please also see [ZBX-17192](#) for more information.

Alerter process crash in Centos/RHEL 7

Instances of a Zabbix server alerter process crash have been encountered in Centos/RHEL 7. Please see [ZBX-10461](#) for details.

Compiling Zabbix agent on HP-UX

If you install the PCRE library from a popular HP-UX package site <http://hpux.connect.org.uk>, for example from file `pcre-8.42-ia64_64-11.3` you get only the 64-bit version of the library installed in the `/usr/local/lib/hpux64` directory.

In this case, for successful agent compilation customized options need to be used for the "configure" script, e.g.:

```
CFLAGS="+DD64" ./configure --enable-agent --with-libpcre-include=/usr/local/include --with-libpcre-lib=/usr
```

Flipping frontend locales

It has been observed that frontend locales may flip without apparent logic, i. e. some pages (or parts of pages) are displayed in one language while other pages (or parts of pages) in a different language. Typically the problem may appear when there are several users, some of whom use one locale, while others use another.

A known workaround to this is to disable multithreading in PHP and Apache.

The problem is related to how setting the locale works [in PHP](#): locale information is maintained per process, not per thread. So in a multi-thread environment, when there are several projects run by same Apache process, it is possible that the locale gets changed in another thread and that changes how data can be processed in the Zabbix thread.

For more information, please see related problem reports:

- [ZBX-10911](#) (Problem with flipping frontend locales)
- [ZBX-16297](#) (Problem with number processing in graphs using the `bcdiv` function of BC Math functions)

## PHP 7.3 opcache configuration

If "opcache" is enabled in the PHP 7.3 configuration, Zabbix frontend may show a blank screen when loaded for the first time. This is a registered [PHP bug](#). To work around this, please set the "opcache.optimization\_level" parameter to 0x7FFFBFDF in the PHP configuration (php.ini file).

## Graphs

Changes to Daylight Saving Time (DST) result in irregularities when displaying X axis labels (date duplication, date missing, etc).

## Log file monitoring

log[] and logrt[] items repeatedly reread log file from the beginning if file system is 100% full and the log file is being appended (see [ZBX-10884](#) for more information).

## Slow MySQL queries

Zabbix server generates slow select queries in case of non-existing values for items. This is caused by a known [issue](#) in MySQL 5.6/5.7 versions. A workaround to this is disabling the index\_condition\_pushdown optimizer in MySQL. For an extended discussion, see [ZBX-10652](#).

## API login

A large number of open user sessions can be created when using custom scripts with the user.login method without a following user.logout.

## IPv6 address issue in SNMPv3 traps

Due to a net-snmp bug, IPv6 address may not be correctly displayed when using SNMPv3 in SNMP traps. For more details and a possible workaround, see [ZBX-14541](#).

## Trimmed long IPv6 IP address in failed login information

A failed login attempt message will display only the first 39 characters of a stored IP address as that's the character limit in the database field. That means that IPv6 IP addresses longer than 39 characters will be shown incompletely.

## Zabbix agent checks on Windows

Non-existing DNS entries in a Server parameter of Zabbix agent configuration file (zabbix\_agentd.conf) may increase Zabbix agent response time on Windows. This happens because Windows DNS caching daemon doesn't cache negative responses for IPv4 addresses. However, for IPv6 addresses negative responses are cached, so a possible workaround to this is disabling IPv4 on the host.

## YAML export/import

There are some known issues with YAML [export/import](#):

- Error messages are not translatable;
- Valid JSON with a .yaml file extension sometimes cannot be imported;
- Unquoted human-readable dates are automatically converted to Unix timestamps.

## Setup wizard on SUSE with NGINX and php-fpm

Frontend setup wizard cannot save configuration file on SUSE with NGINX + php-fpm. This is caused by a setting in /usr/lib/systemd/system/php-fpm.service unit, which prevents Zabbix from writing to /etc. (introduced in [PHP 7.4](#)).

There are two workaround options available:

- Set the [ProtectSystem](#) option to 'true' instead of 'full' in the php-fpm systemd unit.
- Manually save /etc/zabbix/web/zabbix.conf.php file.

## MySQL custom error codes

If Zabbix is used with MySQL installation on Azure, an unclear error message [9002] Some errors occurred may appear in Zabbix logs. This generic error text is sent to Zabbix server or proxy by the database. To get more information about the cause of the error, check Azure logs.

## 9 Template changes

This page lists all changes to the stock templates that are shipped with Zabbix.

Note that upgrading to the latest Zabbix version will not automatically upgrade the templates used. It is suggested to modify the templates in existing installations by:

- Downloading the latest templates from the [Zabbix Git repository](#);
- Then, while in Configuration → Templates you can import them manually into Zabbix. If templates with the same names already exist, the Delete missing options should be checked when importing to achieve a clean import. This way the old items that are no longer in the updated template will be removed (note that it will mean losing the history of these old items).

#### New templates

See the list of [new templates](#) in Zabbix 5.2.0.

#### Changes in 5.2.1

New templates are available:

- Apache Cassandra by JMX - see [JMX templates](#) for setup instructions;
- Apache Kafka by JMX - see [JMX templates](#) for setup instructions.

#### Changes in 5.2.2

#### New templates

New templates are available:

- Aranet Cloud - Aranet Cloud monitoring using [Script items](#);
- Hadoop by HTTP - monitoring of Hadoop using HTTP agent -- see [HTTP templates](#) for setup instructions;
- Morningstar ProStar MPPT SNMP - monitoring of ProStar MPPT solar charge controller via SNMP;
- Morningstar ProStar PWM SNMP - monitoring of ProStar pulse width modulation (PWM) solar charge controller via SNMP;
- Morningstar SunSaver MPPT SNMP - monitoring of SunSaver MPPT solar charge controller via SNMP;
- Morningstar SureSine SNMP - monitoring of SureSine pure sine wave inverter via SNMP;
- Morningstar TriStar MPPT 600V SNMP - monitoring of TriStar MPPT 600V solar charge controller via SNMP;
- Morningstar TriStar MPPT SNMP - monitoring of TriStar MPPT solar charge controller via SNMP;
- Morningstar TriStar PWM SNMP - monitoring of TriStar PWM solar charge controller via SNMP;
- VMware FQDN - agent-less monitoring of VMware vCenter and ESX hypervisor -- see [Virtual machine monitoring](#) for additional info;
- ZooKeeper by HTTP - monitoring of ZooKeeper using HTTP agent -- see [HTTP templates](#) for setup instructions.

#### Template Apache Tomcat by JMX

Template Apache Tomcat by JMX has been updated. Now it is possible to use the template to automatically discover and monitor Apache Tomcat hosts with any configuration settings. See also: [JMX template operation](#).

#### Template VMware

Template VMware has been updated:

- VM host prototype now has a custom interface with IP set to `{#VM.IP}`.
- HV host prototype now has a custom interface with IP set to `{#HV.IP}`.
- New macros have been defined: `{$VM.UUID}` with value `{#VM.UUID}`, `{$VM.DNS}` with value `{#VM.DNS}`, `{$VM.HOST}` - an empty macro set as VM host name.
- The `{HOST.HOST}` macro has been replaced with `{$VM.UUID}` in all item keys for virtual machines.

#### Changes in 5.2.3

A new template is available:

- GitLab by HTTP - see [setup instructions](#) for HTTP templates.

#### Changes in 5.2.4

New templates are available:

- Apache ActiveMQ by JMX - see [setup instructions](#) for JMX templates;
- HashiCorp Vault by HTTP - see [setup instructions](#) for HTTP templates;
- Microsoft Exchange Server 2016 by Zabbix agent - see [setup instructions](#) for Zabbix agent templates;
- Microsoft Exchange Server 2016 by Zabbix agent active - see [setup instructions](#) for Zabbix agent templates;
- NetApp FAS3220 SNMP - monitoring of NetApp FAS3220 via SNMP.

#### Changes in 5.2.5

New templates are available:

- Ignite by JMX - see [setup instructions](#) for JMX templates;
- Jenkins by HTTP - see [setup instructions](#) for HTTP templates.

## Changes in 5.2.6

New templates are available:

- APC UPS SNMP - monitoring of APC UPS Symmetra LX by Zabbix SNMP agent;
- Cisco Catalyst 3750V2-24FS SNMP - monitoring of Cisco Catalyst 3750V2-24FS switch via SNMP;
- Cisco Catalyst 3750V2-24PS SNMP - monitoring of Cisco Catalyst 3750V2-24PS switch via SNMP;
- Cisco Catalyst 3750V2-24TS SNMP - monitoring of Cisco Catalyst 3750V2-24TS switch via SNMP;
- Cisco Catalyst 3750V2-48TS SNMP - monitoring of Cisco Catalyst 3750V2-48TS switch via SNMP;
- Cisco Catalyst 3750V2-48TS SNMP - monitoring of Cisco Catalyst 3750V2-48TS switch via SNMP;
- Huawei OceanStor 5300 V5 SNMP - monitoring of SAN Huawei OceanStor 5300 V5 by Zabbix SNMP agent;
- Microsoft SharePoint by HTTP - see [setup instructions](#) for HTTP templates;
- MongoDB cluster by Zabbix agent 2 - see [setup instructions](#) for Zabbix agent 2 templates;
- MongoDB node by Zabbix agent 2 - see [setup instructions](#) for Zabbix agent 2 templates;
- NetApp AFF A700 by HTTP - see [setup instructions](#) for HTTP templates.
- SMART by Zabbix agent 2 - see [setup instructions](#) for Zabbix agent 2 templates;
- SMART by Zabbix agent 2 active - see [setup instructions](#) for Zabbix agent 2 templates.

Templates VMware and VMware FQDN have been updated:

- New metrics have been added for enhanced monitoring of CPU and memory usage, disk requests, power usage, etc.
- Additionally, the templates will now monitor the number of available datastore paths and send a trigger alert if the multipath count changes.

## Changes in 5.2.7

New templates are available:

- APC UPS Galaxy 3500 SNMP - monitoring of APC UPS Galaxy 3500 by Zabbix SNMP agent LX by Zabbix SNMP agent;
- APC Smart-UPS 2200 RM SNMP - monitoring of APC Smart-UPS 2200 RM by Zabbix SNMP agent;
- APC Smart-UPS 3000 XLM SNMP - monitoring of APC Smart-UPS 3000 XLM by Zabbix SNMP agent;
- APC Smart-UPS RT 1000 RM XL SNMP - monitoring of APC Smart-UPS RT 1000 RM XL by Zabbix SNMP agent;
- APC Smart-UPS RT 1000 XL SNMP - monitoring of APC Smart-UPS RT 1000 XL by Zabbix SNMP agent;
- APC Smart-UPS SRT 5000 SNMP - monitoring of APC Smart-UPS SRT 5000 by Zabbix SNMP agent;
- APC Smart-UPS SRT 8000 SNMP - monitoring of APC Smart-UPS SRT 8000 by Zabbix SNMP agent;
- APC UPS SNMP - monitoring of APC UPS with NMC by Zabbix SNMP agent;
- APC UPS Symmetra RM SNMP - monitoring of APC UPS Symmetra RM by Zabbix SNMP agent;
- APC UPS Symmetra RX SNMP - monitoring of APC UPS Symmetra RX by Zabbix SNMP agent;
- TiDB by HTTP - monitoring of TiDB server of TiDB cluster via HTTP (see [setup instructions](#) for HTTP templates);
- TiDB PD by HTTP - monitoring of PD server of TiDB cluster via HTTP (see [setup instructions](#) for HTTP templates);
- TiDB TiKV by HTTP - monitor TiKV server of TiDB cluster via HTTP (see [setup instructions](#) for HTTP templates).

The template APC UPS SNMP introduced in Zabbix 5.2.6 for monitoring APC UPS Symmetra LX has been renamed to APC UPS Symmetra LX SNMP and updated with new metrics, triggers, a discovery rule, etc., which allow to monitor battery capacity and phase output voltage and load.

## 10 Upgrade notes for 5.2.0

### **Critical** Minimum required PHP version

The minimum required PHP version has been updated from 7.2.0 to 7.2.5.

### API changes

See the list of [API changes](#) in Zabbix 5.2.0.

### **Informational** User roles

It is now possible to define [user roles](#) for granular control on what parts of UI, which API methods, and which functionality (such as the ability to acknowledge problems) are available to end-users.

By default, Zabbix is configured with four user roles, which are automatically assigned to the corresponding user types during upgrade:

Role	Description
Guest role	The same permissions as for Guest users (user type: User). Access to the Monitoring, Inventory, and Reports sections only, without rights to perform any actions. Access to API is disabled. After an upgrade, existing guest users will lose access to API and the ability to acknowledge problems - these settings can be changed later in the Guest role configuration form.
User role	The same permissions to access UI elements as for 'User' user type. Access to the Monitoring, Inventory, and Reports sections only. List of allowed actions has been modified - see the note below.
Admin role	The same permissions as for 'Admin' user type. Access to the Monitoring, Inventory, Reports, and Configuration sections.
Super admin role	Unlimited access permissions. This role cannot be deleted or modified because at least one Super Admin with a full set of rights must exist.

Super Admins can delete or modify these roles, except of the Super Admin role, or create additional roles with custom sets of permissions.

List of API methods available to user types User and Admin has been modified. To view allowed methods, scroll to the Access to API section of the user role configuration form and press Select. Only the methods supported for this user type will be shown. It is possible to restrict some of the methods by specifying an Allow or Deny method list.

**Warning:**

For users of type User read-only access to hosts is now sufficient to perform actions such as event acknowledgment, etc. List of actions that users are allowed to perform is defined by the User role settings. By default, User role allows the following actions:

- Create and edit dashboards and screens
- Create and edit maps
- Acknowledge problems
- Close problems
- Change severity
- Add problem comments
- Execute scripts

To restrict users from performing all or some of the actions, go to Administration → User roles, select the role User role and unmark required checkboxes in the section Access to actions. Press the Update button to save new settings.

Time zone definition

The frontend time zone, previously set by the 'date.timezone' setting of php.ini, now can be set globally in the frontend and adjusted for individual users.

During the upgrade the time zone setting will default to "System" ensuring that everything works for users the same as before. With the System option, the web server time zone is used for the frontend (including the value of 'date.timezone' of php.ini, if set), while Zabbix server uses the time zone of the machine it is running on.

See also: [Time zones](#)

Refreshing unsupported items

A separate setting for refreshing unsupported items has been removed from Administration → General → Other. Instead, the item update interval is now used for each unsupported item. This has been done to remove a potential performance bottleneck in the scenario when a lot of items turn unsupported and the global refresh interval has been set to a short value.

Template screens converted to dashboards

Host screens configured on the template level, or "template screens", have been **converted** to template dashboards. The conversion of template screens will take place as soon as you launch the upgraded Zabbix server. As a result, the template screen elements will become the widgets of template dashboards.

Each template screen will be converted to a template dashboard preserving the name and the configuration and location of screen elements (now widgets).

However, it is not guaranteed that all screen elements will find their place on the converted dashboards, since screens can have a significantly larger width and height comparing to dashboards. In such cases Zabbix will discard the out-of-range screen elements, after trying to accommodate as many screen elements as possible by manipulating the size of newly created widgets.

Please make sure to back up your templates before the upgrade to 5.2.

Note that when importing an older template containing template screens into Zabbix 5.2 or later, the same screen-to-dashboard conversion principles will be applied.

Session stored in cookie

Zabbix session is now stored in a user cookie.

### 11 Upgrade notes for 5.2.1

This minor version has no upgrade notes.

### 12 Upgrade notes for 5.2.2

Positional macros in web monitoring items

[Deprecated positional macros](#) (\$1, \$2, ...) are no longer used in the item names when creating web monitoring [items](#).

In those cases where positional macros are used in existing web monitoring items, the item names will be updated in the database not to use positional macros as soon as the web scenario is updated.

Web monitoring items

Removed support of {HOST.\*} macro in name property of web scenario and web scenario step.

### 13 Upgrade notes for 5.2.3

Zabbix agent 2 plugins

For Ceph, Docker, Memcached, MySQL, Oracle, and Redis plugins, a Uri can no longer be specified as a 1st level plugin parameter. For PostgreSQL plugin a Uri and Database name can no longer be specified as a 1st level plugin parameters. Now these parameters can only be provided at a named session level. All existing parameters in a format Plugins.<PluginName>.Uri and the Plugins.Postgres.Database parameter should be removed from the configuration file, otherwise, the agent will fail to start.

For Uri parameters, specifying a scheme is no longer mandatory.

For the default set of parameters, you can create a named session 'Default' and specify these parameters in the session. See an example below.

Before Zabbix 5.2.3	Since Zabbix 5.2.3
Plugins.Ceph.Uri="https://localhost"	Plugins.Ceph.Sessions.Default.Uri=localhost

### 14 Upgrade notes for 5.2.4

Host/template cloning

Long lists of objects to be cloned (items, triggers, graphs, etc) have been removed from host and template full clone forms.

Notification report

The number of notifications sent per media type is no longer displayed in parentheses after the total number in Reports → [Notifications](#) if 'All' is selected in the Media type dropdown.

### 15 Upgrade notes for 5.2.5

This minor version has no upgrade notes.

## 16 Upgrade notes for 5.2.6

This minor version has no upgrade notes.

## 17 Upgrade notes for 5.2.7

VMware event collector

The behavior of VMware event collector has been changed to fix a memory overload issue.

## 5. Quickstart

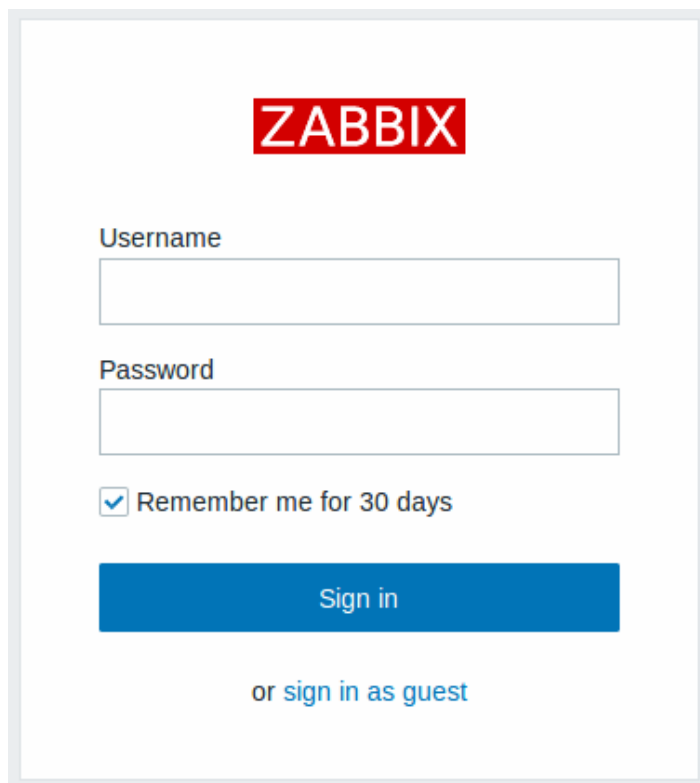
Please use the sidebar to access content in the Quickstart section.

### 1 Login and configuring user

Overview

In this section you will learn how to log in and set up a system user in Zabbix.

Login



**ZABBIX**

Username

Password

Remember me for 30 days

Sign in

or sign in as guest

This is the Zabbix welcome screen. Enter the user name **Admin** with password **zabbix** to log in as a **Zabbix superuser**. Access to Configuration and Administration menus will be granted.

Protection against brute force attacks

In case of five consecutive failed login attempts, Zabbix interface will pause for 30 seconds in order to prevent brute force and dictionary attacks.

The IP address of a failed login attempt will be displayed after a successful login.

Adding user

To view information about users, go to Administration → Users.

<input type="checkbox"/>	Alias	Name	Surname	User role	Groups	Is online?	Login	Frontend access	API access	Debug mode	Status
<input type="checkbox"/>	Admin	Zabbix	Administrator	Super admin role	Zabbix administrators	Yes (2020-10-28 11:38:16)	OK	System default	Enabled	Enabled	Enabled
<input type="checkbox"/>	guest	John	Snow	User role	Guests	No (2020-07-16 11:06:52)	OK	System default	Enabled	Disabled	Disabled

Displaying 2 of 2 found

To add a new user, click on Create user.

In the new user form, make sure to add your user to one of the existing **user groups**, for example 'Zabbix administrators'.

**User** | Media | Permissions

---

\* Alias

Name

Surname

\* Groups

\* Password

\* Password (once again)

All mandatory input fields are marked with a red asterisk.

By default, new users have no media (notification delivery methods) defined for them. To create one, go to the 'Media' tab and click on Add.



## Media



Type

\* Send to  [Remove](#)

[Add](#)

\* When active

Use if severity  Not classified  
 Information  
 Warning  
 Average  
 High  
 Disaster

Enabled

In this pop-up, enter an e-mail address for the user.

You can specify a time period when the medium will be active (see [Time period specification](#) page for description of the format), by default a medium is always active. You can also customize [trigger severity](#) levels for which the medium will be active, but leave all of them enabled for now.

Click on Add to save the medium, then go to the Permissions tab.

Permissions tab has a mandatory field Role. The role determines which frontend elements the user can view and which actions he is allowed to perform. Press Select and select one of the roles from the list. For example, select Admin role to allow access to all Zabbix frontend sections, except Administration. Later on, you can modify permissions or create more user roles. Upon selecting a role, permissions will appear in the same tab:

User Media **Permissions**

\* Role

User type

Permissions

**Access to UI elements**

Monitoring

Inventory

Reports

Configuration

**Access to modules**  
*No enabled modules found.*

**Access to API**

Allowed methods

**Access to actions**

Click Add in the user properties form to save the user. The new user appears in the userlist.

<input type="checkbox"/>	Alias ▲	Name	Surname	User role	Groups	Is online?	Login	Frontend access	API access	Debug mode	Status
<input type="checkbox"/>	Admin	Zabbix	Administrator	Super admin role	Zabbix administrators	Yes (2020-10-28 11:42:05)	Ok	System default	Enabled	Enabled	Enabled
<input type="checkbox"/>	guest	John	Snow	User role	Guests	No (2020-07-16 11:06:52)	Ok	System default	Enabled	Disabled	Disabled
<input type="checkbox"/>	user			Admin role	Zabbix administrators	No	Ok	System default	Enabled	Enabled	Enabled

Displaying 3 of 3 found

### Adding permissions

By default, a new user has no permissions to access hosts. To grant the user rights, click on the group of the user in the Groups column (in this case - 'Zabbix administrators'). In the group properties form, go to the Permissions tab.

## ≡ User groups

Host group	Permissions
All groups	None

type here to search

Include subgroups

[Add](#)

This user is to have read-only access to Linux servers group, so click on Select next to the user group selection field.

### Host groups

- Name
- Discovered hosts
- Hypervisors
- Linux servers
- Templates
- Templates/Applications
- Virtual machines
- Zabbix servers

In this pop-up, mark the checkbox next to 'Linux servers', then click Select. Linux servers should be displayed in the selection field. Click the 'Read' button to set permission level and then Add to add the group to the list of permissions. In the user group properties form, click Update.

#### **Attention:**

In Zabbix, access rights to hosts are assigned to **user groups**, not individual users.

Done! You may try to log in using the credentials of the new user.

## 2 New host

### Overview

In this section you will learn how to set up a new host.

A host in Zabbix is a networked entity (physical, virtual) that you wish to monitor. The definition of what can be a "host" in Zabbix is quite flexible. It can be a physical server, a network switch, a virtual machine or some application.

### Adding host

Information about configured hosts in Zabbix is available in Configuration → Hosts. There is already one pre-defined host, called "Zabbix server", but we want to learn adding another.

To add a new host, click on Create host. This will present us with a host configuration form.

## Hosts

The screenshot shows the 'Create host' form in Zabbix. It has tabs for Host, Templates, IPMI, Tags, Macros, Inventory, and Encryption. The 'Host' tab is active. Fields include: Host name (required, value: 'New host'), Visible name, Groups (selected: 'Linux servers', 'Zabbix servers'), Interfaces table (Agent, 127.0.0.1, IP, 10050), Description, Monitored by proxy (no proxy), and Enabled checkbox. Buttons: Add, Cancel.

All mandatory input fields are marked with a red asterisk.

The bare minimum to enter here is:

### Host name

- Enter a host name. Alphanumerics, spaces, dots, dashes and underscores are allowed.

### Groups

- Select one or several existing groups by clicking Select button or enter a non-existing group name to create a new group.

#### Note:

All access permissions are assigned to host groups, not individual hosts. That is why a host must belong to at least one group.

### IP address

- Although not a required field technically, you may want to enter the IP address of the host. Note that if this is the Zabbix server IP address, it must be specified in the Zabbix agent configuration file 'Server' directive.

Other options will suit us with their defaults for now.

When done, click Add. Your new host should be visible in the host list.

The screenshot shows the 'Hosts' list in Zabbix. It has tabs for Hosts, Create host, and Import. A table lists hosts with columns: Name, Applications, Items, Triggers, Graphs, Discovery, Web, Interface, Proxy, Templates, Status, Availability, Agent encryption, Info, Tags. The 'New host' entry is visible with 'Status' 'Enabled' and 'Availability' 'ZBX'.

The Availability column contains indicators of host availability per each interface. We have defined a Zabbix agent interface, so we can use the agent availability icon (with 'ZBX' on it) to understand host availability:

- - host status has not been established; no metric check has happened yet
- - host is available, a metric check has been successful
- - host is unavailable, a metric check has failed (move your mouse cursor over the icon to see the error message). There might be some error with communication, possibly caused by incorrect interface credentials. Check that Zabbix server is running, and try refreshing the page later as well.

### 3 New item

#### Overview

In this section you will learn how to set up an item.

Items are the basis of gathering data in Zabbix. Without items, there is no data - because only an item defines a single metric or what data to get off of a host.

#### Adding item

All items are grouped around hosts. That is why to configure a sample item we go to Configuration → Hosts and find the "New host" we have created.

Click on the Items link in the row of "New host", and then click on Create item. This will present us with an item definition form.

The screenshot shows the 'Item Preprocessing' configuration form in Zabbix. The form is divided into several sections:

- Name:** CPU load (marked with a red asterisk).
- Type:** Zabbix agent (dropdown menu).
- Key:** system.cpu.load (marked with a red asterisk).
- Host interface:** 127.0.0.1 : 10050 (dropdown menu, marked with a red asterisk).
- Type of information:** Numeric (float) (dropdown menu).
- Units:** (empty text field).
- Update interval:** 1m (text field, marked with a red asterisk).
- Custom intervals:** A table with columns 'Type', 'Interval', and 'Period'. One row is filled with 'Flexible', 'Scheduling', '50s', and '1-7,00:00-24'. There is an 'Add' link below the table.
- History storage period:** A row with 'Do not keep history', 'Storage period', and '90d' (marked with a red asterisk).
- Trend storage period:** A row with 'Do not keep trends', 'Storage period', and '365d' (marked with a red asterisk).

All mandatory input fields are marked with a red asterisk.

For our sample item, the essential information to enter is:

#### Name

- Enter CPU load as the value. This will be the item name displayed in lists and elsewhere.

#### Key

- Manually enter system.cpu.load as the value. This is a technical name of an item that identifies the type of information that will be gathered. The particular key is just one of **pre-defined keys** that come with Zabbix agent.

#### Type of information

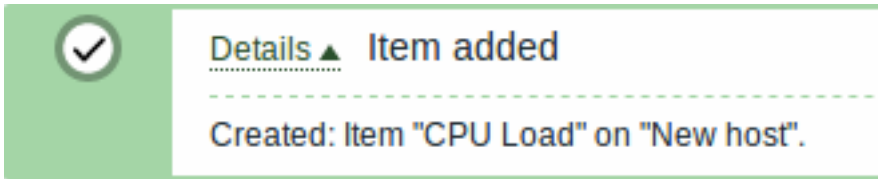
- Select Numeric (float) here. This attribute defines the format of expected data.

**Note:**

You may also want to reduce the amount of days **item history** will be kept, to 7 or 14. This is good practice to relieve the database from keeping lots of historical values.

**Other options** will suit us with their defaults for now.

When done, click Add. The new item should appear in the itemlist. Click on Details above the list to view what exactly was done.



Seeing data

With an item defined, you might be curious if it is actually gathering data. For that, go to Monitoring → Latest data, select 'New host' in the filter and click on Apply.

Then click on the + before - **other** - and expect your item to be there and displaying data.

<input type="checkbox"/> Host	Name ▲	Last check	Last value	Change
▼ New host	- other - (1 Item)			
<input type="checkbox"/>	CPU load	2020-05-29 14:51:57	0.78	-0.35 <a href="#">Graph</a>

Displaying 1 of 1 found

With that said, first data may take up to 60 seconds to arrive. That, by default, is how often the server reads configuration changes and picks up new items to execute.

If you see no value in the 'Change' column, maybe only one value has been received so far. Wait 30 seconds for another value to arrive.

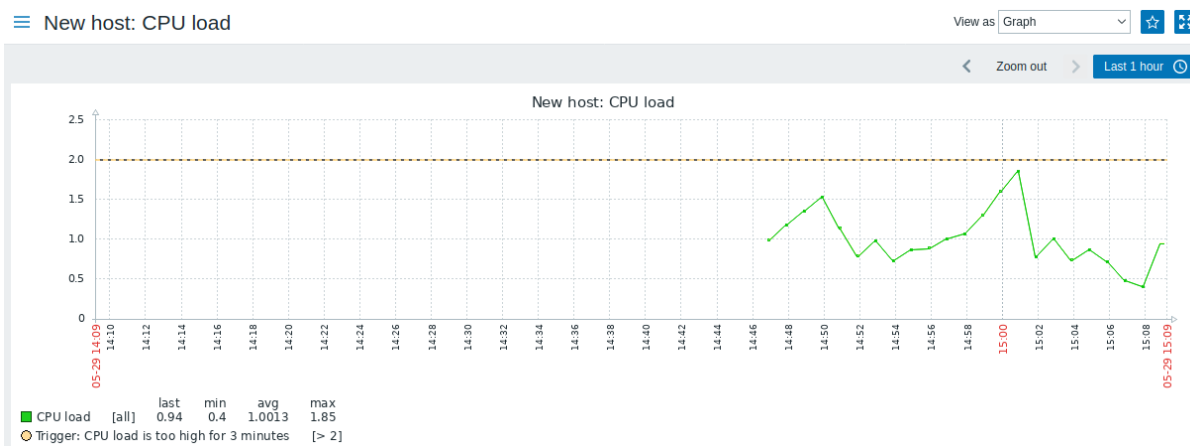
If you do not see information about the item as in the screenshot, make sure that:

- you entered item 'Key' and 'Type of information' fields exactly as in the screenshot
- both agent and server are running
- host status is 'Monitored' and its availability icon is green
- host is selected in the host dropdown, item is active

Graphs

With the item working for a while, it might be time to see something visual. **Simple graphs** are available for any monitored numeric item without any additional configuration. These graphs are generated on runtime.

To view the graph, go to Monitoring → Latest data and click on the 'Graph' link next to the item.



**4 New trigger**

Overview

In this section you will learn how to set up a trigger.

Items only collect data. To automatically evaluate incoming data we need to define triggers. A trigger contains an expression that defines a threshold of what is an acceptable level for the data.

If that level is surpassed by the incoming data, a trigger will "fire" or go into a 'Problem' state - letting us know that something has happened that may require attention. If the level is acceptable again, trigger returns to an 'Ok' state.

Adding trigger

To configure a trigger for our item, go to Configuration → Hosts, find 'New host' and click on Triggers next to it and then on Create trigger. This presents us with a trigger definition form.

The screenshot shows a web-based configuration form for a trigger. At the top, there are three tabs: 'Trigger' (selected), 'Tags', and 'Dependencies'. The form contains the following fields and options:

- Name:** A text input field containing "CPU load too high on "New host" for 3 minutes".
- Operational data:** An empty text input field.
- Severity:** A set of radio buttons with options: "Not classified" (selected), "Information", "Warning", "Average", and "High".
- Expression:** A text input field containing the Zabbix-style expression: `{New host:system.cpu.load.avg(3m)}>2`.
- Expression constructor:** A link below the expression field.
- OK event generation:** A set of radio buttons with options: "Expression" (selected), "Recovery expression", and "None".
- PROBLEM event generation mode:** A set of radio buttons with options: "Single" (selected) and "Multiple".
- OK event closes:** A set of radio buttons with options: "All problems" (selected) and "All problems if tag values match".
- Allow manual close:** An unchecked checkbox.
- URL:** An empty text input field.
- Description:** A large empty text area.
- Enabled:** A checked checkbox.
- Buttons:** "Add" and "Cancel" buttons at the bottom.

For our trigger, the essential information to enter here is:

Name

- Enter CPU load too high on 'New host' for 3 minutes as the value. This will be the trigger name displayed in lists and elsewhere.

## Expression

- Enter: `{New host:system.cpu.load.avg(3m)}>2`

This is the trigger expression. Make sure that the expression is entered right, down to the last symbol. The item key here (`system.cpu.load`) is used to refer to the item. This particular expression basically says that the problem threshold is exceeded when the CPU load average value for 3 minutes is over 2. You can learn more about the [syntax of trigger expressions](#).

When done, click Add. The new trigger should appear in the trigger list.

## Displaying trigger status

With a trigger defined, you might be interested to see its status.

If the CPU load has exceeded the threshold level you defined in the trigger, the problem will be displayed in Monitoring → Problems.

Time	<input type="checkbox"/> Severity	Recovery time	Status	Info	Host ▲	Problem	Operational data	Duration
16:23:06	<input type="checkbox"/> Not classified		PROBLEM		New host	CPU load too high on "New host" for 3 minutes	6.6	56s

The flashing in the status column indicates a recent change of trigger status, one that has taken place in the last 30 minutes.

## 5 Receiving problem notification

### Overview

In this section you will learn how to set up alerting in the form of notifications in Zabbix.

With items collecting data and triggers designed to “fire” upon problem situations, it would also be useful to have some alerting mechanism in place that would notify us about important events even when we are not directly looking at Zabbix frontend.

This is what notifications do. E-mail being the most popular delivery method for problem notifications, we will learn how to set up an e-mail notification.

### E-mail settings

Initially there are several predefined notification [delivery methods](#) in Zabbix. [E-mail](#) is one of those.

To configure e-mail settings, go to Administration → Media types and click on Email in the list of pre-defined media types.

## Media types

<input type="checkbox"/>	Name ▲	Type	Status	Used in actions	Details
<input type="checkbox"/>	Email	Email	Enabled		SMTP server: "mail.zabbix.com",
<input type="checkbox"/>	Mattermost	Webhook	Enabled		
<input type="checkbox"/>	Opsgenie	Webhook	Enabled		

This will present us with the e-mail settings definition form.



## Media types

Media type	Message templates	Options
		<p>* Name <input type="text" value="Email"/></p> <p>Type <input type="text" value="Email"/></p> <p>* SMTP server <input type="text" value="mail.zabbix.com"/></p> <p>SMTP server port <input type="text" value="25"/></p> <p>* SMTP helo <input type="text" value="zabbix.com"/></p> <p>* SMTP email <input type="text" value="zabbix-info@zabbix.com"/></p> <p>Connection security <input type="text" value="None"/> <input type="text" value="STARTTLS"/> <input type="text" value="SSL/TLS"/></p> <p>Authentication <input type="text" value="None"/> <input type="text" value="Username and password"/></p> <p>Message format <input type="text" value="HTML"/> <input type="text" value="Plain text"/></p> <p>Description <input type="text"/></p> <p>Enabled <input checked="" type="checkbox"/></p> <p><input type="button" value="Add"/> <input type="button" value="Cancel"/></p>

All mandatory input fields are marked with a red asterisk.

Set the values of SMTP server, SMTP helo and SMTP e-mail to the appropriate for your environment.

**Note:**

'SMTP email' will be used as the 'From' address for the notifications sent from Zabbix.

Press Update when ready.

Now you have configured 'Email' as a working media type. A media type must be linked to users by defining specific delivery addresses (like we did when [configuring a new user](#)), otherwise it will not be used.

New action

Delivering notifications is one of the things [actions](#) do in Zabbix. Therefore, to set up a notification, go to Configuration → Actions and click on Create action.

## ≡ Actions

Action   Operations

---

\* Name

Conditions

Label	Name
<a href="#">Add</a>	

Enabled

\* At least one operation must exist.

All mandatory input fields are marked with a red asterisk.

In this form, enter a name for the action.

In the most simple case, if we do not add any more specific **conditions**, the action will be taken upon any trigger change from 'Ok' to 'Problem'.

We still should define what the action should do - and that is done in the Operations tab. Click on Add in the Operations block, which opens a new operation form.

### Operation details ✕

Operation type

Steps  -  (0 - infinitely)

Step duration  (0 - use action default)

**\* At least one user or user group must be selected.**

Send to User groups

User group	Action
<a href="#">Add</a>	

Send to Users

User	Action
user (New User)	<a href="#">Remove</a>
<a href="#">Add</a>	

Send only to

Custom message

Conditions

Label	Name	Action
<a href="#">Add</a>		

All mandatory input fields are marked with a red asterisk.

Here, click on Add in the Send to Users block and select the user ('user') we have defined. Select 'Email' as the value of Send only to. When done with this, click on Add, and the operation should be added:

## ☰ Actions

**Action** Operations

**\* Default operation step duration**

Pause operations for suppressed problems

Operations	Steps	Details	Start in	Duration
	1	<b>Send message to users:</b> user (New User) via Email	Immediately	Default
	<a href="#">Add</a>			

That is all for a simple action configuration, so click Add in the action form.

Receiving notification

Now, with delivering notifications configured it would be fun to actually receive one. To help with that, we might on purpose increase the load on our host - so that our **trigger** "fires" and we receive a problem notification.

Open the console on your host and run:

```
cat /dev/urandom | md5sum
```

You may run one or several of [these processes](#).

Now go to Monitoring → Latest data and see how the values of 'CPU Load' have increased. Remember, for our trigger to fire, the 'CPU Load' value has to go over '2' for 3 minutes running. Once it does:

- in Monitoring → Problems you should see the trigger with a flashing 'Problem' status
- you should receive a problem notification in your e-mail

**Attention:**

If notifications do not work:

- verify once again that both the e-mail settings and the action have been configured properly
- make sure the user you created has at least read permissions on the host which generated the event, as noted in the [Adding user](#) step. The user, being part of the 'Zabbix administrators' user group must have at least read access to 'Linux servers' host group that our host belongs to.
- Additionally, you can check out the action log by going to Reports → Action log.

## 6 New template

### Overview

In this section you will learn how to set up a template.

Previously we learned how to set up an item, a trigger and how to get a problem notification for the host.

While all of these steps offer a great deal of flexibility in themselves, it may appear like a lot of steps to take if needed for, say, a thousand hosts. Some automation would be handy.

This is where templates come to help. Templates allow to group useful items, triggers and other entities so that those can be reused again and again by applying to hosts in a single step.

When a template is linked to a host, the host inherits all entities of the template. So, basically a pre-prepared bunch of checks can be applied very quickly.

### Adding template

To start working with templates, we must first create one. To do that, in Configuration → Templates click on Create template. This will present us with a template configuration form.

The screenshot shows the 'Create template' form in Zabbix. At the top, there are four tabs: 'Template', 'Linked templates', 'Tags', and 'Macros'. The 'Template' tab is selected. Below the tabs, there are four main input fields:

- \* Template name:** A text input field containing 'New template'.
- Visible name:** An empty text input field.
- \* Groups:** A dropdown menu showing 'Templates' with a close button (X). Below it is a search box with the placeholder text 'type here to search'.
- Description:** A large empty text area.

At the bottom of the form, there are two buttons: 'Add' (a solid blue button) and 'Cancel' (a white button with a blue border).

All mandatory input fields are marked with a red asterisk.

The required parameters to enter here are:

### Template name

- Enter a template name. Alpha-numericals, spaces and underscores are allowed.

### Groups

- Select one or several groups by clicking Select button. The template must belong to a group.

When done, click Add. Your new template should be visible in the list of templates.

## ☰ Templates

<input type="checkbox"/>	Name ▲	Hosts	Applications	Items	Triggers	Graphs	Dashboards	Discovery	Web
<input type="checkbox"/>	New template	Hosts	Applications	Items	Triggers	Graphs	Dashboards	Discovery	Web

As you may see, the template is there, but it holds nothing in it - no items, triggers or other entities.

Adding item to template

To add an item to the template, go to the item list for 'New host'. In Configuration → Hosts click on Items next to 'New host'.

Then:

- mark the checkbox of the 'CPU Load' item in the list
- click on Copy below the list
- select the template to copy item to

Target type: Host groups | Hosts | **Templates**

\* Target: New template X | type here to search | Select

Copy | Cancel

All mandatory input fields are marked with a red asterisk.

- click on Copy

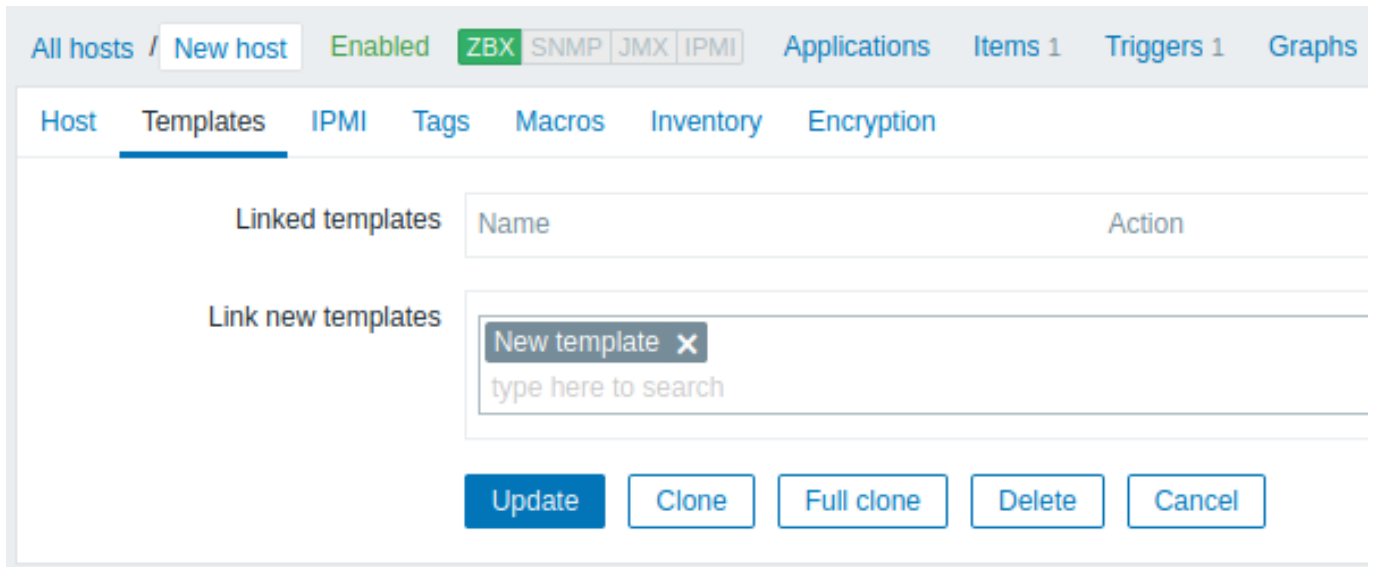
If you now go to Configuration → Templates, 'New template' should have one new item in it.

We will stop at one item only for now, but similarly you can add any other items, triggers or other entities to the template until it's a fairly complete set of entities for given purpose (monitoring OS, monitoring single application).

Linking template to host

With a template ready, it only remains to add it to a host. For that, go to Configuration → Hosts, click on 'New host' to open its property form and go to the **Templates** tab.

There, start typing New template in the Link new templates field. The name of template we have created should appear in the dropdown list. Scroll down to select. See that it appears in the Link new templates field.



Click Update in the form to save the changes. The template is now added to the host, with all entities that it holds.

As you may have guessed, this way it can be applied to any other host as well. Any changes to the items, triggers and other entities at the template level will propagate to the hosts the template is linked to.

Linking pre-defined templates to hosts

As you may have noticed, Zabbix comes with a set of predefined templates for various OS, devices and applications. To get started with monitoring very quickly, you may link the appropriate one of them to a host, but beware that these templates need to be fine-tuned for your environment. Some checks may not be needed, and polling intervals may be way too frequent.

More information about [templates](#) is available.

## 6. Zabbix appliance

**Overview** As an alternative to setting up manually or reusing an existing server for Zabbix, users may [download](#) a Zabbix appliance or a Zabbix appliance installation CD image.

Zabbix appliance and installation CD versions are based upon the following OS:

Zabbix appliance version	OS
5.0.0	CentOS 8 (x86_64)

Zabbix appliance installation CD can be used for instant deployment of Zabbix server (MySQL).

System requirements:

- RAM: 1.5 GB
- Disk space: at least 8 GB should be allocated for the virtual machine.

|<|<|<|

Zabbix appliance contains a Zabbix server (configured and running on MySQL) and a frontend.

Zabbix virtual appliance is available in the following formats:

- VMWare (.vmx)
- Open virtualization format (.ovf)
- Microsoft Hyper-V 2012 (.vhdx)
- Microsoft Hyper-V 2008 (.vhd)
- KVM, Parallels, QEMU, USB stick, VirtualBox, Xen (.raw)
- KVM, QEMU (.qcow2)

To get started, boot the appliance and point a browser at the IP the appliance has received over DHCP.

**Attention:**

DHCP must be enabled on the host.

To get the IP address from inside the virtual machine run:

```
ip addr show
```

To access Zabbix frontend, go to **http://<host\_ip>** (for access from the host's browser bridged mode should be enabled in the VM network settings).

**Note:**

If the appliance fails to start up in Hyper-V, you may want to press **Ctrl+Alt+F2** to switch tty sessions.

**1 Changes to CentOS 8 configuration** The appliance is based on CentOS 8. There are some changes applied to the base CentOS configuration.

### 1.1 Repositories

Official Zabbix **repository** has been added to `/etc/yum.repos.d`:

```
[zabbix]
name=Zabbix Official Repository - $basearch
baseurl=http://repo.zabbix.com/zabbix/5.2/rhel/8/$basearch/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-ZABBIX-A14FE591
```

### 1.2 Firewall configuration

The appliance uses iptables firewall with predefined rules:

- Opened SSH port (22 TCP);
- Opened Zabbix agent (10050 TCP) and Zabbix trapper (10051 TCP) ports;
- Opened HTTP (80 TCP) and HTTPS (443 TCP) ports;
- Opened SNMP trap port (162 UDP);
- Opened outgoing connections to NTP port (53 UDP);
- ICMP packets limited to 5 packets per second;
- All other incoming connections are dropped.

### 1.3 Using a static IP address

By default the appliance uses DHCP to obtain the IP address. To specify a static IP address:

- Log in as root user;
- Open `/etc/sysconfig/network-scripts/ifcfg-eth0` file;
- Replace `BOOTPROTO=dhcp` with `BOOTPROTO=none`
- Add the following lines:
  - `IPADDR=<IP address of the appliance>`
  - `PREFIX=<CIDR prefix>`
  - `GATEWAY=<gateway IP address>`
  - `DNS1=<DNS server IP address>`
- Run **systemctl restart network** command.

Consult the official Red Hat [documentation](#) if needed.

### 1.4 Changing time zone

By default the appliance uses UTC for the system clock. To change the time zone, copy the appropriate file from `/usr/share/zoneinfo` to `/etc/localtime`, for example:

```
cp /usr/share/zoneinfo/Europe/Riga /etc/localtime
```

**2 Zabbix configuration** Zabbix appliance setup has the following passwords and configuration changes:

#### 2.1 Credentials (login:password)

System:

- root:zabbix

Zabbix frontend:

- Admin:zabbix

Database:

- root:<random>
- zabbix:<random>

**Note:**

Database passwords are randomly generated during the installation process. Root password is stored inside the `/root/.my.cnf` file. It is not required to input a password under the "root" account.

To change the database user password, changes have to be made in the following locations:

- MySQL;
- `/etc/zabbix/zabbix_server.conf`;
- `/etc/zabbix/web/zabbix.conf.php`.

**Note:**

Separate users `zabbix_srv` and `zabbix_web` are defined for the server and the frontend respectively.

## 2.2 File locations

- Configuration files are located in **`/etc/zabbix`**.
- Zabbix server, proxy and agent logfiles are located in **`/var/log/zabbix`**.
- Zabbix frontend is located in **`/usr/share/zabbix`**.
- Home directory for the user **zabbix** is **`/var/lib/zabbix`**.

## 2.3 Changes to Zabbix configuration

- Frontend timezone is set to Europe/Riga (this can be modified in **`/etc/php-fpm.d/zabbix.conf`**);

**3 Frontend access** By default, access to the frontend is allowed from anywhere.

The frontend can be accessed at `http://<host>`.

This can be customized in **`/etc/nginx/conf.d/zabbix.conf`**. Nginx has to be restarted after modifying this file. To do so, log in using SSH as **root** user and execute:

```
systemctl restart nginx
```

**4 Firewall** By default, only the ports listed in the **configuration changes** above are open. To open additional ports, modify `/etc/sysconfig/iptables` file and reload firewall rules:

```
systemctl reload iptables
```

**5 Upgrading** The Zabbix appliance packages may be upgraded. To do so, run:

```
dnf update zabbix*
```

**6 System Services** Systemd services are available:

```
systemctl list-units zabbix*
```

## 7 Format-specific notes 7.1 VMware

The images in vmdk format are usable directly in VMware Player, Server and Workstation products. For use in ESX, ESXi and vSphere they must be converted using [VMware converter](#).

### 7.2 HDD/flash image (raw)

```
dd if=./zabbix_appliance_5.2.0.raw of=/dev/sdc bs=4k conv=fdatasync
```

Replace `/dev/sdc` with your Flash/HDD disk device.

## 7. Configuration

Please use the sidebar to access content in the Configuration section.



## 1 Configuring a template

### Overview

Configuring a template requires that you first create a template by defining its general parameters and then you add entities (items, triggers, graphs etc.) to it.

### Creating a template

To create a template, do the following:

- Go to Configuration → Templates
- Click on Create template
- Edit template attributes

The **Template** tab contains general template attributes.

The screenshot shows a configuration form for a template. The 'Template' tab is active. The form includes the following fields:

- \* Template name:** A text input field containing the value 'Linux'.
- Visible name:** An empty text input field.
- \* Groups:** A dropdown menu with 'Templates/Operating systems' selected and a search prompt 'type here to search' below it.
- Description:** A large empty text area.

At the bottom of the form are two buttons: 'Add' (blue) and 'Cancel' (white with blue border).

All mandatory input fields are marked with a red asterisk.

Template attributes:

Parameter	Description
Template name	Unique template name. Alphanumerics, spaces, dots, dashes and underscores are allowed. However, leading and trailing spaces are disallowed.
Visible name	If you set this name, it will be the one visible in lists, maps, etc.
Groups	Host/template groups the template belongs to.
Description	Enter the template description.

The **Linked templates** tab allows you to link one or more "nested" templates to this template. All entities (items, triggers, graphs etc.) will be inherited from the linked templates.

To link a new template, start typing the template name in the Link new templates field. A list of matching templates will appear; scroll down to select. Alternatively, you may click on Select next to the field and select templates from the list in a popup window. The templates that are selected in the Link new templates field will be linked to the template when the template configuration form is saved or updated.

To unlink a template, use one of the two options in the Linked templates block:

- Unlink - unlink the template, but preserve its items, triggers and graphs

- Unlink and clear - unlink the template and remove all its items, triggers and graphs

The **Tags** tab allows you to define template-level tags. All problems of hosts linked to this template will be tagged with the values entered here.

Name	Value
App	MySQL
tag	value

[Add](#)

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags.

The **Macros** tab allows you to define template-level user macros as a name-value pairs. Note that macro values can be kept as plain text, secret text or Vault secret. Adding a description is also supported.

Template macros    Inherited and template macros

Macro	Value		Description
{TEMPLATE_THRESHOLD1}	10M	T ▾	description
{TEMPLATE_THRESHOLD2}	20M	T ▾	description
{TEMPLATE_THRESHOLD3}	30M	T ▾	description
{TEMPLATE_THRESHOLD4}	40M	T ▾	description
{TEMPLATE_THRESHOLD5}	50M	T ▾	description

You may also view here macros from linked templates and global macros if you select the Inherited and template macros option. That is where all defined user macros for the template are displayed with the value they resolve to as well as their origin.

Macro	Effective value	
<code>{\$AGENT.TIMEOUT}</code>	3m	T ▾
Timeout after which agent is considered unavailable. Works only for agents reachable from Zabbix server/proxy (passive mode).		
<code>{\$CPU.UTIL.CRIT}</code>	90	T ▾
description		
<code>{\$IF.ERRORS.WARN}</code>	2	T ▾
description		
<code>{\$IFCONTROL}</code>	1	T ▾

For convenience, links to respective templates and global macro configuration are provided. It is also possible to edit a nested template/global macro on the template level, effectively creating a copy of the macro on the template.

Buttons:

<b>Add</b>	Add the template. The added template should appear in the list.
<b>Update</b>	Update the properties of an existing template.
<b>Clone</b>	Create another template based on the properties of the current template, including the entities (items, triggers, etc) inherited from linked templates.
<b>Full clone</b>	Create another template based on the properties of the current template, including the entities (items, triggers, etc) both inherited from linked templates and directly attached to the current template.
<b>Delete</b>	Delete the template; entities of the template (items, triggers, etc) remain with the linked hosts.
<b>Clear history and trends</b>	Delete the template and all its entities from linked hosts.
<b>Cancel</b>	Cancel the editing of template properties.

With a template created, it is time to add some entities to it.

**Attention:**

Items have to be added to a template first. Triggers and graphs cannot be added without the corresponding item.

Adding items, triggers, graphs

To add items to the template, do the following:

- Go to Configuration → Hosts (or Templates)
- Click on Items in the row of the required host/template
- Mark the checkboxes of items you want add to the template
- Click on Copy below the item list
- Select the template (or group of templates) the items should be copied to and click on Copy

All the selected items should be copied to the template.

Adding triggers and graphs is done in similar fashion (from the list of triggers and graphs respectively), again, keeping in mind that they can only be added if the required items are added first.

Adding dashboards

To add dashboards to a template in Configuration → Templates, do the following:

- Click on Dashboards in the row of the template
- Configure a dashboard following the guidelines of [configuring dashboards](#)

**Attention:**

The widgets that can be included in a template dashboard are: classic graph, graph prototype, clock, plain text, URL.

**Note:**

For details on accessing host dashboards that are created from template dashboards, see the [host dashboard](#) section.

Configuring low-level discovery rules

See the [low-level discovery](#) section of the manual.

Adding web scenarios

To add web scenarios to a template in Configuration → Templates, do the following:

- Click on Web in the row of the template
- Configure a web scenario following the usual method of [configuring web scenarios](#)

## 2 Linking/unlinking

Overview

Linking is a process whereby templates are applied to hosts, whereas unlinking removes the association with the template from a host.

**Attention:**

Templates are linked directly to individual hosts and not to host groups. Simply adding a template to a host group will not link it. Host groups are used only for logical grouping of hosts and templates.

Linking a template

To link a template to the host, do the following:

- Go to Configuration → Hosts
- Click on the required host and switch to the Templates tab
- Start typing the template name in the Link new templates field. A list of matching templates will appear; scroll down to select.
- Alternatively, you may click on Select next to the field and select one or several templates from the list in a popup window
- Click on Add/Update in the host attributes form

The host will now have all the entities (items, triggers, graphs, etc) of the template.

**Attention:**

Linking multiple templates to the same host will fail if in those templates there are items with the same item key. And, as triggers and graphs use items, they cannot be linked to a single host from multiple templates either, if using identical item keys.

When entities (items, triggers, graphs etc.) are added from the template:

- previously existing identical entities on the host are updated as entities of the template
- entities from the template are added
- any directly linked entities that, prior to template linkage, existed only on the host remain untouched

In the lists, all entities from the template now are prefixed by the template name, indicating that these belong to the particular template. The template name itself (in gray text) is a link allowing to access the list of those entities on the template level.

If some entity (item, trigger, graph etc.) is not prefixed by the template name, it means that it existed on the host before and was not added by the template.

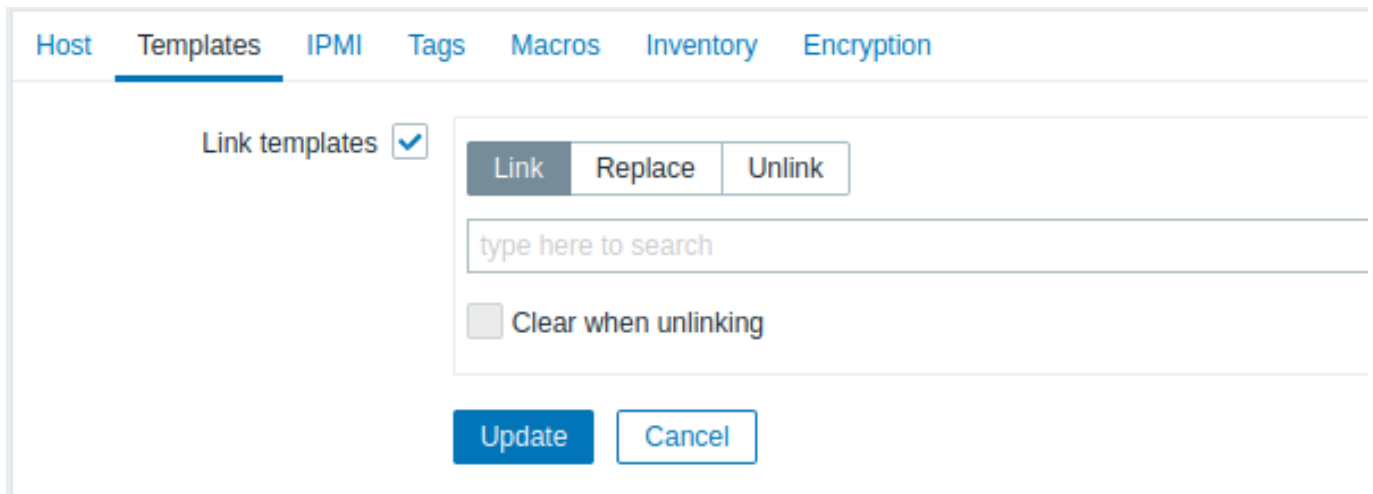
#### Entity uniqueness criteria

When adding entities (items, triggers, graphs etc.) from a template it is important to know what of those entities already exist on the host and need to be updated and what entities differ. The uniqueness criteria for deciding upon the sameness/difference are:

- for items - the item key
- for triggers - trigger name and expression
- for custom graphs - graph name and its items
- for applications - application name

#### Linking templates to several hosts

To update template linkage of many hosts, in Configuration → Hosts select some hosts by marking their checkboxes, then click on **Mass update** below the list and then in the Templates tab select to link additional templates:



Select Link templates and start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the template to link.

The Replace option will allow to link a new template while unlinking any template that was linked to the hosts before. The Unlink option will allow to specify which templates to unlink. The Clear when unlinking option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

#### Note:

Zabbix offers a sizable set of predefined templates. You can use these for reference, but beware of using them unchanged in production as they may contain too many items and poll for data too often. If you feel like using them, finetune them to fit your real needs.

#### Editing linked entities

If you try to edit an item or trigger that was linked from the template, you may realize that many key options are disabled for editing. This makes sense as the idea of templates is that things are edited in one-touch manner on the template level. However, you still can, for example, enable/disable an item on the individual host and set the update interval, history length and some other parameters.

If you want to edit the entity fully, you have to edit it on the template level (template level shortcut is displayed in the form name), keeping in mind that these changes will affect all hosts that have this template linked to them.

#### Unlinking a template

To unlink a template from a host, do the following:

- Go to Configuration → Hosts
- Click on the required host and switch to the Templates tab

- Click on Unlink or Unlink and clear next to the template to unlink
- Click on Update in the host attributes form

Choosing the Unlink option will simply remove association with the template, while leaving all its entities (items, triggers, graphs etc.) with the host.

Choosing the Unlink and clear option will remove both the association with the template and all its entities (items, triggers, graphs etc.).

### 3 Nesting

#### Overview

Nesting is a way of one template encompassing one or more other templates.

As it makes sense to separate out on individual templates entities for various services, applications etc. you may end up with quite a few templates all of which may need to be linked to quite a few hosts. To simplify the picture, it is possible to link some templates together, in one "nested" template.

The benefit of nesting is that then you have to link only the one template to the host and the host will inherit all entities of the linked templates automatically.

#### Configuring a nested template

If you want to link some templates, to begin with you can take an existing template or a new one, then:

- Open the template properties form
- Look for the Linked templates tab
- Click on Select to select templates in the popup window
- Click on Add to list selected templates
- Click on Add/Update in the template properties form

Thus, all entities of the template itself, as well as all linked templates' entities (such as items, triggers, graphs etc.) will appear in the template configuration, except for the linked template dashboards, which will nevertheless be inherited by hosts.

To unlink any of the linked templates, in the same form use the Unlink or Unlink and clear buttons and click on Update.

Choosing the Unlink option will simply remove the association with the other template, while not removing all its entities (items, triggers, graphs etc.).

Choosing the Unlink and clear option will remove both the association with the other template and all its entities (items, triggers, graphs etc.).

### 4 Mass update

#### Overview

Sometimes you may want to change some attribute for a number of templates at once. Instead of opening each individual template for editing, you may use the mass update function for that.

#### Using mass update

To mass-update some templates, do the following:

- Mark the checkboxes before the templates you want to update in the **template list**
- Click on Mass update below the list
- Navigate to the tab with required attributes (Template, Linked templates or Tags)
- Mark the checkboxes of any attribute to update and enter a new value for them

The following options are available when selecting the respective button for host group update:

- Add - allows to specify additional host groups from the existing ones or enter completely new host groups for the templates.
- Replace - will remove the template from any existing host groups and replace them with the one(s) specified in this field (existing or new host groups).
- Remove - will remove specific host groups from templates.

These fields are auto-complete - starting to type in them offers a dropdown of matching host groups. If the host group is new, it also appears in the dropdown and it is indicated by (new) after the string. Just scroll down to select.

The following options are available when selecting the respective button for template linkage update:

- Link - specify which additional templates to link.
- Replace - specify which templates to link while unlinking any template that was linked to the templates before.
- Unlink - specify which templates to unlink.

To specify the templates to link/unlink start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the required template.

The Clear when unlinking option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

Template [Linked templates](#) **Tags** [Macros](#)

Tags

Name	Value
tag	value

[Add](#)

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags. Note, that tags with the same name, but different values are not considered 'duplicates' and can be added to the same template.

Template [Linked templates](#) [Tags](#) **Macros**

Macros

Macro	Value	Type	Description
{SMACRO}	value	T	description

[Add](#)

Update existing

The following options are available when selecting the respective button for macros update:

- Add - allows to specify additional user macros for the templates. If Update existing checkbox is checked, value, type and description for the specified macro name will be updated. If unchecked, if a macro with that name already exist on the template(s), it will not be updated.
- Update - will replace values, types and descriptions of macros specified in this list. If Add missing checkbox is checked, macro that didn't previously exist on a template will be added as new macro. If unchecked, only macros that already exist on a template will be updated.
- Remove - will remove specified macros from templates. If Except selected box is checked, all macros except specified in the list will be removed. If unchecked, only macros specified in the list will be removed.
- Remove all - will remove all user macros from templates. If I confirm to remove all macros checkbox is not checked, a new popup window will open asking to confirm removal of all macros.

When done with all required changes, click on Update. The attributes will be updated accordingly for all the selected templates.

## 1 Hosts and host groups

What is a "host"?

Typical Zabbix hosts are the devices you wish to monitor (servers, workstations, switches, etc).

Creating hosts is one of the first monitoring tasks in Zabbix. For example, if you want to monitor some parameters on a server "x", you must first create a host called, say, "Server X" and then you can look to add monitoring items to it.

Hosts are organized into host groups.

Proceed to [creating and configuring a host](#).



## 1 Configuring a host

### Overview

To configure a host in Zabbix frontend, do the following:

- Go to: Configuration → Hosts
- Click on Create host to the right (or on the host name to edit an existing host)
- Enter parameters of the host in the form

You can also use the Clone and Full clone buttons in the form of an existing host to create a new host. Clicking on Clone will retain all host parameters and template linkage (keeping all entities from those templates). Full clone will additionally retain directly attached entities (applications, items, triggers, graphs, low-level discovery rules and web scenarios).

Note: When a host is cloned, it will retain all template entities as they are originally on the template. Any changes to those entities made on the existing host level (such as changed item interval, modified regular expression or added prototypes to the low-level discovery rule) will not be cloned to the new host; instead they will be as on the template.

### Configuration

The **Host** tab contains general host attributes:

The screenshot shows the Zabbix Host configuration form. The 'Host' tab is active, and the 'Inventory' sub-tab is selected. The form contains the following fields and options:

- Host name:** Zabbix server (mandatory, marked with a red asterisk).
- Visible name:** (empty field).
- Groups:** Discovered hosts, Zabbix servers (mandatory, marked with a red asterisk).
- Interfaces:**
  - Agent:** IP address: 127.0.0.1, DNS name: (empty).
  - SNMP:** IP address: 127.0.0.1, DNS name: (empty).
- SNMP version:** SNMPv2 (mandatory, marked with a red asterisk).
- SNMP community:** {\$SNMP\_COMMUNITY} (mandatory, marked with a red asterisk).
- Use bulk requests:**
- Description:** (empty field, with an 'Add' link above it).
- Monitored by proxy:** (no proxy) (dropdown menu).
- Enabled:**
- Buttons:** Add, Cancel.

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Host name	<p>Enter a unique host name. Alphanumerics, spaces, dots, dashes and underscores are allowed. However, leading and trailing spaces are disallowed.</p> <p>Note: With Zabbix agent running on the host you are configuring, the agent <b>configuration file</b> parameter Hostname must have the same value as the host name entered here. The name in the parameter is needed in the processing of <b>active checks</b>.</p>
Visible name	If you set this name, it will be the one visible in lists, maps, etc. This attribute has UTF-8 support.
Groups	Select host groups the host belongs to. A host must belong to at least one host group. A new group can be created and linked to the host group by adding a non-existing group name.
Interfaces	<p>Several host interface types are supported for a host: Agent, SNMP, JMX and IPMI.</p> <p>No interfaces are defined by default. To add a new interface, click on Add in the Interfaces block, select the interface type and enter IP/DNS, Connect to and Port info.</p> <p>Note: Interfaces that are used in any items cannot be removed and link Remove is grayed out for them.</p> <p>See <b>Configuring SNMP monitoring</b> for additional details on configuring an SNMP interface (v1, v2 and v3).</p> <p>IP address Host IP address (optional).</p> <p>DNS name Host DNS name (optional).</p> <p>Connect to Clicking the respective button will tell Zabbix server what to use to retrieve data from agents:  <b>IP</b> - Connect to the host IP address (recommended)  <b>DNS</b> - Connect to the host DNS name</p> <p>Port TCP/UDP port number. Default values are: 10050 for Zabbix agent, 161 for SNMP agent, 12345 for JMX and 623 for IPMI.</p> <p>Default Check the radio button to set the default interface.</p>
Description	Enter the host description.
Monitored by proxy	<p>The host can be monitored either by Zabbix server or one of Zabbix proxies:</p> <p><b>(no proxy)</b> - host is monitored by Zabbix server  <b>Proxy name</b> - host is monitored by Zabbix proxy "Proxy name"</p>
Enabled	Mark the checkbox to make the host active, ready to be monitored. If unchecked, the host is not active, thus not monitored.

The **Templates** tab allows you to link **templates** to the host. All entities (items, triggers, graphs and applications) will be inherited from the template.

To link a new template, start typing the template name in the Link new templates field. A list of matching templates will appear; scroll down to select. Alternatively, you may click on Select next to the field and select templates from the list in a popup window. The templates that are selected in the Link new templates field will be linked to the host when the host configuration form is saved or updated.

To unlink a template, use one of the two options in the Linked templates block:

- Unlink - unlink the template, but preserve its items, triggers and graphs
- Unlink and clear - unlink the template and remove all its items, triggers and graphs

Listed template names are clickable links leading to the template configuration form.

The **IPMI** tab contains IPMI management attributes.

Parameter	Description
Authentication algorithm	Select the authentication algorithm.
Privilege level	Select the privilege level.
Username	User name for authentication. User macros may be used.
Password	Password for authentication. User macros may be used.

The **Tags** tab allows you to define host-level **tags**. All problems of this host will be tagged with the values entered here.

Name	Value
Service	JIRA

[Add](#)

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags.

The **Macros** tab allows you to define host-level **user macros** as a name-value pairs. Note that macro values can be kept as plain text, secret text or Vault secret. Adding a description is also supported.

Macro	Value	Description
{MEMORY.AVAILABLE.MIN}	50M	description

[Add](#)

You may also view here template-level and global user macros if you select the Inherited and host macros option. That is where all defined user macros for the host are displayed with the value they resolve to as well as their origin.

Macro	Effective value	Template value	Global value (configure)
{AGENT.TIMEOUT}	3m	Template Module Zabbix agent: "3m"	
{CPU.UTIL.CRIT}	90	Template Module Linux CPU by Zabbix agent: "90"	
{HOST_MEMORY_THRESHOLD}	50M		
{IFERRORS.WARN}	2	Template Module Linux network interfaces by Zabbix ...	

For convenience, links to respective templates and global macro configuration are provided. It is also possible to edit a template/global macro on the host level, effectively creating a copy of the macro on the host.

The **Host inventory** tab allows you to manually enter **inventory** information for the host. You can also select to enable Automatic inventory population, or disable inventory population for this host.

Host Templates 2 IPMI Tags 1 Macros 1 **Inventory ●** Encryption

Type

Type (Full details)

Name  ← System name

If inventory is enabled (manual or automatic), a green dot is displayed with the tab name.

### Encryption

The **Encryption** tab allows you to require **encrypted** connections with the host.

Parameter	Description
Connections to host	How Zabbix server or proxy connects to Zabbix agent on a host: no encryption (default), using PSK (pre-shared key) or certificate.
Connections from host	Select what type of connections are allowed from the host (i.e. from Zabbix agent and Zabbix sender). Several connection types can be selected at the same time (useful for testing and switching to other connection type). Default is "No encryption".
Issuer	Allowed issuer of certificate. Certificate is first validated with CA (certificate authority). If it is valid, signed by the CA, then the Issuer field can be used to further restrict allowed CA. This field is intended to be used if your Zabbix installation uses certificates from multiple CAs. If this field is empty then any CA is accepted.
Subject	Allowed subject of certificate. Certificate is first validated with CA. If it is valid, signed by the CA, then the Subject field can be used to allow only one value of Subject string. If this field is empty then any valid certificate signed by the configured CA is accepted.
PSK identity	Pre-shared key identity string. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.
PSK	Pre-shared key (hex-string). Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library. Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952

### Creating a host group

To create a host group in Zabbix frontend, do the following:

- Go to: Configuration → Host groups
- Click on Create Group in the upper right corner of the screen
- Enter parameters of the group in the form

## ≡ Host groups

\* Group name

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Group name	Enter a unique host group name. To create a nested host group, use the '/' forward slash separator, for example Europe/Latvia/Riga/Zabbix servers. You can create this group even if none of the three parent host groups (Europe/Latvia/Riga) exist. In this case creating these parent host groups is up to the user; they will not be created automatically. Leading and trailing slashes, several slashes in a row are not allowed. Escaping of '/' is not supported. Nested representation of host groups is supported since Zabbix 3.2.0.
Apply permissions and tag filters to all subgroups	Checkbox is available to Super Admin users only and only when editing an existing host group. Mark this checkbox and click on Update to apply the same level of permissions/tag filters to all nested host groups. For user groups that may have had differing <b>permissions</b> assigned to nested host groups, the permission level of the parent host group will be enforced on the nested groups. This is a one-time option that is not saved in the database. This option is supported since Zabbix 3.4.0.

### Permissions to nested host groups

- When creating a child host group to an existing parent host group, **user group** permissions to the child are inherited from the parent (for example, when creating Riga/Zabbix servers if Riga already exists)
- When creating a parent host group to an existing child host group, no permissions to the parent are set (for example, when creating Riga if Riga/Zabbix servers already exists)

## 2 Inventory

### Overview

You can keep the inventory of networked devices in Zabbix.

There is a special Inventory menu in the Zabbix frontend. However, you will not see any data there initially and it is not where you enter data. Building inventory data is done manually when configuring a host or automatically by using some automatic population options.

### Building inventory

#### Manual mode

When **configuring a host**, in the Host inventory tab you can enter such details as the type of device, serial number, location, responsible person, etc - data that will populate inventory information.

If a URL is included in host inventory information and it starts with 'http' or 'https', it will result in a clickable link in the Inventory section.

#### Automatic mode

Host inventory can also be populated automatically. For that to work, when configuring a host the inventory mode in the Host inventory tab must be set to Automatic.

Then you can **configure host items** to populate any host inventory field with their value, indicating the destination field with the respective attribute (called Item will populate host inventory field) in item configuration.

Items that are especially useful for automated inventory data collection:

- system.hw.chassis[full|type|vendor|model|serial] - default is [full], root permissions needed
- system.hw.cpu[all|cpunum,full|maxfreq|vendor|model|curfreq] - default is [all,full]
- system.hw.devices[pci|usb] - default is [pci]
- system.hw.macaddr[interface,short|full] - default is [all,full], interface is regexp
- system.sw.arch
- system.sw.os[name|short|full] - default is [name]
- system.sw.packages[package,manager,short|full] - default is [all,all,full], package is regexp

## Inventory mode selection

Inventory mode can be selected in the host configuration form.

Inventory mode by default for new hosts is selected based on the Default host inventory mode setting in Administration → General → **Other**.

For hosts added by network discovery or autoregistration actions, it is possible to define a Set host inventory mode operation selecting manual or automatic mode. This operation overrides the Default host inventory mode setting.

## Inventory overview

The details of all existing inventory data are available in the Inventory menu.

In Inventory → Overview you can get a host count by various fields of the inventory.

In Inventory → Hosts you can see all hosts that have inventory information. Clicking on the host name will reveal the inventory details in a form.

The screenshot shows the 'Host inventory' page for a host named 'Zabbix server'. It features two tabs: 'Overview' (selected) and 'Details'. The 'Overview' tab displays the following information:

- Host name:** Zabbix server
- Agent interfaces:** A table with columns for IP address, DNS name, Connect to, and Port. The IP address is 127.0.0.1, and the port is 10050. The 'Connect to' column has radio buttons for 'IP' (selected) and 'DNS'.
- SNMP interfaces:** A table with columns for IP address, DNS name, Connect to, and Port. The IP address is 127.0.0.1, and the port is 161. The 'Connect to' column has radio buttons for 'IP' (selected) and 'DNS'.
- OS:** Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP
- Monitoring:** Web Latest data Problems Graphs Dashboards
- Configuration:** Host Applications 21 Items 148 Triggers 67 Graphs 28 Discovery 4 Web 1

A 'Cancel' button is located at the bottom of the form.

The **Overview** tab shows:

Parameter	Description
Host name	Name of the host. Clicking on the name opens a menu with the scripts defined for the host. Host name is displayed with an orange icon, if the host is in maintenance.
Visible name	Visible name of the host (if defined).
Host (Agent, SNMP, JMX, IPMI) interfaces	This block provides details of the interfaces configured for the host.
OS	Operating system inventory field of the host (if defined).
Hardware	Host hardware inventory field (if defined).
Software	Host software inventory field (if defined).
Description	Host description.
Monitoring	Links to monitoring sections with data for this host: Web, Latest data, Triggers, Problems, Graphs, Screens.
Configuration	Links to configuration sections for this host: Host, Applications, Items, Triggers, Graphs, Discovery, Web. The amount of configured entities is listed in parenthesis after each link.

The **Details** tab shows all inventory fields that are populated (are not empty).

#### Inventory macros

There are host inventory macros {INVENTORY.\*} available for use in notifications, for example:

"Server in {INVENTORY.LOCATION1} has a problem, responsible person is {INVENTORY.CONTACT1}, phone number {INVENTORY.POC.PRIMARY.PHONE.A1}."

For more details, see the [supported macro](#) page.

### 3 Mass update

#### Overview

Sometimes you may want to change some attribute for a number of hosts at once. Instead of opening each individual host for editing, you may use the mass update function for that.

#### Using mass update

To mass-update some hosts, do the following:

- Mark the checkboxes before the hosts you want to update in the [host list](#)
- Click on Mass update below the list
- Navigate to the tab with required attributes (Host, Templates, IPMI, Inventory or Encryption)
- Mark the checkboxes of any attribute to update and enter a new value for them

The screenshot shows a web interface for mass updating hosts. At the top, there are tabs for 'Host', 'Templates', 'IPMI', 'Tags', 'Macros', 'Inventory', and 'Encryption', with 'Host' being the active tab. Below the tabs, there are several update options, each with a checkbox and a corresponding button or dropdown menu. The 'Host groups' option has a checked checkbox and buttons for 'Add', 'Replace', and 'Remove'. Below this is a search input field with the placeholder text 'type here to search'. The 'Description' option has an unchecked checkbox and the text 'Original'. The 'Monitored by proxy' option has a checked checkbox and a dropdown menu showing '(no proxy)'. The 'Status' option has an unchecked checkbox and the text 'Original'. At the bottom, there are two buttons: 'Update' and 'Cancel'.

The following options are available when selecting the respective button for host group update:

- Add - allows to specify additional host groups from the existing ones or enter completely new host groups for the hosts.
- Replace - will remove the host from any existing host groups and replace them with the one(s) specified in this field (existing or new host groups).
- Remove - will remove specific host groups from hosts.

These fields are auto-complete - starting to type in them offers a dropdown of matching host groups. If the host group is new, it also appears in the dropdown and it is indicated by (new) after the string. Just scroll down to select.

Host **Templates** IPMI Tags Macros Inventory Encryption

Link templates

Link Replace Unlink

type here to search

Clear when unlinking

Update Cancel

The following options are available when selecting the respective button for template linkage update:

- Link - specify which additional templates to link.
- Replace - specify which templates to link while unlinking any template that was linked to the hosts before.
- Unlink - specify which templates to unlink.

To specify the templates to link/unlink start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the required template.

The Clear when unlinking option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

Host **Templates** IPMI Tags Macros Inventory Encryption

Authentication algorithm  Original

Privilege level  Operator

Username  Original

Password  Original

Host **Tags** IPMI Macros Inventory Encryption

Tags  Add Replace Remove

Name	Value
tag	value

[Add](#)

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags. Note, that tags with the same name, but different values are not considered 'duplicates' and can be added to the same host.



Host Templates IPMI Tags **Macros** Inventory Encryption

Macros  **Add** Update Remove Remove all

Macro	Value	Description
{\$MACRO}	value	T description

[Add](#)

Update existing

The following options are available when selecting the respective button for macros update:

- Add - allows to specify additional user macros for the hosts. If Update existing checkbox is checked, value, type and description for the specified macro name will be updated. If unchecked, if a macro with that name already exist on the host(s), it will not be updated.
- Update - will replace values, types and descriptions of macros specified in this list. If Add missing checkbox is checked, macro that didn't previously exist on a host will be added as new macro. If unchecked, only macros that already exist on a host will be updated.
- Remove - will remove specified macros from hosts. If Except selected box is checked, all macros except specified in the list will be removed. If unchecked, only macros specified in the list will be removed.
- Remove all - will remove all user macros from hosts. If I confirm to remove all macros checkbox is not checked, a new popup window will open asking to confirm removal of all macros.

Host Templates IPMI Tags **Macros** Inventory Encryption

Inventory mode  Disabled Manual **Automatic**

Type  Original

Type (Full details)  Original

Name  Original

Alias  Original

OS  Original

OS (Full details)  Original

To be able to mass update inventory fields, the Inventory mode should be set to 'Manual' or 'Automatic'.

Host Templates IPMI Tags Macros Inventory **Encryption**

Connections

Connections to host  No encryption  PSK  Certificate

Connections from host  No encryption  
 PSK  
 Certificate

\* PSK identity

\* PSK

When done with all required changes, click on Update. The attributes will be updated accordingly for all the selected hosts.

## 2 Items

### Overview

Items are the ones that gather data from a host.

Once you have configured a host, you need to add some monitoring items to start getting actual data.

An item is an individual metric. One way of quickly adding many items is to attach one of the predefined templates to a host. For optimized system performance though, you may need to fine-tune the templates to have only as many items and as frequent monitoring as is really necessary.

In an individual item you specify what sort of data will be gathered from the host.

For that purpose you use the **item key**. Thus an item with the key name **system.cpu.load** will gather data of the processor load, while an item with the key name **net.if.in** will gather incoming traffic information.

To specify further parameters with the key, you include those in square brackets after the key name. Thus, **system.cpu.load[avg5]** will return processor load average for the last 5 minutes, while **net.if.in[eth0]** will show incoming traffic in the interface eth0.

#### Note:

For all supported item types and item keys, see individual sections of **item types**.

Proceed to **creating and configuring an item**.

## 1 Creating an item

### Overview

To create an item in Zabbix frontend, do the following:

- Go to: Configuration → Hosts
- Click on Items in the row of the host
- Click on Create item in the upper right corner of the screen
- Enter parameters of the item in the form

You can also create an item by opening an existing one, pressing the Clone button and then saving under a different name.

### Configuration

The **Item** tab contains general item attributes.

\* Name Incoming network traffic on eth0

Type Zabbix agent

\* Key net.if.in[eth0]

\* Host interface 127.0.0.1 : 10050

Type of information Numeric (unsigned)

Units bps


\* Update interval 1m

Custom intervals

Type	Interval	Period
Flexible Scheduling	50s	1-7,0
Flexible Scheduling	{\$FLEX_INTERVAL}	{\$FL
Flexible Scheduling	wd1-5h9-18	
Flexible Scheduling	{\$SCHEDULING}	

Add

\* History storage period Do not keep history Storage period 1w 

\* Trend storage period Do not keep trends Storage period 365d 

Show value As is

New application

Applications

- None-
- CPU
- Filesystems
- General
- Memory
- Network interfaces
- OS
- Performance
- Processes
- Security

Populates host inventory field -None-

Description


Enabled


Add

Cancel

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	<p>Item name.</p> <p>Note that the use of positional macros (\$1, \$2. . . \$9 - referring to the first, second... ninth parameter of the item key) is now deprecated.</p> <p>For example: Free disk space on \$1. If the item key is "vfs.fs.size[/,free]", the description will automatically change to "Free disk space on /"</p>
Type	Item type. See individual <b>item type</b> sections.
Key	<p>Item key (up to 2048 characters).</p> <p>The supported <b>item keys</b> can be found in individual item type sections.</p> <p>The key must be unique within a single host.</p> <p>If key type is 'Zabbix agent', 'Zabbix agent (active)', 'Simple check' or 'Zabbix aggregate', the key value must be supported by Zabbix agent or Zabbix server.</p> <p>See also: the correct <b>key format</b>.</p>
Host interface	Select the host interface. This field is available when editing an item on the host level.
Type of information	<p>Type of data as stored in the database after performing conversions, if any.</p> <p><b>Numeric (unsigned)</b> - 64bit unsigned integer</p> <p><b>Numeric (float)</b> - 64bit floating point number</p> <p>This type will allow precision of approximately 15 digits and range from approximately -1.79E+308 to 1.79E+308 (with exception of <b>PostgreSQL 11 and earlier versions</b>).</p> <p>Receiving values in scientific notation is also supported. E.g. 1.23E+7, 1e308, 1.1E-4.</p> <p><b>Character</b> - short text data</p> <p><b>Log</b> - long text data with optional log related properties (timestamp, source, severity, logeventid)</p> <p><b>Text</b> - long text data. See also <b>text data limits</b>.</p>
Units	<p>If a unit symbol is set, Zabbix will add post processing to the received value and display it with the set unit postfix.</p> <p>By default, if the raw value exceeds 1000, it is divided by 1000 and displayed accordingly. For example, if you set bps and receive a value of 881764, it will be displayed as 881.76 Kbps.</p> <p>The <b>JEDEC</b> memory standard is used for processing <b>B</b> (byte), <b>Bps</b> (bytes per second) units, which are divided by 1024. Thus, if units are set to <b>B</b> or <b>Bps</b> Zabbix will display:</p> <p>1 as 1B/1Bps 1024 as 1KB/1KBps 1536 as 1.5KB/1.5KBps</p> <p>Special processing is used if the following time-related units are used:</p> <p><b>unixtime</b> - translated to "yyyy.mm.dd hh:mm:ss". To translate correctly, the received value must be a Numeric (unsigned) type of information.</p> <p><b>uptime</b> - translated to "hh:mm:ss" or "N days, hh:mm:ss" For example, if you receive the value as 881764 (seconds), it will be displayed as "10 days, 04:56:04"</p> <p><b>s</b> - translated to "yyy mmm ddd hhh mmm sss ms"; parameter is treated as number of seconds. For example, if you receive the value as 881764 (seconds), it will be displayed as "10d 4h 56m"</p> <p>Only 3 upper major units are shown, like "1m 15d 5h" or "2h 4m 46s". If there are no days to display, only two levels are displayed - "1m 5h" (no minutes, seconds or milliseconds are shown). Will be translated to "&lt; 1 ms" if the value is less than 0.001.</p> <p>Note that if a unit is prefixed with !, then no unit prefixes/processing is applied to item values. See <b>unit blacklisting</b>.</p>

Parameter	Description
Update interval	<p>Retrieve a new value for this item every N seconds. Maximum allowed update interval is 86400 seconds (1 day).</p> <p><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d.</p> <p><b>User macros</b> are supported.</p> <p>A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.</p> <p>Note: The update interval can only be set to '0' if custom intervals exist with a non-zero value. If set to '0', and a custom interval (flexible or scheduled) exists with a non-zero value, the item will be polled during the custom interval duration.</p> <p>Note that the first item poll after the item became active or after update interval change might occur earlier than the configured value.</p> <p>An existing passive item can be polled for value immediately by pushing the Execute now <b>button</b>.</p>
Custom intervals	<p>You can create custom rules for checking the item:</p> <p><b>Flexible</b> - create an exception to the Update interval (interval with different frequency)</p> <p><b>Scheduling</b> - create a custom polling schedule.</p> <p>For detailed information see <b>Custom intervals</b>.</p> <p><b>Time suffixes</b> are supported in the Interval field, e.g. 30s, 1m, 2h, 1d.</p> <p><b>User macros</b> are supported.</p> <p>A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.</p> <p>Scheduling is supported since Zabbix 3.0.0.</p> <p>Note: Not available for Zabbix agent active items.</p>
History storage period	<p>Select either:</p> <p><b>Do not keep history</b> - item history is not stored. Useful for master items if only dependent items need to keep history. This setting cannot be overridden by global housekeeper <b>settings</b>.</p> <p><b>Storage period</b> - specify the duration of keeping detailed history in the database (1 hour to 25 years). Older data will be removed by the housekeeper. Stored in seconds.</p> <p><b>Time suffixes</b> are supported, e.g. 2h, 1d. <b>User macros</b> are supported.</p> <p>The Storage period value can be overridden globally in Administration → General → <b>Housekeeper</b>.</p> <p>If a global overriding setting exists, a green  info icon is displayed. If you position your mouse on it, a warning message is displayed, e.g. Overridden by global housekeeper settings (1d). It is recommended to keep the recorded values for the smallest possible time to reduce the size of value history in the database. Instead of keeping a long history of values, you can keep longer data of trends.</p> <p>See also <b>History and trends</b>.</p>

Parameter	Description
Trend storage period	<p>Select either:</p> <p><b>Do not keep trends</b> - trends are not stored.</p> <p>This setting cannot be overridden by global housekeeper <a href="#">settings</a>.</p> <p><b>Storage period</b> - specify the duration of keeping aggregated (hourly min, max, avg, count) history in the database (1 day to 25 years). Older data will be removed by the housekeeper. Stored in seconds.</p> <p><a href="#">Time suffixes</a> are supported, e.g. 24h, 1d. <a href="#">User macros</a> are supported.</p> <p>The Storage period value can be overridden globally in Administration → General → <a href="#">Housekeeper</a>.</p> <p>If a global overriding setting exists, a green  info icon is displayed. If you position your mouse on it, a warning message is displayed, e.g. Overridden by global housekeeper settings (7d).</p> <p>Note: Keeping trends is not available for non-numeric data - character, log and text.</p> <p>See also <a href="#">History and trends</a>.</p>
Show value	<p>Apply value mapping to this item. Value mapping does not change received values, it is for displaying data only.</p> <p>It works with Numeric(unsigned), Numeric(float) and Character items.</p> <p>For example, "Windows service states".</p>
Log time format	<p>Available for items of type <b>Log</b> only. Supported placeholders:</p> <ul style="list-style-type: none"> <li>* <b>y</b>: Year (1970-2038)</li> <li>* <b>M</b>: Month (01-12)</li> <li>* <b>d</b>: Day (01-31)</li> <li>* <b>h</b>: Hour (00-23)</li> <li>* <b>m</b>: Minute (00-59)</li> <li>* <b>s</b>: Second (00-59)</li> </ul> <p>If left blank the timestamp will not be parsed.</p> <p>For example, consider the following line from the Zabbix agent log file:</p> <pre>" 23480:20100328:154718.045 Zabbix agent started. Zabbix 1.8.2 (revision 11211)."</pre> <p>It begins with six character positions for PID, followed by date, time, and the rest of the line.</p> <p>Log time format for this line would be "pppppp:yyyyMMdd:hhmmss".</p> <p>Note that "p" and ":" chars are just placeholders and can be anything but "yMdhms".</p>
New application	Enter the name of a new application for the item.
Applications	Link item to one or more existing applications.
Populates host inventory field	<p>You can select a host inventory field that the value of item will populate. This will work if automatic <a href="#">inventory</a> population is enabled for the host.</p> <p>This field is not available if Type of information is set to 'Log'.</p>
Description	Enter an item description.
Enabled	Mark the checkbox to enable the item so it will be processed.

**Note:**

Item type specific fields are described on [corresponding pages](#).

**Note:**

When editing an existing [template](#) level item on a host level, a number of fields are read-only. You can use the link in the form header and go to the template level and edit them there, keeping in mind that the changes on a template level will change the item for all hosts that the template is linked to.

The **Preprocessing** tab allows to define **transformation rules** for the received values.

## Testing

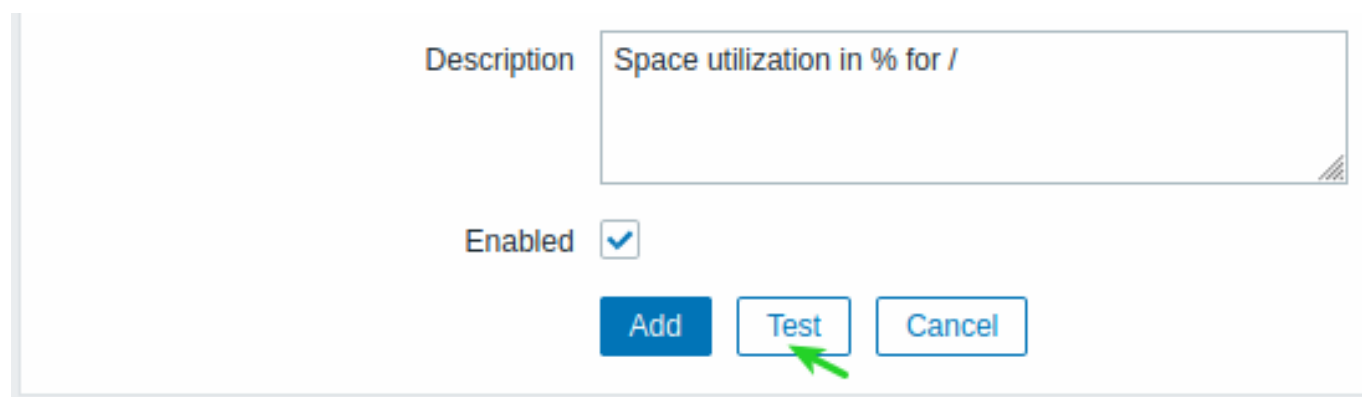
It is possible to test an item and, if configured correctly, get a real value in return. Testing can occur even before an item is saved.

Testing is available for host and template items, item prototypes and low-level discovery rules. Testing is not available for active items.

Item testing is available for the following passive item types:

- Zabbix agent
- SNMP agent (v1, v2, v3)
- IPMI agent
- SSH checks
- Telnet checks
- JMX agent
- Simple checks (except icmping\*, vmware.\* items)
- Zabbix internal
- Zabbix aggregate
- Calculated items
- External checks
- Database monitor
- HTTP agent
- Script

To test an item, click on the Test button at the bottom of the item configuration form. Note that the Test button will be disabled for items that cannot be tested (like active checks, excluded simple checks).



The screenshot shows a portion of the Zabbix item configuration interface. It features a 'Description' field containing the text 'Space utilization in % for /'. Below this is an 'Enabled' checkbox which is checked. At the bottom of the configuration area, there are three buttons: 'Add', 'Test', and 'Cancel'. A green arrow points to the 'Test' button, indicating it is the focus of the discussion.

The item testing form has fields for the required host parameters (host address, port, proxy name/no proxy) and item-specific details (such as SNMPv2 community or SNMPv3 security credentials). These fields are context aware:

- The values are pre-filled when possible, i.e. for items requiring an agent, by taking the information from the selected agent interface of the host
- The values have to be filled manually for template items
- Plain-text macro values are resolved
- Fields where the value (or part of the value) is a secret or Vault macro are empty and have to be entered manually. If any item parameter contains a secret macro value, the following warning message is displayed: "Item contains user-defined macros with secret values. Values of these macros should be entered manually."
- The fields are disabled when not needed in the context of the item type (e.g. the host address field is disabled for calculated and aggregate items, the proxy field is disabled for calculated items)

To test the item, click on Get value. If the value is retrieved successfully, it will fill the Value field, moving the current value (if any) to the Previous value field while also calculating the Prev. time field, i.e. the time difference between the two values (clicks) and trying to detect an EOL sequence and switch to CRLF if detecting "\n\r" in retrieved value.

### Test item ✕

Get value from host

Host address  Port

Proxy

Value   Time

Previous value   Prev. time

End of line sequence

If the configuration is incorrect, an error message is displayed describing the possible cause.

### Test item

! Invalid second parameter.

Get value from host

Host address

Proxy

Value

A successfully retrieved value from host can also be used to test [preprocessing steps](#).

#### Form buttons

Buttons at the bottom of the form allow to perform several operations.

<input type="button" value="Add"/>	Add an item. This button is only available for new items.
<input type="button" value="Update"/>	Update the properties of an item.
<input type="button" value="Clone"/>	Create another item based on the properties of the current item.
<input type="button" value="Execute now"/>	Execute a check for a new item value immediately. Supported for <b>passive</b> checks only (see <a href="#">more details</a> ). Note that when checking for a value immediately, configuration cache is not updated, thus the value will not reflect very recent changes to item configuration.



Test	Test if item configuration is correct by getting a value.
Clear history and trends	Delete the item history and trends.
Delete	Delete the item.
Cancel	Cancel the editing of item properties.

### Text data limits

Text data limits depend on the database backend. Before storing text values in the database they get truncated to match the database value type limit:

Database	Type of information		
	Character	Log	Text
MySQL	255 characters	65536 bytes	65536 bytes
PostgreSQL	255 characters	65536 characters	65536 characters
Oracle	255 characters	65536 characters	65536 characters

### Unit blacklisting

By default, specifying a unit for an item results in a multiplier prefix being added - for example, an incoming value '2048' with unit 'B' would be displayed as '2KB'.

Any unit, however, can be prevented from being converted by using a ! prefix, for example !B. To better illustrate how the conversion works with and without the blacklisting, see the following examples of values and units:

```
1024 !B → 1024 B
1024 B → 1 KB
61 !s → 61 s
61 s → 1m 1s
0 !uptime → 0 uptime
0 uptime → 00:00:00
0 !! → 0 !
0 ! → 0
```

**Note:**

Before Zabbix 4.0, there was a hardcoded unit blacklist consisting of `ms`, `rpm`, `RPM`, `%`. This blacklist has been deprecated, thus the correct way of blacklisting such units is `!ms`, `!rpm`, `!RPM`, `!%`.

### Custom script limit

Available custom script length depends on the database used:

Database	//Limit in characters //	//Limit in bytes //
<b>MySQL</b>	65535	65535
<b>Oracle Database</b>	2048	4000
<b>PostgreSQL</b>	65535	not limited
<b>SQLite (only Zabbix proxy)</b>	65535	not limited

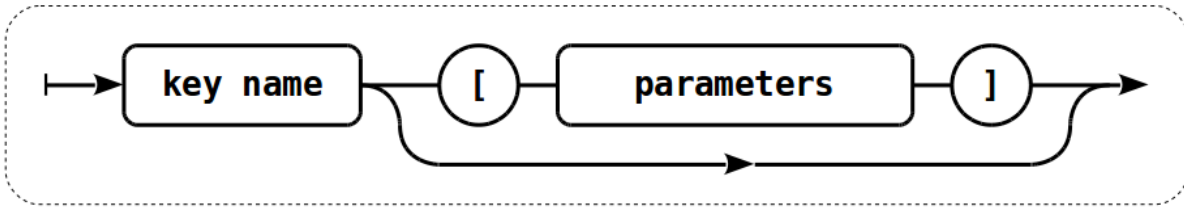
### Unsupported items

An item can become unsupported if its value cannot be retrieved for some reason. Such items are still rechecked at a fixed interval, configurable in Administration → General → **Other parameters**.

Unsupported items are reported as having a NOT SUPPORTED state.

## 1 Item key format

Item key format, including key parameters, must follow syntax rules. The following illustrations depict the supported syntax. Allowed elements and characters at each point can be determined by following the arrows - if some block can be reached through the line, it is allowed, if not - it is not allowed.



To construct a valid item key, one starts with specifying the key name, then there's a choice to either have parameters or not - as depicted by the two lines that could be followed.

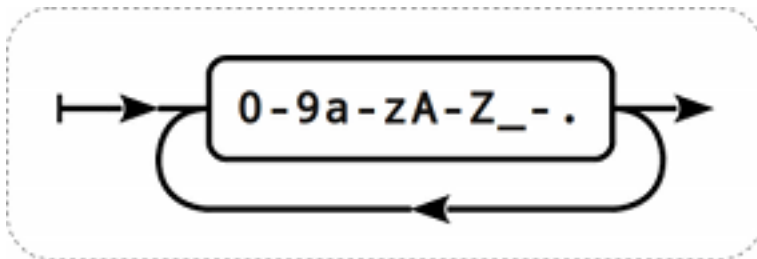
Key name

The key name itself has a limited range of allowed characters, which just follow each other. Allowed characters are:

0-9a-zA-Z\_-. .

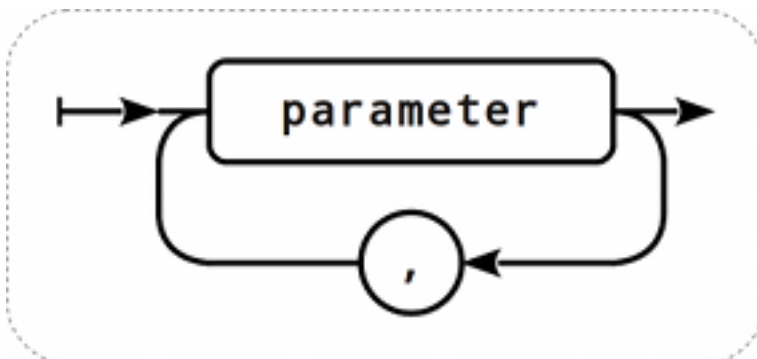
Which means:

- all numbers;
- all lowercase letters;
- all uppercase letters;
- underscore;
- dash;
- dot.

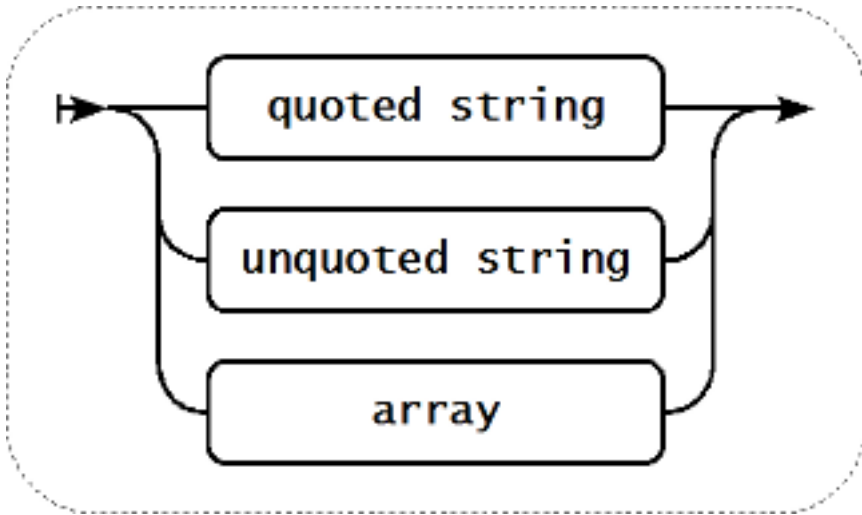


Key parameters

An item key can have multiple parameters that are comma separated.



Each key parameter can be either a quoted string, an unquoted string or an array.



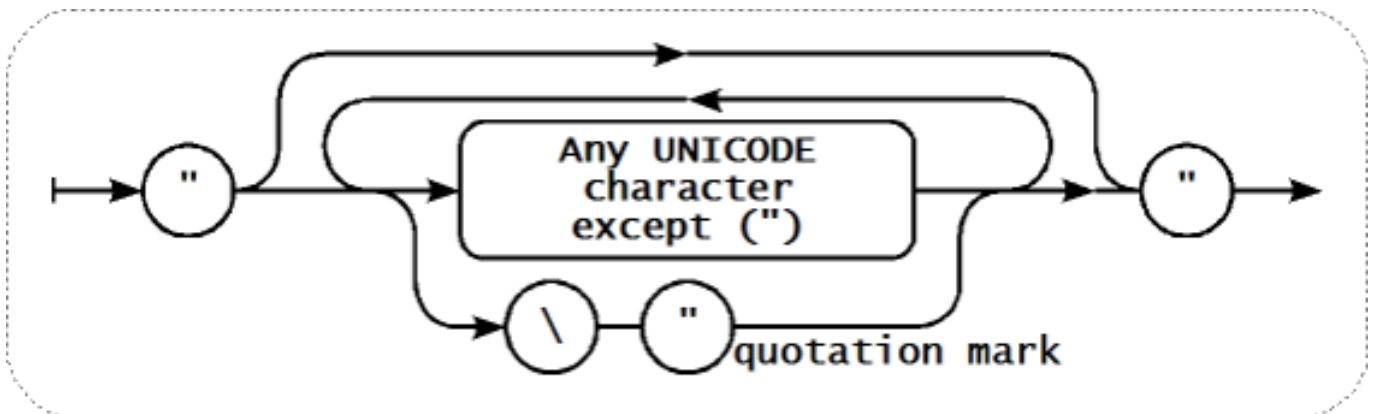
The parameter can also be left empty, thus using the default value. In that case, the appropriate number of commas must be added if any further parameters are specified. For example, item key `icmping[,200,500]` would specify that the interval between individual pings is 200 milliseconds, timeout - 500 milliseconds, and all other parameters are left at their defaults.

Parameter - quoted string

If the key parameter is a quoted string, any Unicode character is allowed.

If the key parameter string contains comma, this parameter has to be quoted.

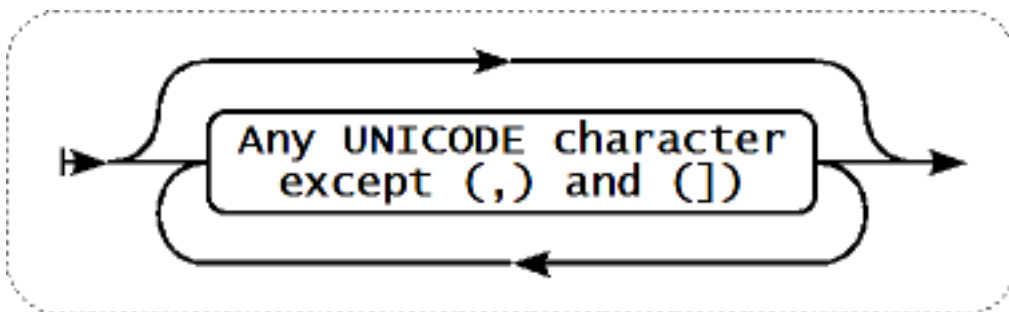
If the key parameter string contains quotation mark, this parameter has to be quoted and each quotation mark which is a part of the parameter string has to be escaped with a backslash (\) character.



**Warning:**  
To quote item key parameters, use double quotes only. Single quotes are not supported.

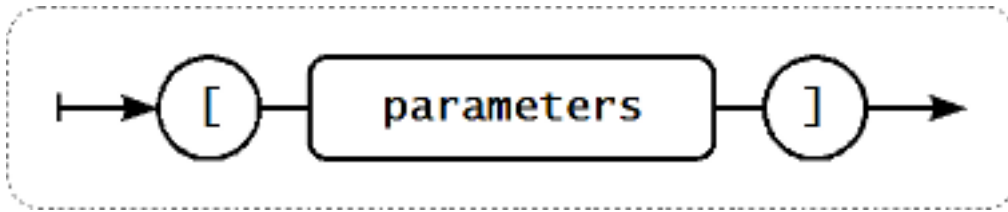
Parameter - unquoted string

If the key parameter is an unquoted string, any Unicode character is allowed except comma and right square bracket (]). Unquoted parameter cannot start with left square bracket ([).



Parameter - array

If the key parameter is an array, it is again enclosed in square brackets, where individual parameters come in line with the rules and syntax of specifying multiple parameters.



**Attention:**

Multi-level parameter arrays, e.g. [a, [b, [c,d] ], e], are not allowed.

## 2 Custom intervals

### Overview

It is possible to create custom rules regarding the times when an item is checked. The two methods for that are Flexible intervals, which allow to redefine the default update interval, and Scheduling, whereby an item check can be executed at a specific time or sequence of times.

### Flexible intervals

Flexible intervals allow to redefine the default update interval for specific time periods. A flexible interval is defined with Interval and Period where:

- Interval – the update interval for the specified time period
- Period – the time period when the flexible interval is active (see the [time periods](#) for detailed description of the Period format)

Up to seven flexible intervals can be defined. If multiple flexible intervals overlap, the smallest Interval value is used for the overlapping period. Note that if the smallest value of overlapping flexible intervals is '0', no polling will take place. Outside the flexible intervals the default update interval is used.

Note that if the flexible interval equals the length of the period, the item will be checked exactly once. If the flexible interval is greater than the period, the item might be checked once or it might not be checked at all (thus such configuration is not advisable). If the flexible interval is less than the period, the item will be checked at least once.

If the flexible interval is set to '0', the item is not polled during the flexible interval period and resumes polling according to the default Update interval once the period is over. Examples:

Interval	Period	Description
10	1-5,09:00-18:00	Item will be checked every 10 seconds during working hours.
0	1-7,00:00-7:00	Item will not be checked during the night.
0	7-7,00:00-24:00	Item will not be checked on Sundays.
60	1-7,12:00-12:01	Item will be checked at 12:00 every day. Note that this was used as a workaround for scheduled checks and starting with Zabbix 3.0 it is recommended to use scheduling intervals for such checks.

### Scheduling intervals

Scheduling intervals are used to check items at specific times. While flexible intervals are designed to redefine the default item update interval, the scheduling intervals are used to specify an independent checking schedule, which is executed in parallel.

A scheduling interval is defined as: md<filter>wd<filter>h<filter>m<filter>s<filter> where:

- **md** - month days
- **wd** - week days
- **h** - hours
- **m** - minutes
- **s** - seconds

<filter> is used to specify values for its prefix (days, hours, minutes, seconds) and is defined as: [<from>[<-to>]] [/<>step>]] [, <filter>] where:

- <from> and <to> define the range of matching values (included). If <to> is omitted then the filter matches a <from> - <from> range. If <from> is also omitted then the filter matches all possible values.

- `<step>` defines the skips of the number value through the range. By default `<step>` has the value of 1, which means that all values of the defined range are matched.

While the filter definitions are optional, at least one filter must be used. A filter must either have a range or the `<step>` value defined.

An empty filter matches either '0' if no lower-level filter is defined or all possible values otherwise. For example, if the hour filter is omitted then only '0' hour will match, provided minute and seconds filters are omitted too, otherwise an empty hour filter will match all hour values.

Valid `<from>` and `<to>` values for their respective filter prefix are:

Prefix	Description	<from>	<to>
md	Month days	1-31	1-31
wd	Week days	1-7	1-7
h	Hours	0-23	0-23
m	Minutes	0-59	0-59
s	Seconds	0-59	0-59

The `<from>` value must be less or equal to `<to>` value. The `<step>` value must be greater or equal to 1 and less or equal to `<to>` - `<from>`.

Single digit month days, hours, minutes and seconds values can be prefixed with 0. For example `md01-31` and `h/02` are valid intervals, but `md01-031` and `wd01-07` are not.

In Zabbix frontend, multiple scheduling intervals are entered in separate rows. In Zabbix API, they are concatenated into a single string with a semicolon ; as a separator.

If a time is matched by several intervals it is executed only once. For example, `wd1h9;h9` will be executed only once on Monday at 9am.

Examples:

Interval	Will be executed
<code>m0-59</code>	every minute
<code>h9-17/2</code>	every 2 hours starting with 9:00 (9:00, 11:00 ...)
<code>m0,30</code> or <code>m/30</code>	hourly at hh:00 and hh:30
<code>m0,5,10,15,20,25,30,35,40,45,50,55</code> or <code>m/5</code>	every five minutes
<code>wd1-5h9</code>	every Monday till Friday at 9:00
<code>wd1-5h9-18</code>	every Monday till Friday at 9:00,10:00,...,18:00
<code>h9,10,11</code> or <code>h9-11</code>	every day at 9:00, 10:00 and 11:00
<code>md1h9m30</code>	every 1st day of each month at 9:30
<code>md1wd1h9m30</code>	every 1st day of each month at 9:30 if it is Monday
<code>h9m/30</code>	every day at 9:00, 9:30
<code>h9m0-59/30</code>	every day at 9:00, 9:30
<code>h9,10m/30</code>	every day at 9:00, 9:30, 10:00, 10:30
<code>h9-10m30</code>	every day at 9:30, 10:30
<code>h9m10-40/30</code>	every day at 9:10, 9:40
<code>h9,10m10-40/30</code>	every day at 9:10, 9:40, 10:10, 10:40
<code>h9-10m10-40/30</code>	every day at 9:10, 9:40, 10:10, 10:40
<code>h9m10-40</code>	every day at 9:10, 9:11, 9:12, ... 9:40
<code>h9m10-40/1</code>	every day at 9:10, 9:11, 9:12, ... 9:40
<code>h9-12,15</code>	every day at 9:00, 10:00, 11:00, 12:00, 15:00
<code>h9-12,15m0</code>	every day at 9:00, 10:00, 11:00, 12:00, 15:00
<code>h9-12,15m0s30</code>	every day at 9:00:30, 10:00:30, 11:00:30, 12:00:30, 15:00:30
<code>h9-12s30</code>	every day at 9:00:30, 9:01:30, 9:02:30 ... 12:58:30, 12:59:30
<code>h9m/30;h10</code> (API-specific syntax)	every day at 9:00, 9:30, 10:00
<code>h9m/30</code>	every day at 9:00, 9:30, 10:00
<code>h10</code> (add this as another row in frontend)	

## 2 Item value preprocessing

## Overview

Preprocessing allows to define transformation rules for the received item values. One or several transformations are possible before saving to the database.

Transformations are executed in the order in which they are defined. Preprocessing is done by Zabbix server or proxy (if items are monitored by proxy).

Note that the conversion to desired value type (as defined in item configuration) is performed at the end of the preprocessing pipeline; conversions, however, may also take place if required by the corresponding preprocessing step. See [preprocessing details](#) for more technical information.

See also: [Usage examples](#)

## Configuration

Preprocessing rules are defined in the **Preprocessing** tab of the item [configuration](#) form.

Preprocessing steps	Name	Parameters	Custom on fail	Actions
1:	JSONPath	<input #devname\"]13]"="" type="text" value="\$values[\"/>	<input type="checkbox"/>	<a href="#">Test</a> <a href="#">Remove</a>
2:	Change per second		<input type="checkbox"/>	<a href="#">Test</a> <a href="#">Remove</a>
3:	Custom multiplier	<input type="text" value="0.001"/>	<input type="checkbox"/>	<a href="#">Test</a> <a href="#">Remove</a>
4:	Regular expression	<input type="text" value="pattern"/> <input type="text" value="output"/>	<input type="checkbox"/>	<a href="#">Test</a> <a href="#">Remove</a>

**Add** [Add](#)

- Regular expression
- Replace
- Trim
- Right trim
- Left trim
- Structured data**
- XML XPath
- JSONPath
- CSV to JSON
- Arithmetic**
- Custom multiplier
- Change**

### Attention:

An item will become **unsupported** if any of the preprocessing steps fails, unless custom error handling has been specified using a Custom on fail option for supported transformations.

For log items, log metadata (without value) will always reset item unsupported state and make item supported again, even if the initial error occurred after receiving a log value from agent.

User [macros](#) and user macros with context are supported in item value preprocessing parameters, including JavaScript code.

### Note:

Context is ignored when a macro is replaced with its value. Macro value is inserted in the code as is, it is not possible to add additional escaping before placing the value in the JavaScript code. Please be advised, that this can cause JavaScript errors in some cases.

Type	Transformation	Description
Text		

Type	Transformation	Description
	Regular expression	<p>Match the value to the &lt;pattern&gt; regular expression and replace value with &lt;output&gt;. The regular expression supports extraction of maximum 10 captured groups with the \N sequence. Failure to match the input value will make the item unsupported.</p> <p>Parameters:</p> <p><b>pattern</b> - regular expression</p> <p><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text. Please refer to <a href="#">regular expressions</a> section for some existing examples.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Replace	<p>Find the search string and replace it with another (or nothing). All occurrences of the search string will be replaced.</p> <p>Parameters:</p> <p><b>search string</b> - the string to find and replace, case-sensitive (required)</p> <p><b>replacement</b> - the string to replace the search string with. The replacement string may also be empty effectively allowing to delete the search string when found.</p> <p>It is possible to use escape sequences to search for or replace line breaks, carriage return, tabs and spaces "\n \r \t \s"; backslash can be escaped as "\\" and escape sequences can be escaped as "\\n". Escaping of line breaks, carriage return, tabs is automatically done during low-level discovery.</p>
	Trim	Remove specified characters from the beginning and end of the value.
	Right trim	Remove specified characters from the end of the value.
	Left trim	Remove specified characters from the beginning of the value.
Structured data		

Type	Transformation	Description
	XML XPath	<p>Extract value or fragment from XML data using XPath functionality.</p> <p>For this option to work, Zabbix server must be compiled with libxml support.</p> <p>Examples:</p> <p><code>number(/document/item/value)</code> will extract 10 from</p> <pre>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/do</pre> <p><code>number(/document/item/@attribute)</code> will extract 10 from <code>&lt;document&gt;&lt;item attribute="10"&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>/document/item</code> will extract</p> <pre>&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;</pre> <p>from <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/do</code></p> <p>Note that namespaces are not supported.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>
	JSON Path	<p>Extract value or fragment from JSON data using <a href="#">JSONPath functionality</a>.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>
	CSV to JSON	<p>Convert CSV file data into JSON format.</p> <p>For more information, see: <a href="#">CSV to JSON preprocessing</a>.</p>
Arithmetic	Custom multiplier	<p>Multiply the value by the specified integer or floating-point value.</p> <p>Use this option to convert values received in KB, MBps, etc into B, Bps. Otherwise Zabbix cannot correctly set <a href="#">prefixes</a> (K, M, G etc).</p> <p>Note that if the item type of information is Numeric (unsigned), incoming values with a fractional part will be trimmed (i.e. '0.9' will become '0') before the custom multiplier is applied.</p> <p>Supported: scientific notation, for example, <code>1e+70</code> (since version 2.2); user macros and LLD macros (since version 4.0); strings that include macros, for example, <code>{#MACRO}e+10</code>, <code>{\$MACRO1}e+{\$MACRO2}</code> (since version 5.2.3)</p> <p>The macros must resolve to an integer or a floating-point number.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>

Change



Type	Transformation	Description
	Simple change	<p>Calculate the difference between the current and previous value.</p> <p>Evaluated as <b>value-prev_value</b>, where value - current value; prev_value - previously received value</p> <p>This setting can be useful to measure a constantly growing value. If the current value is smaller than the previous value, Zabbix discards that difference (stores nothing) and waits for another value. Only one change operation per item is allowed.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Change per second	<p>Calculate the value change (difference between the current and previous value) speed per second.</p> <p>Evaluated as <b>(value-prev_value)/(time-prev_time)</b>, where</p> <p>value - current value; prev_value - previously received value; time - current timestamp; prev_time - timestamp of previous value.</p> <p>This setting is extremely useful to get speed per second for a constantly growing value. If the current value is smaller than the previous value, Zabbix discards that difference (stores nothing) and waits for another value. This helps to work correctly with, for instance, a wrapping (overflow) of 32-bit SNMP counters. Note: As this calculation may produce floating-point numbers, it is recommended to set the 'Type of information' to Numeric (float), even if the incoming raw values are integers. This is especially relevant for small numbers where the decimal part matters. If the floating-point values are large and may exceed the 'float' field length in which case the entire value may be lost, it is actually suggested to use Numeric (unsigned) and thus trim only the decimal part.</p> <p>Only one change operation per item is allowed.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>

Numerical systems

Type	Transformation	Description
	Boolean to decimal	<p>Convert the value from boolean format to decimal. The textual representation is translated into either 0 or 1. Thus, 'TRUE' is stored as 1 and 'FALSE' is stored as 0. All values are matched in a case-insensitive way. Currently recognized values are, for:</p> <p>TRUE - true, t, yes, y, on, up, running, enabled, available, ok, master</p> <p>FALSE - false, f, no, n, off, down, unused, disabled, unavailable, err, slave</p> <p>Additionally, any non-zero numeric value is considered to be TRUE and zero is considered to be FALSE.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Octal to decimal	<p>Convert the value from octal format to decimal.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Hexadecimal to decimal	<p>Convert the value from hexadecimal format to decimal.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>
Custom scripts	Javascript	<p>Enter JavaScript code in the block that appears when clicking in the parameter field or on a pencil icon.</p> <p>Note that available JavaScript length depends on the <a href="#">database used</a>.</p> <p>For more information, see: <a href="#">Javascript preprocessing</a>.</p>
Validation	In range	<p>Define a range that a value should be in by specifying minimum/maximum values (inclusive).</p> <p>Numeric values are accepted (including any number of digits, optional decimal part and optional exponential part, negative values). User macros and low-level discovery macros can be used. The minimum value should be less than the maximum.</p> <p>At least one value must exist.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>

Type	Transformation	Description
	Matches regular expression	<p>Specify a regular expression that a value must match.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Does not match regular expression	<p>Specify a regular expression that a value must not match.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Check for error in JSON	<p>Check for an application-level error message located at JSONpath. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>No error will be reported in case of failing to parse invalid JSON.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Check for error in XML	<p>Check for an application-level error message located at XPath. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>No error will be reported in case of failing to parse invalid XML.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>

Type	Transformation	Description
	Check for error using a regular expression	<p>Check for an application-level error message using a regular expression. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>Parameters:</p> <p><b>pattern</b> - regular expression</p> <p><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text. If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value, or set a specified error message.</p>
	Check for not supported value	<p>Check if there was an error in retrieving item value. Normally that would lead to the item turning unsupported, but you may modify that behavior by specifying the Custom on fail error-handling options: to discard the value, to set a specified value (in this case the item will stay supported and the value can be used in triggers) or set a specified error message. Note that for this preprocessing step, the Custom on fail checkbox is grayed out and always marked. This step is always executed as the first preprocessing step and is placed above all others after saving changes to the item. It can be used only once.</p> <p>Supported since 5.2.0.</p>
Throttling	Discard unchanged	<p>Discard a value if it has not changed. If a value is discarded, it is not saved in the database and the Zabbix server has no knowledge that this value was received. No trigger expressions will be evaluated, as a result, no problems for related triggers will be created/resolved. Trigger functions will work only based on data that is actually saved in the database. As trends are built based on data in the database, if there is no value saved for an hour then there will also be no trends data for that hour.</p> <p>Only one throttling option can be specified for an item.</p>

Type	Transformation	Description
	Discard unchanged with heartbeat	Discard a value if it has not changed within the defined time period (in seconds). Positive integer values are supported to specify the seconds (minimum - 1 second). Time suffixes can be used in this field (e.g. 30s, 1m, 2h, 1d). User macros and low-level discovery macros can be used in this field. If a value is discarded, it is not saved in the database and the Zabbix server has no knowledge that this value was received. No trigger expressions will be evaluated, as a result, no problems for related triggers will be created/resolved. Trigger functions will work only based on data that is actually saved in the database. As trends are built based on data in the database, if there is no value saved for an hour then there will also be no trends data for that hour. Only one throttling option can be specified for an item.
Prometheus	Prometheus pattern	Use the following query to extract required data from Prometheus metrics. See <a href="#">Prometheus checks</a> for more details.
	Prometheus to JSON	Convert required Prometheus metrics to JSON. See <a href="#">Prometheus checks</a> for more details.

**Attention:**

For change and throttling preprocessing steps Zabbix has to remember the last value to calculate/compare the new value as required. These previous values are handled by the preprocessing manager. If Zabbix server or proxy is restarted or there is any change made to preprocessing steps the last value of the corresponding item is reset, resulting in:

- for Simple change, Change per second steps - the next value will be ignored because there is no previous value to calculated change from;
- for Discard unchanged. Discard unchanged with heartbeat steps - the next value will never be discarded, even if it should have been because of discarding rules.

**Note:**

If you use a custom multiplier or store value as Change per second for items with the type of information set to Numeric (unsigned) and the resulting calculated value is actually a float number, the calculated value is still accepted as a correct one by trimming the decimal part and storing the value as an integer.

Testing

Testing preprocessing steps is useful to make sure that complex preprocessing pipelines yield the results that are expected from them, without waiting for the item value to be received and preprocessed.



It is possible to test:

- against a hypothetical value
- against a real value from a host

Each preprocessing step can be tested individually as well as all steps can be tested together. When you click on the Test or Test all steps button respectively in the Actions block, a testing window is opened.

Testing hypothetical value

×
Test item

! cannot perform regular expression "[0-9+]" match for value of type "string": invalid regular expression: missing terminating ] for character class

Get value from host

Value  ✎

 Not supported

Time

Previous value

Prev. time

End of line sequence LF CRLF

Preprocessing steps

Name	Result
1: Regular expression	15
2: Regular expression	1
3: Regular expression	<span style="color: #f00; font-weight: bold;">!</span>

Test
Cancel

Parameter	Description
Get value from host	If you want to test a hypothetical value, leave this checkbox unmarked.
Value	See also: <a href="#">Testing real value</a> . Enter the input value to test. Clicking in the parameter field or on the view/edit button will open a text area window for entering the value or code block.
Not supported	Mark this checkbox to test an unsupported value. This option is available since Zabbix 5.2.4 and it is useful to test the Check for not supported value preprocessing step.
Time	Time of the input value is displayed: now (read-only).
Previous value	Enter a previous input value to compare to. Only for Change and Throttling preprocessing steps.
Previous time	Enter the previous input value time to compare to. Only for Change and Throttling preprocessing steps. The default value is based on the 'Update interval' field value of the item (if '1m', then this field is filled with now-1m). If nothing is specified or user has no access to host, the default is now-30s.
Macros	If any macros are used, they are listed along with their values. The values are editable for testing purposes, but the changes will only be saved within the testing context.
End of line sequence	Select the end of line sequence for multiline input values: <b>LF</b> - LF (line feed) sequence <b>CRLF</b> - CRLF (carriage-return line-feed) sequence.
Preprocessing steps	Preprocessing steps are listed; the testing result is displayed for each step after the Test button is clicked. If the step failed in testing, an error icon is displayed. The error description is displayed on mouseover. In case "Custom on fail" is specified for the step and that action is performed, a new line appears right after the preprocessing test step row, showing what action was done and what outcome it produced (error or value).
Result	The final result of testing preprocessing steps is displayed in all cases when all steps are tested together (when you click on the Test all steps button). The type of conversion to the value type of the item is also displayed, for example Result converted to Numeric (unsigned).

Click on Test to see the result after each preprocessing step.

Test values are stored between test sessions for either individual steps or all steps, allowing user to change preprocessing steps or item configuration and then return to the testing window without having to re-enter information. Values are lost on a page refresh though.

The testing is done by Zabbix server. The frontend sends a corresponding request to the server and waits for the result. The request contains the input value and preprocessing steps (with expanded user macros). For Change and Throttling steps, an optional previous value and time can be specified. The server responds with results for each preprocessing step.

All technical errors or input validations errors are displayed in the error box at the top of the testing window.

### Testing real value

To test preprocessing against a real value:

- Mark the Get value from host checkbox
- Enter or verify host parameters (host address, port, proxy name/no proxy) and item-specific details (such as SNMPv2 community or SNMPv3 security credentials). These fields are context aware:
  - The values are pre-filled when possible, i.e. for items requiring an agent, by taking the information from the selected agent interface of the host
  - The values have to be filled manually for template items
  - Plain-text macro values are resolved
  - Fields where the value (or part of the value) is a secret or Vault macro are empty and have to be entered manually. If any item parameter contains a secret macro value, the following warning message is displayed: "Item contains user-defined macros with secret values. Values of these macros should be entered manually."
  - The fields are disabled when not needed in the context of the item type (e.g. the host address field is disabled for calculated and aggregate items, the proxy field is disabled for calculated items)
- Click on Get value and test to test the preprocessing

If you have specified a value mapping in the item configuration form ('Show value' field), the item test dialog will show another line after the final result, named 'Result with value map applied'.

Parameters that are specific to getting a real value from a host:

Parameter	Description
Get value from host	Mark this checkbox to get a real value from the host.
Host address	Enter the host address. This field is automatically filled by the address of item host interface.
Port	Enter the host port. This field is automatically filled by the port of item host interface.
Additional fields for SNMP interfaces (SNMP version, SNMP community, Context name, etc)	See <a href="#">Configuring SNMP monitoring</a> for additional details on configuring an SNMP interface (v1, v2 and v3). These fields are automatically filled from the item host interface.

Parameter	Description
Proxy	Specify the proxy, if the host is monitored by a proxy. This field is automatically filled by the proxy of the host (if any).

For the rest of the parameters, see [Testing hypothetical value](#) above.

## 1 Usage examples

### Overview

This section presents examples of using preprocessing steps to accomplish some practical tasks.

#### Filtering VMware event log records

Using a regular expression preprocessing to filter unnecessary events of the VMWare event log.

1. On a working VMWare Hypervisor host check that the event log item `vmware.eventlog[<url>,<mode>]` is present and working properly. Note that the event log item could already be present on the hypervisor if the Template VM VMWare template has been linked during the host creation.
2. On the VMWare Hypervisor host create a **dependent item** of 'Log' type and set the event log item as its master.

In the "Preprocessing" tab of the dependent item select the "Matches regular expression" validation option and fill pattern, for example:

```

".* logged in .*" - filters all logging events in the event log
"\bUser\s+\K\S+" - filter only lines with usernames from the event log

```

#### Attention:

If the regular expression is not matched then the dependent item becomes unsupported with a corresponding error message. To avoid this mark the "Custom on fail" checkbox and select to discard unmatched value, for example.

Another approach that allows using matching groups and output control is to select "Regular expression" option in the "Preprocessing" tab and fill parameters, for example:

```

pattern: ".*logged in.*", output: "\0" - filters all logging events in the event log
pattern "User (.*?)(?=\ )", output: "\1" - filter only usernames from the event log

```

## 2 Preprocessing details

### Overview

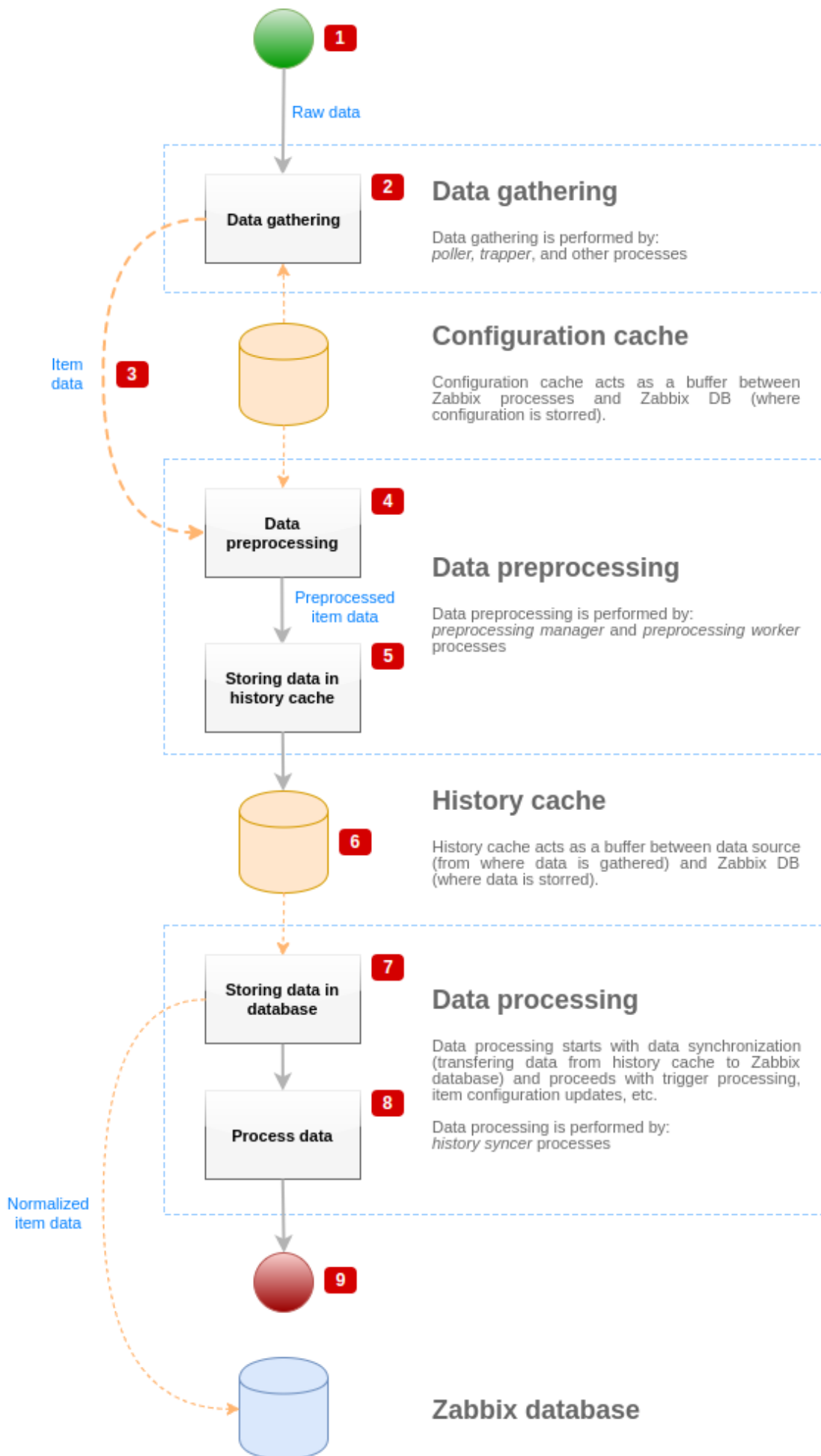
This section provides item value preprocessing details. Item value preprocessing allows to define and execute **transformation rules** for the received item values.

Preprocessing is managed by a preprocessing manager process, which was added in Zabbix 3.4, along with preprocessing workers that perform the preprocessing steps. All values (with or without preprocessing) from different data gatherers pass through the preprocessing manager before being added to the history cache. Socket-based IPC communication is used between data gatherers (pollers, trappers, etc) and the preprocessing process. Either Zabbix server or Zabbix proxy (for items monitored by the proxy) is performing preprocessing steps.

#### Item value processing

To visualize the data flow from data source to the Zabbix database, we can use the following simplified diagram:





The diagram above shows only processes, objects and actions related to item value processing in a **simplified** form. The diagram does not show conditional direction changes, error handling or loops. Local data cache of preprocessing manager is not shown either because it doesn't affect data flow directly. The aim of this diagram is to show processes involved in item value processing and the way they interact.

- Data gathering starts with raw data from a data source. At this point, data contains only ID, timestamp and value (can be multiple values as well)
- No matter what type of data gatherer is used, the idea is the same for active or passive checks, for trapper items and etc, as it only changes the data format and the communication starter (either data gatherer is waiting for a connection and data, or data gatherer initiates the communication and requests the data). Raw data is validated, item configuration is retrieved from configuration cache (data is enriched with the configuration data).
- Socket-based IPC mechanism is used to pass data from data gatherers to preprocessing manager. At this point data gatherer continue to gather data without waiting for the response from preprocessing manager.
- Data preprocessing is performed. This includes execution of preprocessing steps and dependent item processing.

**Note:**

Item can change its state to NOT SUPPORTED while preprocessing is performed if any of preprocessing steps fail.

- History data from local data cache of preprocessing manager is being flushed into history cache.
- At this point data flow stops until the next synchronization of history cache (when history syncer process performs data synchronization).
- Synchronization process starts with data normalization storing data in Zabbix database. Data normalization performs conversions to desired item type (type defined in item configuration), including truncation of textual data based on pre-defined sizes allowed for those types (HISTORY\_STR\_VALUE\_LEN for string, HISTORY\_TEXT\_VALUE\_LEN for text and HISTORY\_LOG\_VALUE\_LEN for log values). Data is being sent to Zabbix database after normalization is done.

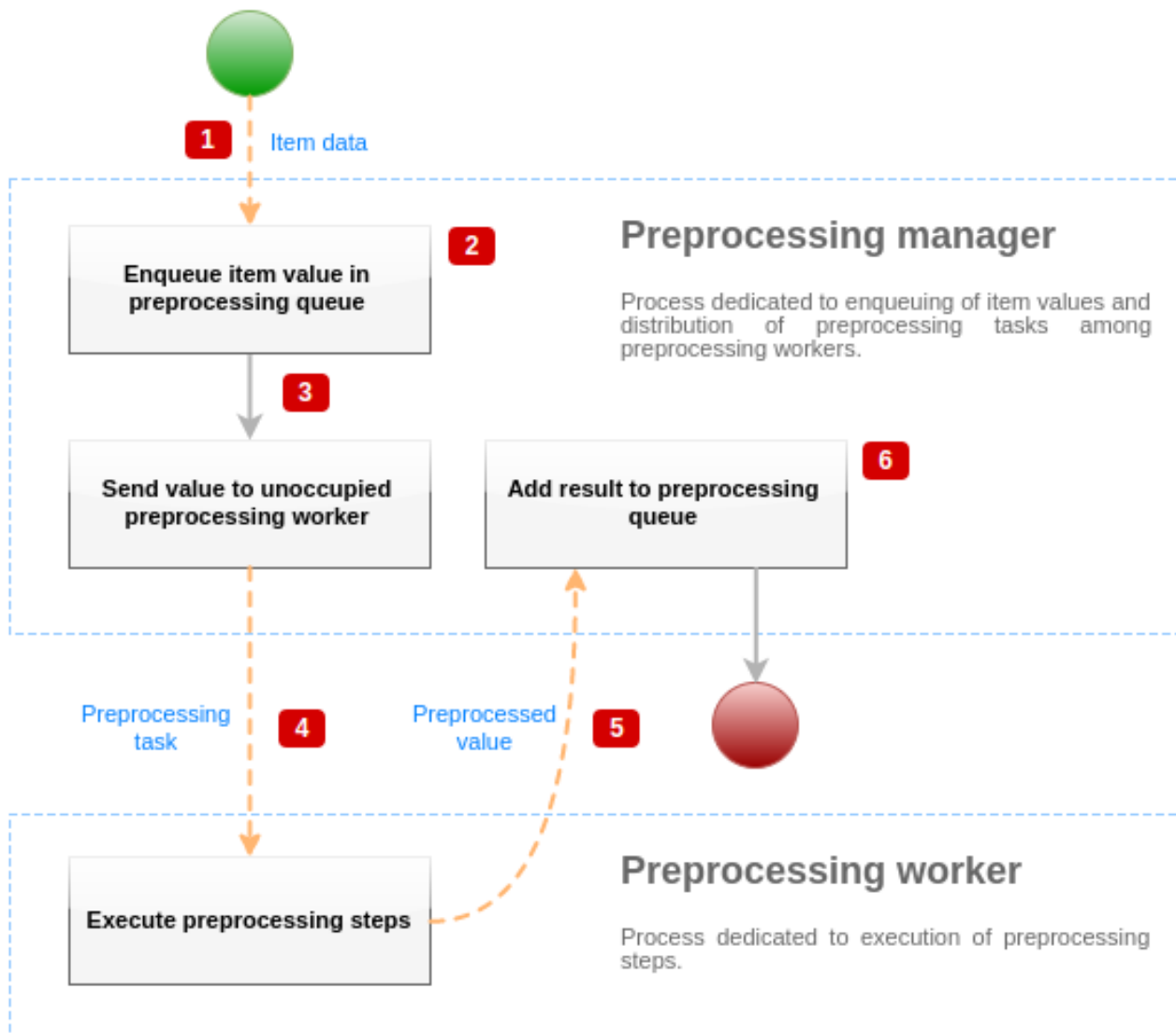
**Note:**

Item can change its state to NOT SUPPORTED if data normalization fails (for example, when textual value cannot be converted to number).

- Gathered data is being processed - triggers are checked, item configuration is updated if item becomes NOT SUPPORTED, etc.
- This is considered the end of data flow from the point of view of item value processing.

Item value preprocessing

To visualize the data preprocessing process, we can use the following simplified diagram:



The diagram above shows only processes, objects and main actions related to item value preprocessing in a **simplified** form. The diagram does not show conditional direction changes, error handling or loops. Only one preprocessing worker is shown on this diagram (multiple preprocessing workers can be used in real-life scenarios), only one item value is being processed and we assume that this item requires to execute at least one preprocessing step. The aim of this diagram is to show the idea behind item value preprocessing pipeline.

- Item data and item value is passed to preprocessing manager using socket-based IPC mechanism.
- Item is placed in the preprocessing queue.

**Note:**

Item can be placed at the end or at the beginning of the preprocessing queue. Zabbix internal items are always placed at the beginning of preprocessing queue, while other item types are enqueued at the end.

- At this point data flow stops until there is at least one unoccupied (that is not executing any tasks) preprocessing worker.
- When preprocessing worker is available, preprocessing task is being sent to it.
- After preprocessing is done (both failed and successful execution of preprocessing steps), preprocessed value is being passed back to preprocessing manager.
- Preprocessing manager converts result to desired format (defined by item value type) and places result in preprocessing queue. If there are dependent items for current item, then dependent items are added to preprocessing queue as well. Dependent items are enqueued in preprocessing queue right after the master item, but only for master items with value set and not in NOT SUPPORTED state.

**Value processing pipeline**

Item value processing is executed in multiple steps (or phases) by multiple processes. This can cause:

- Dependent item can receive values, while THE master value cannot. This can be achieved by using the following use case:

- \* Master item has value type 'UINT', (trapper item can be used), dependent item has value type 'TEXT'
- \* No preprocessing steps are required for both master and dependent items.
- \* Textual value (like, "abc") should be passed to master item.
- \* As there are no preprocessing steps to execute, preprocessing manager checks if master item is not in history.
- \* When both master and dependent items reach history synchronization phase, master item becomes NOT SUPPORTED.

As a result, dependent item receives a value, while master item changes its state to NOT SUPPORTED.

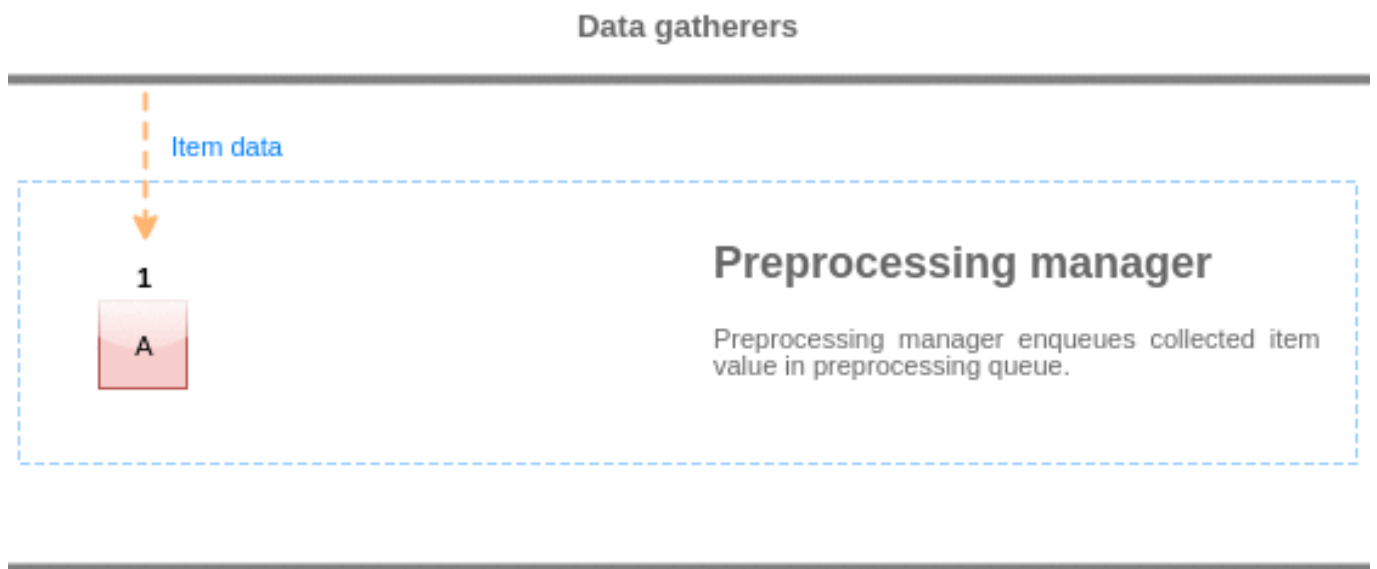
- Dependent item receives value that is not present in master item history. The use case is very similar to the previous one, except for the master item type. For example, if CHAR type is used for master item, then master item value will be truncated at the history synchronization phase, while dependent items will receive their value from the initial (not truncated) value of master item.

### Preprocessing queue

Preprocessing queue is a FIFO data structure that stores values preserving the order in which values are reviewed by preprocessing manager. There are multiple exceptions to FIFO logic:

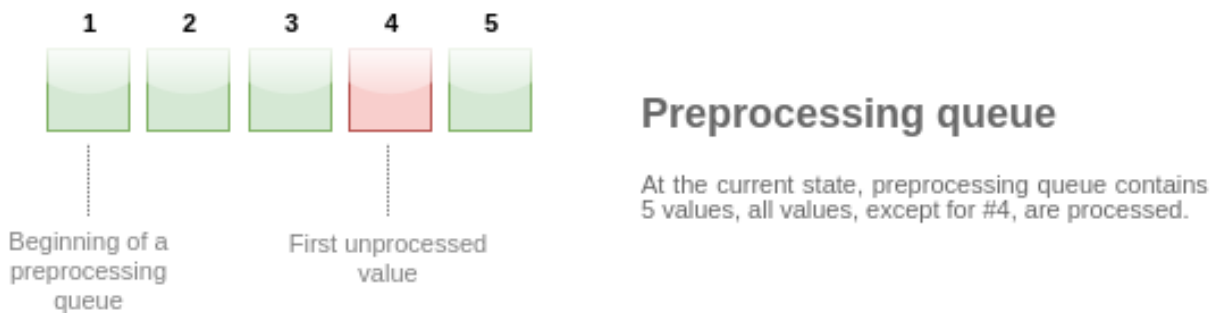
- Internal items are enqueued at the beginning of the queue
- Dependent items are always enqueued after the master item

To visualize the logic of preprocessing queue, we can use the following diagram:



### Preprocessing workers

Values from the preprocessing queue are flushed from the beginning of the queue to the first unprocessed value. So, for example, preprocessing manager will flush values 1, 2 and 3, but will not flush value 5 as value 4 is not processed yet:



Only two values will be left in queue (4 and 5) after flushing, values are added into local data cache of preprocessing manager and then values are transferred from local cache into history cache. Preprocessing manager can flush values from local data cache in single item mode or in bulk mode (used for dependent items and values received in bulk).

### Preprocessing workers

Zabbix server configuration file allows users to set count of preprocessing worker processes. StartPreprocessors configuration parameter should be used to set number of pre-forked instances of preprocessing workers. Optimal number of preprocessing workers can be determined by many factors, including the count of "preprocessable" items (items that require to execute any preprocessing steps), count of data gathering processes, average step count for item preprocessing, etc.

But assuming that there is no heavy preprocessing operations like parsing of large XML / JSON chunks, number of preprocessing workers can match total number of data gatherers. This way, there will mostly (except for the cases when data from gatherer comes in bulk) be at least one unoccupied preprocessing worker for collected data.

**Warning:**

Too many data gathering processes (pollers, unreachable pollers, HTTP pollers, Java pollers, pingers, trappers, proxypollers) together with IPMI manager, SNMP trapper and preprocessing workers can exhaust the per-process file descriptor limit for the preprocessing manager. This will cause Zabbix server to stop (usually shortly after the start, but sometimes it can take more time). The configuration file should be revised or the limit should be raised to avoid this situation.

### 3 JSONPath functionality

#### Overview

This section provides details of supported JSONPath functionality in item value preprocessing steps.

JSONPath consists of segments separated with dots. A segment can be either a simple word like a JSON value name, \* or a more complex construct enclosed within square brackets [ ]. The separating dot before bracket segment is optional and can be omitted. For example:

Path	Description
<code>\$.object.name</code>	Return the object.name contents.
<code>\$.object['name']</code>	Return the object.name contents.
<code>\$.object.['name']</code>	Return the object.name contents.
<code>\$["object"]['name']</code>	Return the object.name contents.
<code>\$.['object'].["name"]</code>	Return the object.name contents.
<code>\$.object.history.length()</code>	Return the number of object.history array elements.
<code>\$[?(@.name == 'Object')].price.first()</code>	Return the price field of the first object with name 'Object'.
<code>\$[?(@.name == 'Object')].history.first().length()</code>	Return the number of history array elements of the first object with name 'Object'.
<code>\$[?(@.price &gt; 10)].length()</code>	Return the number of objects with price being greater than 10.

See also: [Escaping special characters from LLD macro values in JSONPath.](#)

#### Supported segments

Segment	Description
<code>&lt;name&gt;</code>	Match object property by name.
<code>*</code>	Match all object properties.
<code>['&lt;name&gt;']</code>	Match object property by name.
<code>['&lt;name&gt;', '&lt;name&gt;', ...]</code>	Match object property by any of the listed names.
<code>&lt;index&gt;</code>	Match array element by the index.
<code>&lt;number&gt;, &lt;number&gt;, ...]</code>	Match array element by any of the listed indexes.
<code>[*]</code>	Match all object properties or array elements.
<code>[&lt;start&gt;:&lt;end&gt;]</code>	Match array elements by the defined range: <b>&lt;start&gt;</b> - the first index to match (including). If not specified matches all array elements from the beginning. If negative specifies starting offset from the end of array. <b>&lt;end&gt;</b> - the last index to match (excluding). If not specified matches all array elements to the end. If negative specifies starting offset from the end of array.
<code>[?(&lt;expression&gt;)]</code>	Match objects/array elements by applying filter expression.

To find a matching segment ignoring its ancestry (detached segment) it must be prefixed with `..'` , for example `$.name` or `$.['name']` return values of all 'name' properties.

Matched element names can be extracted by adding a ~ suffix to the JSONPath. It returns the name of the matched object or an index in string format of the matched array item. The output format follows the same rules as other JSONPath queries - definite path results are returned 'as is' and indefinite path results are returned in array. However there is not much point of extracting the name of an element matching a definite path - it's already known.

Filter expression

Filter expression is an arithmetical expression in infix notation.

Supported operands:

Operand	Description	Example
"<text>"	Text constant.	'value: \'1\'"
'<text>'		"value: '1'"
<number>	Numeric constant supporting scientific notation.	123
<jsonpath starting with \$>	Value referred to by the JSONPath from the input document root node; only definite paths are supported.	\$.object.name
<jsonpath starting with @>	Value referred to by the JSONPath from the current object/element; only definite paths are supported.	@.name

Supported operators:

Operator	Type	Description	Result
-	binary	Subtraction.	Number.
+	binary	Addition.	Number.
/	binary	Division.	Number.
*	binary	Multiplication.	Number.
==	binary	Is equal to.	Boolean (1 or 0).
!=	binary	Is not equal to.	Boolean (1 or 0).
<	binary	Is less than.	Boolean (1 or 0).
<=	binary	Is less than or equal to.	Boolean (1 or 0).
>	binary	Is greater than.	Boolean (1 or 0).
>=	binary	Is greater than or equal to.	Boolean (1 or 0).
=~	binary	Matches regular expression.	Boolean (1 or 0).
!	unary	Boolean not.	Boolean (1 or 0).
\ \	binary	Boolean or.	Boolean (1 or 0).
&&	binary	Boolean and.	Boolean (1 or 0).

Functions

Functions can be used at the end of JSONPath. Multiple functions can be chained if the preceding function returns value that is accepted by the following function.

Supported functions:

Function	Description	Input	Output
avg	Average value of numbers in input array.	Array of numbers.	Number.
min	Minimum value of numbers in input array.	Array of numbers.	Number.
max	Maximum value of numbers in input array.	Array of numbers.	Number.
sum	Sum of numbers in input array.	Array of numbers.	Number.
length	Number of elements in input array.	Array.	Number.
first	The first array element.	Array.	A JSON construct (object, array, value) depending on input array contents.

Quoted numeric values are accepted by the JSONPath aggregate functions. It means that the values are converted from string type to numeric if aggregation is required.

Incompatible input will cause the function to generate error.

## Output value

JSONPaths can be divided in definite and indefinite paths. A definite path can return only null or a single match. An indefinite path can return multiple matches, basically JSONPaths with detached, multiple name/index list, array slice or expression segments. However, when a function is used the JSONPath becomes definite, as functions always output single value.

A definite path returns the object/array/value it's referencing, while indefinite path returns an array of the matched objects/arrays/values.

## Whitespace

Whitespace (space, tab characters) can be freely used in bracket notation segments and expressions, for example, `$$[ 'a' ] [ 0 ] [ ?( $.b == 'c' ) ] [ : -1 ] .first( )`.

## Strings

Strings should be enclosed with single ' or double " quotes. Inside the strings, single or double quotes (depending on which are used to enclose it) and backslashes \ are escaped with the backslash \ character.

## Examples

### Input data

```
{
  "books": [
    {
      "category": "reference",
      "author": "Nigel Rees",
      "title": "Sayings of the Century",
      "price": 8.95,
      "id": 1
    },
    {
      "category": "fiction",
      "author": "Evelyn Waugh",
      "title": "Sword of Honour",
      "price": 12.99,
      "id": 2
    },
    {
      "category": "fiction",
      "author": "Herman Melville",
      "title": "Moby Dick",
      "isbn": "0-553-21311-3",
      "price": 8.99,
      "id": 3
    },
    {
      "category": "fiction",
      "author": "J. R. R. Tolkien",
      "title": "The Lord of the Rings",
      "isbn": "0-395-19395-8",
      "price": 22.99,
      "id": 4
    }
  ],
  "services": {
    "delivery": {
      "servicegroup": 1000,
      "description": "Next day delivery in local town",
      "active": true,
      "price": 5
    },
    "bookbinding": {
      "servicegroup": 1001,
      "description": "Printing and assembling book in A5 format",
      "active": true,
    }
  }
}
```

```

    "price": 154.99
  },
  "restoration": {
    "servicegroup": 1002,
    "description": "Various restoration methods",
    "active": false,
    "methods": [
      {
        "description": "Checmical cleaning",
        "price": 46
      },
      {
        "description": "Pressing pages damaged by moisture",
        "price": 24.5
      },
      {
        "description": "Rebinding torn book",
        "price": 99.49
      }
    ]
  }
}
},
"filters": {
  "price": 10,
  "category": "fiction",
  "no filters": "no \"filters\""
},
"closed message": "Store is closed",
"tags": [
  "a",
  "b",
  "c",
  "d",
  "e"
]
}
}

```

JSONPath	Type	Result	Comments
\$.filters.price	definite	10	
\$.filters.category	definite	fiction	
\$.filters['no filters']	definite	no "filters"	
\$.filters	definite	{ "price": 10, "category": "fiction", "no filters": "no \"filters\"" }	
\$.books[1].title	definite	Sword of Honour	
\$.books[-1].author	definite	J. R. R. Tolkien	
\$.books.length()	definite	4	
\$.tags[:]	indefinite	["a", "b", "c", "d", "e"]	
\$.tags[2:]	indefinite	["c", "d", "e"]	
\$.tags[:3]	indefinite	["a", "b", "c"]	
\$.tags[1:4]	indefinite	["b", "c", "d"]	
\$.tags[-2:]	indefinite	["d", "e"]	
\$.tags[: -3]	indefinite	["a", "b"]	
\$.tags[: -3].length()	definite	2	
\$.books[0, 2].title	indefinite	["Sayings of the Century", "Moby Dick"]	
\$.books[1]['author', "title"]	indefinite	["Evelyn Waugh", "Sword of Honour"]	
\$.id	indefinite	[1, 2, 3, 4]	



JSONPath	Type	Result	Comments
<code>\$.services..price</code>	indefinite	[5, 154.99, 46, 24.5, 99.49]	
<code>\$.books[?(@.id == 4 - 0.4 * 5)].title</code>	indefinite	["Sword of Honour"]	This query shows that arithmetical operations can be used in queries. Of course this query can be simplified to <code>\$.books[?(@.id == 2)].title</code>
<code>\$.books[?(@.id == 2    @.id == 4)].title</code>	indefinite	["Sword of Honour", "The Lord of the Rings"]	
<code>\$.books[?!(@.id == 2)].title</code>	indefinite	["Sayings of the Century", "Moby Dick", "The Lord of the Rings"]	
<code>\$.books[?(@.id != 2)].title</code>	indefinite	["Sayings of the Century", "Moby Dick", "The Lord of the Rings"]	
<code>\$.books[?(@.title =~ " of ")] .title</code>	indefinite	["Sayings of the Century", "Sword of Honour", "The Lord of the Rings"]	
<code>\$.books[?(@.price &gt; 12.99)].title</code>	indefinite	["The Lord of the Rings"]	
<code>\$.books[?(@.author &gt; "Herman Melville")].title</code>	indefinite	["Sayings of the Century", "The Lord of the Rings"]	
<code>\$.books[?(@.price &gt; \$.filters.price)].title</code>	indefinite	["Sword of Honour", "The Lord of the Rings"]	
<code>\$.books[?(@.category == \$.filters.category)].title</code>	indefinite	["Sword of Honour", "Moby Dick", "The Lord of the Rings"]	

JSONPath	Type	Result	Comments
<code>\$..[?(@.id)]</code>	indefinite	[ { "category": "reference", "author": "Nigel Rees", "title": "Sayings of the Century", "price": 8.95, "id": 1 }, { "category": "fiction", "author": "Evelyn Waugh", "title": "Sword of Honour", "price": 12.99, "id": 2 }, { "category": "fiction", "author": "Herman Melville", "title": "Moby Dick", "isbn": "0-553-21311-3", "price": 8.99, "id": 3 }, { "category": "fiction", "author": "J. R. R. Tolkien", "title": "The Lord of the Rings", "isbn": "0-395-19395-8", "price": 22.99, "id": 4 } ] ]	
<code>\$.services..[?(@.price &gt; 50)].description</code>	indefinite	['Printing and assembling book in A5 format', 'Rebinding torn book']	
<code>\$.id.length()</code>	definite	4	
<code>\$.books[?(@.id == 2)].title.first()</code>	definite	Sword of Honour	
<code>\$.tags.first().length()</code>	definite	5	<code>\$.tags</code> is indefinite path, so it returns an array of matched elements - [["a", "b", "c", "d", "e"]], <code>first()</code> returns the first element - ["a", "b", "c", "d", "e"] and finally <code>length()</code> calculates its length - 5.
<code>\$.books[*].price.min()</code>	definite	8.95	
<code>\$.price.max()</code>	definite	154.99	
<code>\$.books[?(@.category == "fiction")].price.avg()</code>	definite	14.99	
<code>\$.books[?(@.category == \$.filters.xyz)].title</code>	indefinite		A query without match returns NULL for definite and indefinite paths.
<code>\$.services[?(@.active=="true")].servicegroup [1000,1001]</code>	definite		Text constants must be used in boolean value comparisons.
<code>\$.services[?(@.active=="false")].servicegroup [1002]</code>	definite		Text constants must be used in boolean value comparisons.

JSONPath	Type	Result	Comments
<code>\$.services[?(@.servicegroup=defoo)]~.first(restore)</code>	defoo	restore	

Escaping special characters from LLD macro values in JSONPath

When low-level discovery macros are used in JSONPath preprocessing and their values are resolved, the following rules of escaping special characters are applied:

- only backslash (\) and double quote (") characters are considered for escaping;
- if the resolved macro value contains these characters, each of them is escaped with a backslash;
- if they are already escaped with a backslash, it is not considered as escaping and both the backslash and the following special characters are escaped once again.

For example:

JSONPath	LLD macro value	After substitution
<code>\$.[?(@.value == "{#MACRO}")]</code>	special "value"	<code>\$.[?(@.value == "special \"value\"")]</code>
	c:\temp	<code>\$.[?(@.value == "c:\\temp")]</code>
	a\b	<code>\$.[?(@.value == "a\\b")]</code>

When used in the expression the macro that may have special characters should be enclosed in double quotes:

JSONPath	LLD macro value	After substitution	Result
<code>\$.[?(@.value == "{#MACRO}")]</code>	special "value"	<code>\$.[?(@.value == "special \"value\"")]</code>	OK
<code>\$.[?(@.value == {#MACRO})]</code>		<code>\$.[?(@.value == special \"value\"")]</code>	<b>Bad JSONPath expression</b>

When used in the path the macro that may have special characters should be enclosed in square brackets **and** double quotes:

JSONPath	LLD macro value	After substitution	Result
<code>\$.["{#MACRO}"].value</code>	c:\temp	<code>\$.["c:\\temp"].value</code>	OK
<code>\$.{#MACRO}.value</code>		<code>\$.c:\\temp.value</code>	<b>Bad JSONPath expression</b>

## 4 JavaScript preprocessing

Overview

This section provides details of preprocessing by JavaScript.

JavaScript preprocessing

JavaScript preprocessing is done by invoking JavaScript function with a single parameter 'value' and user provided function body. The preprocessing step result is the value returned from this function, for example, to perform Fahrenheit to Celsius conversion user must enter:

```
return (value - 32) * 5 / 9
```

in JavaScript preprocessing parameters, which will be wrapped into a JavaScript function by server:

```
function (value)
{
    return (value - 32) * 5 / 9
}
```

The input parameter 'value' is always passed as a string. The return value is automatically coerced to string via ToString() method (if it fails then the error is returned as string value), with a few exceptions:

- returning undefined value will result in an error
- returning null value will cause the input value to be discarded, much like 'Discard value' preprocessing on 'Custom on fail' action.

Errors can be returned by throwing values/objects (normally either strings or Error objects).

For example:

```
if (value == 0)
    throw "Zero input value"
return 1/value
```

Each script has a 10 second execution timeout (depending on the script it might take longer for the timeout to trigger); exceeding it will return error. A 64 megabyte heap limit is enforced (10MB before Zabbix 5.2.5).

The JavaScript preprocessing step bytecode is cached and reused when the step is applied next time. Any changes to the item's preprocessing steps will cause the cached script to be reset and recompiled later.

Consecutive runtime failures (3 in a row) will cause the engine to be reinitialized to mitigate the possibility of one script breaking the execution environment for the next scripts (this action is logged with DebugLevel 4 and higher).

JavaScript preprocessing is implemented with Duktape (<https://duktape.org/>) JavaScript engine.

See also: [Additional JavaScript objects and global functions](#)

Using macros in scripts

It is possible to use user macros in JavaScript code. If a script contains user macros, these macros are resolved by server/proxy before executing specific preprocessing steps. Note, that when testing preprocessing steps in the frontend, macro values will not be pulled and need to be entered manually.

**Note:**

Context is ignored when a macro is replaced with its value. Macro value is inserted in the code as is, it is not possible to add additional escaping before placing the value in the JavaScript code. Please be advised, that this can cause JavaScript errors in some cases.

In an example below, if received value exceeds a `{ $THRESHOLD }` macro value, the threshold value (if present) will be returned instead:

```
var threshold = '{ $THRESHOLD }';
return (!isNaN(threshold) && value > threshold) ? threshold : value;
```

Additional JavaScript objects

Overview

This section describes Zabbix additions to the JavaScript language implemented with Duktape and supported global JavaScript functions.

Built-in objects

**Zabbix**

The Zabbix object provides interaction with the internal Zabbix functionality.

Method	Description
Log(loglevel, message)	Writes <message> into Zabbix log using <loglevel> log level (see configuration file DebugLevel parameter).

Example:

```
Zabbix.Log(3, "this is a log entry written with 'Warning' log level")
```

**CurlHttpRequest**

This object encapsulates cURL handle allowing to make simple HTTP requests. Errors are thrown as exceptions.

Method	Description
AddHeader(name, value)	Adds HTTP header field. This field is used for all following requests until cleared with the ClearHeader() method.
ClearHeader()	Clears HTTP header. If no header fields are set CurlHttpRequest will set Content-Type to application/json if the data being posted is json formatted and text/plain otherwise.
GetHeaders()	Returns object of received HTTP header fields.
Get(url, data)	Sends HTTP GET request to the URL with optional data payload and returns the response.
Put(url, data)	Sends HTTP PUT request to the URL with optional data payload and returns the response.
Post(url, data)	Sends HTTP POST request to the URL with optional data payload and returns the response.
Delete(url, data)	Sends HTTP DELETE request to the URL with optional data payload and returns the response.
Status()	Returns the status code of the last HTTP request.
SetProxy(proxy)	Sets HTTP proxy to "proxy" value. If this parameter is empty then no proxy is used.
SetHttpAuth(bitmask, username, password)	Sets enabled HTTP authentication methods (HTTPAUTH_BASIC, HTTPAUTH_DIGEST, HTTPAUTH_NEGOTIATE, HTTPAUTH_NTLM, HTTPAUTH_NONE) in the 'bitmask' parameter. The HTTPAUTH_NONE flag allows to disable HTTP authentication. Examples: <pre>request.SetHttpAuth(HTTPAUTH_NTLM   HTTPAUTH_BASIC, username, password) request.SetHttpAuth(HTTPAUTH_NONE)</pre> This method is supported since Zabbix 5.2.5.

Example:

```
try {
    Zabbix.Log(4, 'jira webhook script value='+value);

    var result = {
        'tags': {
            'endpoint': 'jira'
        }
    },
    params = JSON.parse(value),
    req = new CurlHttpRequest(),
    fields = {},
    resp;

    req.AddHeader('Content-Type: application/json');
    req.AddHeader('Authorization: Basic '+params.authentication);

    fields.summary = params.summary;
    fields.description = params.description;
    fields.project = {"key": params.project_key};
    fields.issuetype = {"id": params.issue_id};
    resp = req.Post('https://tsupport.zabbix.lan/rest/api/2/issue/',
        JSON.stringify({"fields": fields})
    );

    if (req.Status() != 201) {
        throw 'Response code: '+req.Status();
    }

    resp = JSON.parse(resp);
    result.tags.issue_id = resp.id;
    result.tags.issue_key = resp.key;
} catch (error) {
```

```

Zabbix.Log(4, 'jira issue creation failed json : '+JSON.stringify({"fields": fields}));
Zabbix.Log(4, 'jira issue creation failed : '+error);

result = {};
}

return JSON.stringify(result);

```

## Global JavaScript functions

Additional global JavaScript functions have been implemented with Duktape:

- btoa(string) - encodes string to base64 string
- atob(base64\_string) - decodes base64 string

```

try {
  b64 = btoa("utf8 string");
  utf8 = atob(b64);
}
catch (error) {
  return {'error.name' : error.name, 'error.message' : error.message}
}

```

- md5(string) - calculates the MD5 hash of a string. This function is supported since Zabbix 5.2.5
- sha256(string) - calculates the SHA256 hash of a string. This function is supported since Zabbix 5.2.5

## 5 CSV to JSON preprocessing

### Overview

In this preprocessing step it is possible to convert CSV file data into JSON format. It's supported in:

- items (item prototypes)
- low-level discovery rules

### Configuration

To configure a CSV to JSON preprocessing step:

- Go to the Preprocessing tab in [item/discovery rule](#) configuration
- Click on Add
- Select the CSV to JSON option

Preprocessing steps	Name	Parameters	Custom on fail
1:	CSV to JSON	<input type="text"/> <input type="text"/> <input checked="" type="checkbox"/> With header row	<input checked="" type="checkbox"/> <input type="text" value="error message"/>

[Add](#)

The first parameter allows to set a custom delimiter. Note that if the first line of CSV input starts with "Sep=" and is followed by a single UTF-8 character then that character will be used as the delimiter in case the first parameter is not set. If the first parameter is not set and a delimiter is not retrieved from the "Sep=" line, then a comma is used as a separator.

The second optional parameter allows to set a quotation symbol.

If the With header row checkbox is marked, the header line values will be interpreted as column names (see [Header processing](#) for more information).

If the Custom on fail checkbox is marked, the item will not become unsupported in case of a failed preprocessing step. Additionally custom error handling options may be set: discard the value, set a specified value or set a specified error message.

### Header processing

The CSV file header line can be processed in two different ways:

- If the With header row checkbox is marked - header line values are interpreted as column names. In this case the column names must be unique and the data row should not contain more columns than the header row;
- If the With header row checkbox is not marked - the header line is interpreted as data. Column names are generated automatically (1,2,3,4...)

CSV file example:

```
Nr,Item name,Key,Qty
1,active agent item,agent.hostname,33
"2","passive agent item","agent.version","44"
3,"active,passive agent items",agent.ping,55
```

**Note:**

A quotation character within a quoted field in the input must be escaped by preceding it with another quotation character.

**Processing header line**

JSON output when a header line is expected:

```
[
  {
    "Nr": "1",
    "Item name": "active agent item",
    "Key": "agent.hostname",
    "Qty": "33"
  },
  {
    "Nr": "2",
    "Item name": "passive agent item",
    "Key": "agent.version",
    "Qty": "44"
  },
  {
    "Nr": "3",
    "Item name": "active,passive agent items",
    "Key": "agent.ping",
    "Qty": "55"
  }
]
```

**No header line processing**

JSON output when a header line is not expected:

```
[
  {
    "1": "Nr",
    "2": "Item name",
    "3": "Key",
    "4": "Qty"
  },
  {
    "1": "1",
    "2": "active agent item",
    "3": "agent.hostname",
    "4": "33"
  },
  {
    "1": "2",
    "2": "passive agent item",
    "3": "agent.version",
    "4": "44"
  },
  {
    "1": "3",
    "2": "active,passive agent items",
    "3": "agent.ping",
    "4": "55"
  }
]
```

### 3 Item types

#### Overview

Item types cover various methods of acquiring data from your system. Each item type comes with its own set of supported item keys and required parameters.

The following items types are currently offered by Zabbix:

- Zabbix agent checks
- SNMP agent checks
- SNMP traps
- IPMI checks
- Simple checks
  - VMware monitoring
- Log file monitoring
- Calculated items
- Zabbix internal checks
- SSH checks
- Telnet checks
- External checks
- Aggregate checks
- Trapper items
- JMX monitoring
- ODBC checks
- Dependent items
- HTTP checks
- Prometheus checks
- Script items

Details for all item types are included in the subpages of this section. Even though item types offer a lot of options for data gathering, there are further options through [user parameters](#) or [loadable modules](#).

Some checks are performed by Zabbix server alone (as agent-less monitoring) while others require Zabbix agent or even Zabbix Java gateway (with JMX monitoring).

#### Attention:

If a particular item type requires a particular interface (like an IPMI check needs an IPMI interface on the host) that interface must exist in the host definition.

Multiple interfaces can be set in the host definition: Zabbix agent, SNMP agent, JMX and IPMI. If an item can use more than one interface, it will search the available host interfaces (in the order: Agent→SNMP→JMX→IPMI) for the first appropriate one to be linked with.

All items that return text (character, log, text types of information) can return whitespace only as well (where applicable) setting the return value to an empty string (supported since 2.0).

### 1 Zabbix agent

#### Overview

These checks use the communication with Zabbix agent for data gathering.

There are [passive](#) and [active](#) agent checks. When configuring an item, you can select the required type:

- Zabbix agent - for passive checks
- Zabbix agent (active) - for active checks

#### Supported item keys

The table provides details on the item keys that you can use with Zabbix agent items.

See also:

- [Items supported by platform](#)
- [Item keys supported by Zabbix agent 2](#)
- [Item keys specific for Windows agent](#)
- [Minimum permission level for Windows agent items](#)



**\*\* Mandatory and optional parameters \*\***

Parameters without angle brackets are mandatory. Parameters marked with angle brackets < > are optional.

Key	Description	Return value	Parameters	Comments
agent.hostname	Agent host name.	String		Returns: As passive check - the name of the first host listed in the Hostname parameter of the agent configuration file; As active check - the name of the current hostname.
agent.ping	Agent availability check.	Nothing - unavailable 1 - available		Use the <b>nodata()</b> trigger function to check for host unavailability.
agent.version	Version of Zabbix agent.	String		Example of returned value: 1.8.2
kernel.maxfiles	Maximum number of opened files supported by OS.	Integer		
kernel.maxproc	Maximum number of processes supported by OS.	Integer		
log[file,<regexp>,<encoding>,<maxlines>,<mode>,<output>,<maxdelay>,<options>]				

Log file monitoring.	Log	<p><b>file</b> - full path and name of log file</p> <p><b>regexp</b> - regular expression<sup>4</sup> describing the required pattern</p> <p><b>encoding</b> - code page</p> <p><b>identifier</b></p> <p><b>maxlines</b> - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in <code>zabbix_agentd.conf</code></p> <p><b>mode</b> (since version 2.0)- possible values: all (default), skip - skip processing of older data (affects only newly created items).</p> <p><b>output</b> (since version 2.2) - an optional output formatting template. The <code>\0</code> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an <code>\N</code> (where N=1...9) escape sequence is replaced with Nth matched group (or an empty string if</p>	<p>The item must be configured as an <b>active check</b>.</p> <p>If file is missing or permissions do not allow access, item turns unsupported.</p> <p>If output is left empty - the whole line containing the matched text is returned. Note that all global regular expression types except 'Result is TRUE' always return the whole matched line and the output parameter is ignored.</p> <p>Content extraction using the output parameter takes place on the agent.</p> <p>Examples: =&gt; log[/var/log/syslog] =&gt; log[/var/log/syslog,error] =&gt; log[/home/zabbix/logs/logfile,,</p> <p>Using <i>output</i> parameter for extracting a number from log record: =&gt; log[/app1/app.log,"task run [0-9.]+ sec, processed ([0-9.]+) records, [0-9.]+ errors",,,\1] → will match a log record "2015-11-13 10:08:26 task run 6.08 sec, processed 6080 records,</p>
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Key

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log.count[file,<regexp>,<encoding>,<maxproclines>,<mode>,<maxdelay>,<options>]

Count of matched lines in log file monitoring.	Integer	<p><b>file</b> - full path and name of log file</p> <p><b>regex</b> - regular expression<sup>4</sup> describing the required pattern</p> <p><b>encoding</b> - code page</p> <p><b>identifier</b></p> <p><b>maxprolines</b> - maximum number of new lines per second the agent will analyze (cannot exceed 10000). Default value is 10*'MaxLines-PerSecond' in <a href="#">zabbix_agentd.conf</a>.</p> <p><b>mode</b> - possible values: all (default), skip - skip processing of older data (affects only newly created items).</p> <p><b>maxdelay</b> - maximum delay in seconds. Type: float. Values: 0 - (default) never ignore log file lines; &gt; 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds. Read the <a href="#">maxdelay</a> notes before using it!</p> <p><b>options</b> (since version 4.4.7) - additional options: mtime-noread - non-unique records, reread only if the file size changes</p>	<p>The item must be configured as an <b>active check</b>.</p> <p>If file is missing or permissions do not allow access, item turns unsupported.</p> <p>See also additional information on <a href="#">log monitoring</a>.</p> <p>This item is not supported for Windows Event Log.</p> <p>Supported since Zabbix 3.2.0.</p>
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Key

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logrt[file\_regexp,<regexp>,<encoding>,<maxlines>,<mode>,<output>,<maxdelay>,<options>]

Log file monitoring with log rotation support.	Log	<p><b>file_regexp</b> - absolute path to file and regular expression<sup>4</sup> describing the file name pattern</p> <p><b>regexp</b> - regular expression<sup>4</sup> describing the required content pattern</p> <p><b>encoding</b> - code page <b>identifier</b></p> <p><b>maxlines</b> - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in <a href="#">zabbix_agentd.conf</a></p> <p><b>mode</b> (since version 2.0) - possible values: all (default), skip - skip processing of older data (affects only newly created items).</p> <p><b>output</b> (since version 2.2) - an optional output formatting template. The <b>\0</b> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an <b>\N</b> (where N=1...9) escape</p>	<p>The item must be configured as an <b>active check</b>. Log rotation is based on the last modification time of files.</p> <p>Note that logrt is designed to work with one currently active log file, with several other matching inactive files rotated. If, for example, a directory has many active log files, a separate logrt item should be created for each one. Otherwise if one logrt item picks up too many files it may lead to exhausted memory and a crash of monitoring.</p> <p>If output is left empty - the whole line containing the matched text is returned. Note that all global regular expression types except 'Result is TRUE' always return the whole matched line and the output parameter is ignored.</p> <p>Content extraction using the output parameter takes place on the agent.</p> <p>Examples:</p>
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Key

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logrt.count[file\_regexp,<regexp>,<encoding>,<maxproclines>,<mode>,<maxdelay>,<options>]

Count of matched lines in log file monitoring with log rotation support.	Integer	<p><b>file_regexp</b> - absolute path to file and regular expression<sup>4</sup> describing the file name pattern</p> <p><b>regexp</b> - regular expression<sup>4</sup> describing the required content pattern</p> <p><b>encoding</b> - code page <b>identifier</b></p> <p><b>maxproclines</b> - maximum number of new lines per second the agent will analyze (cannot exceed 10000). Default value is 10*'MaxLines-PerSecond' in <b>zabbix_agentd.conf</b>.</p> <p><b>mode</b> - possible values: all (default), skip - skip processing of older data (affects only newly created items).</p> <p><b>maxdelay</b> - maximum delay in seconds. Type: float. Values: 0 - (default) never ignore log file lines; &gt; 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds. Read the <b>maxdelay</b> notes before using it!</p> <p><b>options</b> (since version 4.0; mtime-reread, mtime-noread</p>	<p>The item must be configured as an <b>active check</b>. Log rotation is based on the last modification time of files.</p> <p>See also additional information on <b>log monitoring</b>.</p> <p>This item is not supported for Windows Event Log.</p> <p>Supported since Zabbix 3.2.0.</p>
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Key

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modbus.get[endpoint,<slave id>,<function>,<address>,<count>,<type>,<endianness>,<offset>]

Reads Modbus JSON object data.

**endpoint** - Supported since Zabbix 5.2.0.  
defined as protocol://connection\_string

**slave id** - slave ID

**function** - Modbus function

**address** - address of first registry, coil or input

**count** - number of records to read

**type** - type of data

**endianness** - endianness configuration

**offset** - number of registers, starting from 'address', the results of which will be discarded.

See a [detailed description](#) of parameters.

net.dns[<ip>,name,<type>,<timeout>,<count>,<protocol>]

<p>net.dns.record[&lt;ip&gt;,name,&lt;type&gt;,&lt;timeout&gt;,&lt;count&gt;,&lt;protocol&gt;]</p>	<p>Checks if DNS service is up.</p>	<p>0 - DNS is down (server did not respond or DNS resolution failed)</p> <p>1 - DNS is up</p>	<p><b>ip</b> - IP address of DNS server (leave empty for the default DNS server, ignored on Windows)</p> <p><b>name</b> - DNS name to query</p> <p><b>type</b> - record type to be queried (default is SOA)</p> <p><b>timeout</b> (ignored on Windows) - timeout for the request in seconds (default is 1 second)</p> <p><b>count</b> (ignored on Windows) - number of tries for the request (default is 2)</p> <p><b>protocol</b> (since version 3.0) - the protocol used to perform DNS queries: udp (default) or tcp</p>	<p>Example: =&gt; net.dns[8.8.8.8,zabbix.com,M]</p> <p>The possible values for type are: ANY, A, NS, CNAME, MB, MG, MR, PTR, MD, MF, MX, SOA, NULL, WKS (except for Windows), HINFO, MINFO, TXT, SRV</p> <p>Internationalized domain names are not supported, please use IDNA encoded names instead.</p> <p>SRV record type is supported since Zabbix agent versions 1.8.6 (Unix) and 2.0.0 (Windows).</p> <p>Naming before Zabbix 2.0 (still supported): net.tcp.dns</p>
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Key	Description	Type	Parameters	Example
	Performs a DNS query.	Character string with the required type of information	<b>ip</b> - IP address of DNS server (leave empty for the default DNS server, ignored on Windows) <b>name</b> - DNS name to query <b>type</b> - record type to be queried (default is SOA) <b>timeout</b> (ignored on Windows) - timeout for the request in seconds (default is 1 second) <b>count</b> (ignored on Windows) - number of tries for the request (default is 2) <b>protocol</b> (since version 3.0) - the protocol used to perform DNS queries: udp (default) or tcp	Example: => net.dns.record[8.8.8.8,zabbix.  The possible values for type are: ANY, A, NS, CNAME, MB, MG, MR, PTR, MD, MF, MX, SOA, NULL, WKS (except for Windows), HINFO, MINFO, TXT, SRV  Internationalized domain names are not supported, please use IDNA encoded names instead.  SRV record type is supported since Zabbix agent versions 1.8.6 (Unix) and 2.0.0 (Windows).  Naming before Zabbix 2.0 (still supported): net.tcp.dns.query
net.if.collisions[if]	Number of out-of-window collisions.	Integer	<b>if</b> - network interface name	
net.if.discovery				

List of network  
interfaces.  
Used for  
low-level  
discovery.

JSON object

Supported  
since Zabbix  
agent version  
2.0.

On FreeBSD,  
OpenBSD and  
NetBSD  
supported  
since Zabbix  
agent version  
2.2.

Some Windows  
versions (for  
example,  
Server 2008)  
might require  
the latest  
updates  
installed to  
support  
non-ASCII  
characters in  
interface  
names.

net.if.in[if,<mode>]

Incoming traffic statistics on network interface.	Integer	<p><b>if</b> - network interface name (Unix); network interface full description or IPv4 address (Windows)</p> <p><b>mode</b> - possible values:</p> <p>bytes - number of bytes (default)</p> <p>packets - number of packets</p> <p>errors - number of errors</p> <p>dropped - number of dropped packets</p> <p>overruns (fifo) - the number of FIFO buffer errors</p> <p>frame - the number of packet framing errors</p> <p>compressed - the number of compressed packets</p> <p>transmitted or received by the device driver</p> <p>multicast - the number of multicast frames received by the device driver</p>	<p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Multi-byte interface names on Windows are supported since Zabbix agent version 1.8.6.</p> <p>Examples: =&gt; net.if.in[eth0,errors] =&gt; net.if.in[eth0]</p> <p>You may obtain network interface descriptions on Windows with net.if.discovery or net.if.list items.</p> <p>You may use this key with the Change per second preprocessing step in order to get bytes per second statistics.</p>
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net.if.out[if,<mode>]

Outgoing traffic statistics on network interface.	Integer	<p><b>if</b> - network interface name (Unix); network interface full description or IPv4 address (Windows)</p> <p><b>mode</b> - possible values:</p> <p>bytes - number of bytes (default)</p> <p>packets - number of packets</p> <p>errors - number of errors</p> <p>dropped - number of dropped packets</p> <p>overruns (fifo) - the number of FIFO buffer errors</p> <p>collisions (colls) - the number of collisions detected on the interface</p> <p>carrier - the number of carrier losses detected by the device driver</p> <p>compressed - the number of compressed packets transmitted by the device driver</p>	<p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Multi-byte interface names on Windows are supported since Zabbix agent 1.8.6 version.</p> <p>Examples: =&gt; net.if.out[eth0,errors] =&gt; net.if.out[eth0]</p> <p>You may obtain network interface descriptions on Windows with net.if.discovery or net.if.list items.</p> <p>You may use this key with the Change per second preprocessing step in order to get bytes per second statistics.</p>
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net.if.total[if,<mode>]

<p>Sum of incoming and outgoing traffic statistics on network interface.</p>	<p>Integer</p>	<p><b>if</b> - network interface name (Unix); network interface full description or IPv4 address (Windows)  <b>mode</b> - possible values:  bytes - number of bytes (default)  packets - number of packets  errors - number of errors  dropped - number of dropped packets  overruns (fifo) - the number of FIFO buffer errors  compressed - the number of compressed packets transmitted or received by the device driver</p>	<p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Examples:  =&gt;  net.if.total[eth0,errors]  =&gt;  net.if.total[eth0]</p> <p>You may obtain network interface descriptions on Windows with net.if.discovery or net.if.list items.</p> <p>You may use this key with the Change per second preprocessing step in order to get bytes per second statistics.</p> <p>Note that dropped packets are supported only if both net.if.in and net.if.out work for dropped packets on your platform.</p>
<p>net.tcp.listen[port]</p>			

Key

	<p>Checks if this TCP port is in LISTEN state.</p>	<p>0 - it is not in LISTEN state 1 - it is in LISTEN state</p>	<p><b>port</b> - TCP port number</p>	<p>Example: =&gt; net.tcp.listen[80]</p> <p>On Linux supported since Zabbix agent version 1.8.4</p> <p>Since Zabbix 3.0.0, on Linux kernels 2.6.14 and above, information about listening TCP sockets is obtained from the kernel's NETLINK interface, if possible. Otherwise, the information is retrieved from /proc/net/tcp and /proc/net/tcp6 files.</p>
<p>net.tcp.port[&lt;ip&gt;,port]</p>	<p>Checks if it is possible to make TCP connection to specified port.</p>	<p>0 - cannot connect 1 - can connect</p>	<p><b>ip</b> - IP or DNS name (default is 127.0.0.1) <b>port</b> - port number</p>	<p>Example: =&gt; net.tcp.port[,80] → can be used to test availability of web server running on port 80.</p> <p>For simple TCP performance testing use net.tcp.service.perf[tcp,&lt;ip&gt;]</p> <p>Note that these checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually).</p>
<p>net.tcp.service[service,&lt;ip&gt;,&lt;port&gt;]</p>				



Checks if service is running and accepting TCP connections.

0 - service is down

1 - service is running

**service** - either of: ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet (see [details](#))

**ip** - IP address

(default is 127.0.0.1)

**port** - port number (by default standard service port number is used)

Example:

=>  
net.tcp.service[ftp,,45]  
→ can be used to test the availability of FTP server on TCP port 45.

Note that these checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually).

Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.port for checks like these.

Checking of LDAP and HTTPS on Windows is only supported by Zabbix agent 2.

Note that the telnet check looks for a login prompt (':' at the end).

See also [known issues](#) of checking HTTPS service.

https and telnet services are supported since Zabbix 2.0.

net.tcp.service.perf[service,<ip>,<port>]

	Checks performance of TCP service.	0 - service is down  seconds - the number of seconds spent while connecting to the service	<b>service</b> - either of: ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet (see <a href="#">details</a> ) <b>ip</b> - IP address (default is 127.0.0.1) <b>port</b> - port number (by default standard service port number is used)	Example: => net.tcp.service.perf[ssh] → can be used to test the speed of initial response from SSH server.  Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.service.perf[tcp,<ip>], for checks like these.  Checking of LDAP and HTTPS on Windows is only supported by Zabbix agent 2.  Note that the telnet check looks for a login prompt (':' at the end).  See also <a href="#">known issues</a> of checking HTTPS service.  https and telnet services are supported since Zabbix 2.0.
net.udp.listen[port]	Checks if this UDP port is in LISTEN state.	0 - it is not in LISTEN state  1 - it is in LISTEN state	<b>port</b> - UDP port number	Example: => net.udp.listen[68]  On Linux supported since Zabbix agent version 1.8.4
net.udp.service[service,<ip>,<port>]				

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Key

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	Checks if service is running and responding to UDP requests.	0 - service is down 1 - service is running	<b>service</b> - ntp (see <a href="#">details</a> ) <b>ip</b> - IP address (default is 127.0.0.1) <b>port</b> - port number (by default standard service port number is used)	Example: => net.udp.service[ntp,,45] → can be used to test the availability of NTP service on UDP port 45.  This item is supported since Zabbix 3.0.0, but ntp service was available for net.tcp.service[] item in prior versions.
net.udp.service.perf[service,<ip>,<port>]	Checks performance of UDP service.	0 - service is down  seconds - the number of seconds spent waiting for response from the service	<b>service</b> - ntp (see <a href="#">details</a> ) <b>ip</b> - IP address (default is 127.0.0.1) <b>port</b> - port number (by default standard service port number is used)	Example: => net.udp.service.perf[ntp] → can be used to test response time from NTP service.  This item is supported since Zabbix 3.0.0, but ntp service was available for net.tcp.service[] item in prior versions.
proc.cpu.util[<name>,<user>,<type>,<cmdline>,<mode>,<zone>]				

Process CPU utilization percentage.	Float	<p><b>name</b> - process name (default is all processes)</p> <p><b>user</b> - user name (default is all users)</p> <p><b>type</b> - CPU utilization type: total (default), user, system</p> <p><b>cmdline</b> - filter by command line (it is a regular expression<sup>4</sup>)</p> <p><b>mode</b> - data gathering mode: avg1 (default), avg5, avg15</p> <p><b>zone</b> - target zone: current (default), all. This parameter is supported on Solaris only.</p>	<p>Examples:</p> <p>=&gt; proc.cpu.util[,root] → CPU utilization of all processes running under the "root" user</p> <p>=&gt; proc.cpu.util[zabbix_server,za] → CPU utilization of all zabbix_server processes running under the zabbix user</p> <p>The returned value is based on single CPU core utilization percentage. For example CPU utilization of a process fully using two cores is 200%.</p> <p>The process CPU utilization data is gathered by a collector which supports the maximum of 1024 unique (by name, user and command line) queries. Queries not accessed during the last 24 hours are removed from the collector.</p> <p>Note that when setting the zone parameter to current (or default) in case the agent has been compiled on a Solaris without zone support, but running on a newer Solaris where zones are supported, then the agent will return NOT-SUPPORTED (the agent</p>
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Key

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proc.mem[<name>,<user>,<mode>,<cmdline>,<memtype>]

Memory used by process in bytes.	Integer - with mode as max, min, sum	<b>name</b> - process name (default is all processes)	Examples: => proc.mem[,root] → memory used by all processes running under the "root" user
	Float - with mode as avg	<b>user</b> - user name (default is all users)	=> proc.mem[zabbix_server,zabb
		<b>mode</b> - possible values: avg, max, min, sum (default)	=> proc.mem[zabbix_server,zabb
		<b>cmdline</b> - filter by command line (it is a regular expression <sup>4</sup> )	→ memory used by all zabbix_server processes running under the zabbix user =>
		<b>memtype</b> - type of memory used by process	proc.mem[,oracle,max,oracle2] → memory used by the most memory-hungry process running under oracle having oracleZABBIX in its command line
			Note: When several processes use shared memory, the sum of memory used by processes may result in large, unrealistic values.
			See <a href="#">notes</a> on selecting processes with <b>name</b> and <b>cmdline</b> parameters (Linux-specific).
			When this item is invoked from the command line and contains a command line parameter (e.g. using the agent test mode: zabbix_agentd -t proc.mem[, , , apache2]), one extra process will be

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Key

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proc.num[<name>,<user>,<state>,<cmdline>,<zone>]

The number of processes.

Integer

**name** - process name (default is all processes)  
**user** - user name (default is all users)  
**state** (disk and trace options since version 3.4.0) - possible values: all (default), disk - uninterruptible sleep, run - running, sleep - interruptible sleep, trace - stopped, zomb - zombie  
**cmdline** - filter by command line (it is a regular expression<sup>4</sup>)  
**zone** - target zone: current (default), all. This parameter is supported on Solaris only.

Examples:  
 => proc.num[,mysql] → number of processes running under the mysql user  
 => proc.num[apache2,www-data] → number of apache2 processes running under the www-data user  
 => proc.num[,oracle,sleep,oracle] → number of processes in sleep state running under oracle having oracleZABBIX in its command line

See [notes](#) on selecting processes with `name` and `cmdline` parameters (Linux-specific).

On Windows, only the `name` and `user` parameters are supported.

When this item is invoked from the command line and contains a command line parameter (e.g. using the agent test mode:  
 zabbix\_agentd -t proc.num[, , , apache2]), one extra process will be counted, as the agent will count itself.

Note that when setting the `zone` parameter to



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Key

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<p>sensor[device,sensor,&lt;mode&gt;]</p>	<p>Hardware sensor reading.</p>	<p>Float</p>	<p><b>device</b> - device name <b>sensor</b> - sensor name <b>mode</b> - possible values: avg, max, min (if this parameter is omitted, device and sensor are treated verbatim).</p>	<p>Reads /proc/sys/dev/sensors on Linux 2.4.</p> <p>Example: =&gt; sen- sor[w83781d- i2c-0- 2d,temp1]</p> <p>Prior to Zabbix 1.8.4, the sensor[temp1] format was used. Reads /sys/class/hwmon on Linux 2.6+.</p> <p>See a more detailed description of <b>sensor</b> item on Linux. Reads the hw.sensors MIB on OpenBSD.</p> <p>Examples: =&gt; sen- sor[cpu0,temp0] → temperature of one CPU =&gt; sensor["cpu[0- 2]\$",temp,avg] → average temperature of the first three CPU's</p> <p>Supported on OpenBSD since Zabbix 1.8.4.</p>
<p>system.boottime</p>	<p>System boot time.</p>	<p>Integer (Unix timestamp)</p>		
<p>system.cpu.discovery</p>	<p>List of detected CPUs/CPU cores. Used for low-level discovery.</p>	<p>JSON object</p>		<p>Supported on all platforms since 2.4.0.</p>
<p>system.cpu.intr</p>	<p>Device interrupts.</p>	<p>Integer</p>		
<p>system.cpu.load[&lt;cpu&gt;,&lt;mode&gt;]</p>				

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Key

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	CPU load.	Float	<b>cpu</b> - possible values: all (default), percpu (since version 2.0; total load divided by online CPU count) <b>mode</b> - possible values: avg1 (one-minute average, default), avg5, avg15	Example: => system.cpu.load[,avg5].
system.cpu.num[<type>]	Number of CPUs.	Integer	<b>type</b> - possible values: online (default), max	Example: => system.cpu.num
system.cpu.switches	Count of context switches.	Integer		
system.cpu.util[<cpu>,<type>,<mode>,<logical_or_physical>]				

Key	Description	Unit	Default	Example
system.cpu.util[<type>]	CPU utilization percentage.	Float	<p><b>cpu</b> - &lt;CPU number&gt; or all (default)</p> <p><b>type</b> - possible values:  user (default), idle, nice, system (default for Windows), iowait, interrupt, softirq, steal, guest (on Linux kernels 2.6.24 and above), guest_nice (on Linux kernels 2.6.33 and above).  See also <a href="#">platform-specific</a> details for this parameter.</p> <p><b>mode</b> - possible values:  avg1 (one-minute average, default), avg5, avg15</p> <p><b>logical_or_physical</b> (since version 5.0.3; on AIX only) - possible values: logical (default), physical. This parameter is supported on AIX only.</p>	<p>Example:  =&gt; system.cpu.util[0,user,avg5]</p> <p>Old naming:  system.cpu.idleX,  system.cpu.niceX,  system.cpu.systemX,  system.cpu.userX</p>

system.hostname[<type>]

System host  
name.

String

**type** (since  
version 1.8.6  
for Windows  
only, must not  
be used on  
other systems)  
- possible  
values: netbios  
(default) or  
host

The value is  
acquired by  
either GetCom-  
puterName()  
(for **netbios**)  
or  
gethostname()  
(for **host**)  
functions on  
Windows and  
by "hostname"  
command on  
other systems.

Examples of  
returned  
values:  
on Linux:  
=> sys-  
tem.hostname  
→ linux-w7x1  
=> sys-  
tem.hostname  
→  
www.zabbix.com  
on Windows:  
=> sys-  
tem.hostname  
→ WIN-  
SERV2008-I6  
=> sys-  
tem.hostname[host]  
→  
Win-Serv2008-  
I6LonG

See also a  
[more detailed  
description](#).

system.hw.chassis[<info>]

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Key

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Chassis  
information.

String

**info** - one of  
full (default),  
model, serial,  
type or vendor

Example: sys-  
tem.hw.chassis[full]  
Hewlett-  
Packard HP Pro  
3010 Small  
Form Factor PC  
CZXXXXXXXX  
Desktop]

This key  
depends on the  
availability of  
the [SMBIOS](#)  
table.

Will try to read  
the DMI table  
from sysfs, if  
sysfs access  
fails then try  
reading  
directly from  
memory.

**Root  
permissions**

are required  
because the  
value is  
acquired by  
reading from  
sysfs or  
memory.

Supported  
since Zabbix  
agent version  
2.0.

system.hw.cpu[<cpu>, <info>]

Key

	CPU information.	String or integer	<p><b>cpu</b> - &lt;CPU number&gt; or all (default)</p> <p><b>info</b> - possible values: full (default), curfreq, maxfreq, model or vendor</p>	<p>Example: =&gt; sys-tem.hw.cpu[0,vendor] → AuthenticAMD</p> <p>Gathers info from /proc/cpuinfo and /sys/devices/system/cpu/[cpu</p> <p>If a CPU number and curfreq or maxfreq is specified, a numeric value is returned (Hz).</p> <p>Supported since Zabbix agent version 2.0.</p>
system.hw.devices[<type>]	Listing of PCI or USB devices.	Text	<p><b>type</b> (since version 2.0) - pci (default) or usb</p>	<p>Example: =&gt; sys-tem.hw.devices[pci] → 00:00.0 Host bridge: Advanced Micro Devices [AMD] RS780 Host Bridge [..]</p> <p>Returns the output of either lspci or lsusb utility (executed without any parameters).</p>
system.hw.macaddr[<interface>,<format>]				

	Listing of MAC addresses.	String	<b>interface</b> - all (default) or a regular expression <sup>4</sup> <b>format</b> - full (default) or short	Lists MAC addresses of the interfaces whose name matches the given <code>interface</code> regular expression <sup>4</sup> (all lists for all interfaces).  Example: => <code>system.hw.macaddr["eth0\$",full]</code> → [eth0] 00:11:22:33:44:55  If <code>format</code> is specified as short, interface names and identical MAC addresses are not listed.  Supported since Zabbix agent version 2.0.
system.localtime[<type>]	System time.	Integer - with <code>type</code> as <code>utc</code>  String - with <code>type</code> as <code>local</code>	<b>type</b> (since version 2.0) - possible values: <code>utc</code> - (default) the time since the Epoch (00:00:00 UTC, January 1, 1970), measured in seconds. <code>local</code> - the time in the 'yyyy-mm-dd,hh:mm:ss.nnn, +hh:mm' format	Must be used as a <b>passive check</b> only.  Example: => <code>system.localtime[local]</code> → create an item using this key and then use it to display host time in the Clock <b>screen element</b> .
system.run[command,<mode>]				

Run specified command on the host.	Text result of the command	<b>command</b> - command for execution <b>mode</b> - possible values: wait - wait end of execution (default), nowait - do not wait	Up to 512KB of data can be returned, including trailing whitespace that is truncated. To be processed correctly, the output of the command must be text.
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Example:

```
=>
system.run[ls -l /] → detailed file list of root directory.
```

Note:

system.run items are disabled by default. Learn how to [enable them](#).

The return value of the item is standard output together with standard error produced by command. The exit code is not checked.

Empty result is allowed starting with Zabbix 2.4.0. See also: [Command execution](#).

system.stat[resource,<type>]



System statistics.	Integer or float	<p><b>ent</b> - number of processor units this partition is entitled to receive (float)</p> <p><b>kthr,&lt;type&gt;</b> - information about kernel thread states:  r - average number of runnable kernel threads (float)  b - average number of kernel threads placed in the Virtual Memory Manager wait queue (float)</p> <p><b>memory,&lt;type&gt;</b> - information about the usage of virtual and real memory:  avm - active virtual pages (integer)  fre - size of the free list (integer)</p> <p><b>page,&lt;type&gt;</b> - information about page faults and paging activity:  fi - file page-ins per second (float)  fo - file page-outs per second (float)  pi - pages paged in from paging space (float)  po - pages paged out to paging space (float)  fr - pages freed (page replacement) (float)  sr - pages scanned by page-replacement algorithm (float)</p> <p><b>faults,&lt;type&gt;</b> - trap and</p>
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Comments  
 This item is supported on AIX only, since Zabbix 1.8.1. Take note of the following limitations in these items:  
 => sys-tem.stat[cpu,app]  
 - supported only on AIX LPAR of type "Shared"  
 => sys-tem.stat[cpu,ec]  
 - supported on AIX LPAR of type "Shared" and "Dedicated" ("Dedicated" always returns 100 (percent))  
 => sys-tem.stat[cpu,lbusy]  
 - supported only on AIX LPAR of type "Shared"  
 => sys-tem.stat[cpu,pc]  
 - supported on AIX LPAR of type "Shared" and "Dedicated"  
 => sys-tem.stat[ent] - supported on AIX LPAR of type "Shared" and "Dedicated"

system.sw.arch

Software architecture information.

String

Example:  
 =>  
 system.sw.arch  
 → i686

Info is acquired from uname() function.

Supported since Zabbix agent version 2.0.

system.sw.os[<info>]

---

	Operating system information.	String	<b>info</b> - possible values: full (default), short or name	Example: => sys-tem.sw.os[short]→ Ubuntu 2.6.35-28.50-generic 2.6.35.11  Info is acquired from (note that not all files and options are present in all distributions): /proc/version (full) /proc/version_signature (short) PRETTY_NAME parameter from /etc/os-release on systems supporting it, or /etc/issue.net (name)  Supported since Zabbix agent version 2.0.
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system.sw.packages[<package>,<manager>,<format>]

Listing of installed packages.

Text

**package** - all (default) or a regular expression<sup>4</sup>  
**manager** - all (default) or a package manager  
**format** - full (default) or short

Lists (alphabetically) installed packages whose name matches the given package regular expression<sup>4</sup> (all lists them all).

Example:

```
=> system.sw.packages[mini,dpkg,sh]
-> python-minimal,
python2.6-minimal,
ubuntu-minimal
```

Supported package managers (executed command):  
dpkg (dpkg --get-selections)  
pkgtool (ls /var/log/packages)  
rpm (rpm -qa)  
pacman (pacman -Q)

If **format** is specified as **full**, packages are grouped by package managers (each manager on a separate line beginning with its name in square brackets).  
If **format** is specified as **short**, packages are not grouped and are listed on a single line.

Supported since Zabbix agent version 2.0.

system.swap.in[<device>,<type>]

---

	Swap in (from device into memory) statistics.	Integer	<b>device</b> - device used for swapping (default is all) <b>type</b> - possible values: count (number of swapins), sectors (sectors swapped in), pages (pages swapped in). See also <b>platform-specific</b> details for this parameter.	Example: => sys-tem.swap.in[,pages]  The source of this information is: /proc/swaps, /proc/partitions, /proc/stat (Linux 2.4) /proc/swaps, /proc/diskstats, /proc/vmstat (Linux 2.6)
system.swap.out[<device>,<type>]	Swap out (from memory onto device) statistics.	Integer	<b>device</b> - device used for swapping (default is all) <b>type</b> - possible values: count (number of swapouts), sectors (sectors swapped out), pages (pages swapped out). See also <b>platform-specific</b> details for this parameter.	Example: => sys-tem.swap.out[,pages]  The source of this information is: /proc/swaps, /proc/partitions, /proc/stat (Linux 2.4) /proc/swaps, /proc/diskstats, /proc/vmstat (Linux 2.6)
system.swap.size[<device>,<type>]				

Swap space size in bytes or in percentage from total.	Integer - for bytes	<b>device</b> - device used for swapping (default is all)	Example: => system.swap.size[,pfree] → free swap space percentage
	Float - for percentage	<b>type</b> - possible values: free (free swap space, default), pfree (free swap space, in percent), pused (used swap space, in percent), total (total swap space), used (used swap space) Note that pfree, pused are not supported on Windows if swap size is 0. See also <a href="#">platform-specific</a> details for this parameter.	If device is not specified Zabbix agent will only take into account swap devices (files), physical memory will be ignored. For example, on Solaris systems swap -s command includes a portion of physical memory and swap devices (unlike swap -l).  Note that this key might report incorrect swap space size/percentage on virtualized (VMware ESXi, VirtualBox) Windows platforms. In this case you may use the <code>perf_counter[\700(_Total</code> key to obtain correct swap space percentage.

system.uname

Identification  
of the system.

String

Example of  
returned value  
(Unix):  
FreeBSD  
localhost  
4.2-RELEASE  
FreeBSD  
4.2-RELEASE  
#0: Mon Nov  
i386

Example of  
returned value  
(Windows):  
Windows  
ZABBIX-WIN  
6.0.6001  
Microsoft®  
Windows  
Server® 2008  
Standard  
Service Pack 1  
x86

On Unix since  
Zabbix 2.2.0  
the value for  
this item is  
obtained with  
uname()  
system call.  
Previously it  
was obtained  
by invoking  
"uname -a".  
The value of  
this item might  
differ from the  
output of  
"uname -a"  
and does not  
include  
additional  
information  
that "uname  
-a" prints  
based on other  
sources.

On Windows  
since Zabbix  
3.0 the value  
for this item is  
obtained from  
Win32\_OperatingSystem  
and  
Win32\_Processor  
WMI classes.  
Previously it  
was obtained  
from volatile  
Windows APIs  
and  
undocumented  
registry keys.

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## Key

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system.uptime	System uptime in seconds.	Integer	In <i>item configuration</i> , use <b>s</b> or <b>uptime</b> units to get readable values.
system.users.num	Number of users logged in.	Integer	<b>who</b> command is used on the agent side to obtain the value.
vfs.dev.discovery	List of block devices and their type. Used for low-level discovery.	JSON object	This item is supported on Linux platform only.  Supported since Zabbix 4.4.0.
vfs.dev.read[<device>,<type>,<mode>]			



Disk read statistics.	Integer - with type in sectors, operations, bytes	<b>device</b> - disk device (default is all <sup>3</sup> )	You may use relative device names (for example, sda) as well as an optional /dev/ prefix (for example, /dev/sda).
	Float - with type in sps, ops, bps	<b>type</b> - possible values: sectors, operations, bytes, sps, ops, bps	
	Note: if using an update interval of three hours or more <sup>2</sup> , will always return '0'	Note that 'type' parameter support and defaults depend on the platform. See <b>platform-specific</b> details. sps, ops, bps stand for: sectors, operations, bytes per second, respectively.	LVM logical volumes are supported.
		<b>mode</b> - possible values: avg1 (one-minute average, default), avg5, avg15. This parameter is supported only with type in: sps, ops, bps.	Default values of 'type' parameter for different OSes: AIX - operations FreeBSD - bps Linux - sps OpenBSD - operations Solaris - bytes
			Example: => <code>vfs.dev.read[,operations]</code>  sps, ops and bps on supported platforms used to be limited to 8 devices (7 individual and one all). Since Zabbix 2.0.1 this limit is 1024 devices (1023 individual and one for all).

`vfs.dev.write[<device>,<type>,<mode>]`

Disk write statistics.	Integer - with type in sectors, operations, bytes	<b>device</b> - disk device (default is all <sup>3</sup> )	You may use relative device names (for example, sda) as well as an optional /dev/ prefix (for example, /dev/sda).
	Float - with type in sps, ops, bps	<b>type</b> - possible values: sectors, operations, bytes, sps, ops, bps	
	Note: if using an update interval of three hours or more <sup>2</sup> , will always return '0'	Note that 'type' parameter support and defaults depend on the platform. See <b>platform-specific</b> details. sps, ops, bps stand for: sectors, operations, bytes per second, respectively.	LVM logical volumes are supported.
		<b>mode</b> - possible values: avg1 (one-minute average, default), avg5, avg15. This parameter is supported only with type in: sps, ops, bps.	Default values of 'type' parameter for different OSes: AIX - operations FreeBSD - bps Linux - sps OpenBSD - operations Solaris - bytes
			Example: => vfs.dev.write[,operations] sps, ops and bps on supported platforms used to be limited to 8 devices (7 individual and one all). Since Zabbix 2.0.1 this limit is 1024 (1023 individual and one for all).

vfs.dir.count[dir,<regex\_incl>,<regex\_excl>,<types\_incl>,<types\_excl>,<max\_depth>,<min\_size>,<max\_size>,<min\_age>,<max\_age>]

Directory entry count.	Integer		
		<p><b>dir</b> - absolute path to directory</p> <p><b>regex_incl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to include; include all if empty (default value)</p> <p><b>regex_excl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to exclude; don't exclude any if empty (default value)</p> <p><b>types_incl</b> - directory entry types to count, possible values:  file - regular file, dir - subdirectory, sym - symbolic link, sock - socket, bdev - block device, cdev - character device, fifo - FIFO, dev - synonymous with "bdev,cdev", all - all types (default), i.e. "file,dir,sym,sock,only,files,fifo". Multiple types must be separated with comma and quoted.</p> <p><b>types_excl</b> - directory entry types (see &lt;types_incl&gt;) to NOT count. If some entry type is in both &lt;types_incl&gt; and &lt;types_excl&gt;, directory</p>	<p>Environment variables, e.g. %APP_HOME%, \$HOME and %TEMP% are not supported.</p> <p>Pseudo-directories "." and ".." are never counted.</p> <p>Symbolic links are never followed for directory traversal.</p> <p>On Windows, directory symlinks are skipped and hard links are counted only once.</p> <p>Both <code>regex_incl</code> and <code>regex_excl</code> are being applied to files and directories when calculating entry size, but are ignored when picking subdirectories to traverse (if <code>regex_incl</code> is "(?i)^.+\.zip\$" and <code>max_depth</code> is not set, then all subdirectories will be traversed, but <code>only,files,fifo</code> type zip will be counted).</p> <p>Execution time is limited by the default timeout value in agent <b>configuration</b> (3 sec). Since large directory traversal may take longer than that, no data will be returned and</p>

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Key

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vfs.dir.size[dir,<regex\_incl>,<regex\_excl>,<mode>,<max\_depth>,<regex\_excl\_dir>]

Directory size (in bytes).	Integer	<p><b>dir</b> - absolute path to directory</p> <p><b>regex_incl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to include; include all if empty (default value)</p> <p><b>regex_excl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to exclude; don't exclude any if empty (default value)</p> <p><b>mode</b> - possible values:  apparent (default) - gets apparent file sizes rather than disk usage (acts as <code>du -sb dir</code>),  disk - gets disk usage (acts as <code>du -s -B1 dir</code>). Unlike <code>du</code> command, <code>vfs.dir.size</code> item takes hidden files in account when calculating directory size (acts as <code>du -sb . [^.] * *</code> within dir).</p> <p><b>max_depth</b> - maximum depth of subdirectories to traverse. <b>-1</b> (default) - unlimited, <b>0</b> - no descending into subdirectories.</p> <p><b>regex_excl_dir</b> - regular <b>expression</b> describing the</p>	<p>Only directories with at least read permission for zabbix user are calculated.</p> <p>On Windows any symlink is skipped and hard links are taken into account only once.</p> <p>With large directories or slow drives this item may time out due to the Timeout setting in <b>agent</b> and <b>server/proxy</b> configuration files. Increase the timeout values as necessary.</p> <p>Examples:  ⇒ <code>vfs.dir.size[/tmp,log]</code>  - calculates size of all files in /tmp which contain 'log'  ⇒ <code>vfs.dir.size[/tmp,log,^[^.]old\$]</code>  - calculates size of all files in /tmp which contain 'log', excluding files containing '.old'</p> <p>The file size limit depends on <b>large file support</b>.</p> <p>Supported since Zabbix 3.4.0.</p>
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Key

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vfs.file.cksum[file]

File checksum, calculated by the UNIX cksum algorithm.

Integer

**file** - full path to file

Example:  
=>  
vfs.file.cksum[/etc/passwd]

Example of returned value:  
1938292000

The file size limit depends on **large file support**.

vfs.file.contents[file,<encoding>]

Retrieving contents of a file.

Text

**file** - full path to file  
**encoding** - code page identifier

Returns an empty string if the file is empty or contains LF/CR characters only.

Byte order mark (BOM) is excluded from the output.

Example:  
=>  
vfs.file.contents[/etc/passwd]

This item is limited to files no larger than 64 Kbytes.

Supported since Zabbix agent version 2.0.

vfs.file.exists[file,<types\_incl>,<types\_excl>]

<p>Checks if file exists.</p>	<p>0 - not found</p> <p>1 - file of the specified type exists</p>	<p><b>file</b> - full path to file</p> <p><b>types_incl</b> - list of file types to include, possible values: file (regular file, default (if types_excl is not set)), dir (directory), sym (symbolic link), sock (socket), bdev (block device), cdev (character device), fifo (FIFO), dev (synonymous with "bdev,cdev"), all (all mentioned types, default if types_excl is set).</p> <p><b>types_excl</b> - list of file types to exclude, see types_incl for possible values (by default no types are excluded)</p>	<p>Multiple types must be separated with a comma and the entire set enclosed in quotes "".</p> <p>On Windows the double quotes have to be backslash '\ ' escaped and the whole item key enclosed in double quotes when using the command line utility for calling zabbix_get.exe or agent2.</p> <p>If the same type is in both &lt;types_incl&gt; and &lt;types_excl&gt;, files of this type are excluded.</p> <p>Examples: =&gt; vfs.file.exists[/tmp/application =&gt; vfs.file.exists[/tmp/application =&gt; vfs.file.exists[/tmp/application</p> <p>The file size limit depends on <b>large file support</b>.</p> <p>Note that the item may turn unsupported on Windows if a directory is searched within a non-existing directory, e.g. <code>vfs.file.exists[C:\no\dir,dir]</code> (where 'no' does not exist).</p>
<p>vfs.file.md5sum[file]</p>			

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Key

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MD5 checksum  
of file.

Character  
string (MD5  
hash of the file)

**file** - full path  
to file

Example:  
=>  
vfs.file.md5sum[/usr/local/etc/

Example of  
returned value:  
b5052decb577e0fffd622d6dd

The file size  
limit (64 MB)  
for this item  
was removed  
in version  
1.8.6.

The file size  
limit depends  
on **large file  
support**.

vfs.file.regexp[file,regexp,<encoding>,<start  
line>,<end line>,<output>]



Find string in a file.	The line containing the matched string, or as specified by the optional output parameter	<p><b>file</b> - full path to file</p> <p><b>regex</b> - regular expression<sup>4</sup> describing the required pattern</p> <p><b>encoding</b> - code page <b>identifier</b></p> <p><b>start line</b> - the number of first line to search (first line of file by default).</p> <p><b>end line</b> - the number of last line to search (last line of file by default).</p> <p><b>output</b> - an optional output formatting template. The <b>\0</b> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an <b>\N</b> (where N=1...9) escape sequence is replaced with Nth matched group (or an empty string if the N exceeds the number of captured groups).</p>	<p>Only the first matching line is returned. An empty string is returned if no line matched the expression.</p> <p>Byte order mark (BOM) is excluded from the output.</p> <p>Content extraction using the output parameter takes place on the agent.</p> <p>The start line, end line and output parameters are supported from version 2.2.</p> <p>Examples: =&gt; <code>vfs.file.regex[/etc/passwd,zab</code> =&gt; <code>vfs.file.regex[/path/to/some/f</code> <code>9]+)\$" ,,3,5,\1]</code> =&gt; <code>vfs.file.regex[/etc/passwd,"^</code> <code>9]+)" ,,,\1]</code> → getting the ID of user zabbix</p>
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`vfs.file.regmatch[file,regex,<encoding>,<start line>,<end line>]`

Key

	Find string in a file.	0 - match not found 1 - found	<b>file</b> - full path to file <b>regexp</b> - regular expression <sup>4</sup> describing the required pattern <b>encoding</b> - code page <b>identifier</b> <b>start line</b> - the number of first line to search (first line of file by default). <b>end line</b> - the number of last line to search (last line of file by default).	Byte order mark (BOM) is ignored. The start line and end line parameters are supported from version 2.2. Example: => vfs.file.regmatch[/var/log/app.
vfs.file.size[file]	File size (in bytes).	Integer	<b>file</b> - full path to file	The file must have read permissions for user zabbix. Example: => vfs.file.size[/var/log/syslog] The file size limit depends on <b>large file support</b> .
vfs.file.time[file,<mode>]	File time information.	Integer (Unix timestamp)	<b>file</b> - full path to the file <b>mode</b> - possible values: modify (default) - last time of modifying file content, access - last time of reading file, change - last time of changing file properties	Example: => vfs.file.time[/etc/passwd,modi The file size limit depends on <b>large file support</b> .
vfs.fs.discovery				

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Key

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	List of mounted filesystems and their types. Used for low-level discovery.	JSON object		Supported since Zabbix agent version 2.0.  {#FSDRIVETYPE} macro is supported on Windows since Zabbix agent version 3.0.
vfs.fs.get	List of mounted filesystems, their types, disk space and inode statistics. Can be used for low-level discovery.	JSON object		Supported since Zabbix agent version 4.4.5.
vfs.fs.inode[fs,<mode>]	Number or percentage of inodes.	Integer - for number  Float - for percentage	<b>fs</b> - filesystem <b>mode</b> - possible values: total (default), free, used, //pfree // (free, percentage), pused (used, percentage)	Example: => vfs.fs.inode[/,pfree]
vfs.fs.size[fs,<mode>]	Disk space in bytes or in percentage from total.	Integer - for bytes  Float - for percentage	<b>fs</b> - filesystem <b>mode</b> - possible values: total (default), free, used, pfree (free, percentage), pused (used, percentage)	In case of a mounted volume, disk space for local file system is returned.  Example: => vfs.fs.size[/tmp,free]
vm.memory.size[<mode>]				Reserved space of a file system is taken into account and not included when using the free mode.

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Memory size in bytes or in percentage from total.	Integer - for bytes Float - for percentage	<b>mode</b> - possible values: total (default), active, anon, buffers, cached, exec, file, free, inactive, pinned, shared, slab, wired, used, pused (used, percentage), available, pavailable (available, percentage) See also <a href="#">platform-specific</a> support and <a href="#">additional details</a> for this parameter.	This item accepts three categories of parameters: 1) total - total amount of memory; 2) platform-specific memory types: active, anon, buffers, cached, exec, file, free, inactive, pinned, shared, slab, wired; 3) user-level estimates on how much memory is used and available: used, pused, available, pavailable.
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`web.page.get[host,<path>,<port>]`

<p>Get content of web page.</p> <p>web.page.perf[host,&lt;path&gt;,&lt;port&gt;]</p>	<p>Web page source as text (including headers)</p>	<p><b>host</b> - hostname or URL (as scheme://host:port/path, where only host is mandatory). Allowed URL schemes: http, https<sup>5</sup>. Missing scheme will be treated as http. If URL is specified path and port must be empty. Specifying user name/password when connecting to servers that require authentication, for example: http://user:password@www.zabbix.com is only possible with cURL support<sup>5</sup>. Punycode is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p> <p>This item turns unsupported if the resource specified path, host does not exist or is unavailable.</p> <p>host can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.</p> <p>Example: =&gt; web.page.get[www.zabbix.com] =&gt; web.page.get[http://www.zabbix.com] =&gt; web.page.get[https://blog.zabbix.com] =&gt; web.page.get[localhost:80] =&gt; web.page.get["::1]/server-status"]</p>
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Key	Value	Unit	Description
web.page.regexp[host,<path>,<port>,<length>,<output>]	<p><b>host</b> - hostname or URL (as scheme://host:port/path, where only host is mandatory). Allowed URL schemes: http, https<sup>5</sup>. Missing scheme will be treated as http. If URL is specified path and port must be empty. Specifying user name/password when connecting to servers that require authentication, for example: http://user:password@www.zabbix.com is only possible with cURL support<sup>5</sup>. Punycode is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p>	Float	This item turns unsupported if the resource specified path, host does not exist or is unavailable. host can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.

Find string on a web page.	The matched string, or as specified by the optional output parameter	<p><b>host</b> - hostname or URL (as <code>scheme://host:port/path</code>, where only host is mandatory). Allowed URL schemes: http, https<sup>5</sup>. Missing scheme will be treated as http. If URL is specified <code>path</code> and <code>port</code> must be empty. Specifying user name/password when connecting to servers that require authentication, for example: <code>http://user:password@www.example.com</code> is only possible with cURL support<sup>5</sup>. Punycode is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p> <p><b>regexp</b> - regular expression<sup>4</sup> describing the required pattern</p> <p><b>length</b> - maximum number of characters to return</p> <p><b>output</b> - an optional output formatting template. The <code>\0</code> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match</p>	<p>This item turns unsupported if the resource specified, host does not exist or is unavailable.</p> <p>host can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.</p> <p>Content extraction using the output parameter takes place on the agent.</p> <p>The output parameter is supported from version 2.2.</p> <p>Example: =&gt; <code>web.page.regexp[www.zabbix]</code> =&gt; <code>web.page.regexp[https://www</code></p>
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## Key

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zabbix.stats[<ip>,<port>]

Return a set of Zabbix server or proxy internal metrics remotely.

JSON object

**ip** - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1)  
**port** - port of server/proxy to be remotely queried (default is 10051)

Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' **server/proxy** parameter on the target instance.

A selected set of internal metrics is returned by this item. For details, see [Remote monitoring of Zabbix stats](#).

zabbix.stats[<ip>,<port>,queue,<from>,<to>]

Return number of monitored items in the queue which are delayed on Zabbix server or proxy remotely.

JSON object

**ip** - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1)  
**port** - port of server/proxy to be remotely queried (default is 10051)  
**queue** - constant (to be used as is)  
**from** - delayed by at least (default is 6 seconds)  
**to** - delayed by at most (default is infinity)

Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' **server/proxy** parameter on the target instance.

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## Footnotes

<sup>1</sup>A Linux-specific note. Zabbix agent must have read-only access to filesystem /proc. Kernel patches from [www.grsecurity.org](http://www.grsecurity.org) limit access rights of non-privileged users.

<sup>2</sup> `vfs.dev.read[]`, `vfs.dev.write[]`: Zabbix agent will terminate "stale" device connections if the item values are not accessed for more than 3 hours. This may happen if a system has devices with dynamically changing paths or if a device gets manually removed. Note also that these items, if using an update interval of 3 hours or more, will always return '0'.

<sup>3</sup> `vfs.dev.read[]`, `vfs.dev.write[]`: If default all is used for the first parameter then the key will return summary statistics, including all block devices like sda, sdb and their partitions (sda1, sda2, sdb3...) and multiple devices (MD raid) based on those block devices/partitions and logical volumes (LVM) based on those block devices/partitions. In such cases returned values should



be considered only as relative value (dynamic in time) but not as absolute values.

<sup>4</sup> [Perl Compatible Regular Expression](#) (PCRE) since Zabbix 3.4; POSIX-extended regular expression before that. See also: [Regular expressions supported by location](#).

<sup>5</sup> SSL (HTTPS) is supported only if agent is compiled with cURL support. Otherwise the item will turn unsupported.

#### Encoding settings

To make sure that the acquired data are not corrupted you may specify the correct encoding for processing the check (e.g. 'vfs.file.contents') in the `encoding` parameter. The list of supported encodings (code page identifiers) may be found in documentation for [libiconv](#) (GNU Project) or in Microsoft Windows SDK documentation for "Code Page Identifiers".

If no encoding is specified in the `encoding` parameter the following resolution strategies are applied:

- Standard resolution - UTF-8 is used in Unix/Linux (default in newer distributions); ANSI with a system-specific extension is used in Windows;
- BOM analysis - applicable for items 'vfs.file.contents', 'vfs.file.regexp', 'vfs.file.regmatch'. An attempt is made to determine the correct encoding by using the byte order mark (BOM) at the beginning of the file. If BOM is not present - standard resolution (see above) is applied instead.

#### Troubleshooting agent items

- If used with the passive agent, Timeout value in server configuration may need to be higher than Timeout in the agent configuration file. Otherwise the item may not get any value because the server request to agent timed out first.

#### Windows-specific item keys

#### Item keys

The table provides details on the item keys that you can use with Zabbix Windows agent only.

See also: [Minimum permission level for Windows agent items](#)

Key	Description	Return value	Parameters	Comments
eventlog[name,<regexp>,<severity>,<source>,<eventid>,<maxlines>,<mode>]				

Event log monitoring.	Log	<p><b>name</b> - name of event log</p> <p><b>regex</b> - regular expression describing the required pattern</p> <p><b>severity</b> - regular expression describing severity</p> <p>This parameter accepts the following values:</p> <p>"Information", "Warning", "Error", "Critical", "Verbose"</p> <p>(since Zabbix 2.2.0 running on Windows Vista or newer)</p> <p><b>source</b> - regular expression describing source identifier (regular expression is supported since Zabbix 2.2.0)</p> <p><b>eventid</b> - regular expression describing the event identifier(s)</p> <p><b>maxlines</b> - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in <a href="#">zabbix_agentd.win.conf</a></p> <p><b>mode</b> - possible values:</p> <p>all (default), skip - skip processing of</p>	<p>The item must be configured as an <b>active check</b>.</p> <p>Examples:</p> <p>=&gt; event-log[Application]</p> <p>=&gt; event-log[Security,,"Failure Audit",,"^(529 680)\$]</p> <p>=&gt; event-log[System,,"Warning Error"]</p> <p>=&gt; event-log[System,,,,^1\$]</p> <p>=&gt; event-log[System,,,,@TWOSHORT]</p> <p>- here a <b>custom regular expression</b> named TWOSHORT is referenced (defined as a Result is TRUE type, the expression itself being ^1\$\ ^70\$).</p> <p>Note that the agent is unable to send in events from the "Forwarded events" log.</p> <p>The mode parameter is supported since Zabbix 2.0.0. "Windows Eventing 6.0" is supported since Zabbix 2.2.0.</p> <p>Note that selecting a <b>non-Log type of information</b> for this item will lead to the loss of local timestamp, as well as log severity and source information.</p> <p>See also additional information on</p>
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Key

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net.if.list

Network interface list (includes interface type, status, IPv4 address, description).

Text

Supported since Zabbix agent version 1.8.1. Multi-byte interface names supported since Zabbix agent version 1.8.6. Disabled interfaces are not listed.

Note that enabling/disabling some components may change their ordering in the Windows interface name.

Some Windows versions (for example, Server 2008) might require the latest updates installed to support non-ASCII characters in interface names.

perf\_counter[counter,<interval>]

	Value of any Windows performance counter.	Integer, float, string or text (depending on the request)	<b>counter</b> - path to the counter <b>interval</b> - last N seconds for storing the average value. The <code>interval</code> must be between 1 and 900 seconds (included) and the default value is 1.	Performance Monitor can be used to obtain list of available counters. Until version 1.6 this parameter will return correct value only for counters that require just one sample (like <code>\System\Threads</code> ). It will not work as expected for counters that require more than one sample - like CPU utilization. Since 1.6, <code>interval</code> is used, so the check returns an average value for last "interval" seconds every time.  See also: <a href="#">Windows performance counters</a> .
<code>perf_counter_en[counter,&lt;interval&gt;]</code>	Value of any Windows performance counter in English.	Integer, float, string or text (depending on the request)	<b>counter</b> - path to the counter in English <b>interval</b> - last N seconds for storing the average value. The <code>interval</code> must be between 1 and 900 seconds (included) and the default value is 1.	This item is only supported on <b>Windows Server 2008/Vista</b> and above.  You can find the list of English strings by viewing the following registry key: <code>HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Perf1</code>  Supported since Zabbix agent versions 4.0.13 and 4.2.7.
<code>perf_instance.discovery[object]</code>				

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Key

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	List of object instances of Windows performance counters. Used for <b>low-level discovery</b> .	JSON object	<b>object</b> - object name (localized)	Supported since Zabbix agent version 5.0.1.
perf_instance_en.discovery[object]	List of object instances of Windows performance counters, discovered using object names in English. Used for <b>low-level discovery</b> .	JSON object	<b>object</b> - object name (in English)	Supported since Zabbix agent version 5.0.1.
proc_info[process,<attribute>,<type>]				

Various information about specific process(es).	Float	<p><b>process</b> - process name</p> <p><b>attribute</b> - requested process attribute</p> <p><b>type</b> - representation type (meaningful when more than one process with the same name exists)</p>	<p>The following attributes are supported:</p> <p>vmsize (default) - size of process virtual memory in Kbytes</p> <p>wkset - size of process working set (amount of physical memory used by process) in Kbytes</p> <p>pf - number of page faults</p> <p>ktime - process kernel time in milliseconds</p> <p>utime - process user time in milliseconds</p> <p>io_read_b - number of bytes read by process during I/O operations</p> <p>io_read_op - number of read operation performed by process</p> <p>io_write_b - number of bytes written by process during I/O operations</p> <p>io_write_op - number of write operation performed by process</p> <p>io_other_b - number of bytes transferred by process during operations other than read and write operations</p> <p>io_other_op - number of I/O operations performed by process, other than read and write operations</p> <p>gdiobj - number of GDI objects used</p>
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service.discovery	List of Windows services. Used for <b>low-level discovery</b> .	JSON object		Supported since Zabbix agent version 3.0.
service.info[service,<param>]	Information about a service.	<p>Integer - with <b>param</b> as state, startup</p> <p>String - with <b>param</b> as displayname, path, user</p> <p>Text - with <b>param</b> as description</p> <p>Specifically for state:  0 - running,  1 - paused,  2 - start pending,  3 - pause pending,  4 - continue pending,  5 - stop pending,  6 - stopped,  7 - unknown,  255 - no such service</p> <p>Specifically for startup:  0 - automatic,  1 - automatic delayed,  2 - manual,  3 - disabled,  4 - unknown,  5 - automatic trigger start,  6 - automatic delayed trigger start,  7 - manual trigger start</p>	<p><b>service</b> - a real service name or its display name as seen in MMC Services snap-in</p> <p><b>param</b> - state (default), displayname, path, user, startup or description</p>	<p>Examples:  =&gt; service.info[SNMPTRAP] - state of the SNMPTRAP service  =&gt; service.info[SNMP Trap] - state of the same service, but with display name specified  =&gt; service.info[EventLog,startup] - startup type of the EventLog service</p> <p>Items service.info[service,state] and service.info[service] will return the same information.</p> <p>Note that only with <b>param</b> as state this item returns a value for non-existing services (255).</p> <p>This item is supported since Zabbix 3.0.0. It should be used instead of the deprecated service_state[service] item.</p>
services[<type>,<state>,<exclude>]				

Key	Description	Parameters	Options	Examples
	Listing of services.	0 - if empty Text - list of services separated by a newline	<b>type</b> - all (default), automatic, manual or disabled <b>state</b> - all (default), stopped, started, start_pending, stop_pending, running, continue_pending, pause_pending or paused <b>exclude</b> - services to exclude from the result. Excluded services should be listed in double quotes, separated by comma, without spaces.	Examples: => ser- vices[,started] - list of started services => ser- vices[automatic, stopped] - list of stopped services, that should be run => ser- vices[automatic, stopped, "ser- vice1,service2,service3"] - list of stopped services, that should be run, excluding services with names service1, service2 and service3  The exclude parameter is supported since Zabbix 1.8.1.
wmi.get[<namespace>,<query>]	Execute WMI query and return the first selected object.	Integer, float, string or text (depending on the request)	<b>namespace</b> - WMI namespace <b>query</b> - WMI query returning a single object	WMI queries are performed with <a href="#">WQL</a> .  Example: => wmi.get[root\cimv2,select status from Win32_DiskDrive where Name like '%PHYSI- CALDRIVE0%'] - returns the status of the first physical disk  This key is supported since Zabbix 2.2.0.
wmi.getall[<namespace>,<query>]				



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Key

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<p>vm.vmemory.size[&lt;type&gt;]</p>	<p>Execute WMI query and return the whole response.</p> <p>Can be used for <b>low-level discovery</b>.</p>	<p>JSON object</p>	<p><b>namespace</b> - WMI namespace <b>query</b> - WMI query</p>	<p>WMI queries are performed with <a href="#">WQL</a>.</p> <p>Example: =&gt; wmi.getall[root\cimv2,select * from Win32_DiskDrive where Name like '%PHYSICALDRIVE%'] - returns status information of physical disks</p> <p>JSONPath <b>preprocessing</b> can be used to point to more specific values in the returned JSON.</p> <p>This key is supported since Zabbix 4.4.0.</p>
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## Key

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Virtual memory size in bytes or in percentage from total.	Integer - for bytes Float - for percentage	<b>type</b> - possible values: available (available virtual memory), pavailable (available virtual memory, in percent), pused (used virtual memory, in percent), total (total virtual memory, default), used (used virtual memory)	Example: => vm.vmemory.size[pavailable] → available virtual memory, in percentage  Monitoring of virtual memory statistics is based on: * Total virtual memory on Windows (total physical + page file size); * The maximum amount of memory Zabbix agent can commit; * The current committed memory limit for the system or Zabbix agent, whichever is smaller.  This key is supported since Zabbix 3.0.7 and 3.2.3.
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### Monitoring Windows services

This tutorial provides step-by-step instructions for setting up the monitoring of Windows services. It is assumed that Zabbix server and agent are configured and operational.

#### Step 1

Get the service name.

You can get that name by going to MMC Services snap-in and bringing up the properties of the service. In the General tab you should see a field called 'Service name'. The value that follows is the name you will use when setting up an item for monitoring.

For example, if you wanted to monitor the "workstation" service then your service might be: **lanmanworkstation**.

#### Step 2

**Configure an item** for monitoring the service.

The item `service.info[service,<param>]` retrieves the information about a particular service. Depending on the information you need, specify the param option which accepts the following values: displayname, state, path, user, startup or description. The default value is state if param is not specified (`service.info[service]`).

The type of return value depends on chosen param: integer for state and startup; character string for displayname, path and user; text for description.

Example:

- Key: `service.info[lanmanworkstation]`

- Type of information: Numeric (unsigned)
- Show value: select the Windows service state value mapping

Two value maps are available Windows service state and Windows service startup type to map a numerical value to a text representation in the Frontend.

Discovery of Windows services

**Low-level discovery** provides a way to automatically create items, triggers, and graphs for different entities on a computer. Zabbix can automatically start monitoring Windows services on your machine, without the need to know the exact name of a service or create items for each service manually. A filter can be used to generate real items, triggers, and graphs only for services of interest.

Zabbix agent 2

Item keys

The table provides details on the item keys that you can use with Zabbix agent 2 only.

**Note:**

Parameters without angle brackets are mandatory. Parameters marked with angle brackets < > are optional.

Key	Description	Return value	Parameters	Comments
ceph.df.details [connString, <user>, <apikey>]	Cluster's data usage and distribution among pools.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Ceph login credentials.	This item is supported for the <b>Ceph plugin</b> .
ceph.osd.stats [connString, <user>, <apikey>]	Aggregated and per OSD statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Ceph login credentials.	This item is supported for the <b>Ceph plugin</b> .
ceph.osd.discovery [connString, <user>, <apikey>]	List of discovered OSDs. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Ceph login credentials.	This item is supported for the <b>Ceph plugin</b> .
ceph.osd.dump [connString, <user>, <apikey>]	Usage thresholds and statuses of OSDs.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Ceph login credentials.	This item is supported for the <b>Ceph plugin</b> .
ceph.ping [connString, <user>, <apikey>]				

Key

<p>ceph.pool.discovery [connString, &lt;user&gt;, &lt;apikey&gt;]</p>	<p>Tests whether a connection to Ceph can be established.</p>	<p>0 - connection is broken (if there is any error presented including AUTH and configuration issues) 1 - connection is successful.</p>	<p><b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Ceph login credentials.</p>	<p>This item is supported for the <b>Ceph plugin</b>.</p>
<p>ceph.pool.discovery [connString, &lt;user&gt;, &lt;apikey&gt;]</p>	<p>List of discovered pools. Used for <b>low-level discovery</b>.</p>	<p>JSON object</p>	<p><b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Ceph login credentials.</p>	<p>This item is supported for the <b>Ceph plugin</b>.</p>
<p>ceph.status [connString, &lt;user&gt;, &lt;apikey&gt;]</p>	<p>Overall cluster's status.</p>	<p>JSON object</p>	<p><b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Ceph login credentials.</p>	<p>This item is supported for the <b>Ceph plugin</b>.</p>
<p>docker.container_info [&lt;ID&gt;]</p>	<p>Low-level information about a container.</p>	<p>An output of the <b>Container-Inspect</b> API call serialized as JSON</p>	<p><b>ID</b> — ID or name of the container</p>	<p>This item is supported since Zabbix 5.0.0 for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <b>group</b> for sufficient privileges. Otherwise the check will fail.</p>
<p>docker.container_stats [&lt;ID&gt;]</p>	<p>Container resource usage statistics.</p>	<p>An output of the <b>ContainerStats</b> API call serialized as JSON</p>	<p><b>ID</b> — ID or name of the container</p>	<p>This item is supported for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <b>group</b> for sufficient privileges. Otherwise the check will fail.</p>
<p>docker.containers</p>				

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Key

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	A list of containers.	An output of the <a href="#">ContainerList</a> API call serialized as JSON	-	<p>This item is supported for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail.</p>
<code>docker.containers.discovery[&lt;options&gt;]</code>	A list of containers. Used for <a href="#">low-level discovery</a> .	JSON object.	<b>options</b> — specifies whether all or only running containers should be discovered. Supported values: true - return all containers; false - return only running containers (default).	<p>This item is supported for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail.</p>
<code>docker.data_usage</code>	Information about current data usage.	An output of the <a href="#">System-DataUsage</a> API call serialized as JSON	-	<p>This item is supported for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail.</p>
<code>docker.images</code>	A list of images.	An output of the <a href="#">ImageList</a> API call serialized as JSON	-	<p>This item is supported for the Docker plugin.</p> <p>The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail.</p>
<code>docker.images.discovery</code>				

Key

	A list of images. Used for <b>low-level discovery</b> .	JSON object.	-	This item is supported for the Docker plugin.  The Agent2 user ('zabbix') must be added to the 'docker' <b>group</b> for sufficient privileges. Otherwise the check will fail.
docker.info	System information.	An output of the <b>SystemInfo</b> API call serialized as JSON	-	This item is supported for the Docker plugin.  The Agent2 user ('zabbix') must be added to the 'docker' <b>group</b> for sufficient privileges. Otherwise the check will fail.
docker.ping	Test if a Docker daemon is alive or not.	1 - connection is alive  0 - connection is broken	-	This item is supported for the Docker plugin.  The Agent2 user ('zabbix') must be added to the 'docker' <b>group</b> for sufficient privileges. Otherwise the check will fail.
memcached.ping[connString,<user>,<password>]	Test if a connection is alive or not.	1 - connection is alive  0 - connection is broken (if there is any error presented including AUTH and configuration issues)	<b>connString</b> - URI or session name.	This item is supported for the Memcached plugin.
memcached.stats[connString,<user>,<password>,<type>]				

	Gets the output of the STATS command.	JSON - output is serialized as JSON	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Memcached login credentials. <b>type</b> - stat type to be returned: items, sizes, slabs or settings (empty by default, returns general statistics).	This item is supported for the Memcached plugin.
mongodb.collection.stats[connString,<user>,<password>,<database>,collection]	Returns a variety of storage statistics for a given collection.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - MongoDB login credentials. <b>database</b> - database name (default: admin). <b>collection</b> — collection name.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.collections.discovery[connString,<user>,<password>]	Returns a list of discovered collections. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.collections.usage[connString,<user>,<password>]	Returns usage statistics for collections.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.connpool.stats[connString,<user>,<password>]				

	Returns information regarding the open outgoing connections from the current database instance to other members of the sharded cluster or replica set.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.db.stats[connString,<user>,<password>,<database>]	Returns statistics reflecting a given database system state.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials. <b>database</b> - database name (default: admin).	This item is supported for the <b>MongoDB plugin</b> .
mongodb.db.discovery[connString,<user>,<password>]	Returns a list of discovered databases. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.jumbo_chunks.count[connString,<user>,<password>]	Returns count of jumbo chunks.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.oplog.stats[connString,<user>,<password>]	Returns a status of the replica set, using data polled from the oplog.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.ping[connString,<user>,<password>]	Tests if a connection is alive or not.	1 - connection is alive 0 - connection is broken (if there is any error presented including AUTH and configuration issues).	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .



Key

mongodb.rs.config[connString,<user>,<password>]	Returns a current configuration of the replica set.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.rs.status[connString,<user>,<password>]	Returns a replica set status from the point of view of the member where the method is run.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.server.status[connString,<user>,<password>]	Returns database state.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mongodb.sh.discovery[connString,<user>,<password>]	Returns a list of discovered shards present in the cluster.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - MongoDB login credentials.	This item is supported for the <b>MongoDB plugin</b> .
mqtt.get[<broker_url>,topic,<username>,<password>]	Subscribes to a specific topic or topics (with wildcards) of the provided broker and waits for publications.	Depending on topic content.  If wildcards are used, returns topic content as JSON.	<b>broker_url</b> - MQTT broker URL (if empty, localhost with port 1883 is used). <b>topic</b> - MQTT topic (mandatory). Wildcards (+,#) are supported. <b>username,password</b> - authentication credentials (if required)	This item is supported for the <b>MQTT plugin</b> .  The item must be configured as an <b>active check</b> ('Zabbix agent (active)' item type).  For encryption certificates can be used by saving them into a default location (e.g. /etc/ssl/certs/ directory for Ubuntu). For TLS, use the <b>tls://</b> scheme.
mysql.db.discovery[connString, <username>,<password>]				

Key

<p>mysql.db.size[connString, &lt;username&gt;, &lt;password&gt;, dbName]</p>	<p>List of MySQL databases. Used for <b>low-level discovery</b>.</p>	<p>Result of the "show databases" SQL query in LLD JSON format.</p>	<p><b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials.</p>	<p>This item is supported for the MySQL plugin.</p>
<p>mysql.get_status_variables[connString, &lt;username&gt;, &lt;password&gt;]</p>	<p>Database size in bytes.</p>	<p>Result of the "select coalesce(sum(data_length + index_length), 0) as size from information_schema.tables where table_schema=?" SQL query for specific database in bytes.</p>	<p><b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials. <b>dbName</b> - Database name.</p>	<p>This item is supported for the MySQL plugin.</p>
<p>mysql.ping[connString, &lt;username&gt;, &lt;password&gt;]</p>	<p>Values of global status variables.</p>	<p>Result of the "show global status" SQL query in JSON format.</p>	<p><b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials.</p>	<p>This item is supported for the MySQL plugin.</p>
<p>mysql.replication.discovery[connString, &lt;username&gt;, &lt;password&gt;]</p>	<p>List of MySQL replications. Used for <b>low-level discovery</b>.</p>	<p>1 - connection is alive 0 - connection is broken (if there is any error presented including AUTH and configuration issues).</p>	<p><b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials.</p>	<p>This item is supported for the MySQL plugin.</p>
<p>mysql.replication.get_slave_status[connString, &lt;username&gt;, &lt;password&gt;, &lt;masterHost&gt;]</p>	<p>List of MySQL replications. Used for <b>low-level discovery</b>.</p>	<p>Result of the "show slave status" SQL query in LLD JSON format.</p>	<p><b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials.</p>	<p>This item is supported for the MySQL plugin.</p>

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Key

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	Replication status.	Result of the "show slave status" SQL query in JSON format.	<b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials. <b>masterHost</b> - Replication master host name.	This item is supported for the MySQL plugin.
mysql.version[connString, <username>, <password>]	MySQL version.	String with MySQL instance version.	<b>connString</b> - URI or session name. <b>username, password</b> - MySQL login credentials.	This item is supported for the MySQL plugin.
oracle.diskgroups.stats[connString,<user>,<password>,<service>]	ASM disk groups statistics.	JSON object	<b>connString</b> - URI or session name. <b>user, password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.diskgroups.discovery[connString,<user>,<password>,<service>]	List of ASM disk groups. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user, password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.archive.info[connString,<user>,<password>,<service>]	Archive logs statistics.	JSON object	<b>connString</b> - URI or session name. <b>user, password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.cdb.info[connString,<user>,<password>,<service>]				

	CDBs info.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.custom.query[connString,<user>,<password>,<service>, queryName, <args...>]	Result of a custom query.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name. <b>queryName</b> — name of a custom query (must be equal to a name of an sql file without an extension). <b>args...</b> — one or several comma-separated arguments to pass to a query.	This item is supported for the Oracle plugin.
oracle.datafiles.stats[connString,<user>,<password>,<service>]	Data files statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.db.discovery[connString,<user>,<password>,<service>]	List of databases. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.fra.stats[connString,<user>,<password>,<service>]				

	FRA statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.instance.info[connString,<user>,<password>,<service>]	Instance statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.pdb.info[connString,<user>,<password>,<service>]	PDBs info.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.pdb.discovery[connString,<user>,<password>,<service>]	List of PDBs. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.pga.stats[connString,<user>,<password>,<service>]	PGA statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.ping[connString,<user>,<password>,<service>]				

	Tests whether a connection to Oracle can be established.	0 - connection is broken (if there is any error presented including AUTH and configuration issues) 1 - connection is successful.	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.proc.stats[connString,<user>,<password>,<service>]	Processes statistics.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.redolog.info[connString,<user>,<password>,<service>]	Log file information from the control file.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.sga.stats[connString,<user>,<password>,<service>]	SGA statistics.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.sessions.stats[connString,<user>,<password>,<service>,<lockMaxTime>]				

	Sessions statistics.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name. <b>lockMaxTime</b> - maximum session lock duration in seconds to count the session as a prolongedly locked. Default: 600 seconds.	This item is supported for the Oracle plugin.
oracle.sys.metrics[connString,<user>,<password>,<service>,<duration>]	A set of system metric values.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name. <b>duration</b> - capturing interval (in seconds) of system metric values. Possible values: 60 — long duration (default), 15 — short duration.	This item is supported for the Oracle plugin.
oracle.sys.params[connString,<user>,<password>,<service>]	A set of system parameter values.	JSON object	<b>connString</b> - URI or session name. <b>user,</b> <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.ts.stats[connString,<user>,<password>,<service>]				

Key

	Tablespaces statistics.	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.ts.discovery[connString,<user>,<password>,<service>]	List of tablespaces. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name.	This item is supported for the Oracle plugin.
oracle.user.info[connString,<user>,<password>,<username>]	List of tablespaces. Used for <b>low-level discovery</b> .	JSON object	<b>connString</b> - URI or session name. <b>user</b> , <b>password</b> - Oracle login credentials. <b>service</b> - Oracle service name. <b>username</b> - a username, for which the information is needed. Lowercase usernames are not supported. Default: current user.	This item is supported for the Oracle plugin.
pgsql.autovacuum.count[uri,<username>,<password>,<dbName>]	The number of autovacuum workers.	SQL query.	<b>uri</b> - URI or session name. <b>username</b> , <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.archive[uri,<username>,<password>,<dbName>]				



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Key

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Information about archived files.

SQL query in JSON format.

**uri** - URI or session name.  
**username, password** - PostgreSQL credentials.  
**dbName** - Database name.

Returned data are processed by dependent items:  
**pgsql.archive.count\_archived** - the number of WAL files that have been successfully archived.  
**pgsql.archive.failed\_trying** - the number of failed attempts for archiving WAL files.  
**pgsql.archive.count\_files\_to\_archive** - the number of files to archive.  
**pgsql.archive.size\_files\_to\_archive** - the size of files to archive.

This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.

pgsql.bgwriter[uri,<username>,<password>,<dbName>]

Combined number of checkpoints for the database cluster, broken down by checkpoint type.	SQL query in JSON format.	<b>uri</b> - URI or session name. <b>username, password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	Returned data are processed by dependent items: <b>pgsql.bgwriter.buffers_all</b> - the number of buffers allocated. <b>pgsql.bgwriter.buffers_bac</b> -the number of buffers written directly by a backend. <b>pgsql.bgwriter.maxwritten</b> - the number of times the background writer stopped a cleaning scan, because it had written too many buffers. <b>pgsql.bgwriter.buffers_bac</b> -the number of times a backend had to execute its own fsync call instead of the background writer. <b>pgsql.bgwriter.buffers_clea</b> - the number of buffers written by the background writer. <b>pgsql.bgwriter.buffers_che</b> - the number of buffers written during checkpoints. <b>pgsql.bgwriter.checkpoints</b> - the number of scheduled checkpoints that have been performed. <b>pgsql.bgwriter.checkpoints</b> - the number of requested checkpoints that have been performed. <b>pgsql.bgwriter.checkpoint</b> - the total amount of time spent in the portion of checkpoint processing where files are written to disk, in milliseconds.
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Key

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pgsql.cache.hit[uri,<username>,<password>,<dbName>]

PostgreSQL  
buffer cache  
hit rate.

SQL query in  
percentage.

**uri** - URI or  
session name.  
**username,**  
**password** -  
PostgreSQL  
credentials.  
**dbName** -  
Database  
name.

This item is  
supported  
since Zabbix  
5.0.1 for the  
PostgreSQL  
plugin.

pgsql.connections[uri,<username>,<password>,<dbName>]

Connections by JSON object.  
type.

**uri** - URI or session name.  
**username,**  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

Returned data are processed by dependent items:  
**pgsql.connections.active** - the backend is executing a query.  
**pgsql.connections.fastpath** - the backend is executing a fast-path function.  
**pgsql.connections.idle** - the backend is waiting for a new client command.  
**pgsql.connections.idle\_in\_t** - the backend is in a transaction, but is not currently executing a query.  
**pgsql.connections.prepare** - the number of prepared connections.  
**pgsql.connections.total** - the total number of connections.  
**pgsql.connections.total\_pc** - percentage of total connections in respect to 'max\_connections' setting of the PostgreSQL server.  
**pgsql.connections.waiting** - number of connections in a query.  
**pgsql.connections.idle\_in\_t** - the backend is in a transaction, but is not currently executing a query and one of the statements in the transaction caused an error.

This item is supported since Zabbix 5.0.1 for the

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Key

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pgsql.dbstat[uri,<username>,<password>,  
dbName]

Collects statistics per database. Used for <b>low-level discovery</b> .	SQL query in JSON format.	<b>uri</b> - URI or session name. <b>username, password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	Returned data are processed by dependent items: <b>pgsql.dbstat.numbackends</b> - time spent reading data file blocks by backends in this database, in milliseconds. <b>pgsql.dbstat.sum.blk_read</b> - time spent reading data file blocks by backends in this database, in milliseconds. <b>pgsql.dbstat.sum.blk_write</b> - time spent writing data file blocks by backends in this database, in milliseconds. <b>pgsql.dbstat.sum.checksum</b> - the number of data page checksum failures detected (or on a shared object), or NULL if data checksums are not enabled. (PostgreSQL version 12 only) <b>pgsql.dbstat.blks_read.rate</b> - the number of disk blocks read in this database. <b>pgsql.dbstat.deadlocks.rate</b> - the number of deadlocks detected in this database. <b>pgsql.dbstat.blks_hit.rate</b> - the number of times disk blocks were found already in the buffer cache, so that a read was not necessary (this only includes hits in the PostgreSQL Pro buffer cache, not the operating system's file
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Key

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pgsql.dbstat.sum[uri,<username>,<password>,  
<dbName>]

Summarized data for all databases in a cluster.

SQL query in JSON format.

**uri** - URI or session name.  
**username,**  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

Returned data are processed by the dependent items:

**pgsql.dbstat.numbackends**  
- the number of backends currently connected to this database.

**pgsql.dbstat.sum.blk\_read**  
- time spent reading data file blocks by backends in this database, in milliseconds.

**pgsql.dbstat.sum.blk\_write**  
- time spent writing data file blocks by backends in this database, in milliseconds.

**pgsql.dbstat.sum.checksum**  
- the number of data page checksum failures detected (or on a shared object), or NULL if data checksums are not enabled (PostgreSQL version 12 only).

**pgsql.dbstat.sum.xact\_com**  
- the number of transactions in this database that have been committed.

**pgsql.dbstat.sum.conflicts**  
- database statistics about query cancels due to conflict with recovery on standby servers.

**pgsql.dbstat.sum.deadlock**  
- the number of deadlocks detected in this database.

**pgsql.dbstat.sum.blks\_read**  
- the number of disk blocks read in this database.

**pgsql.dbstat.sum.blks\_hit**  
- the number of



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## Key

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pgsql.db.age[uri,<username>,<password>,  
dbName]

Age of the oldest FrozenXID of the database. Used for **low-level discovery**.

SQL query for specific database in transactions.

**uri** - URI or session name.  
**username**,  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.

pgsql.db.bloating\_tables[uri,<username>,<password>,  
<dbName>]

The number of bloating tables per database. Used for **low-level discovery**.

SQL query.

**uri** - URI or session name.  
**username**,  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.

pgsql.db.discovery[uri,<username>,<password>,  
<dbName>]

List of the PostgreSQL databases. Used for **low-level discovery**.

SQL query in the LLD JSON format.

**uri** - URI or session name.  
**username**,  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.

pgsql.db.size[uri,<username>,<password>,  
dbName]

Database size in bytes. Used for **low-level discovery**.

SQL query for specific database in bytes.

**uri** - URI or session name.  
**username**,  
**password** - PostgreSQL credentials.  
**dbName** - Database name.

This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.

pgsql.locks[uri,<username>,<password>,  
<dbName>]

	<p>Information about granted locks per database. Used for <b>low-level discovery</b>.</p>	<p>SQL query in JSON format.</p>	<p><b>uri</b> - URI or session name.  <b>username, password</b> - PostgreSQL credentials.  <b>dbName</b> - Database name.</p>	<p>Returned data are processed by dependent items:</p> <ul style="list-style-type: none"> <li><b>pgsql.locks.shareupdateexcl</b> - the number of share update exclusive locks.</li> <li><b>pgsql.locks.accessesexclusive</b> - the number of access exclusive locks.</li> <li><b>pgsql.locks.accessshare["#DBN</b> - the number of access share locks.</li> <li><b>pgsql.locks.exclusive["#DBN</b> - the number of exclusive locks.</li> <li><b>pgsql.locks.rowexclusive["#DBN</b> - the number of row exclusive locks.</li> <li><b>pgsql.locks.rowshare["#DBN</b> - the number of row share locks.</li> <li><b>pgsql.locks.share["#DBN</b> - the number of shared locks.</li> <li><b>pgsql.locks.sharerowexclu</b> - the number of share row exclusive locks.</li> </ul> <p>This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.</p>
<p>pgsql.oldest.xid[uri,&lt;username&gt;,&lt;password&gt;,&lt;dbName&gt;]</p>	<p>Age of the oldest XID.</p>	<p>SQL query.</p>	<p><b>uri</b> - URI or session name.  <b>username, password</b> - PostgreSQL credentials.  <b>dbName</b> - Database name.</p>	<p>This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.</p>
<p>pgsql.ping[uri,&lt;username&gt;,&lt;password&gt;,&lt;dbName&gt;]</p>				

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Key

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	Tests whether a connection is alive or not.	1 - connection is alive  0 - connection is broken (if there is any error presented including AUTH and configuration issues).	<b>uri</b> - URI or session name. <b>username,</b> <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.replication.count[uri,<username>,<password>,<dbName>]	The number of standby servers.	SQL query.	<b>uri</b> - URI or session name. <b>username,</b> <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.replication.recovery_role[uri,<username>,<password>,<dbName>]	Recovery status.	0 - master mode 1 - recovery is still in progress (standby mode)	<b>uri</b> - URI or session name. <b>username,</b> <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.replication.status[uri,<username>,<password>,<dbName>]	The status of replication.	0 - streaming is down 1 - streaming is up 2 - master mode	<b>uri</b> - URI or session name. <b>username,</b> <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.replication_lag.b[uri,<username>,<password>,<dbName>]	Replication lag in bytes.	SQL query in bytes.	<b>uri</b> - URI or session name. <b>username,</b> <b>password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.replication_lag.sec[uri,<username>,<password>,<dbName>]				

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Key

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	Replication lag in seconds.	SQL query in seconds.	<b>uri</b> - URI or session name. <b>username, password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.uptime[uri,<username>,<password>,<dbName>]	PostgreSQL uptime in milliseconds.	SQL query in milliseconds.	<b>uri</b> - URI or session name. <b>username, password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
pgsql.wal.stat[uri,<username>,<password>,<dbName>]	WAL statistics.	SQL query in JSON format.	<b>uri</b> - URI or session name. <b>username, password</b> - PostgreSQL credentials. <b>dbName</b> - Database name.	Returned data are processed by dependent items: <b>pgsql.wal.count</b> — the number of WAL files. <b>pgsql.wal.write</b> - the WAL Isn used (in bytes).  This item is supported since Zabbix 5.0.1 for the PostgreSQL plugin.
redis.config[connString,<password>,<pattern>]	Gets the configuration parameters of a Redis instance that match the pattern.	JSON - if a glob-style pattern was used  single value - if a pattern did not contain any wildcard character	<b>connString</b> - URI or session name. <b>password</b> - Redis password. <b>pattern</b> - glob-style pattern (* by default).	This item is supported since Zabbix 4.4.5 for the Redis plugin.
redis.info[connString,<password>,<section>]	Gets the output of the INFO command.	JSON - output is serialized as JSON	<b>connString</b> - URI or session name. <b>password</b> - Redis password. <b>section</b> - <a href="#">section</a> of information (default by default).	This item is supported since Zabbix 4.4.5 for the Redis plugin.

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Key

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redis.ping[connString,<password>]	Test if a connection is alive or not.	1 - connection is alive 0 - connection is broken (if there is any error presented including AUTH and configuration issues)	<b>connString</b> - URI or session name. <b>password</b> - Redis password.	This item is supported since Zabbix 4.4.5 for the Redis plugin.
redis.slowlog.count[connString,<password>]	The number of slow log entries since Redis was started.	Integer	<b>connString</b> - URI or session name. <b>password</b> - Redis password.	This item is supported since Zabbix 4.4.5 for the Redis plugin.
smart.attribute.discovery	Returns a list of S.M.A.R.T. device attributes.	JSON object		The following macros and their values are returned: {#NAME}, {#DISKTYPE}, {#ID}, {#ATTRNAME}, {#THRESH}. HDD, SSD and NVME drive types are supported. Drives can be alone or combined in a RAID. {#NAME} will have an add-on in case of RAID, e.g: {"{#NAME}": "/dev/sda cciss,2"}  This item is supported for the Smart plugin since Zabbix 5.2.5.
smart.disk.discovery				

Returns a list of JSON object  
S.M.A.R.T.  
devices.

The following macros and their values are returned:  
{#NAME},  
{#DISKTYPE},  
{#MODEL},  
{#SN}.  
HDD, SSD and NVME drive types are supported.  
Drives can be alone or combined in a RAID.  
{#NAME} will have an add-on in case of RAID, e.g:  
{"{#NAME}":  
"/dev/sda  
cciss,2"}

This item is supported for the Smart plugin since Zabbix 5.2.5.

smart.disk.get

	Returns all available properties of S.M.A.R.T. devices.	JSON object		HDD, SSD and NVME drive types are supported. Drives can be alone or combined in a RAID. The data includes smartctl version and call arguments, and additional fields: disk_name - holds the name with the required add-ons for RAID discovery, e.g: {"disk_name": "/dev/sda cciss,2"} disk_type - holds the disk type HDD, SSD, or NVME, e.g: {"disk_type": "ssd"}  This item is supported for the Smart plugin since Zabbix 5.2.5.
systemd.unit.get[unit name,<interface>]	Returns all properties of a systemd unit.	JSON object	<b>unit name</b> - unit name (you may want to use the {#UNIT.NAME} macro in item prototype to discover the name) <b>interface</b> - unit interface type, possible values: Unit (default), Service, Socket, Device, Mount, Automount, Swap, Target, Path	This item is supported on Linux platform only.  LoadState, ActiveState and UnitFileState for Unit interface are returned as text and integer: "ActiveState":{"state":  This item is supported since Zabbix 5.2.3.
systemd.unit.info[unit name,<property>,<interface>]				

Systemd unit information.

String

**unit name** - unit name (you may want to use the `{#UNIT.NAME}` macro in item prototype to discover the name)

This item allows to retrieve a specific property from specific type of interface as described in [dbus API](#).

**property** - unit property (e.g. `ActiveState` (default), `LoadState`, `Description`)

This item is supported on Linux platform only.

**interface** - unit interface type (e.g. `Unit` (default), `Socket`, `Service`)

Examples:

```
=> sys-temd.unit.info["{#UNIT.NAME}
- collect active state (active, reloading, inactive, failed, activating, deactivating)
info on discovered systemd units
=> sys-temd.unit.info["{#UNIT.NAME}
- collect load state info on discovered systemd units
=> sys-temd.unit.info[mysqld.service]
- retrieve service technical name (mysqld.service)
=> sys-temd.unit.info[mysqld.service]
- retrieve service description (MySQL Server)
=> sys-temd.unit.info[mysqld.service]
- retrieve the last time the service entered the active state (1562565036283903)
=> sys-temd.unit.info[dbus.socket,NO]
- collect the number of connections from this socket unit
```

`systemd.unit.discovery[<type>]`



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Key

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List of systemd units and their details. Used for **low-level discovery**.

JSON object

**type** - possible values: all, automount, device, mount, path, service (default), socket, swap, target

This item is supported on Linux platform only.

---

## 2 SNMP agent

### Overview

You may want to use SNMP monitoring on devices such as printers, network switches, routers or UPS that usually are SNMP-enabled and on which it would be impractical to attempt setting up complete operating systems and Zabbix agents.

To be able to retrieve data provided by SNMP agents on these devices, Zabbix server must be **initially configured** with SNMP support.

SNMP checks are performed over the UDP protocol only.

Zabbix server and proxy daemons query SNMP devices for multiple values in a single request. This affects all kinds of SNMP items (regular SNMP items, SNMP items with dynamic indexes, and SNMP low-level discovery) and should make SNMP processing much more efficient. See the **bulk processing** section for technical details on how it works internally. Bulk requests can also be disabled for devices that cannot handle them properly using the "Use bulk requests" setting for each interface.

Zabbix server and proxy daemons log lines similar to the following if they receive an incorrect SNMP response:

```
SNMP response from host "gateway" does not contain all of the requested variable bindings
```

While they do not cover all the problematic cases, they are useful for identifying individual SNMP devices for which bulk requests should be disabled.

Zabbix server/proxy will always retry at least one time after an unsuccessful query attempt: either through the SNMP library's retrying mechanism or through the internal **bulk processing** mechanism.

#### **Warning:**

If monitoring SNMPv3 devices, make sure that msgAuthoritativeEngineID (also known as snmpEngineID or "Engine ID") is never shared by two devices. According to [RFC 2571](#) (section 3.1.1.1) it must be unique for each device.

#### **Warning:**

RFC3414 requires the SNMPv3 devices to persist their engineBoots. Some devices do not do that, which results in their SNMP messages being discarded as outdated after being restarted. In such situation, SNMP cache needs to be manually cleared on a server/proxy (by using `-R snmp_cache_reload`) or the server/proxy needs to be restarted.

### Configuring SNMP monitoring

To start monitoring a device through SNMP, the following steps have to be performed:

#### Step 1

Find out the SNMP string (or OID) of the item you want to monitor.

To get a list of SNMP strings, use the **snmpwalk** command (part of [net-snmp](#) software which you should have installed as part of the Zabbix installation) or equivalent tool:

```
shell> snmpwalk -v 2c -c public <host IP> .
```

As '2c' here stands for SNMP version, you may also substitute it with '1', to indicate SNMP Version 1 on the device.

This should give you a list of SNMP strings and their last value. If it doesn't then it is possible that the SNMP 'community' is different from the standard 'public' in which case you will need to find out what it is.

You can then go through the list until you find the string you want to monitor, e.g. if you wanted to monitor the bytes coming in to your switch on port 3 you would use the IF-MIB::ifInOctets.3 string from this line:

```
IF-MIB::ifInOctets.3 = Counter32: 3409739121
```

You may now use the **snmpget** command to find out the numeric OID for 'IF-MIB::ifInOctets.3':

```
shell> snmpget -v 2c -c public -On 10.62.1.22 IF-MIB::ifInOctets.3
```

Note that the last number in the string is the port number you are looking to monitor. See also: [Dynamic indexes](#).

This should give you something like the following:

```
.1.3.6.1.2.1.2.2.1.10.3 = Counter32: 3472126941
```

Again, the last number in the OID is the port number.

**Note:**

3COM seem to use port numbers in the hundreds, e.g. port 1 = port 101, port 3 = port 103, but Cisco use regular numbers, e.g. port 3 = 3.

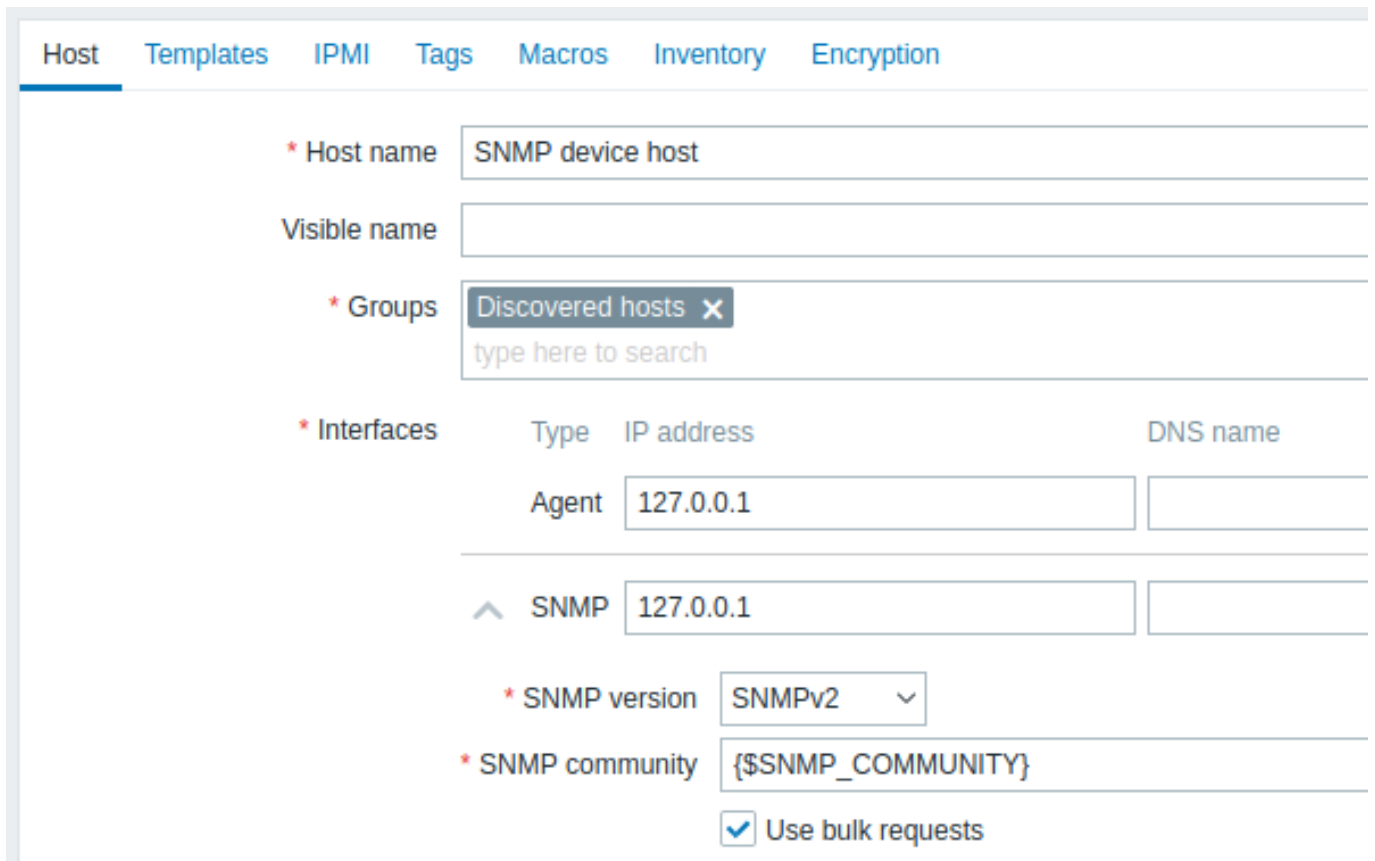
**Note:**

Some of the most used SNMP OIDs are [translated automatically to a numeric representation](#) by Zabbix.

In the last example above value type is "Counter32", which internally corresponds to ASN\_COUNTER type. The full list of supported types is ASN\_COUNTER, ASN\_COUNTER64, ASN\_UINTEGER, ASN\_UNSIGNED64, ASN\_INTEGER, ASN\_INTEGER64, ASN\_FLOAT, ASN\_DOUBLE, ASN\_TIMETICKS, ASN\_GAUGE, ASN\_IPADDRESS, ASN\_OCTET\_STR and ASN\_OBJECT\_ID (since 2.2.8, 2.4.3). These types roughly correspond to "Counter32", "Counter64", "UInteger32", "INTEGER", "Float", "Double", "Timeticks", "Gauge32", "IpAddress", "OCTET STRING", "OBJECT IDENTIFIER" in **snmpget** output, but might also be shown as "STRING", "Hex-STRING", "OID" and other, depending on the presence of a display hint.

Step 2

Create a [host](#) corresponding to a device.



The screenshot shows the Zabbix Host configuration form. The 'Host' tab is selected. The form contains the following fields and options:

- \* Host name:** SNMP device host
- Visible name:** (empty)
- \* Groups:** Discovered hosts (selected), type here to search
- \* Interfaces:** A table with columns 'Type', 'IP address', and 'DNS name'.

Type	IP address	DNS name
Agent	127.0.0.1	
SNMP	127.0.0.1	
- \* SNMP version:** SNMPv2 (dropdown)
- \* SNMP community:** {\$SNMP\_COMMUNITY}
- Use bulk requests

Add an SNMP interface for the host:

- Enter the IP address/DNS name and port number
- Select the SNMP version from the dropdown
- Add interface credentials depending on the selected SNMP version:
  - SNMPv1, v2 require only the community (usually 'public')
  - SNMPv3 requires more specific options (see below)
- Leave the Use bulk requests checkbox marked to allow bulk processing of SNMP requests

SNMPv3 parameter	Description
Context name	Enter context name to identify item on SNMP subnet. Context name is supported for SNMPv3 items since Zabbix 2.2.
Security name	User macros are resolved in this field. Enter security name.
Security level	User macros are resolved in this field. Select security level: <b>noAuthNoPriv</b> - no authentication nor privacy protocols are used <b>AuthNoPriv</b> - authentication protocol is used, privacy protocol is not <b>AuthPriv</b> - both authentication and privacy protocols are used
Authentication protocol	Select authentication protocol - MD5 or SHA.
Authentication passphrase	Enter authentication passphrase. User macros are resolved in this field.
Privacy protocol	Select privacy protocol - DES or AES.
Privacy passphrase	Enter privacy passphrase. User macros are resolved in this field.

In case of wrong SNMPv3 credentials (security name, authentication protocol/passphrase, privacy protocol) Zabbix receives an ERROR from net-snmp, except for wrong Privacy passphrase in which case Zabbix receives a TIMEOUT error from net-snmp.

**Warning:**

Changes in Authentication protocol, Authentication passphrase, Privacy protocol or Privacy passphrase, made without changing the Security name, will take effect only after the cache on a server/proxy is manually cleared (by using `-R snmp_cache_reload`) or the server/proxy is restarted. In cases, where Security name is also changed, all parameters will be updated immediately.

You can use one of the provided SNMP templates (Template SNMP Device and others) that will automatically add a set of items. However, the template may not be compatible with the host. Click on Add to save the host.

Step 3

Create an item for monitoring.

So, now go back to Zabbix and click on Items for the SNMP host you created earlier. Depending on whether you used a template or not when creating your host, you will have either a list of SNMP items associated with your host or just an empty list. We will work on the assumption that you are going to create the item yourself using the information you have just gathered using snmpwalk and snmpget, so click on Create item. In the new item form:

- Enter the item name
- Change the 'Type' field to 'SNMP agent'
- Enter the 'Key' as something meaningful, e.g. SNMP-InOctets-Bps
- Make sure the 'Host interface' field has your switch/router in it
- Enter the textual or numeric OID that you retrieved earlier into the 'SNMP OID' field, for example: .1.3.6.1.2.1.2.1.10.3
- Set the 'Type of information' to Numeric (float)
- Enter an 'Update interval' and 'History storage' period if you want them to be different from the default
- In the Preprocessing tab, add a Change per second step (important, otherwise you will get cumulative values from the SNMP device instead of the latest change). Choose a custom multiplier if you want one.

Item Preprocessing

\* Name

Type

\* Key

\* Host interface

\* SNMP OID

Type of information

Units

\* Update interval

Custom intervals

Type	Interval	Period
Flexible Scheduling	50s	1-7,00:00-24:

[Add](#)

\* History storage period

\* Trend storage period

All mandatory input fields are marked with a red asterisk.

Now save the item and go to Monitoring → Latest data for your SNMP data!

Example 1

General example:

Parameter	Description
<b>OID</b>	1.2.3.45.6.7.8.0 (or .1.2.3.45.6.7.8.0)
<b>Key</b>	<Unique string to be used as reference to triggers> For example, "my_param".

Note that OID can be given in either numeric or string form. However, in some cases, string OID must be converted to numeric representation. Utility `snmpget` may be used for this purpose:

```
shell> snmpget -On localhost public enterprises.ucdavis.memory.memTotalSwap.0
```

Monitoring of SNMP parameters is possible if `--with-net-snmp` flag was specified while configuring Zabbix sources.

Example 2

Monitoring of uptime:

Parameter	Description
<b>OID</b>	MIB::sysUpTime.0
<b>Key</b>	router.uptime
<b>Value type</b>	Float
<b>Units</b>	uptime

Parameter	Description
<b>Multiplier</b>	0.01

## Internal workings of bulk processing

Starting from 2.2.3 Zabbix server and proxy query SNMP devices for multiple values in a single request. This affects several types of SNMP items:

- regular SNMP items
- SNMP items **with dynamic indexes**
- SNMP **low-level discovery rules**

All SNMP items on a single interface with identical parameters are scheduled to be queried at the same time. The first two types of items are taken by pollers in batches of at most 128 items, whereas low-level discovery rules are processed individually, as before.

On the lower level, there are two kinds of operations performed for querying values: getting multiple specified objects and walking an OID tree.

For "getting", a GetRequest-PDU is used with at most 128 variable bindings. For "walking", a GetNextRequest-PDU is used for SNMPv1 and GetBulkRequest with "max-repetitions" field of at most 128 is used for SNMPv2 and SNMPv3.

Thus, the benefits of bulk processing for each SNMP item type are outlined below:

- regular SNMP items benefit from "getting" improvements;
- SNMP items with dynamic indexes benefit from both "getting" and "walking" improvements: "getting" is used for index verification and "walking" for building the cache;
- SNMP low-level discovery rules benefit from "walking" improvements.

However, there is a technical issue that not all devices are capable of returning 128 values per request. Some always return a proper response, but others either respond with a "tooBig(1)" error or do not respond at all once the potential response is over a certain limit.

In order to find an optimal number of objects to query for a given device, Zabbix uses the following strategy. It starts cautiously with querying 1 value in a request. If that is successful, it queries 2 values in a request. If that is successful again, it queries 3 values in a request and continues similarly by multiplying the number of queried objects by 1.5, resulting in the following sequence of request sizes: 1, 2, 3, 4, 6, 9, 13, 19, 28, 42, 63, 94, 128.

However, once a device refuses to give a proper response (for example, for 42 variables), Zabbix does two things.

First, for the current item batch it halves the number of objects in a single request and queries 21 variables. If the device is alive, then the query should work in the vast majority of cases, because 28 variables were known to work and 21 is significantly less than that. However, if that still fails, then Zabbix falls back to querying values one by one. If it still fails at this point, then the device is definitely not responding and request size is not an issue.

The second thing Zabbix does for subsequent item batches is it starts with the last successful number of variables (28 in our example) and continues incrementing request sizes by 1 until the limit is hit. For example, assuming the largest response size is 32 variables, the subsequent requests will be of sizes 29, 30, 31, 32, and 33. The last request will fail and Zabbix will never issue a request of size 33 again. From that point on, Zabbix will query at most 32 variables for this device.

If large queries fail with this number of variables, it can mean one of two things. The exact criteria that a device uses for limiting response size cannot be known, but we try to approximate that using the number of variables. So the first possibility is that this number of variables is around the device's actual response size limit in the general case: sometimes response is less than the limit, sometimes it is greater than that. The second possibility is that a UDP packet in either direction simply got lost. For these reasons, if Zabbix gets a failed query, it reduces the maximum number of variables to try to get deeper into the device's comfortable range, but (starting from 2.2.8) only up to two times.

In the example above, if a query with 32 variables happens to fail, Zabbix will reduce the count to 31. If that happens to fail, too, Zabbix will reduce the count to 30. However, Zabbix will not reduce the count below 30, because it will assume that further failures are due to UDP packets getting lost, rather than the device's limit.

If, however, a device cannot handle bulk requests properly for other reasons and the heuristic described above does not work, since Zabbix 2.4 there is a "Use bulk requests" setting for each interface that allows to disable bulk requests for that device.

## 1 Dynamic indexes

## Overview

While you may find the required index number (for example, of a network interface) among the SNMP OIDs, sometimes you may not completely rely on the index number always staying the same.

Index numbers may be dynamic - they may change over time and your item may stop working as a consequence.

To avoid this scenario, it is possible to define an OID which takes into account the possibility of an index number changing.

For example, if you need to retrieve the index value to append to **ifInOctets** that corresponds to the **GigabitEthernet0/1** interface on a Cisco device, use the following OID:

```
ifInOctets["index","ifDescr","GigabitEthernet0/1"]
```

The syntax

A special syntax for OID is used:

**<OID of data>["index", "<base OID of index>", "<string to search for>"]**

Parameter	Description
OID of data	Main OID to use for data retrieval on the item.
index	Method of processing. Currently one method is supported: <b>index</b> - search for index and append it to the data OID
base OID of index	This OID will be looked up to get the index value corresponding to the string.
string to search for	The string to use for an exact match with a value when doing lookup. Case sensitive.

Example

Getting memory usage of apache process.

If using this OID syntax:

```
HOST-RESOURCES-MIB::hrSWRunPerfMem["index", "HOST-RESOURCES-MIB::hrSWRunPath", "/usr/sbin/apache2"]
```

the index number will be looked up here:

```
...
HOST-RESOURCES-MIB::hrSWRunPath.5376 = STRING: "/sbin/getty"
HOST-RESOURCES-MIB::hrSWRunPath.5377 = STRING: "/sbin/getty"
HOST-RESOURCES-MIB::hrSWRunPath.5388 = STRING: "/usr/sbin/apache2"
HOST-RESOURCES-MIB::hrSWRunPath.5389 = STRING: "/sbin/sshd"
...
```

Now we have the index, 5388. The index will be appended to the data OID in order to receive the value we are interested in:

```
HOST-RESOURCES-MIB::hrSWRunPerfMem.5388 = INTEGER: 31468 KBytes
```

Index lookup caching

When a dynamic index item is requested, Zabbix retrieves and caches whole SNMP table under base OID for index, even if a match would be found sooner. This is done in case another item would refer to the same base OID later - Zabbix would look up index in the cache, instead of querying the monitored host again. Note that each poller process uses separate cache.

In all subsequent value retrieval operations only the found index is verified. If it has not changed, value is requested. If it has changed, cache is rebuilt - each poller that encounters a changed index walks the index SNMP table again.

## 2 Special OIDs

Some of the most used SNMP OIDs are translated automatically to a numeric representation by Zabbix. For example, **ifIndex** is translated to **1.3.6.1.2.1.2.2.1.1**, **ifIndex.0** is translated to **1.3.6.1.2.1.2.2.1.1.0**.

The table contains list of the special OIDs.

Special OID	Identifier	Description
ifIndex	1.3.6.1.2.1.2.2.1.1	A unique value for each interface.

Special OID	Identifier	Description
ifDescr	1.3.6.1.2.1.2.2.1.2	A textual string containing information about the interface. This string should include the name of the manufacturer, the product name and the version of the hardware interface.
ifType	1.3.6.1.2.1.2.2.1.3	The type of interface, distinguished according to the physical/link protocol(s) immediately 'below' the network layer in the protocol stack.
ifMtu	1.3.6.1.2.1.2.2.1.4	The size of the largest datagram which can be sent / received on the interface, specified in octets.
ifSpeed	1.3.6.1.2.1.2.2.1.5	An estimate of the interface's current bandwidth in bits per second.
ifPhysAddress	1.3.6.1.2.1.2.2.1.6	The interface's address at the protocol layer immediately 'below' the network layer in the protocol stack.
ifAdminStatus	1.3.6.1.2.1.2.2.1.7	The current administrative state of the interface.
ifOperStatus	1.3.6.1.2.1.2.2.1.8	The current operational state of the interface.
ifInOctets	1.3.6.1.2.1.2.2.1.10	The total number of octets received on the interface, including framing characters.
ifInUcastPkts	1.3.6.1.2.1.2.2.1.11	The number of subnetwork-unicast packets delivered to a higher-layer protocol.
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12	The number of non-unicast (i.e., subnetwork- broadcast or subnetwork-multicast) packets delivered to a higher-layer protocol.
ifInDiscards	1.3.6.1.2.1.2.2.1.13	The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.
ifInErrors	1.3.6.1.2.1.2.2.1.14	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
ifInUnknownProtos	1.3.6.1.2.1.2.2.1.15	The number of packets received via the interface which were discarded because of an unknown or unsupported protocol.
ifOutOctets	1.3.6.1.2.1.2.2.1.16	The total number of octets transmitted out of the interface, including framing characters.
ifOutUcastPkts	1.3.6.1.2.1.2.2.1.17	The total number of packets that higher-level protocols requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.

Special OID	Identifier	Description
ifOutDiscards	1.3.6.1.2.1.2.2.1.19	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
ifOutErrors	1.3.6.1.2.1.2.2.1.20	The number of outbound packets that could not be transmitted because of errors.
ifOutQLen	1.3.6.1.2.1.2.2.1.21	The length of the output packet queue (in packets).

### 3 MIB files

#### Introduction

MIB stands for a Management Information Base. MIB files allow you to use textual representation of the OID (Object Identifier).

For example,

```
ifHCOutOctets
```

is textual representation of OID

```
1.3.6.1.2.1.31.1.1.1.10
```

You can use either, when monitoring SNMP devices with Zabbix, but if you feel more comfortable when using textual representation you have to install MIB files.

#### Installing MIB files

On Debian-based systems:

```
# apt install snmp-mibs-downloader
# download-mibs
```

On RedHat-based systems:

```
# yum install net-snmp-libs
```

#### Enabling MIB files

On RedHat-based systems the mib files should be enabled by default. On Debian-based systems you have to edit file `/etc/snmp/snmp.conf` and comment out the line that says `mibs` :

```
# As the snmp packages come without MIB files due to license reasons, loading
# of MIBs is disabled by default. If you added the MIBs you can re-enable
# loading them by commenting out the following line.
#mibs :
```

#### Testing MIB files

Testing snmp MIBs can be done using `snmpwalk` utility. If you don't have it installed, use the following instructions.

On Debian-based systems:

```
# apt install snmp
```

On RedHat-based systems:

```
# yum install net-snmp-utils
```

After that, the following command must not give error when you query a network device:

```
$ snmpwalk -v 2c -c public <NETWORK DEVICE IP> ifInOctets
IF-MIB::ifInOctets.1 = Counter32: 176137634
IF-MIB::ifInOctets.2 = Counter32: 0
IF-MIB::ifInOctets.3 = Counter32: 240375057
IF-MIB::ifInOctets.4 = Counter32: 220893420
[...]
```



## Using MIBs in Zabbix

The most important is to keep in mind that Zabbix processes do not get aware of the changes made to MIB files. So after every change you must restart Zabbix server or proxy, e. g.:

```
# service zabbix-server restart
```

After that, the changes made to MIB files are in effect.

## Using custom MIB files

There are standard MIB files coming with every GNU/Linux distribution. But some device vendors provide their own.

Let's say, you would like to use **CISCO-SMI** MIB file. The following instructions will download and install it:

```
# wget ftp://ftp.cisco.com/pub/mibs/v2/CISCO-SMI.my -P /tmp
# mkdir -p /usr/local/share/snmp/mibs
# grep -q '^mibdirs +/usr/local/share/snmp/mibs' /etc/snmp/snmp.conf 2>/dev/null || echo "mibdirs +/usr/local/share/snmp/mibs" >> /etc/snmp/snmp.conf
# cp /tmp/CISCO-SMI.my /usr/local/share/snmp/mibs
```

Now you should be able to use it. Try to translate the name of the object `ciscoProducts` from the MIB file to OID:

```
# snmptranslate -IR -On CISCO-SMI::ciscoProducts
.1.3.6.1.4.1.9.1
```

If you receive errors instead of the OID, ensure all the previous commands did not return any errors.

The object name translation worked, you are ready to use custom MIB file. Note the MIB name prefix (`CISCO-SMI::`) used in the query. You will need this when using command-line tools as well as Zabbix.

Don't forget to restart Zabbix server/proxy before using this MIB file in Zabbix.

### Attention:

Keep in mind that MIB files can have dependencies. That is, one MIB may require another. In order to satisfy these dependencies you have to install all the affected MIB files.

## 3 SNMP traps

### Overview

Receiving SNMP traps is the opposite to querying SNMP-enabled devices.

In this case the information is sent from a SNMP-enabled device and is collected or "trapped" by Zabbix.

Usually traps are sent upon some condition change and the agent connects to the server on port 162 (as opposed to port 161 on the agent side that is used for queries). Using traps may detect some short problems that occur amidst the query interval and may be missed by the query data.

Receiving SNMP traps in Zabbix is designed to work with **snmptrapd** and one of the built-in mechanisms for passing the traps to Zabbix - either a perl script or SNMPTT.

The workflow of receiving a trap:

1. **snmptrapd** receives a trap
2. **snmptrapd** passes the trap to SNMPTT or calls Perl trap receiver
3. SNMPTT or Perl trap receiver parses, formats and writes the trap to a file
4. Zabbix SNMP trapper reads and parses the trap file
5. For each trap Zabbix finds all "SNMP trapper" items with host interfaces matching the received trap address. Note that only the selected "IP" or "DNS" in host interface is used during the matching.
6. For each found item, the trap is compared to regexp in "snmptrap[regexp]". The trap is set as the value of **all** matched items. If no matching item is found and there is an "snmptrap.fallback" item, the trap is set as the value of that.
7. If the trap was not set as the value of any item, Zabbix by default logs the unmatched trap. (This is configured by "Log unmatched SNMP traps" in Administration → General → Other.)

### 1 Configuring SNMP traps

Configuring the following fields in the frontend is specific for this item type:

- Your host must have an SNMP interface

In Configuration → Hosts, in the **Host interface** field set an SNMP interface with the correct IP or DNS address. The address from each received trap is compared to the IP and DNS addresses of all SNMP interfaces to find the corresponding hosts.

- Configure the item

In the **Key** field use one of the SNMP trap keys:

Key	Description	Return value	Comments
snmptrap[regex]	Catches all SNMP traps that match the <b>regular expression</b> specified in <b>regex</b> . If regex is unspecified, catches any trap.	SNMP trap	This item can be set only for SNMP interfaces. This item is supported since Zabbix <b>2.0.0</b> . Note: Starting with Zabbix 2.0.5, user macros and global regular expressions are supported in the parameter of this item key.
snmptrap.fallback	Catches all SNMP traps that were not caught by any of the snmptrap[] items for that interface.	SNMP trap	This item can be set only for SNMP interfaces. This item is supported since Zabbix <b>2.0.0</b> .

**Note:**

Multi-line regex matching is not supported at this time.

Set the **Type of information** to be 'Log' for the timestamps to be parsed. Note that other formats such as 'Numeric' are also acceptable but might require a custom trap handler.

**Note:**

For SNMP trap monitoring to work, it must first be correctly set up.

## 2 Setting up SNMP trap monitoring

### Configuring Zabbix server/proxy

To read the traps, Zabbix server or proxy must be configured to start the SNMP trapper process and point to the trap file that is being written by SNMPTT or a perl trap receiver. To do that, edit the configuration file (**zabbix\_server.conf** or **zabbix\_proxy.conf**):

1. StartSNMPTrapper=1
2. SNMPTTrapperFile=[TRAP FILE]

**Warning:**

If systemd parameter **PrivateTmp** is used, this file is unlikely to work in /tmp.

### Configuring SNMPTT

At first, snmptrapd should be configured to use SNMPTT.

**Note:**

For the best performance, SNMPTT should be configured as a daemon using **snmptthandler-embedded** to pass the traps to it. See instructions for configuring SNMPTT in its homepage:

<http://snmptt.sourceforge.net/docs/snmptt.shtml>

When SNMPTT is configured to receive the traps, configure **snmptt.ini**:

1. enable the use of the Perl module from the NET-SNMP package:  
net\_snmp\_perl\_enable = 1

- log traps to the trap file which will be read by Zabbix:
 

```
log_enable = 1
log_file = [TRAP FILE]
```
- set the date-time format:
 

```
date_time_format = %H:%M:%S %Y/%m/%d = [DATE TIME FORMAT]
```

**Warning:**

The "net-snmp-perl" package has been removed in RHEL/CentOS 8.0-8.2; re-added in RHEL 8.3. For more information, see the [known issues](#).

Now format the traps for Zabbix to recognize them (edit snmptt.conf):

- Each FORMAT statement should start with "ZBXTRAP [address]", where [address] will be compared to IP and DNS addresses of SNMP interfaces on Zabbix. E.g.:
 

```
EVENT coldStart .1.3.6.1.6.3.1.1.5.1 "Status Events" Normal
FORMAT ZBXTRAP $aA Device reinitialized (coldStart)
```
- See more about SNMP trap format below.

**Attention:**

Do not use unknown traps - Zabbix will not be able to recognize them. Unknown traps can be handled by defining a general event in snmptt.conf:
 

```
EVENT general .* "General event" Normal
```

### Configuring Perl trap receiver

Requirements: Perl, Net-SNMP compiled with --enable-embedded-perl (done by default since Net-SNMP 5.4)

Perl trap receiver (look for misc/snmptrap/zabbix\_trap\_receiver.pl) can be used to pass traps to Zabbix server directly from snmptrapd. To configure it:

- add the perl script to snmptrapd configuration file (snmptrapd.conf), e.g.:
 

```
perl do "[FULL PATH TO PERL RECEIVER SCRIPT]";
```
- configure the receiver, e.g.:
 

```
$SNMPTrapperFile = '[TRAP FILE]';
$DateTimeFormat = '[DATE TIME FORMAT]';
```

**Note:**

If script name is not quoted, snmptrapd will refuse to start up with messages, similar to these:  
 Regexp modifiers "/l" and "/a" are mutually exclusive at (eval 2) line 1, at end of line  
 Regexp modifier "/l" may not appear twice at (eval 2) line 1, at end of line

**Warning:**

net-snmp agent does not support AES256 with SNMPv3/USM.

### SNMP trap format

All customized perl trap receivers and SNMPPTT trap configuration must format the trap in the following way: **[timestamp] [the trap, part 1] ZBXTRAP [address] [the trap, part 2]**, where

- [timestamp] - timestamp used for log items
- ZBXTRAP - header that indicates that a new trap starts in this line
- [address] - IP address used to find the host for this trap

Note that "ZBXTRAP" and "[address]" will be cut out from the message during processing. If the trap is formatted otherwise, Zabbix might parse the traps unexpectedly.

Example trap:

```
11:30:15 2011/07/27 .1.3.6.1.6.3.1.1.5.3 Normal "Status Events" localhost - ZBXTRAP 192.168.1.1 Link down on interface 2.
Admin state: 1. Operational state: 2
```

This will result in the following trap for SNMP interface with IP=192.168.1.1:

```
11:30:15 2011/07/27 .1.3.6.1.6.3.1.1.5.3 Normal "Status Events" localhost - Link down on interface 2. Admin state: 1.
```

### 3 System requirements

Large file support

Zabbix has "Large file support" for SNMP trapper files. The maximum file size that Zabbix can read is  $2^{63}$  (8 EiB). Note that the filesystem may impose a lower limit on the file size.

#### Log rotation

Zabbix does not provide any log rotation system - that should be handled by the user. The log rotation should first rename the old file and only later delete it so that no traps are lost:

1. Zabbix opens the trap file at the last known location and goes to step 3
2. Zabbix checks if the currently opened file has been rotated by comparing the inode number to the define trap file's inode number. If there is no opened file, Zabbix resets the last location and goes to step 1.
3. Zabbix reads the data from the currently opened file and sets the new location.
4. The new data are parsed. If this was the rotated file, the file is closed and goes back to step 2.
5. If there was no new data, Zabbix sleeps for 1 second and goes back to step 2.

#### File system

Because of the trap file implementation, Zabbix needs the file system to support inodes to differentiate files (the information is acquired by a `stat()` call).

#### 4 Setup example

This example uses `snmptrapd` + `SNMPTT` to pass traps to Zabbix server. Setup:

1. **zabbix\_server.conf** - configure Zabbix to start SNMP trapper and set the trap file:  
`StartSNMPTrapper=1`  
`SNMPTrapperFile=/tmp/my_zabbix_traps.tmp`
2. **snmptrapd.conf** - add `SNMPTT` as the trap handler:  
`traphandle default snmptt`
3. **snmptt.ini** - enable the use of the Perl module from the `NET-SNMP` package:  
`net_snmp_perl_enable = 1`  
configure output file and time format:  
`log_file = /tmp/my_zabbix_traps.tmp`  
`date_time_format = %H:%M:%S %Y/%m/%d`
4. **snmptt.conf** - define a default trap format:  
`EVENT general .* "General event" Normal`  
`FORMAT ZBXTRAP $aA $ar`
5. Create an SNMP item `TEST`:  
Host's SNMP interface IP: `127.0.0.1`  
Key: `snmptrap["General"]`  
Log time format: `hh:mm:ss yyyy/MM/dd`

This results in:

1. Command used to send a trap:  
`snmptrap -v 1 -c public 127.0.0.1 '.1.3.6.1.6.3.1.1.5.3' '0.0.0.0' 6 33 '55' .1.3.6.1.6.3.1.1.5.3 s "teststring000"`
2. The received trap:  
`15:48:18 2011/07/26 .1.3.6.1.6.3.1.1.5.3.0.33 Normal "General event" localhost - ZBXTRAP 127.0.0.1 127.0.0.1`
3. Value for item `TEST`:  
`15:48:18 2011/07/26 .1.3.6.1.6.3.1.1.5.3.0.33 Normal "General event" localhost - 127.0.0.1`

#### Note:

This simple example uses `SNMPTT` as **traphandle**. For better performance on production systems, use embedded Perl to pass traps from `snmptrapd` to `SNMPTT` or directly to Zabbix.

#### 5 See also

- [Zabbix blog article on SNMP traps](#)
- [CentOS based SNMP trap tutorial on zabbix.org](#)

## 4 IPMI checks

#### Overview

You can monitor the health and availability of Intelligent Platform Management Interface (IPMI) devices in Zabbix. To perform IPMI checks Zabbix server must be initially **configured** with IPMI support.

IPMI is a standardized interface for remote "lights-out" or "out-of-band" management of computer systems. It allows to monitor hardware status directly from the so-called "out-of-band" management cards, independently from the operating system or whether the machine is powered on at all.

Zabbix IPMI monitoring works only for devices having IPMI support (HP iLO, DELL DRAC, IBM RSA, Sun SSP, etc).

Since Zabbix 3.4, a new IPMI manager process has been added to schedule IPMI checks by IPMI pollers. Now a host is always polled by only one IPMI poller at a time, reducing the number of open connections to BMC controllers. With those changes it's safe to increase the number of IPMI pollers without worrying about BMC controller overloading. The IPMI manager process is automatically started when at least one IPMI poller is started.

See also [known issues](#) for IPMI checks.

## Configuration

### Host configuration

A host must be configured to process IPMI checks. An IPMI interface must be added, with the respective IP and port numbers, and IPMI authentication parameters must be defined.

See the [configuration of hosts](#) for more details.

### Server configuration

By default, the Zabbix server is not configured to start any IPMI pollers, thus any added IPMI items won't work. To change this, open the Zabbix server configuration file ([zabbix\\_server.conf](#)) as root and look for the following line:

```
# StartIPMIPollers=0
```

Uncomment it and set poller count to, say, 3, so that it reads:

```
StartIPMIPollers=3
```

Save the file and restart `zabbix_server` afterwards.

### Item configuration

When [configuring an item](#) on a host level:

- Select 'IPMI agent' as the Type
- Enter an item [key](#) that is unique within the host (say, `ipmi.fan.rpm`)
- For Host interface select the relevant IPMI interface (IP and port). Note that an IPMI interface must exist on the host.
- Specify the IPMI sensor (for example 'FAN MOD 1A RPM' on Dell Poweredge) to retrieve the metric from. By default, the sensor ID should be specified. It is also possible to use prefixes before the value:
  - `id:` - to specify sensor ID;
  - `name:` - to specify sensor full name. This can be useful in situations when sensors can only be distinguished by specifying the full name.
- Select the respective type of information ('Numeric (float)' in this case; for discrete sensors - 'Numeric (unsigned)'), units (most likely 'rpm') and any other required item attributes

## Supported checks

The table below describes in-built items that are supported in IPMI agent checks.

Item key	Description	Return value	Comments
▲ ipmi.get	IPMI-sensor related information.	JSON object	This item can be used for the <a href="#">discovery of IPMI sensors</a> . Supported since Zabbix 5.0.0.

## Timeout and session termination

IPMI message timeouts and retry counts are defined in OpenIPMI library. Due to the current design of OpenIPMI, it is not possible to make these values configurable in Zabbix, neither on interface nor item level.

IPMI session inactivity timeout for LAN is 60 +/-3 seconds. Currently it is not possible to implement periodic sending of Activate Session command with OpenIPMI. If there are no IPMI item checks from Zabbix to a particular BMC for more than the session timeout configured in BMC then the next IPMI check after the timeout expires will time out due to individual message timeouts, retries or receive error. After that a new session is opened and a full rescan of the BMC is initiated. If you want to avoid unnecessary rescans of the BMC it is advised to set the IPMI item polling interval below the IPMI session inactivity timeout configured in BMC.

#### Notes on IPMI discrete sensors

To find sensors on a host start Zabbix server with **DebugLevel=4** enabled. Wait a few minutes and find sensor discovery records in Zabbix server logfile:

```
$ grep 'Added sensor' zabbix_server.log
8358:20130318:111122.170 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:7 id:'CATERR' reading_type:
8358:20130318:111122.170 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:15 id:'CPU Therm Trip' read
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'System Event Log' re
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'PhysicalSecurity' re
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'IPMI Watchdog' readi
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'Power Unit Stat' rea
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'P1 Therm Ctrl %' rea
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'P1 Therm Margin' rea
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:13 id:'System Fan 2' readin
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:13 id:'System Fan 3' readin
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'P1 Mem Margin' readi
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'Front Panel Temp' re
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:15 id:'Baseboard Temp' read
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:9 id:'BB +5.0V' reading_typ
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'BB +3.3V STBY' readi
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:9 id:'BB +3.3V' reading_typ
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'BB +1.5V P1 DDR3' re
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'BB +1.1V P1 Vccp' re
8358:20130318:111122.174 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'BB +1.05V PCH' readi
```

To decode IPMI sensor types and states, get a copy of IPMI 2.0 specifications at <http://www.intel.com/content/www/us/en/servers/ipmi/ipmi-specifications.html> (At the time of writing the newest document was <http://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/second-gen-interface-spec-v2.pdf>)

The first parameter to start with is "reading\_type". Use "Table 42-1, Event/Reading Type Code Ranges" from the specifications to decode "reading\_type" code. Most of the sensors in our example have "reading\_type:0x1" which means "threshold" sensor. "Table 42-3, Sensor Type Codes" shows that "type:0x1" means temperature sensor, "type:0x2" - voltage sensor, "type:0x4" - Fan etc. Threshold sensors sometimes are called "analog" sensors as they measure continuous parameters like temperature, voltage, revolutions per minute.

Another example - a sensor with "reading\_type:0x3". "Table 42-1, Event/Reading Type Code Ranges" says that reading type codes 02h-0Ch mean "Generic Discrete" sensor. Discrete sensors have up to 15 possible states (in other words - up to 15 meaningful bits). For example, for sensor 'CATERR' with "type:0x7" the "Table 42-3, Sensor Type Codes" shows that this type means "Processor" and the meaning of individual bits is: 00h (the least significant bit) - IERR, 01h - Thermal Trip etc.

There are few sensors with "reading\_type:0x6f" in our example. For these sensors the "Table 42-1, Event/Reading Type Code Ranges" advises to use "Table 42-3, Sensor Type Codes" for decoding meanings of bits. For example, sensor 'Power Unit Stat' has type "type:0x9" which means "Power Unit". Offset 00h means "PowerOff/Power Down". In other words if the least significant bit is 1, then server is powered off. To test this bit a function **band** with mask 1 can be used. The trigger expression could be like

```
{www.zabbix.com:Power Unit Stat.band(#1,1)}=1
```

to warn about a server power off.

#### Notes on discrete sensor names in OpenIPMI-2.0.16, 2.0.17, 2.0.18 and 2.0.19

Names of discrete sensors in OpenIPMI-2.0.16, 2.0.17 and 2.0.18 often have an additional "0" (or some other digit or letter) appended at the end. For example, while ipmitool and OpenIPMI-2.0.19 display sensor names as "PhysicalSecurity" or "CATERR", in OpenIPMI-2.0.16, 2.0.17 and 2.0.18 the names are "PhysicalSecurity0" or "CATERR0", respectively.

When configuring an IPMI item with Zabbix server using OpenIPMI-2.0.16, 2.0.17 and 2.0.18, use these names ending with "0" in the IPMI sensor field of IPMI agent items. When your Zabbix server is upgraded to a new Linux distribution, which uses OpenIPMI-2.0.19 (or later), items with these IPMI discrete sensors will become "NOT SUPPORTED". You have to change their IPMI sensor names (remove the '0' in the end) and wait for some time before they turn "Enabled" again.

Notes on threshold and discrete sensor simultaneous availability

Some IPMI agents provide both a threshold sensor and a discrete sensor under the same name. In Zabbix versions prior to 2.2.8 and 2.4.3, the first provided sensor was chosen. Since versions 2.2.8 and 2.4.3, preference is always given to the threshold sensor.

Notes on connection termination

If IPMI checks are not performed (by any reason: all host IPMI items disabled/notsupported, host disabled/deleted, host in maintenance etc.) the IPMI connection will be terminated from Zabbix server or proxy in 3 to 4 hours depending on the time when Zabbix server/proxy was started.

## 5 Simple checks

Overview

Simple checks are normally used for remote agent-less checks of services.

Note that Zabbix agent is not needed for simple checks. Zabbix server/proxy is responsible for the processing of simple checks (making external connections, etc).

Examples of using simple checks:

```
net.tcp.service[ftp,,155]
net.tcp.service[http]
net.tcp.service.perf[http,,8080]
net.udp.service.perf[ntp]
```

### Note:

User name and Password fields in simple check item configuration are used for VMware monitoring items; ignored otherwise.

Supported simple checks

List of supported simple checks:

See also:

- [VMware monitoring item keys](#)

Key

	Description	Return value	Parameters	Comments
icmpping[<target>,<packets>,<interval>,<size>,<timeout>]	Host accessibility by ICMP ping.	0 - ICMP ping fails 1 - ICMP ping successful	<b>target</b> - host IP or DNS name <b>packets</b> - number of packets <b>interval</b> - time between successive packets in milliseconds <b>size</b> - packet size in bytes <b>timeout</b> - timeout in milliseconds	Example: => icmpping[,4] → if at least one packet of the four is returned, the item will return 1.  See also: table of <a href="#">default values</a> .
icmppingloss[<target>,<packets>,<interval>,<size>,<timeout>]				

Key	Description	Unit	Parameters	Notes
	Percentage of lost packets.	Float.	<b>target</b> - host IP or DNS name <b>packets</b> - number of packets <b>interval</b> - time between successive packets in milliseconds <b>size</b> - packet size in bytes <b>timeout</b> - timeout in milliseconds	See also: table of <b>default values</b> .
icmppingsec[<target>,<packets>,<interval>,<size>,<timeout>,<mode>]	ICMP ping response time (in seconds).	Float.	<b>target</b> - host IP or DNS name <b>packets</b> - number of packets <b>interval</b> - time between successive packets in milliseconds <b>size</b> - packet size in bytes <b>timeout</b> - timeout in milliseconds <b>mode</b> - possible values: min, max, avg (default)	Packets which are lost or timed out are not used in the calculation.  If host is not available (timeout reached), the item will return 0.  If the return value is less than 0.0001 seconds, the value will be set to 0.0001 seconds.  See also: table of <b>default values</b> .
net.tcp.service[service,<ip>,<port>]				



Checks if service is running and accepting TCP connections.

0 - service is down

1 - service is running

**service** - possible values: ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet (see [details](#))

**ip** - IP address or DNS name (by default host IP/DNS is used)

**port** - port number (by default standard service port number is used).

Example:  
=>  
net.tcp.service[ftp,,45]  
→ can be used to test the availability of FTP server on TCP port 45.

Note that with tcp service indicating the port is mandatory. These checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually). Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.service[tcp,<ip>,<port>] for checks like these. https and telnet services are supported since Zabbix 2.0.

net.tcp.service.perf[service,<ip>,<port>]

	Checks performance of TCP service.	Float. 0.000000 - service is down  seconds - the number of seconds spent while connecting to the service	<b>service</b> - possible values: ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet (see <a href="#">details</a> ) <b>ip</b> - IP address or DNS name (by default, host IP/DNS is used) <b>port</b> - port number (by default standard service port number is used).	Example: => net.tcp.service.perf[ssh] → can be used to test the speed of initial response from SSH server.  Note that with tcp service indicating the port is mandatory. Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.service.perf[tcp,<ip>,<port>] for checks like these. https and telnet services are supported since Zabbix 2.0. Called tcp_perf before Zabbix 2.0.
net.udp.service[service,<ip>,<port>]	Checks if service is running and responding to UDP requests.	0 - service is down  1 - service is running	<b>service</b> - possible values: ntp (see <a href="#">details</a> ) <b>ip</b> - IP address or DNS name (by default host IP/DNS is used) <b>port</b> - port number (by default standard service port number is used).	Example: => net.udp.service[ntp,,45] → can be used to test the availability of NTP service on UDP port 45.  This item is supported since Zabbix 3.0, but ntp service was available for net.tcp.service[] item in prior versions.
net.udp.service.perf[service,<ip>,<port>]				

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Key

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Checks performance of UDP service.	Float. 0.000000 - service is down  seconds - the number of seconds spent waiting for response from the service	<b>service</b> - possible values: ntp (see <a href="#">details</a> ) <b>ip</b> - IP address or DNS name (by default, host IP/DNS is used) <b>port</b> - port number (by default standard service port number is used).	Example: => net.udp.service.perf[ntp] → can be used to test response time from NTP service.  This item is supported since Zabbix 3.0, but ntp service was available for net.tcp.service[] item in prior versions.
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### Timeout processing

Zabbix will not process a simple check longer than the Timeout seconds defined in the Zabbix server/proxy configuration file.

### ICMP pings

Zabbix uses external utility **fping** for processing of ICMP pings.

The utility is not part of Zabbix distribution and has to be additionally installed. If the utility is missing, has wrong permissions or its location does not match the location set in the Zabbix server/proxy configuration file ('FpingLocation' parameter), ICMP pings (**icmpping**, **icmppingloss**, **icmppingsec**) will not be processed.

See also: [known issues](#)

**fping** must be executable by the user Zabbix daemons run as and setuid root. Run these commands as user **root** in order to set up correct permissions:

```
shell> chown root:zabbix /usr/sbin/fping
shell> chmod 4710 /usr/sbin/fping
```

After performing the two commands above check ownership of the **fping** executable. In some cases the ownership can be reset by executing the chmod command.

Also check, if user zabbix belongs to group zabbix by running:

```
shell> groups zabbix
```

and if it's not add by issuing:

```
shell> usermod -a -G zabbix zabbix
```

Defaults, limits and description of values for ICMP check parameters:

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Parameter	Unit	Description	Fping's flag	Defaults set by	Allowed limits by Zabbix
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In addition Zabbix uses fping options -i interval ms (do not mix up with the item parameter interval mentioned in the table above, which corresponds to fping option -p) and -S source IP address (or -l in older fping versions). Those options are auto-detected by running checks with different option combinations. Zabbix tries to detect the minimal value in milliseconds that fping allows to use with -i by trying 3 values: 0, 1 and 10. The value that first succeeds is then used for subsequent ICMP checks. This process is done by each **ICMP pinger** process individually.

Auto-detected fping options are invalidated every hour and detected again on the next attempt to perform ICMP check. Set DebugLevel>=4 in order to view details of this process in the server or proxy log file.

#### **Warning:**

Warning: fping defaults can differ depending on platform and version - if in doubt, check fping documentation.

Zabbix writes IP addresses to be checked by any of three icmping\* keys to a temporary file, which is then passed to **fping**. If items have different key parameters, only ones with identical key parameters are written to a single file. All IP addresses written to the single file will be checked by fping in parallel, so Zabbix icmp pinger process will spend fixed amount of time disregarding the number of IP addresses in the file.

## 1 VMware monitoring item keys

### Item keys

The table provides details on the simple checks that can be used to monitor **VMware environments**.

Key	Description	Return value	Parameters	Comments
vmware.cluster.discovery[<url>]	Discovery of VMware clusters.	JSON object	<b>url</b> - VMware service URL	
vmware.cluster.status[<url>, <name>]	VMware cluster status.	Integer: 0 - gray; 1 - green; 2 - yellow; 3 - red	<b>url</b> - VMware service URL <b>name</b> - VMware cluster name	
vmware.datastore.discovery[<url>]	Discovery of VMware datastores.	JSON object	<b>url</b> - VMware service URL	
vmware.datastore.hv.list[<url>,<datastore>]	List of datastore hypervisors.	JSON object	<b>url</b> - VMware service URL <b>datastore</b> - datastore name	
vmware.datastore.read[<url>,<datastore>,<mode>]	Amount of time for a read operation from the datastore (milliseconds).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>datastore</b> - datastore name <b>mode</b> - latency (average value, default), maxlatency (maximum value)	
vmware.datastore.size[<url>,<datastore>,<mode>]	VMware datastore space in bytes or in percentage from total.	Integer - for bytes Float - for percentage	<b>url</b> - VMware service URL <b>datastore</b> - datastore name <b>mode</b> - possible values: total (default), free, pfree (free, percentage), uncommitted	
vmware.datastore.write[<url>,<datastore>,<mode>]				

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Key

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	Amount of time for a write operation to the datastore (milliseconds).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>datastore</b> - datastore name <b>mode</b> - latency (average value, default), maxlatency (maximum value)	
vmware.dc.discovery[<url>]	Discovery of VMware datacenters.	JSON object	<b>url</b> - VMware service URL	
vmware.eventlog[<url>,<mode>]	VMware event log.	Log	<b>url</b> - VMware service URL <b>mode</b> - all (default), skip - skip processing of older data	See also: <a href="#">example of filtering</a> VMware event log records.
vmware.fullname[<url>]	VMware service full name.	String	<b>url</b> - VMware service URL	
vmware.hv.cluster.name[<url>,<uuid>]	VMware hypervisor cluster name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.cpu.usage[<url>,<uuid>]	VMware hypervisor processor usage (Hz).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.cpu.usage.perf[<url>,<uuid>]	VMware hypervisor processor usage as a percentage during the interval.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	Supported since Zabbix 5.2.5
vmware.hv.cpu.utilization[<url>,<uuid>]	VMware hypervisor processor usage as a percentage during the interval, depends on power management or HT.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	Supported since Zabbix 5.2.5
vmware.hv.datacenter.name[<url>,<uuid>]				

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Key

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	VMware hypervisor datacenter name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.datastore.discovery[<url>,<uuid>]	Discovery of VMware hypervisor datastores.	JSON object	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.datastore.list[<url>,<uuid>]	List of VMware hypervisor datastores.	JSON object	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.datastore.multipath[<url>,<uuid>,<datastore>,<partitionid>]	Number of available datastore paths.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>datastore</b> - datastore name <b>partitionid</b> - internal ID of physical device from vmware.hv.datastore.discovery	Supported since Zabbix 5.2.5
vmware.hv.datastore.read[<url>,<uuid>,<datastore>,<mode>]	Average amount of time for a read operation from the datastore (milliseconds).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>datastore</b> - datastore name <b>mode</b> - latency (default)	
vmware.hv.datastore.size[<url>,<uuid>,<datastore>,<mode>]	VMware datastore space in bytes or in percentage from total.	Integer - for bytes Float - for percentage	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>datastore</b> - datastore name <b>mode</b> - possible values: total (default), free, pfree (free, percentage), uncommitted	
vmware.hv.datastore.write[<url>,<uuid>,<datastore>,<mode>]				

	Average amount of time for a write operation to the datastore (milliseconds).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>datastore</b> - datastore name <b>mode</b> - latency (default)
vmware.hv.discovery[<url>]	Discovery of VMware hypervisors.	JSON object	<b>url</b> - VMware service URL
vmware.hv.fullname[<url>,<uuid>]	VMware hypervisor name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.cpu.freq[<url>,<uuid>]	VMware hypervisor processor frequency (Hz).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.cpu.model[<url>,<uuid>]	VMware hypervisor processor model.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.cpu.num[<url>,<uuid>]	Number of processor cores on VMware hypervisor.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.cpu.threads[<url>,<uuid>]	Number of processor threads on VMware hypervisor.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.memory[<url>,<uuid>]	VMware hypervisor total memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.model[<url>,<uuid>]	VMware hypervisor model.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name
vmware.hv.hw.uuid[<url>,<uuid>]	VMware hypervisor BIOS UUID.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name

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Key

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vmware.hv.hw.vendor[<url>,<uuid>]	VMware hypervisor vendor name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.memory.size.ballooned[<url>,<uuid>]	VMware hypervisor ballooned memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.memory.used[<url>,<uuid>]	VMware hypervisor used memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.network.in[<url>,<uuid>,<mode>]	VMware hypervisor network input statistics (bytes per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>mode</b> - bps (default)	
vmware.hv.network.out[<url>,<uuid>,<mode>]	VMware hypervisor network output statistics (bytes per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>mode</b> - bps (default)	
vmware.hv.perfcounter[<url>,<uuid>,<path>,<instance>]	VMware hypervisor performance counter value.	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>path</b> - performance counter path <sup>1</sup> <b>instance</b> - performance counter instance. Use empty instance for aggregate values (default)	
vmware.hv.power[<url>,<uuid>,<max>]	VMware hypervisor power usage (W).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name <b>max</b> - maximum allowed power usage	Supported since Zabbix 5.2.5



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Key

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vmware.hv.sensor.health.state[<url>,<uuid>]	VMware hypervisor health state rollup sensor.	Integer: 0 - gray; 1 - green; 2 - yellow; 3 - red	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.status[<url>,<uuid>]	VMware hypervisor status.	Integer: 0 - gray; 1 - green; 2 - yellow; 3 - red	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	Uses host system overall status property since Zabbix 2.2.16, 3.0.6, 3.2.2
vmware.hv.uptime[<url>,<uuid>]	VMware hypervisor uptime (seconds).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.version[<url>,<uuid>]	VMware hypervisor version.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.hv.vm.num[<url>,<uuid>]	Number of virtual machines on VMware hypervisor.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware hypervisor host name	
vmware.version[<url>]	VMware service version.	String	<b>url</b> - VMware service URL	
vmware.vm.cluster.name[<url>,<uuid>]	VMware virtual machine name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.cpu.latency[<url>,<uuid>]	Percentage of time the virtual machine is unable to run because it is contending for access to the physical CPU(s).	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.cpu.num[<url>,<uuid>]	Number of processors on VMware virtual machine.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.cpu.readiness[<url>,<uuid>,<instance>]				

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Key

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vmware.vm.cpu.ready[<url>,<uuid>]	Percentage of time that the virtual machine was ready, but could not get scheduled to run on the physical CPU.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - CPU instance	Supported since Zabbix 5.2.5
vmware.vm.cpu.swapwait[<url>,<uuid>,<instance>]	Time (in milliseconds) that the virtual machine was ready, but could not get scheduled to run on the physical CPU. CPU ready time is dependent on the number of virtual machines on the host and their CPU loads (%).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.cpu.usage[<url>,<uuid>]	Percentage of CPU time spent waiting for swap-in.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - CPU instance	Supported since Zabbix 5.2.5
vmware.vm.cpu.usage.perf[<url>,<uuid>]	VMware virtual machine processor usage (Hz).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.datacenter.name[<url>,<uuid>]	VMware virtual machine processor usage as a percentage during the interval.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.discovery[<url>]	VMware virtual machine datacenter name.	String	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.guest.memory.size.swapped[<url>,<uuid>]	Discovery of VMware virtual machines.	JSON object	<b>url</b> - VMware service URL	

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Key

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vmware.vm.guest.osuptime[<url>,<uuid>]	Amount of guest physical memory that is swapped out to the swap space (KB).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.hv.name[<url>,<uuid>]	Total time elapsed since the last operating system boot-up (in seconds).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.memory.size[<url>,<uuid>]	VMware virtual machine total memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.ballooned[<url>,<uuid>]	VMware virtual machine ballooned memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.compressed[<url>,<uuid>]	VMware virtual machine compressed memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.consumed[<url>,<uuid>]	Amount of host physical memory consumed for backing up guest physical memory pages (KB).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.memory.size.private[<url>,<uuid>]	VMware virtual machine private memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.shared[<url>,<uuid>]	VMware virtual machine shared memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.swapped[<url>,<uuid>]				

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Key

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vmware.vm.memory.size.usage.guest[<url>,<uuid>]	VMware virtual machine swapped memory size (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.size.usage.host[<url>,<uuid>]	VMware virtual machine guest memory usage (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.memory.usage[<url>,<uuid>]	VMware virtual machine host memory usage (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.net.if.discovery[<url>,<uuid>]	Percentage of host physical memory that has been consumed.	Float	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	Supported since Zabbix 5.2.5
vmware.vm.net.if.in[<url>,<uuid>,<instance>,<mode>]	Discovery of VMware virtual machine network interfaces.	JSON object	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.net.if.in[<url>,<uuid>,<instance>,<mode>]	VMware virtual machine network interface input statistics (bytes/packets per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - network interface instance <b>mode</b> - bps (default)/pps - bytes/packets per second	
vmware.vm.net.if.out[<url>,<uuid>,<instance>,<mode>]	VMware virtual machine network interface output statistics (bytes/packets per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - network interface instance <b>mode</b> - bps (default)/pps - bytes/packets per second	
vmware.vm.net.if.usage[<url>,<uuid>,<instance>]				

Key

	VMware virtual machine network utilization (combined transmit-rates and receive-rates) during the interval (KBps).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - network interface instance	Supported since Zabbix 5.2.5
vmware.vm.perfcounter[<url>,<uuid>,<path>,<instance>]	VMware virtual machine performance counter value.	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>path</b> - performance counter path <sup>1</sup> <b>instance</b> - performance counter instance. Use empty instance for aggregate values (default)	
vmware.vm.powerstate[<url>,<uuid>]	VMware virtual machine power state.	Integer: 0 - poweredOff; 1 - poweredOn; 2 - suspended	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.storage.committed[<url>,<uuid>]	VMware virtual machine committed storage space (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.storage.readio[<url>,<uuid>,<instance>]	Average number of outstanding read requests to the virtual disk during the collection interval.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance (mandatory)	Supported since Zabbix 5.2.5
vmware.vm.storage.totalreadlatency[<url>,<uuid>,<instance>]	The average time a read from the virtual disk takes (milliseconds).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance (mandatory)	Supported since Zabbix 5.2.5
vmware.vm.storage.totalwritelatency[<url>,<uuid>,<instance>]				

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Key

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	The average time a write to the virtual disk takes (milliseconds).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance (mandatory)	Supported since Zabbix 5.2.5
vmware.vm.storage.uncommitted[<url>,<uuid>]	VMware virtual machine uncommitted storage space (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.storage.unshared[<url>,<uuid>]	VMware virtual machine unshared storage space (bytes).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.storage.writeoio[<url>,<uuid>,<instance>]	Average number of outstanding write requests to the virtual disk during the collection interval.	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance (mandatory)	Supported since Zabbix 5.2.5
vmware.vm.uptime[<url>,<uuid>]	VMware virtual machine uptime (seconds).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.vfs.dev.discovery[<url>,<uuid>]	Discovery of VMware virtual machine disk devices.	JSON object	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	
vmware.vm.vfs.dev.read[<url>,<uuid>,<instance>,<mode>]	VMware virtual machine disk device read statistics (bytes/operations per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance <b>mode</b> - bps (default)/ops - bytes/operations per second	
vmware.vm.vfs.dev.write[<url>,<uuid>,<instance>,<mode>]				

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**Key**

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	VMware virtual machine disk device write statistics (bytes/operations per second).	Integer <sup>2</sup>	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>instance</b> - disk device instance <b>mode</b> - bps (default)/ops - bytes/operations per second	
vmware.vm.vfs.fs.discovery[<url>,<uuid>]	Discovery of VMware virtual machine file systems.	JSON object	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name	VMware Tools must be installed on the guest virtual machine.
vmware.vm.vfs.fs.size[<url>,<uuid>,<fsname>,<mode>]	VMware virtual machine file system statistics (bytes/percentages).	Integer	<b>url</b> - VMware service URL <b>uuid</b> - VMware virtual machine host name <b>fsname</b> - file system name <b>mode</b> - total/free/used/pfree/pused	VMware Tools must be installed on the guest virtual machine.

---

**Footnotes**

<sup>1</sup> The VMware performance counter path has the `group/counter[rollup]` format where:

- `group` - the performance counter group, for example `cpu`
- `counter` - the performance counter name, for example `usagemhz`
- `rollup` - the performance counter rollup type, for example `average`

So the above example would give the following counter path: `cpu/usagemhz[average]`

The performance counter group descriptions, counter names and rollup types can be found in [VMware documentation](#).

<sup>2</sup> The value of these items is obtained from VMware performance counters and the `VMwarePerfFrequency` parameter is used to refresh their data in Zabbix VMware cache:

- `vmware.hv.datastore.read`
- `vmware.hv.datastore.write`
- `vmware.hv.network.in`
- `vmware.hv.network.out`
- `vmware.hv.perfcounter`
- `vmware.vm.cpu.ready`
- `vmware.vm.net.if.in`
- `vmware.vm.net.if.out`
- `vmware.vm.perfcounter`
- `vmware.vm.vfs.dev.read`
- `vmware.vm.vfs.dev.write`

**More info**

See [Virtual machine monitoring](#) for detailed information how to configure Zabbix to monitor VMware environments.

**6 Log file monitoring****Overview**

Zabbix can be used for centralized monitoring and analysis of log files with/without log rotation support.

Notifications can be used to warn users when a log file contains certain strings or string patterns.

To monitor a log file you must have:

- Zabbix agent running on the host
- log monitoring item set up

**Attention:**

The size limit of a monitored log file depends on [large file support](#).

### Configuration

Verify agent parameters

Make sure that in the [agent configuration file](#):

- 'Hostname' parameter matches the host name in the frontend
- Servers in the 'ServerActive' parameter are specified for the processing of active checks

### Item configuration

Configure a log monitoring [item](#).

* Name	<input type="text" value="Log item"/>
Type	<input type="text" value="Zabbix agent (active)"/>
* Key	<input type="text" value="log[/var/log/syslog,error]"/>
Type of information	<input type="text" value="Log"/>
* Update interval	<input type="text" value="30s"/>
* History storage period	<input type="text" value="3600"/>
Log time format	<input type="text" value="ppppddphh:mm:ss"/>

All mandatory input fields are marked with a red asterisk.

Specifically for log monitoring items you enter:

Type  
Key

Select **Zabbix agent (active)** here.

Use one of the following item keys:

**log[] or logrt[]:**

These two item keys allow to monitor logs and filter log entries by the content regexp, if present.

For example: `log[/var/log/syslog,error]`. Make sure that the file has read permissions for the 'zabbix' user otherwise the item status will be set to 'unsupported'.

**log.count[] or logrt.count[]:**

These two item keys allow to return the number of matching lines only.

See supported [Zabbix agent item](#) key section for details on using these item keys and their parameters.

Select:

For log[] or logrt[] items - Log;

For log.count[] or logrt.count[] items - Numeric (unsigned).

If optionally using the output parameter, you may select the appropriate type of information other than Log.

Note that choosing a non-Log type of information will lead to the loss of local timestamp.

Type of information



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Update interval (in sec)	The parameter defines how often Zabbix agent will check for any changes in the log file. Setting it to 1 second will make sure that you get new records as soon as possible.
Log time format	<p>In this field you may optionally specify the pattern for parsing the log line timestamp.</p> <p>If left blank the timestamp will not be parsed.</p> <p>Supported placeholders:</p> <ul style="list-style-type: none"> <li>* <b>y</b>: Year (0001-9999)</li> <li>* <b>M</b>: Month (01-12)</li> <li>* <b>d</b>: Day (01-31)</li> <li>* <b>h</b>: Hour (00-23)</li> <li>* <b>m</b>: Minute (00-59)</li> <li>* <b>s</b>: Second (00-59)</li> </ul> <p>For example, consider the following line from the Zabbix agent log file:</p> <pre>" 23480:20100328:154718.045 Zabbix agent started. Zabbix 1.8.2 (revision 11211)."</pre> <p>It begins with six character positions for PID, followed by date, time, and the rest of the line.</p> <p>Log time format for this line would be "pppppp:yyyyMMdd:hhmmss".</p> <p>Note that "p" and ":" chars are just placeholders and can be anything but "yMdhms".</p>

---

#### Important notes

- The server and agent keep the trace of a monitored log's size and last modification time (for logrt) in two counters. Additionally:
  - \* The agent also internally uses inode numbers (on UNIX/GNU/Linux), file indexes (on Microsoft Windows)
  - \* On UNIX/GNU/Linux systems it is assumed that the file systems where log files are stored report inode numbers
  - \* On Microsoft Windows Zabbix agent determines the file system type the log files reside on and uses:
    - \* On NTFS file systems 64-bit file indexes.
    - \* On ReFS file systems (only from Microsoft Windows Server 2012) 128-bit file IDs.
    - \* On file systems where file indexes change (e.g. FAT32, exFAT) a fall-back algorithm is used to take MD5 sums
  - \* The inode numbers, file indexes and MD5 sums are internally collected by Zabbix agent. They are not transmitted to the server
  - \* Do not modify the last modification time of log files with 'touch' utility, do not copy a log file with 'cp' utility
  - \* If there are several matching log files for 'logrt[]' item and Zabbix agent is following the most recent one
- \* The agent starts reading the log file from the point it stopped the previous time.
- \* The number of bytes already analyzed (the size counter) and last modification time (the time counter) are stored in the server
- \* Whenever the log file becomes smaller than the log size counter known by the agent, the counter is reset to the current size of the log file
- \* If there are several matching files with the same last modification time in the directory, then the agent will process only one of them
- \* Zabbix agent processes new records of a log file once per //Update interval// seconds.
- \* Zabbix agent does not send more than **maxlines** of a log file per second. The limit prevents overloading the server
- \* To find the required string Zabbix will process 10 times more new lines than set in MaxLinesPerSecond. This is done to avoid false matches
- \* Additionally, log and log.count values are always limited to 50% of the agent send buffer size, even if MaxLinesPerSecond is set to 1
- \* In the absence of log items all agent buffer size is used for non-log values. When log values come in then the buffer size is reduced
- \* For log file records longer than 256kB, only the first 256kB are matched against the regular expression
- \* Special note for "\" path separators: if file\_format is "file\\.log", then there should not be a "file" directory
- \* Regular expressions for 'logrt' are supported in filename only, directory regular expression matching is not supported
- \* On UNIX platforms a 'logrt[]' item becomes NOTSUPPORTED if a directory where the log files are expected does not exist
- \* On Microsoft Windows, if a directory does not exist the item will not become NOTSUPPORTED (for example, 'logrt[\\]') because the agent will not be able to read the log files
- \* An absence of log files for 'logrt[]' item does not make it NOTSUPPORTED. Errors of reading log files are reported in the log
- \* Zabbix agent log file can be helpful to find out why a 'log[]' or 'logrt[]' item became NOTSUPPORTED

#### Extracting matching part of regular expression

Sometimes we may want to extract only the interesting value from a target file instead of returning the whole line when a regular expression match is found.

Since Zabbix 2.2.0, log items have the ability to extract desired values from matched lines. This is accomplished by the additional **output** parameter in log and logrt items.

Using the 'output' parameter allows to indicate the subgroup of the match that we may be interested in.

So, for example

```
log[/path/to/the/file,"large result buffer allocation.*Entries: ([0-9]+)",,,\1]
```

should allow returning the entry count as found in the content of:

```
Fr Feb 07 2014 11:07:36.6690 */ Thread Id 1400 (GLEWF) large result
buffer allocation - /Length: 437136/Entries: 5948/Client Ver: >=10/RPC
ID: 41726453/User: AUser/Form: CFG:ServiceLevelAgreement
```

The reason why Zabbix will return only the number is because 'output' here is defined by `\1` referring to the first and only subgroup of interest: **([0-9]+)**

And, with the ability to extract and return a number, the value can be used to define triggers.

Using `maxdelay` parameter

The 'maxdelay' parameter in log items allows ignoring some older lines from log files in order to get the most recent lines analyzed within the 'maxdelay' seconds.

**Warning:**

Specifying 'maxdelay' > 0 may lead to **ignoring important log file records and missed alerts**. Use it carefully at your own risk only when necessary.

By default items for log monitoring follow all new lines appearing in the log files. However, there are applications which in some situations start writing an enormous number of messages in their log files. For example, if a database or a DNS server is unavailable, such applications flood log files with thousands of nearly identical error messages until normal operation is restored. By default, all those messages will be dutifully analyzed and matching lines sent to server as configured in `log` and `logrt` items.

Built-in protection against overload consists of a configurable 'maxlines' parameter (protects server from too many incoming matching log lines) and a `4*maxlines` limit (protects host CPU and I/O from overloading by agent in one check). Still, there are 2 problems with the built-in protection. First, a large number of potentially not-so-informative messages are reported to server and consume space in the database. Second, due to the limited number of lines analyzed per second the agent may lag behind the newest log records for hours. Quite likely, you might prefer to be sooner informed about the current situation in the log files instead of crawling through old records for hours.

The solution to both problems is using the 'maxdelay' parameter. If 'maxdelay' > 0 is specified, during each check the number of processed bytes, the number of remaining bytes and processing time is measured. From these numbers the agent calculates an estimated delay - how many seconds it would take to analyze all remaining records in a log file.

If the delay does not exceed 'maxdelay' then the agent proceeds with analyzing the log file as usual.

If the delay is greater than 'maxdelay' then the agent **ignores a chunk of a log file by "jumping" over it** to a new estimated position so that the remaining lines could be analyzed within 'maxdelay' seconds.

Note that agent does not even read ignored lines into buffer, but calculates an approximate position to jump to in a file.

The fact of skipping log file lines is logged in the agent log file like this:

```
14287:20160602:174344.206 item:"logrt[/home/zabbix32/test[0-9].log",ERROR,,1000,,120.0]"
logfile:"/home/zabbix32/test1.log" skipping 679858 bytes
(from byte 75653115 to byte 76332973) to meet maxdelay
```

The "to byte" number is approximate because after the "jump" the agent adjusts the position in the file to the beginning of a log line which may be further in the file or earlier.

Depending on how the speed of growing compares with the speed of analyzing the log file you may see no "jumps", rare or often "jumps", large or small "jumps", or even a small "jump" in every check. Fluctuations in the system load and network latency also affect the calculation of delay and hence, "jumping" ahead to keep up with the "maxdelay" parameter.

Setting 'maxdelay' < 'update interval' is not recommended (it may result in frequent small "jumps").

Notes on handling 'copytruncate' log file rotation

`logrt` with the `copytruncate` option assumes that different log files have different records (at least their timestamps are different), therefore MD5 sums of initial blocks (up to the first 512 bytes) will be different. Two files with the same MD5 sums of initial blocks means that one of them is the original, another - a copy.

`logrt` with the `copytruncate` option makes effort to correctly process log file copies without reporting duplicates. However, things like producing multiple log file copies with the same timestamp, log file rotation more often than `logrt[]` item update interval, frequent restarting of agent are not recommended. The agent tries to handle all these situations reasonably well, but good results cannot be guaranteed in all circumstances.

Actions if communication fails between agent and server

Each matching line from `log[]` and `logrt[]` item and a result of each `log.count[]` and `logrt.count[]` item check requires a free slot in the designated 50% area in the agent send buffer. The buffer elements are regularly sent to server (or proxy) and the buffer slots are free again.

While there are free slots in the designated log area in the agent send buffer and communication fails between agent and server (or proxy) the log monitoring results are accumulated in the send buffer. This helps to mitigate short communication failures.

During longer communication failures all log slots get occupied and the following actions are taken:

- `log[]` and `logrt[]` item checks are stopped. When communication is restored and free slots in the buffer are available the checks are resumed from the previous position. No matching lines are lost, they are just reported later.
- `log.count[]` and `logrt.count[]` checks are stopped if `maxdelay = 0` (default). Behavior is similar to `log[]` and `logrt[]` items as described above. Note that this can affect `log.count[]` and `logrt.count[]` results: for example, one check counts 100 matching lines in a log file, but as there are no free slots in the buffer the check is stopped. When communication is restored the agent counts the same 100 matching lines and also 70 new matching lines. The agent now sends `count = 170` as if they were found in one check.
- `log.count[]` and `logrt.count[]` checks with `maxdelay > 0`: if there was no "jump" during the check, then behavior is similar to described above. If a "jump" over log file lines took place then the position after "jump" is kept and the counted result is discarded. So, the agent tries to keep up with a growing log file even in case of communication failure.

## 7 Calculated items

### Overview

With calculated items you can create calculations on the basis of other items.

Thus, calculated items are a way of creating virtual data sources. The values will be periodically calculated based on an arithmetical expression. All calculations are done by the Zabbix server - nothing related to calculated items is performed on Zabbix agents or proxies.

The resulting data will be stored in the Zabbix database as for any other item - this means storing both history and trend values for fast graph generation. Calculated items may be used in trigger expressions, referenced by macros or other entities same as any other item type. Comparison to strings is allowed in calculated items.

To use calculated items, choose the item type **Calculated**.

### Configurable fields

The **key** is a unique item identifier (per host). You can create any key name using supported symbols.

Calculation definition should be entered in the **Formula** field. There is virtually no connection between the formula and the key. The key parameters are not used in formula in any way.

The correct syntax of a simple formula is:

```
func(<key>|<hostname:key>,<parameter1>,<parameter2>,...)
```

Where:

ARGUMENT	DEFINITION
<b>func</b>	One of the <b>functions</b> supported in trigger expressions: last, min, max, avg, count, etc
<b>key</b>	The key of another item whose data you want to use. It may be defined as <b>key</b> or <b>hostname:key</b> . Note: Putting the whole key in double quotes ("...") is strongly recommended to avoid incorrect parsing because of spaces or commas within the key. If there are also quoted parameters within the key, those double quotes must be escaped by using the backslash (\). See <b>Example 5</b> below.
<b>parameter(s)</b>	Function parameter(s), if required.

**Note:**

All items that are referenced from the calculated item formula must exist and be collecting data (exceptions in **functions and unsupported items**). Also, if you change the item key of a referenced item, you have to manually update any formulas using that key.

**Attention:**

User macros in the formula will be expanded if used to reference a function parameter or a constant. User macros will NOT be expanded if referencing a function, host name, item key, item key parameter or operator.

A more complex formula may use a combination of functions, operators and brackets. You can use all functions and **operators** supported in trigger expressions. Note that the syntax is slightly different, however logic and operator precedence are exactly the same.

Unlike trigger expressions, Zabbix processes calculated items according to the item update interval, not upon receiving a new value.

**Note:**

If the calculation result is a float value it will be trimmed to an integer if the calculated item type of information is Numeric (unsigned).

A calculated item may become unsupported in several cases:

1. referenced item(s)
  - is not found
  - is disabled
  - belongs to a disabled host
  - is not supported (see exceptions in **functions and unsupported items**, **Expressions with unsupported items and unknown values** and **Operators**)
2. no data to calculate a function
3. division by zero
4. incorrect syntax used

Support for calculated items was introduced in Zabbix 1.8.1.

Starting from Zabbix 3.2 calculated items in some cases may involve unsupported items as described in **functions and unsupported items**, **Expressions with unsupported items and unknown values** and **Operators**.

Usage examples

Example 1

Calculating percentage of free disk space on '/'.

Use of function **last**:

```
100*last("vfs.fs.size[/,free])/last("vfs.fs.size[/,total]")
```

Zabbix will take the latest values for free and total disk spaces and calculate percentage according to the given formula.

Example 2

Calculating a 10-minute average of the number of values processed by Zabbix.

Use of function **avg**:

```
avg("Zabbix Server:zabbix[wcache,values]",600)
```

Note that extensive use of calculated items with long time periods may affect performance of Zabbix server.

Example 3

Calculating total bandwidth on eth0.

Sum of two functions:

```
last("net.if.in[eth0,bytes])+last("net.if.out[eth0,bytes]")
```

Example 4

Calculating percentage of incoming traffic.

More complex expression:

```
100*last("net.if.in[eth0,bytes]"/(last("net.if.in[eth0,bytes]")+last("net.if.out[eth0,bytes]")))
```

#### Example 5

Using aggregated items correctly within a calculated item.

Take note of how double quotes are escaped within the quoted key:

```
last("grpsum[\"video\", \"net.if.out[eth0,bytes]\", \"last\"]") / last("grpsum[\"video\", \"nginx_stat.sh[act
```

## 8 Internal checks

### Overview

Internal checks allow to monitor the internal processes of Zabbix. In other words, you can monitor what goes on with Zabbix server or Zabbix proxy.

Internal checks are calculated:

- on Zabbix server - if the host is monitored by server
- on Zabbix proxy - if the host is monitored by proxy

Internal checks are processed by server or proxy regardless of host maintenance status.

To use this item, choose the **Zabbix internal** item type.

#### Note:

Internal checks are processed by Zabbix pollers.

### Supported checks

- Parameters without angle brackets are constants - for example, 'host' and 'available' in `zabbix[host,<type>,available]`. Use them in the item key as is.
- Values for items and item parameters that are "not supported on proxy" can only be gathered if the host is monitored by server. And vice versa, values "not supported on server" can only be gathered if the host is monitored by proxy.

#### Key

Key	Description	Return value	Comments
▲ zabbix[boottime]	Startup time of Zabbix server or Zabbix proxy process in seconds.	Integer.	
zabbix[history]	Number of values stored in the HISTORY table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! (not supported on proxy)
zabbix[history_log]	Number of values stored in the HISTORY_LOG table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! (not supported on proxy)

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**Key**

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zabbix[history_str]	Number of values stored in the HIS-TORY_STR table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! (not supported on proxy)
zabbix[history_text]	Number of values stored in the HIS-TORY_TEXT table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! (not supported on proxy)
zabbix[history_uint]	Number of values stored in the HIS-TORY_UINT table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! This item is supported since Zabbix 1.8.3. (not supported on proxy)
zabbix[host,,items]	Number of enabled items (supported and not supported) on the host.	Integer.	This item is supported since Zabbix 3.0.0.
zabbix[host,,items_unsupported]	Number of enabled unsupported items on the host.	Integer.	This item is supported since Zabbix 3.0.0.*
zabbix[host,,maintenance]			

Key

	Current maintenance status of a host.	0 - host in normal state, 1 - host in maintenance with data collection, 2 - host in maintenance without data collection.	This item is always processed by Zabbix server regardless of host location (on server or proxy). The proxy will not receive this item with configuration data. The second parameter must be empty and is reserved for future use.
zabbix[host,discovery,interfaces]	Details of all configured interfaces of the host in Zabbix frontend.	JSON object.	This item can be used in <b>low-level discovery</b> . This item is supported since Zabbix 3.4.0. (not supported on proxy)
zabbix[host,<type>,available]	Availability of a particular type of checks on the host. The value of this item corresponds to availability icons in the host list.	0 - not available, 1 - available, 2 - unknown.	Valid <b>types</b> are: agent, snmp, ipmi, jmx  The item value is calculated according to configuration parameters regarding host <b>unreachability/unavailability</b> .  This item is supported since Zabbix 2.0.0.
zabbix[hosts]	Number of monitored hosts.	Integer.	
zabbix[items]			

---

Key

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	Number of enabled items (supported and not supported).	Integer.	
zabbix[items_unsupported]			
	Number of not supported items.	Integer.	
zabbix[java,,<param>]			
	Information about Zabbix Java gateway.	If <param> is ping, "1" is returned. Can be used to check Java gateway availability using nodata() trigger function.	Valid values for <b>param</b> are: ping, version
		If <param> is version, version of Java gateway is returned. Example: "2.0.0".	Second parameter must be empty and is reserved for future use.
zabbix[lld_queue]			
	Count of values enqueued in the low-level discovery processing queue.	Integer.	This item can be used to monitor the low-level discovery processing queue length.
			This item is supported since Zabbix 4.2.0.
zabbix[preprocessing_queue]			
	Count of values enqueued in the preprocessing queue.	Integer.	This item can be used to monitor the preprocessing queue length.
			This item is supported since Zabbix 3.4.0.
zabbix[process,<type>,<mode>,<state>]			



<p>Time a particular Zabbix process or a group of processes (identified by &lt;type&gt; and &lt;mode&gt;) spent in &lt;state&gt; in percentage. It is calculated for the last minute only.</p>	<p>Percentage of time. Float.</p>	<p>Supported <b>types</b> of <b>server</b> <b>processes</b>: alert manager, alert syncer, alerter, configuration syncer, discoverer, escalator, history syncer, house-keeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, lld manager, lld worker, poller, pre-processing manager, preprocess- ing worker, proxy poller, self-monitoring, snmp trapper, task manager, timer, trapper, unreachable poller, vmware collector</p>
<p>If &lt;mode&gt; is Zabbix process number that is not running (for example, with 5 pollers running &lt;mode&gt; is specified to be 6), such an item will turn into unsupported state. Minimum and maximum refers to the usage percentage for a single process. So if in a group of 3 pollers usage percentages per process were 2, 18 and 66, min would return 2 and max would return 66. Processes report what they are doing in shared memory and the self-monitoring process summarizes that data</p>		<p>Supported <b>types</b> of <b>proxy</b> <b>processes</b>: configuration syncer, data sender, discoverer, heartbeat sender, history syncer, house-keeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, poller, pre-processing manager, preprocess- ing worker,</p>

---

Key

---

zabbix[proxy,<name>,<param>]

Information  
about  
Zabbix  
proxy.

Integer.

**name:**  
proxy name

Valid values  
for **param**  
are:  
lastaccess -  
timestamp  
of last heart  
beat  
message  
received  
from proxy  
delay - how  
long  
collected  
values are  
unsent,  
calculated  
as "proxy  
delay"  
(difference  
between the  
current  
proxy time  
and the  
timestamp  
of the oldest  
unsent value  
on proxy) +  
("current  
server time"  
- "proxy  
lastaccess")

Example:  
=> zab-

bix[proxy,"Germany",lastacc

fuzzytime()  
**trigger**  
**function** can  
be used to  
check  
availability  
of proxies.  
This item is  
always  
processed  
by Zabbix  
server  
regardless of  
host location  
(on server or  
proxy).

zabbix[proxy\_history]

Key

	Number of values in the proxy history table waiting to be sent to the server.	Integer.	(not supported on server)
zabbix[queue,<from>,<to>]	Number of monitored items in the queue which are delayed at least by <from> seconds but less than by <to> seconds.	Integer.	<b>from</b> - default: 6 seconds <b>to</b> - default: infinity <b>Time-unit symbols</b> (s,m,h,d,w) are supported for these parameters.
zabbix[rcache,<cache>,<mode>]	Availability statistics of Zabbix configuration cache.	Integer (for size); float (for percentage).	<b>cache:</b> buffer  Valid <b>modes</b> are: total - total size of buffer free - size of free buffer pfree - percentage of free buffer used - size of used buffer pused - percentage of used buffer  pused mode is supported since Zabbix 4.0.0.
zabbix[requiredperformance]	Required performance of Zabbix server or Zabbix proxy, in new values per second expected.	Float.	Approximately correlates with "Required server performance, new values per second" in Reports → <b>System information.</b>
zabbix[stats,<ip>,<port>]			

---

Remote Zabbix server or proxy internal metrics.	JSON object.	<b>ip</b> - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1) <b>port</b> - port of server/proxy to be remotely queried (default is 10051)
		Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' <b>server/proxy</b> parameter on the target instance.
		A selected set of internal metrics is returned by this item. For details, see <b>Remote monitoring of Zabbix stats</b> .
zabbix[stats,<ip>,<port>,queue,<from>,<to>]		Supported since 4.2.0.

	Remote Zabbix server or proxy internal queue metrics (see <code>zabbix[queue,&lt;from&gt;,&lt;to&gt;]</code> ).	JSON object.	<p><b>ip</b> - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1)</p> <p><b>port</b> - port of server/proxy to be remotely queried (default is 10051)</p> <p><b>from</b> - delayed by at least (default is 6 seconds)</p> <p><b>to</b> - delayed by at most (default is infinity)</p> <p>Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' <code>server/proxy</code> parameter on the target instance.</p> <p>Supported since 4.2.0.</p>
<code>zabbix[trends]</code>	Number of values stored in the TRENDS table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! (not supported on proxy)
<code>zabbix[trends_uint]</code>			

---

Key

---

	Number of values stored in the TRENDS_UINT table.	Integer.	Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! This item is supported since Zabbix 1.8.3. (not supported on proxy)
zabbix[triggers]	Number of enabled triggers in Zabbix database, with all items enabled on enabled hosts.	Integer.	(not supported on proxy)
zabbix[uptime]	Uptime of Zabbix server or Zabbix proxy process in seconds.	Integer.	
zabbix[vcache,buffer,<mode>]	Availability statistics of Zabbix value cache.	Integer (for size); float (for percentage).	Valid <b>modes</b> are: total - total size of buffer free - size of free buffer pfree - percentage of free buffer used - size of used buffer pused - percentage of used buffer  (not supported on proxy)
zabbix[vcache,cache,<parameter>]			

Effectiveness  
statistics of  
Zabbix value  
cache.

Integer.

With the  
mode  
parameter:  
0 - normal  
mode,  
1 - low  
memory  
mode

Valid  
**parameter**

values are:  
requests -  
total number  
of requests  
hits -  
number of  
cache hits  
(history  
values taken  
from the  
cache)  
misses -  
number of  
cache  
misses  
(history  
values taken  
from the  
database)  
mode -  
value cache  
operating  
mode

This item is  
supported  
since Zabbix  
2.2.0 and  
the mode  
parameter  
since Zabbix  
3.0.0.  
(not  
supported  
on proxy)

Once the  
low memory  
mode has  
been  
switched on,  
the value  
cache will  
remain in  
this state for  
24 hours,  
even if the  
problem that  
triggered  
this mode is  
resolved  
sooner.

You may use  
this key with  
the Change  
per second  
preprocess-  
ing step in  
order to get  
values per  
second  
statistics.

Key

zabbix[version]	Version of Zabbix server or proxy.		String.	This item is supported since Zabbix 5.0.0.  Example of return value: 5.0.0beta1
zabbix[vmware,buffer,<mode>]	Availability statistics of Zabbix vmware cache.		Integer (for size); float (for percentage).	Valid <b>modes</b> are: total - total size of buffer free - size of free buffer pfree - percentage of free buffer used - size of used buffer pused - percentage of used buffer
zabbix[wcache,<cache>,<mode>]	Statistics and availability of Zabbix write cache. <b>Cache</b> values	<b>Mode</b>		Specifying <cache> is mandatory.
		all (default)	Total number of values processed by Zabbix server or Zabbix proxy, except unsupported items.	Integer. Counter. You may use this key with the Change per second preprocessing step in order to get values per second statistics.
		float	Number of processed float values.	Integer. Counter.
		uint	Number of processed unsigned integer values.	Integer. Counter.
		str	Number of processed character/string values.	Integer. Counter.
		log	Number of processed log values.	Integer. Counter.



---

Key

---

	text	Number of processed text values.	Integer.	Counter.
	not supported	Number of times item processing resulted in item becoming unsupported or keeping that state.	Integer.	Counter.
history	pfree (default)	Percentage of free history buffer.	Float.	History cache is used to store item values. A low number indicates performance problems on the database side.
	free	Size of free history buffer.	Integer.	
	total	Total size of history buffer.	Integer.	
	used	Size of used history buffer.	Integer.	
	puused	Percentage of used history buffer.	Float.	puused mode is supported since Zabbix 4.0.0.
index	pfree (default)	Percentage of free history index buffer.	Float.	History index cache is used to index values stored in history cache. Index cache is supported since Zabbix 3.0.0.
	free	Size of free history index history buffer.	Integer.	
	total	Total size of history index history buffer.	Integer.	
	used	Size of used history index history buffer.	Integer.	

Key					
		used	Percentage of used history index buffer.	Float.	<p>used mode is supported since Zabbix 4.0.0.</p> <p>Trend cache stores aggregate for the current hour for all items that receive data. (not supported on proxy)</p> <p>(not supported on proxy)</p> <p>(not supported on proxy)</p> <p>(not supported on proxy)</p> <p>(not supported on proxy)</p> <p>(not supported on proxy)</p> <p>used mode is supported since Zabbix 4.0.0.</p>
trend		pfree (default)	Percentage of free trend cache.	Float.	
		free	Size of free trend buffer.	Integer.	
		total	Total size of trend buffer.	Integer.	
		used	Size of used trend buffer.	Integer.	
		used	Percentage of used trend buffer.	Float.	

## 9 SSH checks

### Overview

SSH checks are performed as agent-less monitoring. Zabbix agent is not needed for SSH checks.

To perform SSH checks Zabbix server must be initially **configured** with SSH2 support (libssh2 or libssh). See also: [Requirements](#).

#### Attention:

Only libssh is supported starting with RHEL/CentOS 8.

### Configuration

#### Passphrase authentication

SSH checks provide two authentication methods, a user/password pair and key-file based.

If you do not intend to use keys, no additional configuration is required, besides linking libssh2/libssh to Zabbix, if you're building from source.

#### Key file authentication

To use key based authentication for SSH items, certain changes to the server configuration are required.

Open the Zabbix server configuration file ([zabbix\\_server.conf](#)) as root and look for the following line:

```
# SSHKeyLocation=
```

Uncomment it and set full path to a folder where public and private keys will be located:

```
SSHKeyLocation=/home/zabbix/.ssh
```

Save the file and restart `zabbix_server` afterwards.

`/home/zabbix` here is the home directory for the `zabbix` user account and `.ssh` is a directory where by default public and private keys will be generated by a `ssh-keygen` command inside the home directory.

Usually installation packages of `zabbix-server` from different OS distributions create the `zabbix` user account with a home directory in not very well-known places (as for system accounts). For example, for CentOS it's `/var/lib/zabbix`, for Debian it's `/var/run/zabbix`.

Before starting to generate the keys, an approach to reallocate the home directory to a better known place (intuitively expected) could be considered. This will correspond with the `SSHKeyLocation` Zabbix server configuration parameter mentioned above.

These steps can be skipped if `zabbix` account has been added manually according to the [installation section](#) because in this case most likely the home directory is already located at `/home/zabbix`.

To change the setting for the `zabbix` user account all working processes which are using it have to be stopped:

```
# service zabbix-agent stop
# service zabbix-server stop
```

To change the home directory location with an attempt to move it (if it exists) a command should be executed:

```
# usermod -m -d /home/zabbix zabbix
```

It's absolutely possible that a home directory did not exist in the old place (in the CentOS for example), so it should be created at the new place. A safe attempt to do that is:

```
# test -d /home/zabbix || mkdir /home/zabbix
```

To be sure that all is secure, additional commands could be executed to set permissions to the home directory:

```
# chown zabbix:zabbix /home/zabbix
# chmod 700 /home/zabbix
```

Previously stopped processes now can be started again:

```
# service zabbix-agent start
# service zabbix-server start
```

Now steps to generate public and private keys can be performed by a command:

```
# sudo -u zabbix ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/zabbix/.ssh/id_rsa):
Created directory '/home/zabbix/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/zabbix/.ssh/id_rsa.
Your public key has been saved in /home/zabbix/.ssh/id_rsa.pub.
The key fingerprint is:
90:af:e4:c7:e3:f0:2e:5a:8d:ab:48:a2:0c:92:30:b9 zabbix@it0
The key's randomart image is:
+--[ RSA 2048]-----+
|          |
|      .   |
|     o    |
|  .  o    |
|+   . S   |
|. +  o =   |
|E .  * =   |
|=o . . * . |
|... oo.o+  |
+-----+

```

Note: public and private keys (`id_rsa.pub` and `id_rsa` respectively) have been generated by default in the `/home/zabbix/.ssh` directory which corresponds to the Zabbix server `SSHKeyLocation` configuration parameter.

**Attention:**

Key types other than "rsa" may be supported by the `ssh-keygen` tool and SSH servers but they may not be supported by `libssh2`, used by Zabbix.

Shell configuration form

This step should be performed only once for every host that will be monitored by SSH checks.

By using the following command the **public** key file can be installed on a remote host 10.10.10.10 so that then SSH checks can be performed with a root account:

```
# sudo -u zabbix ssh-copy-id root@10.10.10.10
The authenticity of host '10.10.10.10 (10.10.10.10)' can't be established.
RSA key fingerprint is 38:ba:f2:a4:b5:d9:8f:52:00:09:f7:1f:75:cc:0b:46.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.10.10.10' (RSA) to the list of known hosts.
root@10.10.10.10's password:
Now try logging into the machine, with "ssh 'root@10.10.10.10'", and check in:
 .ssh/authorized_keys
to make sure we haven't added extra keys that you weren't expecting.
```

Now it's possible to check the SSH login using the default private key (/home/zabbix/.ssh/id\_rsa) for zabbix user account:

```
# sudo -u zabbix ssh root@10.10.10.10
```

If the login is successful, then the configuration part in the shell is finished and remote SSH session can be closed.

### Item configuration

Actual command(s) to be executed must be placed in the **Executed script** field in the item configuration.

Multiple commands can be executed one after another by placing them on a new line. In this case returned values also will be formatted as multi lined.

The screenshot shows the Zabbix configuration interface for an item named 'SSH test check (without passphrase)'. The configuration is as follows:

- Name:** SSH test check (without passphrase)
- Type:** SSH agent
- Key:** ssh.run[clear] (with a 'Select' button)
- Host interface:** 127.0.0.1:10050
- Authentication method:** Public key
- User name:** root
- Public key file:** id\_rsa.pub
- Private key file:** id\_rsa
- Key passphrase:** (empty)
- Executed script:** service mysql-server status
- Type of information:** Numeric (unsigned)

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for SSH items are:

Parameter	Description	Comments
Type	Select <b>SSH agent</b> here.	

Parameter	Description	Comments
Key	Unique (per host) item key in format <b>ssh.run[&lt;unique short description&gt;,&lt;ip&gt;,&lt;port&gt;,&lt;encoding&gt;]</b>	<unique short description> is required and should be unique for all SSH items per host Default port is 22, not the port specified in the interface to which this item is assigned
Authentication method	One of the "Password" or "Public key"	
User name	User name to authenticate on remote host. Required	
Public key file	File name of public key if Authentication method is "Public key". Required	Example: id_rsa.pub - default public key file name generated by a command <a href="#">ssh-keygen</a>
Private key file	File name of private key if Authentication method is "Public key". Required	Example: id_rsa - default private key file name
Password or Key passphrase	Password to authenticate or Passphrase <b>if</b> it was used for the private key	Leave the Key passphrase field empty if passphrase was not used See also <a href="#">known issues</a> regarding passphrase usage
Executed script	Executed shell command(s) using SSH remote session	Examples: date +%s service mysql-server status ps auxww   grep httpd   wc -l

**Attention:**

libssh2 library may truncate executable scripts to ~32kB.

## 10 Telnet checks

### Overview

Telnet checks are performed as agent-less monitoring. Zabbix agent is not needed for Telnet checks.

### Configurable fields

Actual command(s) to be executed must be placed in the **Executed script** field in the item configuration.

Multiple commands can be executed one after another by placing them on a new line. In this case returned value also will be formatted as multi lined.

Supported characters that the shell prompt can end with:

- \$
- #
- .
- %

**Note:**

A telnet prompt line which ended with one of these characters will be removed from the returned value, but only for the first command in the commands list, i.e. only at a start of the telnet session.

Key	Description	Comments
<b>telnet.run[&lt;unique short description&gt;,&lt;ip&gt;,&lt;port&gt;,&lt;encoding&gt;]</b>	Run a command on a remote device using telnet connection	

**Attention:**

If a telnet check returns a value with non-ASCII characters and in non-UTF8 encoding then the <encoding> parameter of the key should be properly specified. See [encoding of returned values](#) page for more details.

## 11 External checks

### Overview

External check is a check executed by Zabbix server by **running a shell script** or a binary. However, when hosts are monitored by a Zabbix proxy, the external checks are executed by the proxy.

External checks do not require any agent running on a host being monitored.

The syntax of the item key is:

```
script[<parameter1>,<parameter2>,...]
```

Where:

ARGUMENT	DEFINITION
<b>script</b>	Name of a shell script or a binary.
<b>parameter(s)</b>	Optional command line parameters.

If you don't want to pass any parameters to the script you may use:

```
script[] or  
script
```

Zabbix server will look in the directory defined as the location for external scripts (parameter 'ExternalScripts' in [Zabbix server configuration file](#)) and execute the command. The command will be executed as the user Zabbix server runs as, so any access permissions or environment variables should be handled in a wrapper script, if necessary, and permissions on the command should allow that user to execute it. Only commands in the specified directory are available for execution.

**Warning:**

Do not overuse external checks! As each script requires starting a fork process by Zabbix server, running many scripts can decrease Zabbix performance a lot.

### Usage example

Executing the script **check\_oracle.sh** with the first parameters '-h'. The second parameter will be replaced by IP address or DNS name, depending on the selection in the host properties.

```
check_oracle.sh["-h","{HOST.CONN}"]
```

Assuming host is configured to use IP address, Zabbix will execute:

```
check_oracle.sh '-h' '192.168.1.4'
```

### External check result

The return value of the check is standard output together with standard error (the full output with trimmed trailing whitespace is returned since Zabbix 2.0).

**Attention:**

A text (character, log or text type of information) item will not become unsupported in case of standard error output.

In case the requested script is not found or Zabbix server has no permissions to execute it, the item will become unsupported and corresponding error message will be set. In case of a timeout, the item will be marked as unsupported as well, an according error message will be displayed and the forked process for the script will be killed.

## 12 Aggregate checks

### Overview

In aggregate checks Zabbix server collects aggregate information from items by doing direct database queries.

Aggregate checks do not require any agent running on the host being monitored.

### Syntax

The syntax of the aggregate item key is:

```
groupfunc["host group","item key",itemfunc,timeperiod]
```

Supported group functions (groupfunc) are:

Group function	Description
grpavg	Average value
grpmax	Maximum value
grpmin	Minimum value
grpsum	Sum of values

Multiple host groups may be included by inserting a comma-delimited array. Specifying a parent host group will include the parent group and all nested host groups with their items.

All items that are referenced from the aggregate item key must exist and be collecting data. Only enabled items on enabled hosts are included in the calculations.

#### Attention:

The key of the aggregate item must be updated manually, if the item key of a referenced item is changed.

Supported item functions (itemfunc) are:

Item function	Description
avg	Average value
count	Number of values
last	Last value
max	Maximum value
min	Minimum value
sum	Sum of values

The **timeperiod** parameter specifies a time period of latest collected values. **Supported unit symbols** can be used in this parameter for convenience, for example '5m' (minutes) instead of '300' (seconds) or '1d' (day) instead of '86400' (seconds).

#### Warning:

An amount of values (prefixed with #) is not supported in the timeperiod.

Timeperiod is ignored by the server if the third parameter (item function) is last and can thus be omitted:

```
groupfunc["host group","item key",last]
```

#### Note:

If the aggregate results in a float value it will be trimmed to an integer if the aggregated item type of information is Numeric (unsigned).

An aggregate item may become unsupported if:

- none of the referenced items is found (which may happen if the item key is incorrect, none of the items exist or all included groups are incorrect)
- no data to calculate a function

### Usage examples

Examples of keys for aggregate checks:

#### Example 1

Total disk space of host group 'MySQL Servers'.

```
grpsum["MySQL Servers","vfs.fs.size[/,total]",last]
```

#### Example 2

Average processor load of host group 'MySQL Servers'.

```
grpavg["MySQL Servers", "system.cpu.load[,avg1]", last]
```

#### Example 3

5-minute average of the number of queries per second for host group 'MySQL Servers'.

```
grpavg["MySQL Servers", mysql.qps, avg, 5m]
```

#### Example 4

Average CPU load on all hosts in multiple host groups.

```
grpavg[["Servers A", "Servers B", "Servers C"], system.cpu.load, last]
```

## 13 Trapper items

### Overview

Trapper items accept incoming data instead of querying for it.

It is useful for any data you might want to "push" into Zabbix.

To use a trapper item you must:

- have a trapper item set up in Zabbix
- send in the data into Zabbix

### Configuration

#### Item configuration

To configure a trapper item:

- Go to: Configuration → Hosts
- Click on Items in the row of the host
- Click on Create item
- Enter parameters of the item in the form

* Name	<input type="text" value="Trapper item"/>
Type	<input type="text" value="Zabbix trapper"/>
* Key	<input type="text" value="trap"/>
Type of information	<input type="text" value="Text"/>
* History storage period	<input type="text" value="3600"/>
Allowed hosts	<input type="text"/>

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for trapper items are:

Type  
Key

Select **Zabbix trapper** here.

Enter a key that will be used to recognize the item when sending in data.

Type of information

Select the type of information that will correspond the format of data that will be sent in.



---

## Allowed hosts

List of comma delimited IP addresses, optionally in CIDR notation, or hostnames.

If specified, incoming connections will be accepted only from the hosts listed here.

If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and ':::0' will allow any IPv4 or IPv6 address.

'0.0.0.0/0' can be used to allow any IPv4 address.

Note, that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by [RFC4291](#).

Example: Server=127.0.0.1, 192.168.1.0/24, 192.168.3.1-255, 192.168.1-10.1-255, ::1,2001:db8::/32, zabbix.domain

Spaces and **user macros** are allowed in this field since Zabbix 2.2.0.

Host macros: {HOST.HOST}, {HOST.NAME}, {HOST.IP}, {HOST.DNS}, {HOST.CONN} are allowed in this field since Zabbix 4.0.2.

---

### Note:

You may have to wait up to 60 seconds after saving the item until the server picks up the changes from a configuration cache update, before you can send in values.

## Sending in data

In the simplest of cases, we may use **zabbix\_sender** utility to send in some 'test value':

```
zabbix_sender -z <server IP address> -p 10051 -s "New host" -k trap -o "test value"
```

To send in the value we use these keys:

- z - to specify Zabbix server IP address
- p - to specify Zabbix server port number (10051 by default)
- s - to specify the host (make sure to use the 'technical' **host name** here, instead of the 'visible' name)
- k - to specify the key of the item we just defined
- o - to specify the actual value to send

### Attention:

Zabbix trapper process does not expand macros used in the item key in attempt to check corresponding item key existence for targeted host.

## Display

This is the result in Monitoring → Latest data:

HOST	NAME	LAST CHECK	LAST VALUE	CHANGE
▼ <input type="checkbox"/> New host	- other - (2 Items)			
<input type="checkbox"/>	Trapper item	2015-08-11 18:50:53	test value	<a href="#">History</a>

Note that if a single numeric value is sent in, the data graph will show a horizontal line to the left and to the right of the time point of the value.

## 14 JMX monitoring

### Overview

JMX monitoring can be used to monitor JMX counters of a Java application.

JMX monitoring has native support in Zabbix in the form of a Zabbix daemon called "Zabbix Java gateway", introduced since Zabbix 2.0.

To retrieve the value of a particular JMX counter on a host, Zabbix server queries the Zabbix **Java gateway**, which in turn uses the [JMX management API](#) to query the application of interest remotely.

For more details and setup see the [Zabbix Java gateway](#) section.

**Warning:**

Communication between Java gateway and the monitored JMX application should not be firewalled.

#### Enabling remote JMX monitoring for Java application

A Java application does not need any additional software installed, but it needs to be started with the command-line options specified below to have support for remote JMX monitoring.

As a bare minimum, if you just wish to get started by monitoring a simple Java application on a local host with no security enforced, start it with these options:

```
java \  
-Dcom.sun.management.jmxremote \  
-Dcom.sun.management.jmxremote.port=12345 \  
-Dcom.sun.management.jmxremote.authenticate=false \  
-Dcom.sun.management.jmxremote.ssl=false \  
-Dcom.sun.management.jmxremote.registry.ssl=false \  
-jar /usr/share/doc/openjdk-6-jre-headless/demo/jfc/Notepad/Notepad.jar
```

This makes Java listen for incoming JMX connections on port 12345, from local host only, and tells it not to require authentication or SSL.

If you want to allow connections on another interface, set the `-Djava.rmi.server.hostname` parameter to the IP of that interface.

If you wish to be more stringent about security, there are many other Java options available to you. For instance, the next example starts the application with a more versatile set of options and opens it to a wider network, not just local host.

```
java \  
-Djava.rmi.server.hostname=192.168.3.14 \  
-Dcom.sun.management.jmxremote \  
-Dcom.sun.management.jmxremote.port=12345 \  
-Dcom.sun.management.jmxremote.authenticate=true \  
-Dcom.sun.management.jmxremote.password.file=/etc/java-6-openjdk/management/jmxremote.password \  
-Dcom.sun.management.jmxremote.access.file=/etc/java-6-openjdk/management/jmxremote.access \  
-Dcom.sun.management.jmxremote.ssl=true \  
-Dcom.sun.management.jmxremote.registry.ssl=true \  
-Djavax.net.ssl.keyStore=$YOUR_KEY_STORE \  
-Djavax.net.ssl.keyStorePassword=$YOUR_KEY_STORE_PASSWORD \  
-Djavax.net.ssl.trustStore=$YOUR_TRUST_STORE \  
-Djavax.net.ssl.trustStorePassword=$YOUR_TRUST_STORE_PASSWORD \  
-Dcom.sun.management.jmxremote.ssl.need.client.auth=true \  
-jar /usr/share/doc/openjdk-6-jre-headless/demo/jfc/Notepad/Notepad.jar
```

Most (if not all) of these settings can be specified in `/etc/java-6-openjdk/management/management.properties` (or wherever that file is on your system).

Note that if you wish to use SSL, you have to modify `startup.sh` script by adding `-Djavax.net.ssl.*` options to Java gateway, so that it knows where to find key and trust stores.

See [Monitoring and Management Using JMX](#) for a detailed description.

#### Configuring JMX interfaces and items in Zabbix frontend

With Java gateway running, server knowing where to find it and a Java application started with support for remote JMX monitoring, it is time to configure the interfaces and items in Zabbix GUI.

#### Configuring JMX interface

You begin by creating a JMX-type interface on the host of interest.

Host Templates IPMI Tags Macros Inventory Encryption

\* Host name

Visible name

\* Groups

Interfaces	Type	IP address	DNS name	Connect to	Port
Agent		<input type="text" value="127.0.0.1"/>	<input type="text"/>	<input type="button" value="IP"/> <input type="button" value="DNS"/>	<input type="text" value="10050"/>
JMX		<input type="text" value="127.0.0.1"/>	<input type="text"/>	<input type="button" value="IP"/> <input type="button" value="DNS"/>	<input type="text" value="12345"/>

[Add](#)

All mandatory input fields are marked with a red asterisk.

Adding JMX agent item

For each JMX counter you are interested in you add **JMX agent** item attached to that interface.

The key in the screenshot below says `jmx["java.lang:type=Memory", "HeapMemoryUsage.used"]`.

Item Preprocessing

\* Name

Type

\* Key

\* Host interface

\* JMX endpoint

User name

Password

Type of information

Units

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for JMX items are:

Type

Set **JMX agent** here.

---

Key	The <code>jmx[]</code> item key contains two parameters: <b>object name</b> - the object name of an MBean; <b>attribute name</b> - an MBean attribute name with optional composite data field names separated by dots. See below for more detail on JMX item keys. Since Zabbix 3.4, you may discover MBeans and MBean attributes using a <code>jmx.discovery[]</code> <a href="#">low-level discovery</a> item.
JMX endpoint	You may specify a custom JMX endpoint. Make sure that JMX endpoint connection parameters match the JMX interface. This can be achieved by using <code>{HOST.*}</code> macros as done in the default JMX endpoint. This field is supported since 3.4.0. <code>{HOST.*}</code> <a href="#">macros</a> and user macros are supported.
User name	Specify the user name, if you have configured authentication on your Java application. User macros are supported.
Password	Specify the password, if you have configured authentication on your Java application. User macros are supported.

---

If you wish to monitor a Boolean counter that is either "true" or "false", then you specify type of information as "Numeric (unsigned)" and select "Boolean to decimal" preprocessing step in the Preprocessing tab. Server will store Boolean values as 1 or 0, respectively.

#### JMX item keys in more detail

##### Simple attributes

An MBean object name is nothing but a string which you define in your Java application. An attribute name, on the other hand, can be more complex. In case an attribute returns primitive data type (an integer, a string etc.) there is nothing to worry about, the key will look like this:

```
jmx[com.example:Type=Hello,weight]
```

In this example an object name is "com.example:Type=Hello", attribute name is "weight" and probably the returned value type should be "Numeric (float)".

##### Attributes returning composite data

It becomes more complicated when your attribute returns composite data. For example: your attribute name is "apple" and it returns a hash representing its parameters, like "weight", "color" etc. Your key may look like this:

```
jmx[com.example:Type=Hello,apple.weight]
```

This is how an attribute name and a hash key are separated, by using a dot symbol. Same way, if an attribute returns nested composite data the parts are separated by a dot:

```
jmx[com.example:Type=Hello,fruits.apple.weight]
```

##### Attributes returning tabular data

Tabular data attributes consist of one or multiple composite attributes. If such an attribute is specified in the attribute name parameter then this item value will return the complete structure of the attribute in JSON format. The individual element values inside the tabular data attribute can be retrieved using preprocessing.

##### Tabular data attribute example:

```
jmx[com.example:type=Hello,foodinfo]
```

##### Item value:

```
[
  {
    "a": "apple",
    "b": "banana",
    "c": "cherry"
  },
  {
    "a": "potato",
```

```
    "b": "lettuce",
    "c": "onion"
  }
]
```

#### Problem with dots

So far so good. But what if an attribute name or a hash key contains dot symbol? Here is an example:

```
jmx[com.example:Type=Hello,all.fruits.apple.weight]
```

That's a problem. How to tell Zabbix that attribute name is "all.fruits", not just "all"? How to distinguish a dot that is part of the name from the dot that separates an attribute name and hash keys?

Before **2.0.4** Zabbix Java gateway was unable to handle such situations and users were left with UNSUPPORTED items. Since 2.0.4 this is possible, all you need to do is to escape the dots that are part of the name with a backslash:

```
jmx[com.example:Type=Hello,all\.fruits.apple.weight]
```

Same way, if your hash key contains a dot you escape it:

```
jmx[com.example:Type=Hello,all\.fruits.apple.total\.weight]
```

#### Other issues

A backslash character in an attribute name should be escaped:

```
jmx[com.example:type=Hello,c:\\documents]
```

For handling any other special characters in JMX item key, please see the item key format [section](#).

This is actually all there is to it. Happy JMX monitoring!

#### Non-primitive data types

Since Zabbix 4.0.0 it is possible to work with custom MBeans returning non-primitive data types, which override the **toString()** method.

#### Using custom endpoint with JBoss EAP 6.4

Custom endpoints allow working with different transport protocols other than the default RMI.

To illustrate this possibility, let's try to configure JBoss EAP 6.4 monitoring as an example. First, let's make some assumptions:

- You have already installed Zabbix Java gateway. If not, then you can do it in accordance with the [documentation](#).
- Zabbix server and Java gateway are installed with the prefix `/usr/local/`
- JBoss is already installed in `/opt/jboss-eap-6.4/` and is running in standalone mode
- We shall assume that all these components work on the same host
- Firewall and SELinux are disabled (or configured accordingly)

Let's make some simple settings in `zabbix_server.conf`:

```
JavaGateway=127.0.0.1
StartJavaPollers=5
```

And in the `zabbix_java/settings.sh` configuration file (or `zabbix_java_gateway.conf`):

```
START_POLLERS=5
```

Check that JBoss listens to its standard management port:

```
$ netstat -natp | grep 9999
tcp        0      0 127.0.0.1:9999          0.0.0.0:*               LISTEN      10148/java
```

Now let's create a host with JMX interface `127.0.0.1:9999` in Zabbix.

Host Templates IPMI Tags Macros Inventory Encryption

\* Host name

Visible name

\* Groups

Interfaces	Type	IP address	DNS name	Connect to	Port
Agent	<input type="text" value="127.0.0.1"/>	<input type="text"/>	<input type="button" value="IP"/> <input type="button" value="DNS"/>	<input type="text" value="10050"/>	
JMX	<input type="text" value="127.0.0.1"/>	<input type="text"/>	<input type="button" value="IP"/> <input type="button" value="DNS"/>	<input type="text" value="9999"/>	

[Add](#)

As we know that this version of JBoss uses the the JBoss Remoting protocol instead of RMI, we may mass update the JMX endpoint parameter for items in our JMX template accordingly:

```
service:jmx:remoting-jmx://{HOST.CONN}:{HOST.PORT}
```

### Mass update

Item **Preprocessing**

Type  Original

JMX endpoint

Let's update the configuration cache:

```
$ /usr/local/sbin/zabbix_server -R config_cache_reload
```

Note that you may encounter an error first.

```
3. mc [root@centos7-dev]:/home/vagrant/zabbix-3.2.6/src/zabbix_java (ssh)
com.zabbix.gateway.ZabbixException: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at com.zabbix.gateway.JMXItemChecker.getValues(JMXItemChecker.java:97) ~[zabbix-java-gateway-3.4.2.jar:na]
    at com.zabbix.gateway.SocketProcessor.run(SocketProcessor.java:63) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [na:1.8.0_144]
    at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [na:1.8.0_144]
    at java.lang.Thread.run(Thread.java:748) [na:1.8.0_144]
Caused by: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at javax.management.remote.JMXConnectorFactory.newJMXConnector(JMXConnectorFactory.java:359) ~[na:1.8.0_144]
    at javax.management.remote.JMXConnectorFactory.connect(JMXConnectorFactory.java:269) ~[na:1.8.0_144]
    at com.zabbix.gateway.ZabbixJMXConnectorFactory$1.run(ZabbixJMXConnectorFactory.java:76) ~[zabbix-java-gatewa
-3.4.2.jar:na]
    at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:511) ~[na:1.8.0_144]
    at java.util.concurrent.FutureTask.run(FutureTask.java:266) ~[na:1.8.0_144]
    ... 3 common frames omitted
2017-11-07 13:52:12.644 [pool-1-thread-1] WARN com.zabbix.gateway.SocketProcessor - error processing request
com.zabbix.gateway.ZabbixException: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at com.zabbix.gateway.JMXItemChecker.getValues(JMXItemChecker.java:97) ~[zabbix-java-gateway-3.4.2.jar:na]
    at com.zabbix.gateway.SocketProcessor.run(SocketProcessor.java:63) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [na:1.8.0_144]
    at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [na:1.8.0_144]
    at java.lang.Thread.run(Thread.java:748) [na:1.8.0_144]
Caused by: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at javax.management.remote.JMXConnectorFactory.newJMXConnector(JMXConnectorFactory.java:359) ~[na:1.8.0_144]
    at javax.management.remote.JMXConnectorFactory.connect(JMXConnectorFactory.java:269) ~[na:1.8.0_144]
    at com.zabbix.gateway.ZabbixJMXConnectorFactory$1.run(ZabbixJMXConnectorFactory.java:76) ~[zabbix-java-gatewa
-3.4.2.jar:na]
    at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:511) ~[na:1.8.0_144]
    at java.util.concurrent.FutureTask.run(FutureTask.java:266) ~[na:1.8.0_144]
    ... 3 common frames omitted
2017-11-07 13:52:14.889 [Thread-0] INFO com.zabbix.gateway.JavaGateway - Zabbix Java Gateway 3.4.2 (revision 72885)
as stopped
2017-11-07 13:52:26.167 [main] INFO com.zabbix.gateway.JavaGateway - Zabbix Java Gateway 3.4.2 (revision 72885) has
tarted
```

"Unsupported protocol: remoting-jmx" means that Java gateway does not know how to work with the specified protocol. That can be fixed by creating a `~/needed_modules.txt` file with the following content:

```
jboss-as-remoting
jboss-logging
jboss-logmanager
jboss-marshalling
jboss-remoting
jboss-sasl
jcl-over-slf4j
jul-to-slf4j-stub
log4j-jboss-logmanager
remoting-jmx
slf4j-api
xnio-api
xnio-nio</pre>
```

and then executing the command:

```
$ for i in $(cat ~/needed_modules.txt); do find /opt/jboss-eap-6.4 -iname ${i}*.jar -exec cp {} /usr/local
```

Thus, Java gateway will have all the necessary modules for working with jmx-remoting. What's left is to restart the Java gateway, wait a bit and if you did everything right, see that JMX monitoring data begin to arrive in Zabbix:

Latest data				
Name ▲	Last check	Last value	Change	
Classes (3 Items)				
<input type="checkbox"/> cl Loaded Class Count	2017-11-07 14:08:10	7866	+2	
<input type="checkbox"/> cl Total Loaded Class Count	2017-11-07 14:08:09	7865	+2	
<input type="checkbox"/> cl Unloaded Class Count	2017-11-07 14:08:10	0		
Compilation (2 Items)				
<input type="checkbox"/> comp Accumulated time spent in compilation	2017-11-07 14:08:10	46s 759ms	+1s 440ms	
<input checked="" type="checkbox"/> comp Name of the current JIT compiler	2017-11-07 14:00:39	HotSpot 64-Bit Tiered Compilers		
Garbage Collector (4 Items)				
<input type="checkbox"/> gc Copy accumulated time spent in collection	2017-11-07 14:08:09	0		
<input type="checkbox"/> gc Copy number of collections per second	2017-11-07 14:08:09	0		
<input type="checkbox"/> gc MarkSweepCompact accumulated time spent in collection	2017-11-07 14:08:10	372ms		
<input type="checkbox"/> gc MarkSweepCompact number of collections per second	2017-11-07 14:08:10	0		
Memory (6 Items)				
<input type="checkbox"/> mem Heap Memory committed	2017-11-07 14:08:10	1.23 GB		
<input type="checkbox"/> mem Heap Memory max	2017-11-07 14:00:39	1.23 GB		
<input type="checkbox"/> mem Heap Memory used	2017-11-07 14:08:09	271.07 MB	+4.01 MB	
<input type="checkbox"/> mem Non-Heap Memory committed	2017-11-07 14:08:10	66.39 MB	+384 KB	
<input type="checkbox"/> mem Non-Heap Memory used	2017-11-07 14:08:10	59.5 MB	+128.1 KB	
<input type="checkbox"/> mem Object Pending Finalization Count	2017-11-07 14:08:10	0		
Memory Pool (6 Items)				
<input type="checkbox"/> mp Code Cache committed	2017-11-07 14:08:09	12.31 MB	+128 KB	
<input type="checkbox"/> mp Code Cache max	2017-11-07 14:00:40	240 MB		
<input type="checkbox"/> mp Code Cache used	2017-11-07 14:08:09	12.23 MB	+145.44 KB	
<input type="checkbox"/> mp Tenured Gen committed	2017-11-07 14:08:10	869.38 MB		
<input type="checkbox"/> mp Tenured Gen max	2017-11-07 14:00:40	869.38 MB		
<input type="checkbox"/> mp Tenured Gen used	2017-11-07 14:08:09	32.25 MB		

## 15 ODBC monitoring

### Overview

ODBC monitoring corresponds to the Database monitor item type in the Zabbix frontend.

ODBC is a C programming language middle-ware API for accessing database management systems (DBMS). The ODBC concept was developed by Microsoft and later ported to other platforms.

Zabbix may query any database, which is supported by ODBC. To do that, Zabbix does not directly connect to the databases, but uses the ODBC interface and drivers set up in ODBC. This function allows for more efficient monitoring of different databases for multiple purposes - for example, checking specific database queues, usage statistics and so on. Zabbix supports unixODBC, which is one of the most commonly used open source ODBC API implementations.

#### Attention:

See also the [known issues](#) for ODBC checks.

### Installing unixODBC

The suggested way of installing unixODBC is to use the Linux operating system default package repositories. In the most popular Linux distributions unixODBC is included in the package repository by default. If it's not available, it can be obtained at the unixODBC homepage: <http://www.unixodbc.org/download.html>.

Installing unixODBC on RedHat/Fedora based systems using the yum package manager:

```
shell> yum -y install unixODBC unixODBC-devel
```

Installing unixODBC on SUSE based systems using the zypper package manager:

```
# zypper in unixODBC-devel
```

**Note:**

The unixODBC-devel package is needed to compile Zabbix with unixODBC support.

Installing unixODBC drivers

A unixODBC database driver should be installed for the database, which will be monitored. unixODBC has a list of supported databases and drivers: <http://www.unixodbc.org/drivers.html>. In some Linux distributions database drivers are included in package repositories. Installing MySQL database driver on RedHat/Fedora based systems using the yum package manager:

```
shell> yum install mysql-connector-odbc
```

Installing MySQL database driver on SUSE based systems using the zypper package manager:

```
zypper in MyODBC-unixODBC
```

Configuring unixODBC

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. To verify the configuration file location, type:

```
shell> odbcinst -j
```

**odbcinst.ini** is used to list the installed ODBC database drivers:

```
[mysql]
Description = ODBC for MySQL
Driver      = /usr/lib/libmyodbc5.so
```

Parameter details:

Attribute	Description
mysql	Database driver name.
Description	Database driver description.
Driver	Database driver library location.

**odbc.ini** is used to define data sources:

```
[test]
Description = MySQL test database
Driver      = mysql
Server     = 127.0.0.1
User       = root
Password   =
Port       = 3306
Database   = zabbix
```

Parameter details:

Attribute	Description
test	Data source name (DSN).
Description	Data source description.
Driver	Database driver name - as specified in odbcinst.ini
Server	Database server IP/DNS.
User	Database user for connection.
Password	Database user password.
Port	Database connection port.
Database	Database name.



To verify if ODBC connection is working successfully, a connection to database should be tested. That can be done with the **isql** utility (included in the unixODBC package):

```
shell> isql test
+-----+
| Connected!
|
| sql-statement
| help [tablename]
| quit
|
+-----+
SQL>
```

Compiling Zabbix with ODBC support

To enable ODBC support, Zabbix should be compiled with the following flag:

```
--with-unixodbc[=ARG] use odbc driver against unixODBC package
```

**Note:**

See more about Zabbix installation from the [source code](#).

Item configuration in Zabbix frontend

Configure a database monitoring [item](#).

The screenshot shows the 'Item' configuration page in the Zabbix frontend. The page has a header with 'Item' and 'Preprocessing' tabs. The configuration form includes the following fields:

- Name:** MySQL host count (marked with a red asterisk)
- Type:** Database monitor (dropdown menu)
- Key:** db.odbc.select[mysql-simple-check,test] (marked with a red asterisk)
- User name:** zabbix
- Password:** (empty field)
- SQL query:** select count(\*) from hosts (marked with a red asterisk)
- Type of information:** Numeric (unsigned) (dropdown menu)

All mandatory input fields are marked with a red asterisk.

Specifically for database monitoring items you must enter:

Type

Select Database monitor here.

Key	<p>Enter one of the two supported item keys:</p> <p><b>db.odbc.select</b>[&lt;unique short description&gt;,&lt;dsn&gt;,&lt;connection string&gt;] - this item is designed to return one value, i.e. the first column of the first row of the SQL query result. If a query returns more than one column, only the first column is read. If a query returns more than one line, only the first line is read.</p> <p><b>db.odbc.get</b>[&lt;unique short description&gt;,&lt;dsn&gt;,&lt;connection string&gt;] - this item is capable of returning multiple rows/columns in JSON format. Thus it may be used as a master item that collects all data in one system call, while JSONPath preprocessing may be used in dependent items to extract individual values. For more information, see an <a href="#">example</a> of the returned format, used in low-level discovery. This item is supported since Zabbix 4.4. The unique description will serve to identify the item in triggers, etc.</p> <p>Although <code>dsn</code> and <code>connection string</code> are optional parameters, at least one of them should be present. If both data source name (DSN) and connection string are defined, the DSN will be ignored.</p> <p>The data source name, if used, must be set as specified in <code>odbc.ini</code>.</p> <p>The connection string may contain driver-specific arguments.</p> <p>Example (connection for MySQL ODBC driver 5):  =&gt; <code>db.odbc.get[MySQL example,,"Driver=/usr/local/lib/libmyodbc5a.so;Database=master;Server=127.0.0.1;User=;Password=;"]</code></p>
User name	<p>Enter the database user name</p> <p>This parameter is optional if user is specified in <code>odbc.ini</code>. If connection string is used, and User name field is not empty, it is appended to the connection string as <code>UID=&lt;user&gt;</code></p>
Password	<p>Enter the database user password</p> <p>This parameter is optional if password is specified in <code>odbc.ini</code>. If connection string is used, and Password field is not empty, it is appended to the connection string as <code>PWD=&lt;password&gt;</code>.</p>
SQL query	<p>Enter the SQL query.</p> <p>Note that with the <code>db.odbc.select []</code> item the query must return one value only.</p>
Type of information	<p>It is important to know what type of information will be returned by the query, so that it is selected correctly here. With an incorrect type of information the item will turn unsupported.</p>

#### Important notes

- Zabbix does not limit the query execution time. It is up to the user to choose queries that can be executed in a reasonable amount of time.
- The **Timeout** parameter value from Zabbix server is used as the ODBC login timeout (note that depending on ODBC drivers the login timeout setting might be ignored).
- The SQL command must return a result set like any query with `select . . .`. The query syntax will depend on the RDBMS which will process them. The syntax of request to a storage procedure must be started with `call` keyword.

#### Error messages

ODBC error messages are structured into fields to provide detailed information. For example:

Cannot execute ODBC query: [SQL\_ERROR]:[42601][7][ERROR: syntax error at or near ";"; Error while executing

	Native error code	Native error message
	SQLState	
Zabbix message	ODBC return code	

Note that the error message length is limited to 2048 bytes, so the message can be truncated. If there is more than one ODBC diagnostic record Zabbix tries to concatenate them (separated with |) as far as the length limit allows.

## 1 Recommended UnixODBC settings for MySQL

### Installation

\*\*\* Red Hat Enterprise Linux/CentOS\*\*:

```
# yum install mysql-connector-odbc
```

\*\*\*Debian/Ubuntu\*\*:

Please refer to [MySQL documentation](#) to download necessary database driver for the corresponding platform.

For some additional information please refer to: [installing unixODBC](#).

### Configuration

ODBC configuration is done by editing **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in /etc folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

#### **odbcinst.ini**

```
[mysql]
Description = General ODBC for MySQL
Driver       = /usr/lib64/libmyodbc5.so
Setup       = /usr/lib64/libodbcmyS.so
FileUsage   = 1
```

Please consider the following examples of **odbc.ini** configuration parameters.

- An example with a connection through an IP:

```
[TEST_MYSQL]
Description = MySQL database 1
Driver      = mysql
Port       = 3306
Server     = 127.0.0.1
```

- An example with a connection through an IP and with the use of credentials. A Zabbix database is used by default:

```
[TEST_MYSQL_FILLED_CRED]
Description = MySQL database 2
Driver      = mysql
User        = root
Port       = 3306
Password   = zabbix
Database   = zabbix
Server     = 127.0.0.1
```

- An example with a connection through a socket and with the use of credentials. A Zabbix database is used by default:

```
[TEST_MYSQL_FILLED_CRED SOCK]
Description = MySQL database 3
Driver      = mysql
User        = root
Password   = zabbix
Socket     = /var/run/mysqld/mysqld.sock
Database   = zabbix
```

All other possible configuration parameter options can be found in [MySQL official documentation](#) web page.

## 2 Recommended UnixODBC settings for PostgreSQL

### Installation

\*\*\* Red Hat Enterprise Linux/CentOS\*\*:

```
# yum install postgresql-odbc
```

\*\*\*Debian/Ubuntu\*\*:

Please refer to [PostgreSQL documentation](#) to download necessary database driver for the corresponding platform.

For some additional information please refer to: [installing unixODBC](#).

Configuration

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in /etc folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

Please consider the following examples:

#### **odbcinst.ini**

```
[postgresql]
Description = General ODBC for PostgreSQL
Driver      = /usr/lib64/libodbcpsql.so
Setup       = /usr/lib64/libodbcpsqlS.so
FileUsage   = 1
# Since 1.6 if the driver manager was built with thread support you may add another entry to each driver e
# This entry alters the default thread serialization level.
Threading   = 2
```

#### **odbc.ini**

```
[TEST_PSQL]
Description = PostgreSQL database 1
Driver      = postgresql
#CommLog    = /tmp/sql.log
Username    = zbx_test
Password    = zabbix
# Name of Server. IP or DNS
Servername  = 127.0.0.1
# Database name
Database    = zabbix
# Postmaster listening port
Port        = 5432
# Database is read only
# Whether the datasource will allow updates.
ReadOnly    = No
# PostgreSQL backend protocol
# Note that when using SSL connections this setting is ignored.
# 7.4+: Use the 7.4(V3) protocol. This is only compatible with 7.4 and higher backends.
Protocol    = 7.4+
# Includes the OID in SQLColumns
ShowOidColumn = No
# Fakes a unique index on OID
FakeOidIndex = No
# Row Versioning
# Allows applications to detect whether data has been modified by other users
# while you are attempting to update a row.
# It also speeds the update process since every single column does not need to be specified in the where c
RowVersioning = No
# Show SystemTables
# The driver will treat system tables as regular tables in SQLTables. This is good for Access so you can s
ShowSystemTables = No
# If true, the driver automatically uses declare cursor/fetch to handle SELECT statements and keeps 100 ro
Fetch        = Yes
# Booleans as Char
# Booleans are mapped to SQL_CHAR, otherwise to SQL_BIT.
BooleansAsChar = Yes
# SSL mode
```

```
SSLmode = Yes
# Send to backend on connection
ConnSettings =

3 Recommended UnixODBC settings for Oracle
```

#### Installation

Please refer to [Oracle documentation](#) for all the necessary instructions.

For some additional information please refer to: [Installing unixODBC](#).

#### 4 Recommended UnixODBC settings for MSSQL

#### Installation

```
*** Red Hat Enterprise Linux/CentOS**:
```

```
# yum -y install freetds unixODBC
```

```
***Debian/Ubuntu**:
```

Please refer to [FreeTDS user guide](#) to download necessary database driver for the corresponding platform.

For some additional information please refer to: [installing unixODBC](#).

#### Configuration

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in /etc folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

Please consider the following examples:

##### **odbcinst.ini**

```
$ vi /etc/odbcinst.ini
[FreeTDS]
Driver = /usr/lib64/libtdsodbc.so.0
```

##### **odbc.ini**

```
$ vi /etc/odbc.ini
[sql1]
Driver = FreeTDS
Server = <SQL server 1 IP>
PORT = 1433
TDS_Version = 8.0
```

## 16 Dependent items

#### Overview

There are situations when one item gathers multiple metrics at a time or it even makes more sense to collect related metrics simultaneously, for example:

- CPU utilization of individual cores
- Incoming/outgoing/total network traffic

To allow for bulk metric collection and simultaneous use in several related items, Zabbix supports dependent items. Dependent items depend on the master item that collects their data simultaneously, in one query. A new value for the master item automatically populates the values of the dependent items. Dependent items cannot have a different update interval than the master item.

Zabbix preprocessing options can be used to extract the part that is needed for the dependent item from the master item data.

Preprocessing is managed by a `preprocessing manager` process, which has been added in Zabbix 3.4, along with workers that perform the preprocessing steps. All values (with or without preprocessing) from different data gatherers pass through the

preprocessing manager before being added to the history cache. Socket-based IPC communication is used between data gatherers (pollers, trappers, etc) and the preprocessing process.

Zabbix server or Zabbix proxy (if host is monitored by proxy) are performing preprocessing steps and processing dependent items.

Item of any type, even dependent item, can be set as master item. Additional levels of dependent items can be used to extract smaller parts from the value of an existing dependent item.

#### Limitations

- Only same host (template) dependencies are allowed
- An item prototype can depend on another item prototype or regular item from the same host
- Maximum count of dependent items for one master item is limited to 29999 (regardless of the number of dependency levels)
- Maximum 3 dependency levels allowed
- Dependent item on a host with master item from template will not be exported to XML

#### Item configuration

A dependent item depends on its master item for data. That is why the **master item** must be configured (or exist) first:

- Go to: Configuration → Hosts
- Click on Items in the row of the host
- Click on Create item
- Enter parameters of the item in the form

The screenshot shows the 'Item Preprocessing' configuration form in Zabbix. The form is titled 'Item Preprocessing' and contains the following fields:

- Name** (mandatory): Apache server status
- Type**: Zabbix agent
- Key** (mandatory): web.page.get[127.0.0.1,/server-status]
- Host interface** (mandatory): 127.0.0.1 : 10050
- Type of information**: Text
- Update interval** (mandatory): 30s

All mandatory input fields are marked with a red asterisk.

Click on Add to save the master item.

Then you can configure a **dependent item**.

The screenshot shows the 'Item Preprocessing' configuration form in Zabbix for a dependent item. The form is titled 'Item Preprocessing' and contains the following fields:

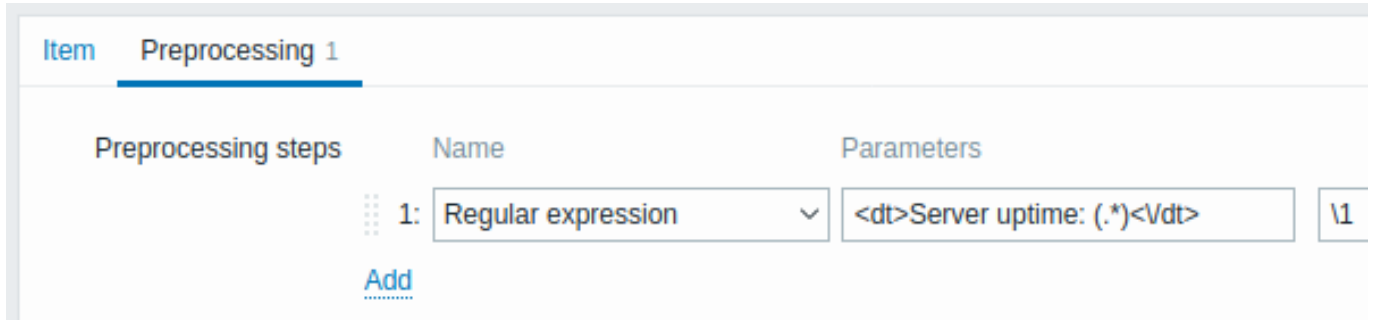
- Name** (mandatory): Apache server uptime
- Type**: Dependent item
- Key** (mandatory): apache.server.uptime
- Master item** (mandatory): Apache server status: web.page.get[127.0.0.1,/server-status]
- Type of information**: Text

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for dependent items are:

Type	Select <b>Dependent item</b> here.
Key	Enter a key that will be used to recognize the item.
Master item	Select the master item. Master item value will be used to populate dependent item value.
Type of information	Select the type of information that will correspond the format of data that will be stored.

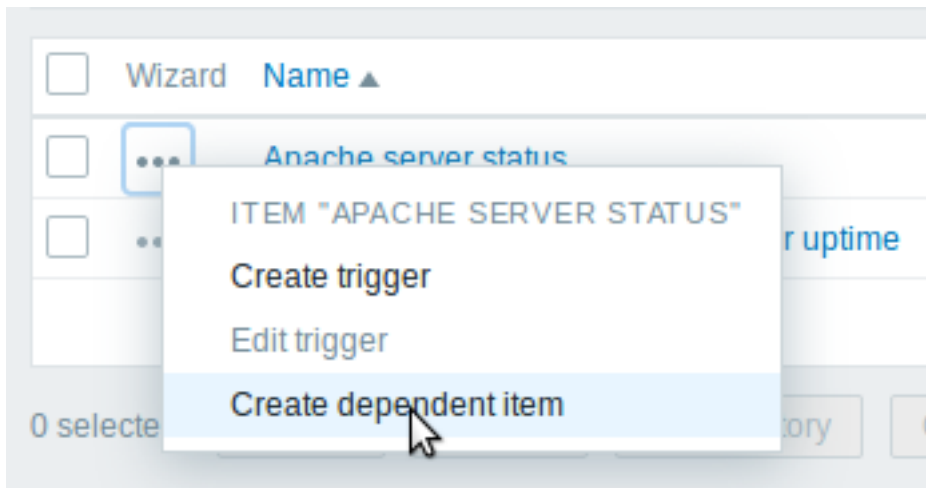
You may use item value **preprocessing** to extract the required part of the master item value.



Without preprocessing, the dependent item value will be exactly the same as the master item value.

Click on Add to save the dependent item.

A shortcut to creating a dependent item quicker is to use the wizard in the item list:



Display

In the item list dependent items are displayed with their master item name as prefix.

Wizard	Name ▲	Triggers	Key
<input type="checkbox"/>	...	Apache server status	web.page.get[192.168.3.31,/server-status]
<input type="checkbox"/>	...	Apache server status: Apache server uptime	apache.server.uptime

If a master item is deleted, so are all its dependent items.

## 17 HTTP agent

Overview

This item type allows data polling using the HTTP/HTTPS protocol. Trapping is also possible using Zabbix sender or Zabbix sender protocol.

HTTP item check is executed by Zabbix server. However, when hosts are monitored by a Zabbix proxy, HTTP item checks are executed by the proxy.

HTTP item checks do not require any agent running on a host being monitored.

HTTP agent supports both HTTP and HTTPS. Zabbix will optionally follow redirects (see the Follow redirects option below). Maximum number of redirects is hard-coded to 10 (using cURL option CURLOPT\_MAXREDIRS).

See also [known issues](#) for when using HTTPS protocol.

**Attention:**

Zabbix server/proxy must be initially configured with cURL (libcurl) support.

## Configuration

To configure an HTTP item:

- Go to: Configuration → Hosts
- Click on Items in the row of the host
- Click on Create item
- Enter parameters of the item in the form



\* Name

Type

\* Key

\* URL

Name	Value
<input type="text" value="scroll"/>	<input type="text" value="10s"/>

[Add](#)

Request type

\* Timeout

Request body type

Request body

```
{
  "query": {
    "bool": {
      "must": [{
        "match": {
          "itemid": 28275
        }
      ]
    }
  }
}
```

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Add](#)

Required status codes

Follow redirects

Retrieve mode

Convert to JSON

HTTP proxy

HTTP authentication

SSL verify peer

SSL verify host

SSL certificate file

SSL key file

SSL key password

\* Host interface

Type of information

Units

\* Update interval

Custom intervals	Type	Interval	Period
<input checked="" type="text" value="Flexible"/> <input type="text" value="Scheduling"/>		<input type="text" value="50s"/>	<input type="text" value="1-7,00:00-24:00"/>

[Add](#)

\* History storage period

\* Trend storage period

Show value

Enable trapping

Allowed hosts

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for HTTP items are:

---

Type	Select <b>HTTP agent</b> here.
Key	Enter a unique item key.
URL	URL to connect to and retrieve data. For example: https://www.google.com http://www.zabbix.com/download Domain names can be specified in Unicode characters. They are automatically punycode-converted to ASCII when executing the HTTP check. The Parse button can be used to separate optional query fields (like ?name=Admin&password=mypassword) from the URL, moving the attributes and values into Query fields for automatic URL-encoding. Limited to 2048 characters. Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros. This sets the <b>CURLOPT_URL</b> cURL option.
Query fields	Variables for the URL (see above). Specified as attribute and value pairs. Values are URL-encoded automatically. Values from macros are resolved and then URL-encoded automatically. Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros. This sets the <b>CURLOPT_URL</b> cURL option.
Request type	Select request method type: GET, POST, PUT or HEAD
Timeout	Zabbix will not spend more than the set amount of time on processing the URL (1-60 seconds). Actually this parameter defines the maximum time for making a connection to the URL and maximum time for performing an HTTP request. Therefore, Zabbix will not spend more than 2 x Timeout seconds on one check. Time suffixes are supported, e.g. 30s, 1m. Supported macros: user macros, low-level discovery macros. This sets the <b>CURLOPT_TIMEOUT</b> cURL option.
Request body type	Select the request body type: <b>Raw data</b> - custom HTTP request body, macros are substituted but no encoding is performed <b>JSON data</b> - HTTP request body in JSON format. Macros can be used as string, number, true and false; macros used as strings must be enclosed in double quotes. Values from macros are resolved and then escaped automatically. If "Content-Type" is not specified in headers then it will default to "Content-Type: application/json" <b>XML data</b> - HTTP request body in XML format. Macros can be used as a text node, attribute or CDATA section. Values from macros are resolved and then escaped automatically in a text node and attribute. If "Content-Type" is not specified in headers then it will default to "Content-Type: application/xml"
Request body	Note that selecting XML data requires libxml2. Enter the request body. Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.

Headers	<p>Custom HTTP headers that will be sent when performing a request.</p> <p>Specified as attribute and value pairs.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_HTTPHEADER</a> cURL option.</p>
Required status codes	<p>List of expected HTTP status codes. If Zabbix gets a code which is not in the list, the item will become unsupported. If empty, no check is performed.</p> <p>For example: 200,201,210-299</p> <p>Supported macros in the list: user macros, low-level discovery macros.</p> <p>This uses the <a href="#">CURLOPT_RESPONSE_CODE</a> cURL option.</p>
Follow redirects	<p>Mark the checkbox to follow HTTP redirects.</p> <p>This sets the <a href="#">CURLOPT_FOLLOWLOCATION</a> cURL option.</p>
Retrieve mode	<p>Select the part of response that must be retrieved:</p> <p><b>Body</b> - body only</p> <p><b>Headers</b> - headers only</p> <p><b>Body and headers</b> - body and headers</p>
Convert to JSON	<p>Headers are saved as attribute and value pairs under the "header" key.</p> <p>If 'Content-Type: application/json' is encountered then body is saved as an object, otherwise it is stored as string, for example:</p> <pre>{   "header": {     "&lt;key&gt;": "&lt;value&gt;",     "&lt;key2&gt;": "&lt;value&gt;"   },   "body": &lt;body&gt; }</pre>
HTTP proxy	<p>You can specify an HTTP proxy to use, using the format <code>[protocol://] [username[:password]@]proxy.example.com[:port]</code>.</p> <p>The optional <code>protocol://</code> prefix may be used to specify alternative proxy protocols (e.g. <code>https</code>, <code>socks4</code>, <code>socks5</code>; see <a href="#">documentation</a>; the protocol prefix support was added in cURL 7.21.7). With no protocol specified, the proxy will be treated as an HTTP proxy. If you specify the wrong protocol, the connection will fail and the item will become unsupported.</p> <p>By default, 1080 port will be used.</p> <p>If specified, the proxy will overwrite proxy related environment variables like <code>http_proxy</code>, <code>HTTPS_PROXY</code>. If not specified, the proxy will not overwrite proxy-related environment variables. The entered value is passed on "as is", no sanity checking takes place.</p> <p>Note that only simple authentication is supported with HTTP proxy.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_PROXY</a> cURL option.</p>

---

HTTP authentication	<p>Authentication type:</p> <p><b>None</b> - no authentication used.</p> <p><b>Basic</b> - basic authentication is used.</p> <p><b>NTLM</b> - NTLM (<a href="#">Windows NT LAN Manager</a>) authentication is used.</p> <p><b>Kerberos</b> - Kerberos authentication is used. See also: <a href="#">Configuring Kerberos with Zabbix</a>.</p> <p><b>Digest</b> - Digest authentication is used.</p> <p>Selecting an authentication method will provide two additional fields for entering a user name and password, where user macros and low-level discovery macros are supported.</p> <p>This sets the <a href="#">CURLOPT_HTTPAUTH</a> cURL option.</p>
SSL verify peer	<p>Mark the checkbox to verify the SSL certificate of the web server. The server certificate will be automatically taken from system-wide certificate authority (CA) location. You can override the location of CA files using Zabbix server or proxy configuration parameter <code>SSLCALocation</code>.</p> <p>This sets the <a href="#">CURLOPT_SSL_VERIFYPEER</a> cURL option.</p>
SSL verify host	<p>Mark the checkbox to verify that the Common Name field or the Subject Alternate Name field of the web server certificate matches.</p> <p>This sets the <a href="#">CURLOPT_SSL_VERIFYHOST</a> cURL option.</p>
SSL certificate file	<p>Name of the SSL certificate file used for client authentication. The certificate file must be in PEM<sup>1</sup> format. If the certificate file contains also the private key, leave the SSL key file field empty. If the key is encrypted, specify the password in SSL key password field. The directory containing this file is specified by Zabbix server or proxy configuration parameter <code>SSLCertLocation</code>.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_SSLCERT</a> cURL option.</p>
SSL key file	<p>Name of the SSL private key file used for client authentication. The private key file must be in PEM<sup>1</sup> format. The directory containing this file is specified by Zabbix server or proxy configuration parameter <code>SSLKeyLocation</code>.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_SSLKEY</a> cURL option.</p>
SSL key password	<p>SSL private key file password.</p> <p>Supported macros: user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_KEYPASSWD</a> cURL option.</p>
Enable trapping	<p>With this checkbox marked, the item will also function as <b>trapper item</b> and will accept data sent to this item by Zabbix sender or using Zabbix sender protocol.</p>

---

## Allowed hosts

Visible only if Enable trapping checkbox is marked.

List of comma delimited IP addresses, optionally in CIDR notation, or hostnames.

If specified, incoming connections will be accepted only from the hosts listed here.

If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and ':::0' will allow any IPv4 or IPv6 address.

'0.0.0.0/0' can be used to allow any IPv4 address.

Note, that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by [RFC4291](#).

Example: Server=127.0.0.1, 192.168.1.0/24, 192.168.3.1-255, 192.168.1-10.1-255, ::1,2001:db8::/32, zabbix.domain

Spaces and **user macros** are allowed in this field.

Host macros: {HOST.HOST}, {HOST.NAME}, {HOST.IP}, {HOST.DNS}, {HOST.CONN} are allowed in this field.

---

### Note:

If the HTTP proxy field is left empty, another way for using an HTTP proxy is to set proxy-related environment variables.

For HTTP - set the `http_proxy` environment variable for the Zabbix server user. For example:

```
//http_proxy=http://%%proxy_ip:proxy_port//.
```

For HTTPS - set the `HTTPS_PROXY` environment variable. For example:

```
//HTTPS_PROXY=http://%%proxy_ip:proxy_port//. More details are available by running a shell command: # man curl.
```

### Attention:

[1] Zabbix supports certificate and private key files in PEM format only. In case you have your certificate and private key data in PKCS #12 format file (usually with extension \*.p12 or \*.pfx) you may generate the PEM file from it using the following commands:

```
openssl pkcs12 -in ssl-cert.p12 -clcerts -nokeys -out ssl-cert.pem
```

```
openssl pkcs12 -in ssl-cert.p12 -nocerts -nodes -out ssl-cert.key
```

## Examples

### Example 1

Send simple GET requests to retrieve data from services such as Elasticsearch:

- Create a GET item with URL: `localhost:9200/?pretty`
- Notice the response:

```
{
  "name" : "YQ2VAY-",
  "cluster_name" : "elasticsearch",
  "cluster_uuid" : "kH4CYqh5QfqgeTsjh2F9zg",
  "version" : {
    "number" : "6.1.3",
    "build_hash" : "af51318",
    "build_date" : "2018-01-26T18:22:55.523Z",
    "build_snapshot" : false,
    "lucene_version" : "7.1.0",
    "minimum_wire_compatibility_version" : "5.6.0",
    "minimum_index_compatibility_version" : "5.0.0"
  },
  "tagline" : "You know, for search"
}
```

- Now extract the version number using a JSONPath preprocessing step: `$.version.number`

### Example 2

Send simple POST requests to retrieve data from services such as Elasticsearch:

- Create a POST item with URL: `http://localhost:9200/str/values/_search?scroll=10s`

- Configure the following POST body to obtain the processor load (1 min average per core)

```
{
  "query": {
    "bool": {
      "must": [{
        "match": {
          "itemid": 28275
        }
      }],
      "filter": [{
        "range": {
          "clock": {
            "gt": 1517565836,
            "lte": 1517566137
          }
        }
      ]
    }
  }
}
```

- Received:

```
{
  "_scroll_id": "DnF1ZXJ5VGhlbkZldGNoBQAAAAAAAAAkF1lRM1ZBWS1UU1pxTmdEeGVwQjRBTFEAAAAAAAAAJRZZUTJWQVktVFN",
  "took": 18,
  "timed_out": false,
  "_shards": {
    "total": 5,
    "successful": 5,
    "skipped": 0,
    "failed": 0
  },
  "hits": {
    "total": 1,
    "max_score": 1.0,
    "hits": [{
      "_index": "dbl",
      "_type": "values",
      "_id": "dqX9VWEBV6sEKSMYk6sw",
      "_score": 1.0,
      "_source": {
        "itemid": 28275,
        "value": "0.138750",
        "clock": 1517566136,
        "ns": 25388713,
        "ttl": 604800
      }
    }
  ]
}
```

- Now use a JSONPath preprocessing step to get the item value: `$.hits.hits[0]._source.value`

### Example 3

Checking if Zabbix API is alive, using `apiinfo.version`.

- Item configuration:

Item **Preprocessing**

\* Name

Type

\* Key

\* URL

Query fields

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Add](#)

Request type

\* Timeout

Request body type

Request body 

```
{
  "jsonrpc": "2.0",
  "method": "apiinfo.version",
  "params": [],
  "id": 1
}
```

Headers

Name	Value
<input type="text" value="Content-Type"/>	<input type="text" value="application/json-rpc"/>

[Add](#)

Required status codes

Follow redirects

Retrieve mode

Note the use of the POST method with JSON data, setting request headers and asking to return headers only:

- Item value preprocessing with regular expression to get HTTP code:

**Item** Preprocessing 1

Preprocessing steps	Name	Parameters	
1:	Regular expression	HTTPV1.1 ([0-9]+)	1

[Add](#)

- Checking the result in Latest data:

**Latest data**

Filter

Host groups: type here to search  Name: Check Zabbix API

Hosts: Zabbix server x nginx x  Show items without data

Application:   Show details

<input type="checkbox"/> Host	Name	Last check	Last value	Change
<input type="checkbox"/> Zabbix server	- other - (1 Item)			
<input type="checkbox"/>	Check Zabbix API version	2018-05-16 23:50:34	OK (200)	<a href="#">Graph</a>

#### Example 4

Retrieving weather information by connecting to the Openweathermap public service.

- Configure a master item for bulk data collection in a single JSON:



## Item Preprocessing

Parent items [Template Weather](#)

\* Name

Type

\* Key

\* URL

Query fields

Name	Value	
<input type="text" value="units"/>	⇒ <input type="text" value="metric"/>	<a href="#">Rem</a>
<input type="text" value="lat"/>	⇒ <input type="text" value="{\\$LAT}"/>	<a href="#">Rem</a>
<input type="text" value="lon"/>	⇒ <input type="text" value="{\\$LON}"/>	<a href="#">Rem</a>
<input type="text" value="APPID"/>	⇒ <input type="text" value="{\\$WEATHER_APIKEY}"/>	<a href="#">Rem</a>
<input type="text" value="lang"/>	⇒ <input type="text" value="{\\$WEATHER_LANG}"/>	<a href="#">Rem</a>
<a href="#">Add</a>		

Request type

\* Timeout

Request body type

Request body

Note the usage of macros in query fields. Refer to the [Openweathermap API](#) for how to fill them.

Sample JSON returned in response to HTTP agent:

```
{
  "body": {
    "coord": {
      "lon": 40.01,
      "lat": 56.11
    },
    "weather": [{
      "id": 801,
      "main": "Clouds",
      "description": "few clouds",
      "icon": "02n"
    }],
    "base": "stations",
    "main": {
      "temp": 15.14,
      "pressure": 1012.6,
      "humidity": 66,
```

```

    "temp_min": 15.14,
    "temp_max": 15.14,
    "sea_level": 1030.91,
    "grnd_level": 1012.6
  },
  "wind": {
    "speed": 1.86,
    "deg": 246.001
  },
  "clouds": {
    "all": 20
  },
  "dt": 1526509427,
  "sys": {
    "message": 0.0035,
    "country": "RU",
    "sunrise": 1526432608,
    "sunset": 1526491828
  },
  "id": 487837,
  "name": "Stavrovo",
  "cod": 200
}
}

```

The next task is to configure dependent items that extract data from the JSON.

- Configure a sample dependent item for humidity:

**Item** Preprocessing

---

\* Name

Type

\* Key  Select

\* Master item  Select

Type of information

Other weather metrics such as 'Temperature' are added in the same manner.

- Sample dependent item value preprocessing with JSONPath:

**Item** Preprocessing 1

---

Preprocessing steps	Name	Parameters
<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">⋮</div> <div style="margin-right: 5px;">1:</div> <div style="border: 1px solid #ccc; padding: 2px;">JSONPath</div> <div style="margin-left: 5px; border: none; border-bottom: 1px solid #ccc;">▼</div> </div>	\$.body.main.humidity	
<a href="#" style="color: #007bff; text-decoration: none;">Add</a>		

- Check the result of weather data in Latest data:

<input type="checkbox"/>	Host	Name ▲	Inter...	History	Trends	Type	Last check	Last value
▼	weather	Weather (8 Items)						
<input type="checkbox"/>		Get weather <a href="#">get_weather.http</a>	10m	1d		HTTP agent	2018-05-17 01:23:45	{'body': {'coord': {'lon...
<input type="checkbox"/>		Get weather HTTP response code <a href="#">get_weather.http_code</a>		7d	0	Depende...	2018-05-17 01:23:45	OK (200)
<input type="checkbox"/>		Humidity <a href="#">humidity</a>		90d	365d	Depende...	2018-05-17 01:23:45	66 %
<input type="checkbox"/>		Temperature <a href="#">temp</a>		90d	365d	Depende...	2018-05-17 01:23:45	15.14 C
<input type="checkbox"/>		Weather <a href="#">weather</a>		90d		Depende...	2018-05-17 01:23:45	Clouds
<input type="checkbox"/>		Weather condition id <a href="#">weather.condition.id</a>		7d	0	Depende...	2018-05-17 01:23:45	801
<input type="checkbox"/>		Weather description <a href="#">weather.description</a>		90d		Depende...	2018-05-17 01:23:45	few clouds
<input type="checkbox"/>		Wind speed <a href="#">wind.speed</a>		90d	365d	Depende...	2018-05-17 01:23:45	1.86 m/s

### Example 5

Connecting to Nginx status page and getting its metrics in bulk.

- Configure Nginx following the [official guide](#).
- Configure a master item for bulk data collection:

Item
Preprocessing

\* Name

Type

\* Key

\* URL

Query fields

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Add](#)

Request type

\* Timeout

Request body type

Raw data

JSON data

XML data

Sample Nginx stub status output:

```
Active connections: 1 Active connections:
server accepts handled requests
 52 52 52
Reading: 0 Writing: 1 Waiting: 0
```

The next task is to configure dependent items that extract data.

- Configure a sample dependent item for requests per second:

Item **Preprocessing**

\* Name

Type

\* Key

\* Master item

Type of information

- Sample dependent item value preprocessing with regular expression `server accepts handled requests\s+([0-9]+) ([0-9]+) ([0-9]+):`

Item **Preprocessing 2**

Preprocessing steps	Name	Parameters
1:	<input type="text" value="Regular expression"/>	<input type="text" value="requests\s+([0-9]+) ([0-9]+) ([0-9]+)"/> <input type="button" value="13"/>
2:	<input type="text" value="Change per second"/>	

[Add](#)

- Check the complete result from stub module in Latest data:

<input type="checkbox"/> Host	Name ▲	Last check	Last value
<input type="checkbox"/> nginx	<b>Nginx (8 Items)</b>		
<input type="checkbox"/>	Accepted client connections	2018-05-18 17:54:53	568
<input type="checkbox"/>	Active connections	2018-05-18 17:54:53	1
<input type="checkbox"/>	Client requests per second	2018-05-18 17:54:53	0 rps
<input checked="" type="checkbox"/>	Get Nginx stub status	2018-05-18 17:54:53	HTTP/1.1 200 OK Se...
<input type="checkbox"/>	Handled connections per second	2018-05-18 17:54:53	0
<input type="checkbox"/>	Reading	2018-05-18 17:54:53	0
<input type="checkbox"/>	Waiting	2018-05-18 17:54:53	0
<input type="checkbox"/>	Writing	2018-05-18 17:54:53	1

## 18 Prometheus checks

### Overview

Zabbix can query metrics exposed in the Prometheus line format.

Two steps are required to start gathering Prometheus data:

- an **HTTP master item** pointing to the appropriate data endpoint, e.g. `https://<prometheus host>/metrics`
- dependent items using a Prometheus preprocessing option to query required data from the metrics gathered by the master item

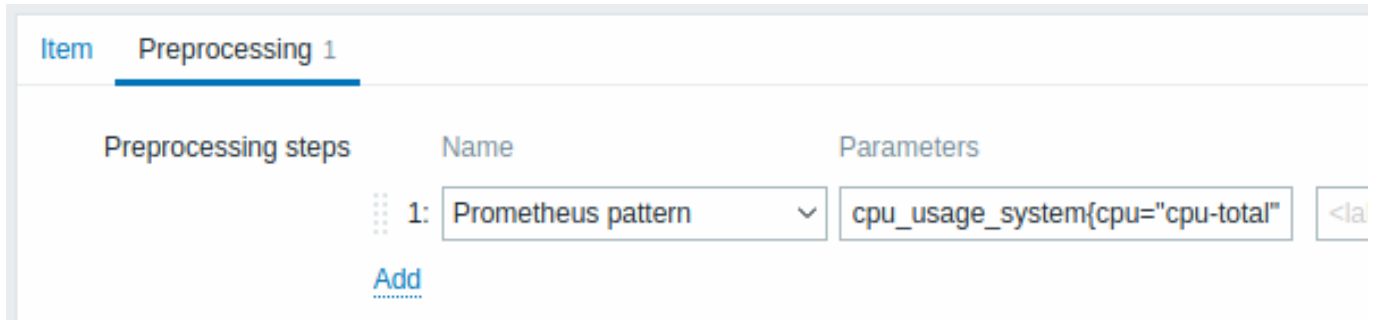
There are two Prometheus data preprocessing options:

- Prometheus pattern - used in normal items to query Prometheus data
- Prometheus to JSON - used in normal items and for low-level discovery. In this case queried Prometheus data are returned in a JSON format.

### Configuration

Providing you have the HTTP master item configured, you need to create a **dependent item** that uses Prometheus preprocessing step:

- enter general dependent item parameters in the configuration form
- go to the Preprocessing tab
- select a Prometheus preprocessing option (Prometheus pattern or Prometheus to JSON)



Parameter	Description	Examples
Pattern	<p>To define the required data pattern you may use a query language that is similar to Prometheus query language (see <a href="#">comparison table</a>), e.g.:</p> <p>&lt;metric name&gt; - select by metric name            {__name__="&lt;metric name&gt;} - select by metric name            {__name__=~"&lt;regex&gt;} - select by metric name matching a regular expression            {&lt;label name&gt;="&lt;label value&gt;","...} - select by label name            {&lt;label name&gt;=~"&lt;regex&gt;","...} - select by label name matching a regular expression            {__name__=~".*"}==&lt;value&gt; - select by metric value</p> <p>Or a combination of the above:            &lt;metric name&gt;{&lt;label1 name&gt;="&lt;label1 value&gt;",&lt;label2 name&gt;=~"&lt;regex&gt;","...}==&lt;value&gt;</p> <p>Label value can be any sequence of UTF-8 characters, but the backslash, double-quote and line feed characters have to be escaped as \\, \" and \n respectively; other characters shall not be escaped.</p>	<pre>wmi_os_physical_memory_free_bytes cpu_usage_system{cpu="cpu-total"} cpu_usage_system{cpu=~".*"} cpu_usage_system{cpu="cpu-total",host=~".*"} wmi_service_state{name="dhcp"}==1 wmi_os_timezone{timezone=~".*"}==1</pre>
Output	<p>Define label name (optional). In this case the value corresponding to the label name is returned.</p> <p>This field is only available for the Prometheus pattern option.</p>	

### Prometheus to JSON

Data from Prometheus can be used for low-level discovery. In this case data in JSON format are needed and the Prometheus to JSON preprocessing option will return exactly that.

For more details, see [Discovery using Prometheus data](#).

### Query language comparison

The following table lists differences and similarities between PromQL and Zabbix Prometheus preprocessing query language.

PromQL instant vector selector	Zabbix Prometheus preprocessing
<b>Differences</b>	

PromQL instant vector selector	Zabbix Prometheus preprocessing
<p>Query Prometheus server target instant vector</p>	<p>Plain text in Prometheus exposition format</p>
<p>Return instant vector</p> <p>Labels, !=, =~, !~</p> <p>Matching operators</p>	<p>Metric or label value (Prometheus pattern)</p> <p>Array of metrics for single value in JSON (Prometheus to JSON)</p> <p>=, =~</p>
<p>Regular expression used in label or metric name matching</p>	<p>PCRE</p>
<p>Comparison operators</p>	<p>Only == (equal) is supported for value filtering</p>
<p><b>Similarities</b></p> <p>Selecting metric name&gt; or {__name__="&lt;metric name&gt;"}</p> <p>by metric name that equals string</p>	<p>&lt;metric name&gt; or {__name__="&lt;metric name&gt;"}</p>
<p>Selecting metric name =~ "&lt;regex&gt;"</p> <p>by metric name that matches regular expression</p>	<p>{__name__=~"&lt;regex&gt;"}</p>

PromQL instant vector selector	Zabbix Prometheus preprocessing
<pre>Select [label name]="&lt;label value&gt;","...} by &lt;la- bel name&gt; value that equals string</pre>	<pre>{&lt;label name&gt;="&lt;label value&gt;","...}</pre>
<pre>Select [label name]="~"&lt;regex&gt;","...} by &lt;la- bel name&gt; value that matches reg- u- lar ex- pres- sion</pre>	<pre>{&lt;label name&gt;=~"&lt;regex&gt;","...}</pre>
<pre>Select [time__=~".*"] == &lt;value&gt; by value that equals string</pre>	<pre>{_name_ =~".*" } == &lt;value&gt;</pre>

## 19 Script items

### Overview

Script items can be used to collect data by executing a user-defined JavaScript code with the ability to retrieve data over HTTP/HTTPS. In addition to the script, an optional list of parameters (pairs of name and value) and timeout can be specified.

This item type may be useful in data collection scenarios that require multiple steps or complex logic. As an example, a Script item can be configured to make an HTTP call, then process the data received in the first step in some way, and pass transformed value to the second HTTP call.

Script items are processed by Zabbix server or proxy pollers.

### Configuration

In the Type field of [item configuration form](#) select Script then fill out required fields.

Item **Preprocessing**

\* Name

Type  ▾

\* Key  Sel

Parameters	Name	Value	Action
	<input type="text" value="host"/>	<input type="text" value="{HOST.CONN}"/>	<a href="#">Remove</a>
	<input type="text" value="endpoint"/>	<input type="text" value="{SENDPOINT}"/>	<a href="#">Remove</a>
	<a href="#">Add</a>		

\* Script  ✎

\* Timeout

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for Script items are:

Field	Description
Key	Enter a unique key that will be used to identify the item.
Parameters	Specify the variables to be passed to the script as the attribute and value pairs. <b>Built-in macros</b> {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.IP}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG} and <b>user macros</b> are supported.
Script	Enter JavaScript code in the block that appears when clicking in the parameter field (or on the view/edit button next to it). This code must provide the logic for returning the metric value. The code has access to all parameters, it may perform HTTP GET, POST, PUT and DELETE requests and has control over HTTP headers and request body. See also: <a href="#">Additional JavaScript objects</a> , <a href="#">JavaScript Guide</a> .
Timeout	JavaScript execution timeout (1-60s, default 3s). Time suffixes are supported, e.g. 30s, 1m.

### Examples

#### Simple data collection

Collect the content of [https://www.zabbix.com/release\\_notes](https://www.zabbix.com/release_notes):

- Create an item with type "Script".
- In the Script field, enter the following code:

```
var request = new CurlHttpRequest();
return request.Get("https://www.zabbix.com/release_notes");
```

#### Data collection with parameters

Use the {HOST.CONN} macro as parameter value and get a response with expanded macro:

- Create an item with type "Script".



- Create a parameter:  
Name: host  
Value: {HOST.CONN}

- In the Script field, enter the following code:

```
var request = new CurlHttpRequest();
return request.Post("https://postman-echo.com/post", JSON.parse(value));
```

#### Multiple HTTP requests

Collect the content of both <https://www.zabbix.com> and [https://www.zabbix.com/release\\_notes](https://www.zabbix.com/release_notes):

- Create an item with type "Script".
- In the Script field, enter the following code:

```
var request = new CurlHttpRequest();
return request.Get("https://www.zabbix.com") + request.Get("https://www.zabbix.com/release_notes");
```

#### Logging

Add the "Log test" entry to the Zabbix server log and receive the item value "1" in return:

- Create an item with type "Script".
- In the Script field, enter the following code:

```
Zabbix.Log(3, 'Log test');
return 1;
```

## 4 History and trends

### Overview

History and trends are the two ways of storing collected data in Zabbix.

Whereas history keeps each collected value, trends keep averaged information on hourly basis and therefore are less resource-hungry.

### Keeping history

You can set for how many days history will be kept:

- in the item properties **form**
- when mass-updating items
- when **setting up** housekeeper tasks

Any older data will be removed by the housekeeper.

The general strong advice is to keep history for the smallest possible number of days and that way not to overload the database with lots of historical values.

Instead of keeping a long history, you can keep longer data of trends. For example, you could keep history for 14 days and trends for 5 years.

You can get a good idea of how much space is required by history versus trends data by referring to the [database sizing page](#).

While keeping shorter history, you will still be able to review older data in graphs, as graphs will use trend values for displaying older data.

#### Attention:

If history is set to '0', the item will update only dependent items and inventory. No trigger functions will be evaluated because trigger evaluation is based on history data only.

#### Note:

As an alternative way to preserve history consider to use [history export](#) functionality of loadable modules.

### Keeping trends

Trends is a built-in historical data reduction mechanism which stores minimum, maximum, average and the total number of values per every hour for numeric data types.

You can set for how many days trends will be kept:

- in the item properties **form**
- when mass-updating items
- when setting up Housekeeper tasks

Trends usually can be kept for much longer than history. Any older data will be removed by the housekeeper.

Zabbix server accumulates trend data in runtime in the trend cache, as the data flows in. Server flushes trends into the database (where frontend can find them) in these situations:

- a new hour has started and server receives a new value for the item;
- a new hour is about to end in less than 5 minutes (no new values)
- server stops

To see trends on a graph you need to wait at least to the beginning of the next hour (if item is updated frequently) and at most to the end of the next hour (if item is updated rarely), which is 2 hours maximum.

When server flushes trend cache and there are already trends in the database for this hour (for example, server has been restarted mid-hour), server needs to use update statements instead of simple inserts. Therefore on a bigger installation if restart is needed it is desirable to stop server in the end of one hour and start in the beginning of the next hour to avoid trend data overlap.

History tables do not participate in trend generation in any way.

**Attention:**

If trends are set to '0', Zabbix server does not calculate or store trends at all.

**Note:**

The trends are calculated and stored with the same data type as the original values. As a result the average value calculations of unsigned data type values are rounded and the less the value interval is the less precise the result will be. For example if item has values 0 and 1, the average value will be 0, not 0.5.

Also restarting server might result in the precision loss of unsigned data type average value calculations for the current hour.

## 5 User parameters

### Overview

Sometimes you may want to run an agent check that does not come predefined with Zabbix. This is where user parameters come to help.

You may write a command that retrieves the data you need and include it in the user parameter in the **agent configuration file** ('UserParameter' configuration parameter).

A user parameter has the following syntax:

```
UserParameter=<key>,<command>
```

As you can see, a user parameter also contains a key. The key will be necessary when configuring an item. Enter a key of your choice that will be easy to reference (it must be unique within a host). Restart the agent.

Then, when **configuring an item**, enter the key to reference the command from the user parameter you want executed.

User parameters are commands executed by Zabbix agent. Up to 512KB of data can be returned before item preprocessing steps. Note, however, that the text value that can be eventually stored in database is limited to 64KB on MySQL (see info on other databases in the **table**).

**/bin/sh** is used as a command line interpreter under UNIX operating systems. User parameters obey the agent check timeout; if timeout is reached the forked user parameter process is terminated.

See also:

- **Step-by-step tutorial** on making use of user parameters
- **Command execution**

Examples of simple user parameters

A simple command:

```
UserParameter=ping,echo 1
```

The agent will always return '1' for an item with 'ping' key.

A more complex example:

```
UserParameter=mysql.ping,mysqladmin -uroot ping | grep -c alive
```

The agent will return '1', if MySQL server is alive, '0' - otherwise.

Flexible user parameters

Flexible user parameters accept parameters with the key. This way a flexible user parameter can be the basis for creating several items.

Flexible user parameters have the following syntax:

```
UserParameter=key[*],command
```

Parameter	Description
<b>Key</b>	Unique item key. The [*] defines that this key accepts parameters within the brackets.
<b>Command</b>	Parameters are given when configuring the item. Command to be executed to evaluate value of the key. For flexible user parameters only: You may use positional references \$1...\$9 in the command to refer to the respective parameter in the item key. Zabbix parses the parameters enclosed in [ ] of the item key and substitutes \$1,...,\$9 in the command accordingly. \$0 will be substituted by the original command (prior to expansion of \$0,...,\$9) to be run. Positional references are interpreted regardless of whether they are enclosed between double (") or single (') quotes. To use positional references unaltered, specify a double dollar sign - for example, awk '{print \$\$2}'. In this case \$\$2 will actually turn into \$2 when executing the command.

**Attention:**

Positional references with the \$ sign are searched for and replaced by Zabbix agent only for flexible user parameters. For simple user parameters, such reference processing is skipped and, therefore, any \$ sign quoting is not necessary.

**Attention:**

Certain symbols are not allowed in user parameters by default. See [UnsafeUserParameters](#) documentation for a full list.

Example 1

Something very simple:

```
UserParameter=ping[*],echo $1
```

We may define unlimited number of items for monitoring all having format ping[something].

- ping[0] - will always return '0'
- ping[aaa] - will always return 'aaa'

Example 2

Let's add more sense!

```
UserParameter=mysql.ping[*],mysqladmin -u$1 -p$2 ping | grep -c alive
```

This parameter can be used for monitoring availability of MySQL database. We can pass user name and password:

```
mysql.ping[zabbix,our_password]
```

Example 3

How many lines matching a regular expression in a file?

```
UserParameter=wc[*],grep -c "$2" $1
```

This parameter can be used to calculate number of lines in a file.

```
wc [/etc/passwd,root]
wc [/etc/services,zabbix]
```

Command result

The return value of the command is standard output together with standard error.

**Attention:**

A text (character, log or text type of information) item will not become unsupported in case of standard error output.

User parameters that return text (character, log, text type of information) can return whitespace. In case of invalid result the item will become unsupported.

## 1 Extending Zabbix agents

This tutorial provides step-by-step instructions on how to extend the functionality of Zabbix agent with the use of a **user parameter**.

### Step 1

Write a script or command line to retrieve required parameter.

For example, we may write the following command in order to get total number of queries executed by a MySQL server:

```
mysqladmin -uroot status | cut -f4 -d":" | cut -f1 -d"S"
```

When executed, the command returns total number of SQL queries.

### Step 2

Add the command to `zabbix_agentd.conf`:

```
UserParameter=mysql.questions,mysqladmin -uroot status | cut -f4 -d":" | cut -f1 -d"S"
```

**mysql.questions** is a unique identifier. It can be any valid key identifier, for example, queries.

Test this parameter by using Zabbix agent with `-t` flag (if running under root, however, note that the agent may have different permissions when launched as a daemon):

```
zabbix_agentd -t mysql.questions
```

### Step 3

Restart Zabbix agent.

Agent will reload configuration file.

Test this parameter by using **zabbix\_get** utility.

### Step 4

Add new item with `Key=mysql.questions` to the monitored host. Type of the item must be either Zabbix Agent or Zabbix Agent (active).

Be aware that type of returned values must be set correctly on Zabbix server. Otherwise Zabbix won't accept them.

## 6 Loadable modules

### 1 Overview

Loadable modules offer a performance-minded option for extending Zabbix functionality.

There already are ways of extending Zabbix functionality by way of:

- **user parameters** (agent metrics)
- **external checks** (agent-less monitoring)
- `system.run []` Zabbix **agent item**.

They work very well, but have one major drawback, namely `fork()`. Zabbix has to fork a new process every time it handles a user metric, which is not good for performance. It is not a big deal normally, however it could be a serious issue when monitoring embedded systems, having a large number of monitored parameters or heavy scripts with complex logic or long startup time.

Support of loadable modules offers ways for extending Zabbix agent, server and proxy without sacrificing performance.

A loadable module is basically a shared library used by Zabbix daemon and loaded on startup. The library should contain certain functions, so that a Zabbix process may detect that the file is indeed a module it can load and work with.

Loadable modules have a number of benefits. Great performance and ability to implement any logic are very important, but perhaps the most important advantage is the ability to develop, use and share Zabbix modules. It contributes to trouble-free maintenance and helps to deliver new functionality easier and independently of the Zabbix core code base.

Module licensing and distribution in binary form is governed by the GPL license (modules are linking with Zabbix in runtime and are using Zabbix headers; currently the whole Zabbix code is licensed under GPL license). Binary compatibility is not guaranteed by Zabbix.

Module API stability is guaranteed during one Zabbix LTS (Long Term Support) [release](#) cycle. Stability of Zabbix API is not guaranteed (technically it is possible to call Zabbix internal functions from a module, but there is no guarantee that such modules will work).

## 2 Module API

In order for a shared library to be treated as a Zabbix module, it should implement and export several functions. There are currently six functions in the Zabbix module API, only one of which is mandatory and the other five are optional.

### 2.1 Mandatory interface

The only mandatory function is **zbx\_module\_api\_version()**:

```
int zbx_module_api_version(void);
```

This function should return the API version implemented by this module and in order for the module to be loaded this version must match module API version supported by Zabbix. Version of module API supported by Zabbix is ZBX\_MODULE\_API\_VERSION. So this function should return this constant. Old constant ZBX\_MODULE\_API\_VERSION\_ONE used for this purpose is now defined to equal ZBX\_MODULE\_API\_VERSION to preserve source compatibility, but it's usage is not recommended.

### 2.2 Optional interface

The optional functions are **zbx\_module\_init()**, **zbx\_module\_item\_list()**, **zbx\_module\_item\_timeout()**, **zbx\_module\_history\_write\_cbs()** and **zbx\_module\_uninit()**:

```
int zbx_module_init(void);
```

This function should perform the necessary initialization for the module (if any). If successful, it should return ZBX\_MODULE\_OK. Otherwise, it should return ZBX\_MODULE\_FAIL. In the latter case Zabbix will not start.

```
ZBX_METRIC *zbx_module_item_list(void);
```

This function should return a list of items supported by the module. Each item is defined in a ZBX\_METRIC structure, see the section below for details. The list is terminated by a ZBX\_METRIC structure with "key" field of NULL.

```
void zbx_module_item_timeout(int timeout);
```

If module exports **zbx\_module\_item\_list()** then this function is used by Zabbix to specify the timeout settings in Zabbix configuration file that the item checks implemented by the module should obey. Here, the "timeout" parameter is in seconds.

```
ZBX_HISTORY_WRITE_CBS zbx_module_history_write_cbs(void);
```

This function should return callback functions Zabbix server will use to export history of different data types. Callback functions are provided as fields of ZBX\_HISTORY\_WRITE\_CBS structure, fields can be NULL if module is not interested in the history of certain type.

```
int zbx_module_uninit(void);
```

This function should perform the necessary uninitialization (if any) like freeing allocated resources, closing file descriptors, etc.

All functions are called once on Zabbix startup when the module is loaded, with the exception of zbx\_module\_uninit(), which is called once on Zabbix shutdown when the module is unloaded.

### 2.3 Defining items

Each item is defined in a ZBX\_METRIC structure:

```
typedef struct
{
    char *key;
    unsigned flags;
    int (*function)();
    char *test_param;
```

```
}
ZBX_METRIC;
```

Here, **key** is the item key (e.g., "dummy.random"), **flags** is either CF\_HAVEPARAMS or 0 (depending on whether the item accepts parameters or not), **function** is a C function that implements the item (e.g., "zbx\_module\_dummy\_random"), and **test\_param** is the parameter list to be used when Zabbix agent is started with the "-p" flag (e.g., "1,1000", can be NULL). An example definition may look like this:

```
static ZBX_METRIC keys[] =
{
    { "dummy.random", CF_HAVEPARAMS, zbx_module_dummy_random, "1,1000" },
    { NULL }
}
```

Each function that implements an item should accept two pointer parameters, the first one of type AGENT\_REQUEST and the second one of type AGENT\_RESULT:

```
int zbx_module_dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    ...

    SET_UI64_RESULT(result, from + rand() % (to - from + 1));

    return SYSINFO_RET_OK;
}
```

These functions should return SYSINFO\_RET\_OK, if the item value was successfully obtained. Otherwise, they should return SYSINFO\_RET\_FAIL. See example "dummy" module below for details on how to obtain information from AGENT\_REQUEST and how to set information in AGENT\_RESULT.

#### 2.4 Providing history export callbacks

##### Attention:

History export via module is no longer supported by Zabbix proxy since Zabbix 4.0.0.

Module can specify functions to export history data by type: Numeric (float), Numeric (unsigned), Character, Text and Log:

```
typedef struct
{
    void (*history_float_cb)(const ZBX_HISTORY_FLOAT *history, int history_num);
    void (*history_integer_cb)(const ZBX_HISTORY_INTEGER *history, int history_num);
    void (*history_string_cb)(const ZBX_HISTORY_STRING *history, int history_num);
    void (*history_text_cb)(const ZBX_HISTORY_TEXT *history, int history_num);
    void (*history_log_cb)(const ZBX_HISTORY_LOG *history, int history_num);
}
ZBX_HISTORY_WRITE_CBS;
```

Each of them should take "history" array of "history\_num" elements as arguments. Depending on history data type to be exported, "history" is an array of the following structures, respectively:

```
typedef struct
{
    zbx_uint64_t itemid;
    int clock;
    int ns;
    double value;
}
ZBX_HISTORY_FLOAT;

typedef struct
{
    zbx_uint64_t itemid;
    int clock;
    int ns;
    zbx_uint64_t value;
}
```

```

ZBX_HISTORY_INTEGER;

typedef struct
{
    zbx_uint64_t    itemid;
    int            clock;
    int            ns;
    const char     *value;
}
ZBX_HISTORY_STRING;

typedef struct
{
    zbx_uint64_t    itemid;
    int            clock;
    int            ns;
    const char     *value;
}
ZBX_HISTORY_TEXT;

typedef struct
{
    zbx_uint64_t    itemid;
    int            clock;
    int            ns;
    const char     *value;
    const char     *source;
    int            timestamp;
    int            logeventid;
    int            severity;
}
ZBX_HISTORY_LOG;

```

Callbacks will be used by Zabbix server history syncer processes in the end of history sync procedure after data is written into Zabbix database and saved in value cache.

## 2.5 Building modules

Modules are currently meant to be built inside Zabbix source tree, because the module API depends on some data structures that are defined in Zabbix headers.

The most important header for loadable modules is **include/module.h**, which defines these data structures. Other necessary system headers that help **include/module.h** to work properly are **stdlib.h** and **stdint.h**.

With this information in mind, everything is ready for the module to be built. The module should include **stdlib.h**, **stdint.h** and **module.h**, and the build script should make sure that these files are in the include path. See example "dummy" module below for details.

Another useful header is **include/log.h**, which defines **zabbix\_log()** function, which can be used for logging and debugging purposes.

## 3 Configuration parameters

Zabbix agent, server and proxy support two **parameters** to deal with modules:

- LoadModulePath – full path to the location of loadable modules
- LoadModule – module(s) to load at startup. The modules must be located in a directory specified by LoadModulePath or the path must precede the module name. If the preceding path is absolute (starts with '/') then LoadModulePath is ignored. It is allowed to include multiple LoadModule parameters.

For example, to extend Zabbix agent we could add the following parameters:

```

LoadModulePath=/usr/local/lib/zabbix/agent/
LoadModule=mariadb.so
LoadModule=apache.so
LoadModule=kernel.so
LoadModule=/usr/local/lib/zabbix/dummy.so

```

Upon agent startup it will load the mariadb.so, apache.so and kernel.so modules from the /usr/local/lib/zabbix/agent directory while dummy.so will be loaded from /usr/local/lib/zabbix. It will fail if a module is missing, in case of bad permissions or if a shared library is not a Zabbix module.

#### 4 Frontend configuration

Loadable modules are supported by Zabbix agent, server and proxy. Therefore, item type in Zabbix frontend depends on where the module is loaded. If the module is loaded into the agent, then the item type should be "Zabbix agent" or "Zabbix agent (active)". If the module is loaded into server or proxy, then the item type should be "Simple check".

History export through Zabbix modules does not need any frontend configuration. If the module is successfully loaded by server and provides **zbx\_module\_history\_write\_cbs()** function which returns at least one non-NULL callback function then history export will be enabled automatically.

#### 5 Dummy module

Zabbix includes a sample module written in C language. The module is located under src/modules/dummy:

```
alex@alex:~trunk/src/modules/dummy$ ls -l
-rw-rw-r-- 1 alex alex 9019 Apr 24 17:54 dummy.c
-rw-rw-r-- 1 alex alex 67 Apr 24 17:54 Makefile
-rw-rw-r-- 1 alex alex 245 Apr 24 17:54 README
```

The module is well documented, it can be used as a template for your own modules.

After ./configure has been run in the root of Zabbix source tree as described above, just run **make** in order to build **dummy.so**.

```
/*
** Zabbix
** Copyright (C) 2001-2020 Zabbix SIA
**
** This program is free software; you can redistribute it and/or modify
** it under the terms of the GNU General Public License as published by
** the Free Software Foundation; either version 2 of the License, or
** (at your option) any later version.
**
** This program is distributed in the hope that it will be useful,
** but WITHOUT ANY WARRANTY; without even the implied warranty of
** MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
** GNU General Public License for more details.
**
** You should have received a copy of the GNU General Public License
** along with this program; if not, write to the Free Software
** Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.
**/

####include <stdlib.h>
####include <string.h>
####include <time.h>
####include <stdint.h>

####include "module.h"

/* the variable keeps timeout setting for item processing */
static int item_timeout = 0;

/* module SHOULD define internal functions as static and use a naming pattern different from Zabbix internal
/* symbols (zbx_*) and loadable module API functions (zbx_module_*) to avoid conflicts
static int dummy_ping(AGENT_REQUEST *request, AGENT_RESULT *result);
static int dummy_echo(AGENT_REQUEST *request, AGENT_RESULT *result);
static int dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result);

static ZBX_METRIC keys[] =
/* KEY FLAG FUNCTION TEST PARAMETERS */
{
    {"dummy.ping", 0, dummy_ping, NULL},
    {"dummy.echo", CF_HAVEPARAMS, dummy_echo, "a message"},
}
```



```

    {"dummy.random",    CF_HAVEPARAMS,    dummy_random,    "1,1000"},
    {NULL}
};

/*****
 *
 * Function: zbx_module_api_version
 *
 * Purpose: returns version number of the module interface
 *
 * Return value: ZBX_MODULE_API_VERSION - version of module.h module is
 *             compiled with, in order to load module successfully Zabbix
 *             MUST be compiled with the same version of this header file
 *
 *****/
int zbx_module_api_version(void)
{
    return ZBX_MODULE_API_VERSION;
}

/*****
 *
 * Function: zbx_module_item_timeout
 *
 * Purpose: set timeout value for processing of items
 *
 * Parameters: timeout - timeout in seconds, 0 - no timeout set
 *
 *****/
void zbx_module_item_timeout(int timeout)
{
    item_timeout = timeout;
}

/*****
 *
 * Function: zbx_module_item_list
 *
 * Purpose: returns list of item keys supported by the module
 *
 * Return value: list of item keys
 *
 *****/
ZBX_METRIC *zbx_module_item_list(void)
{
    return keys;
}

static int dummy_ping(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    SET_UI64_RESULT(result, 1);

    return SYSINFO_RET_OK;
}

static int dummy_echo(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    char *param;

    if (1 != request->nparam)
    {
        /* set optional error message */
    }
}

```

```

    SET_MSG_RESULT(result, strdup("Invalid number of parameters.));
    return SYSINFO_RET_FAIL;
}

param = get_rparam(request, 0);

SET_STR_RESULT(result, strdup(param));

return SYSINFO_RET_OK;
}

/*****
 *
 * Function: dummy_random
 *
 * Purpose: a main entry point for processing of an item
 *
 * Parameters: request - structure that contains item key and parameters
 *             request+key - item key without parameters
 *             request+nparam - number of parameters
 *             request+params[N-1] - pointers to item key parameters
 *             request+types[N-1] - item key parameters types:
 *                 REQUEST_PARAMETER_TYPE_UNDEFINED (key parameter is empty)
 *                 REQUEST_PARAMETER_TYPE_ARRAY (array)
 *                 REQUEST_PARAMETER_TYPE_STRING (quoted or unquoted string)
 *
 *             result - structure that will contain result
 *
 * Return value: SYSINFO_RET_FAIL - function failed, item will be marked
 *              as not supported by zabbix
 *              SYSINFO_RET_OK - success
 *
 * Comment: get_rparam(request, N-1) can be used to get a pointer to the Nth
 *          parameter starting from 0 (first parameter). Make sure it exists
 *          by checking value of request+nparam.
 *          In the same manner get_rparam_type(request, N-1) can be used to
 *          get a parameter type.
 *****/
static int dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    char *param1, *param2;
    int from, to;

    if (2 != request+nparam)
    {
        /* set optional error message */
        SET_MSG_RESULT(result, strdup("Invalid number of parameters.));
        return SYSINFO_RET_FAIL;
    }

    param1 = get_rparam(request, 0);
    param2 = get_rparam(request, 1);

    /* there is no strict validation of parameters and types for simplicity sake */
    from = atoi(param1);
    to = atoi(param2);

    if (from > to)
    {
        SET_MSG_RESULT(result, strdup("Invalid range specified.));
        return SYSINFO_RET_FAIL;
    }
}

```

```

}

SET_UI64_RESULT(result, from + rand() % (to - from + 1));

return SYSINFO_RET_OK;
}

/*****
 *
 * Function: zbx_module_init
 *
 * Purpose: the function is called on agent startup
 *          It should be used to call any initialization routines
 *
 * Return value: ZBX_MODULE_OK - success
 *              ZBX_MODULE_FAIL - module initialization failed
 *
 * Comment: the module won't be loaded in case of ZBX_MODULE_FAIL
 *
 *****/
int zbx_module_init(void)
{
    /* initialization for dummy.random */
    srand(time(NULL));

    return ZBX_MODULE_OK;
}

/*****
 *
 * Function: zbx_module_uninit
 *
 * Purpose: the function is called on agent shutdown
 *          It should be used to cleanup used resources if there are any
 *
 * Return value: ZBX_MODULE_OK - success
 *              ZBX_MODULE_FAIL - function failed
 *
 *****/
int zbx_module_uninit(void)
{
    return ZBX_MODULE_OK;
}

/*****
 *
 * Functions: dummy_history_float_cb
 *            dummy_history_integer_cb
 *            dummy_history_string_cb
 *            dummy_history_text_cb
 *            dummy_history_log_cb
 *
 * Purpose: callback functions for storing historical data of types float,
 *          integer, string, text and log respectively in external storage
 *
 * Parameters: history      - array of historical data
 *            history_num - number of elements in history array
 *
 *****/
static void dummy_history_float_cb(const ZBX_HISTORY_FLOAT *history, int history_num)
{
    int i;

```

```

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_integer_cb(const ZBX_HISTORY_INTEGER *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_string_cb(const ZBX_HISTORY_STRING *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_text_cb(const ZBX_HISTORY_TEXT *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_log_cb(const ZBX_HISTORY_LOG *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

/*****
 *
 * Function: zbx_module_history_write_cbs
 *
 * Purpose: returns a set of module functions Zabbix will call to export
 *          different types of historical data
 *
 * Return value: structure with callback function pointers (can be NULL if
 *              module is not interested in data of certain types)
 *
 *****/
ZBX_HISTORY_WRITE_CBS    zbx_module_history_write_cbs(void)
{
    static ZBX_HISTORY_WRITE_CBS    dummy_callbacks =
    {
        dummy_history_float_cb,

```

```

    dummy_history_integer_cb,
    dummy_history_string_cb,
    dummy_history_text_cb,
    dummy_history_log_cb,
};

return dummy_callbacks;
}

```

The module exports three new items:

- `dummy.ping` - always returns '1'
- `dummy.echo[param1]` - returns the first parameter as it is, for example, `dummy.echo[ABC]` will return ABC
- `dummy.random[param1, param2]` - returns a random number within the range of param1-param2, for example, `dummy.random[1,1000000]`

## 6 Limitations

Support of loadable modules is implemented for the Unix platform only. It means that it does not work for Windows agents.

In some cases a module may need to read module-related configuration parameters from `zabbix_agentd.conf`. It is not supported currently. If you need your module to use some configuration parameters you should probably implement parsing of a module-specific configuration file.

## 7 Windows performance counters

### Overview

You can effectively monitor Windows performance counters using the `perf_counter[]` key.

For example:

```
perf_counter["\Processor(0)\Interrupts/sec"]
```

or

```
perf_counter["\Processor(0)\Interrupts/sec", 10]
```

For more information on using this key or its English-only equivalent `perf_counter_en`, see [Windows-specific item keys](#).

In order to get a full list of performance counters available for monitoring, you may run:

```
typeperf -qx
```

You may also use low-level discovery to discover multiple [object instances](#) of Windows performance counters and automate the creation of `perf_counter` items for multiple instance objects.

### Numeric representation

Windows maintains numeric representations (indexes) for object and performance counter names. Zabbix supports these numeric representations as parameters to the `perf_counter`, `perf_counter_en` item keys and in `PerfCounter`, `PerfCounterEn` configuration parameters.

However, it's not recommended to use them unless you can guarantee your numeric indexes map to correct strings on specific hosts. If you need to create portable items that work across different hosts with various localized Windows versions, you can use the `perf_counter_en` key or `PerfCounterEn` configuration parameter which allow to use English names regardless of system locale.

To find out the numeric equivalents, run **regedit**, then find `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib\00`

The registry entry contains information like this:

```

1
1847
2
System
4
Memory
6
% Processor Time
10
File Read Operations/sec

```

12  
File Write Operations/sec  
14  
File Control Operations/sec  
16  
File Read Bytes/sec  
18  
File Write Bytes/sec  
....

Here you can find the corresponding numbers for each string part of the performance counter, like in '\System\% Processor Time':

System → 2  
% Processor Time → 6

Then you can use these numbers to represent the path in numbers:

\2\6

Performance counter parameters

You can deploy some PerfCounter parameters for the monitoring of Windows performance counters.

For example, you can add these to the Zabbix agent configuration file:

```
PerfCounter=UserPerfCounter1,"\Memory\Page Reads/sec",30  
or  
PerfCounter=UserPerfCounter2,"4\24",30
```

With such parameters in place, you can then simply use UserPerfCounter1 or UserPerfCounter2 as the keys for creating the respective items.

Remember to restart Zabbix agent after making changes to the configuration file.

## 8 Mass update

### Overview

Sometimes you may want to change some attribute for a number of items at once. Instead of opening each individual item for editing, you may use the mass update function for that.

### Using mass update

To mass-update some items, do the following:

- Mark the checkboxes of the items to update in the list
- Click on Mass update below the list
- Navigate to the tab with required attributes (Item or Preprocessing)
- Mark the checkboxes of the attributes to update
- Enter new values for the attributes

- Type  Original
- Host interface  Original
- JMX endpoint  Original
- URL  Original
- Request body type  Original
- Timeout  Original
- Request body  Original
- Headers  Original
- Type of information  Original
- Units  Original
- Authentication method  Original
  - User name  Original
  - Public key file  Original
  - Private key file  Original
  - Password  Original
- Update interval  Original
- History storage period 

Do not keep history	Storage period	7d
---------------------	----------------	----
- Trend storage period  Original
- Status  Original
- Log time format  Original
- Show value  Original
- Enable trapping  Original
- Allowed hosts  Original
- Applications 

Add	Replace	Remove
type here to search		
- Master item  Original
- Description  Original

The Applications option allows to:

- Add - add new or existing applications to the items by specifying application name
- Replace - replace existing applications of the items with the one(s) specified in this field
- Remove - only remove specified applications from the items

The field for specifying applications is auto-complete - starting to type in it offers a dropdown of matching applications. If the application is new, it also appears in the dropdown and it is indicated by (new) after the string. Just scroll down to select.

Name	Parameters
1: JavaScript	script
2: JSONPath	\$.path.to.node

[Add](#)

When done, click on Update.

## 9 Value mapping

### Overview

For a more "human" representation of received values, you can use value maps that contain the mapping between numeric values and string representations.

Value mappings can be used in both the Zabbix frontend and notifications sent by email, SMS or script.

For example, an item which has value '0' or '1' can use value mapping to represent the values in a human-readable form:

- '0' => 'Not Available'
- '1' => 'Available'

Or, a backup related value map could be:

- 'F' → 'Full'
- 'D' → 'Differential'
- 'I' → 'Incremental'

Thus, when **configuring items** you can use a value map to "humanize" the way an item value will be displayed. To do that, you refer to the name of a previously defined value map in the Show value field.

#### Note:

Value mapping can be used with items having Numeric (unsigned), Numeric (float) and Character type of information.

Value mappings, starting with Zabbix 3.0, can be exported/imported, either separately, or with the respective template or host.

### Configuration

To define a value map:

- Go to: Administration → General
- Select Value mapping from the dropdown
- Click on Create value map (or on the name of an existing map)



\* Name

\* Mappings

Value	Mapped to
<input type="text" value="0"/>	⇒ <input type="text" value="Running"/>
<input type="text" value="1"/>	⇒ <input type="text" value="Paused"/>
<input type="text" value="2"/>	⇒ <input type="text" value="Start pending"/>
<input type="text" value="3"/>	⇒ <input type="text" value="Pause pending"/>
<input type="text" value="4"/>	⇒ <input type="text" value="Continue pending"/>
<input type="text" value="5"/>	⇒ <input type="text" value="Stop pending"/>
<input type="text" value="6"/>	⇒ <input type="text" value="Stopped"/>
<input type="text" value="7"/>	⇒ <input type="text" value="Unknown"/>
<input type="text" value="255"/>	⇒ <input type="text" value="No such service"/>

[Add](#)

Parameters of a value map:

Parameter	Description
Name	Unique name of a set of value mappings.
Mappings	Individual mappings - pairs of numeric values and their string representations.

All mandatory input fields are marked with a red asterisk.

To add a new individual mapping, click on Add.

How this works

For example, one of the predefined agent items 'Ping to the server (TCP)' uses an existing value map called 'Service state' to display its values.

\* Name

\* Mappings

Value	Mapped to
<input type="text" value="0"/>	⇒ <input type="text" value="Down"/>
<input type="text" value="1"/>	⇒ <input type="text" value="Up"/>

[Add](#)

In the item **configuration form** you can see a reference to this value map in the Show value field:

Show value  [show value mappings](#)

So in Monitoring → Latest data the mapping is put to use to display 'Up' (with the raw value in parentheses).

NAME	LAST CHECK	LAST VALUE
Zabbix agent (1 item)		
Agent ping	2015-08-11 22:01:07	Up (1)

In the Latest data section displayed values are shortened to 20 symbols. If value mapping is used, this shortening is not applied to the mapped value, but only to the raw value separately (displayed in parenthesis).

**Note:**  
A value being displayed in a human-readable form is also easier to understand when receiving notifications.

Without a predefined value map you would only get this:

NAME	LAST CHECK	LAST VALUE
Zabbix agent (1 item)		
Agent ping	2015-08-11 22:09:21	1

So in this case you would either have to guess what the '1' stands for or do a search of documentation to find out.

## 10 Applications

### Overview

Applications are used to group items in logical groups.

For example, the MySQL Server application can hold all items related to the MySQL server: availability of MySQL, disk space, processor load, transactions per second, number of slow queries, etc.

Applications are also used for grouping web scenarios.

If you are using applications, then in Monitoring → Latest data you will see items and web scenarios grouped under their respective applications.

### Configuration

To work with applications you must first create them and then link items or web scenarios to them.

To create an application, do the following:

- Go to Configuration → Hosts or Templates
- Click on Applications next to the required host or template
- Click on Create application
- Enter the application name and click on Add to save it

## ≡ Applications

All hosts / Zabbix server Enabled ZBX SNMP JMX IPMI Applications 18 Items 171 Triggers 59

\* Name

Add Cancel

You can also create a new application directly in the item properties form.

Items are linked to applications in the item properties form. Select one or more applications the item will belong to.

Web scenarios are linked to applications in the web scenario definition form. Select the application the scenario will belong to.

## 11 Queue

### Overview

The queue displays items that are waiting for a refresh. The queue is just a **logical** representation of data. There is no IPC queue or any other queue mechanism in Zabbix.

Items monitored by proxies are also included in the queue - they will be counted as queued for the proxy history data update period.

Only items with scheduled refresh times are displayed in the queue. This means that the following item types are excluded from the queue:

- log, logrt and event log active Zabbix agent items
- SNMP trap items
- trapper items
- web monitoring items
- dependent items

Statistics shown by the queue is a good indicator of the performance of Zabbix server.

The queue is retrieved directly from Zabbix server using JSON protocol. The information is available only if Zabbix server is running.

### Reading the queue

To read the queue, go to Administration → Queue.

≡ Queue overview ▾

Items	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
Zabbix agent	1	11	1	0	0	0
Zabbix agent (active)	0	0	0	0	0	0
Simple check	0	0	0	0	0	0
SNMPv1 agent	0	0	0	0	0	0
SNMPv2 agent	0	0	0	0	0	0
SNMPv3 agent	0	0	0	0	0	0
Zabbix internal	0	0	0	0	0	0
Zabbix aggregate	0	0	0	0	0	0
External check	0	0	0	0	0	0
Database monitor	0	0	0	0	0	0
HTTP agent	0	0	0	0	0	0

The picture here is generally "ok" so we may assume that the server is doing fine.

The queue shows some items waiting up to 30 seconds. It would be great to know what items these are.

To do just that, select Queue details in the title dropdown. Now you can see a list of those delayed items.

☰ Queue details ▾

Scheduled check	Delayed by	Host	Name	Proxy
2019-09-02 11:46:40	58s	My host	CPU idle time	Remote proxy
2019-09-02 11:46:41	57s	My host	CPU interrupt time	Remote proxy
2019-09-02 11:46:42	56s	My host	CPU iowait time	Remote proxy
2019-09-02 11:46:43	55s	My host	CPU nice time	Remote proxy
2019-09-02 11:46:44	54s	My host	CPU softirq time	Remote proxy
2019-09-02 11:46:45	53s	My host	CPU steal time	Remote proxy
2019-09-02 11:46:46	52s	My host	CPU system time	Remote proxy

With these details provided it may be possible to find out why these items might be delayed.

With one or two delayed items there perhaps is no cause for alarm. They might get updated in a second. However, if you see a bunch of items getting delayed for too long, there might be a more serious problem.

☰ Queue overview ▾

Items	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
Zabbix agent	0	1	1	26	0	0
Zabbix agent (active)	0	0	0	0	0	0
Simple check	0	0	0	0	0	0
SNMPv1 agent	0	0	0	0	0	0
SNMPv2 agent	0	0	0	0	0	0
SNMPv3 agent	0	0	0	0	0	0
Zabbix internal	0	0	0	0	0	0
Zabbix aggregate	0	0	0	0	0	0
External check	0	0	0	0	0	0
Database monitor	0	0	0	0	0	0
HTTP agent	0	0	0	0	0	0
IPMI agent	0	0	0	0	0	0
SSH agent	0	0	0	0	0	0
TELNET agent	0	0	0	0	0	0
JMX agent	0	0	0	0	0	0
Calculated	0	0	0	0	0	0

### Queue item

A special internal item **zabbix[queue,<from>,<to>]** can be used to monitor the health of the queue in Zabbix. It will return the number of items delayed by the set amount of time. For more information see [Internal items](#).

## 12 Value cache

### Overview

To make the calculation of trigger expressions, calculated/aggregate items and some macros much faster, since Zabbix 2.2 a value cache option is supported by the Zabbix server.

This in-memory cache can be used for accessing historical data, instead of making direct SQL calls to the database. If historical values are not present in the cache, the missing values are requested from the database and the cache updated accordingly.

To enable the value cache functionality, an optional **ValueCacheSize** parameter is supported by the Zabbix server [configuration file](#).

Two internal items are supported for monitoring the value cache: **zabbix[vcache,buffer,<mode>]** and **zabbix[vcache,cache,<parameter>]**. See more details with [internal items](#).

## 13 Execute now

### Overview

Checking for a new item value in Zabbix is a cyclic process that is based on configured update intervals. While for many items the update intervals are quite short, there are others (including low-level discovery rules) for which the update intervals are quite

long, so in real-life situations there may be a need to check for a new value quicker - to pick up changes in discoverable resources, for example. To accommodate such a necessity, it is possible to reschedule a passive check and retrieve a new value immediately.

This functionality is supported for **passive** checks only. The following item types are supported:

- Zabbix agent (passive)
- SNMPv1/v2/v3 agent
- IPMI agent
- Simple check
- Zabbix internal
- Zabbix aggregate
- External check
- Database monitor
- JMX agent
- SSH agent
- Telnet
- Calculated
- HTTP agent

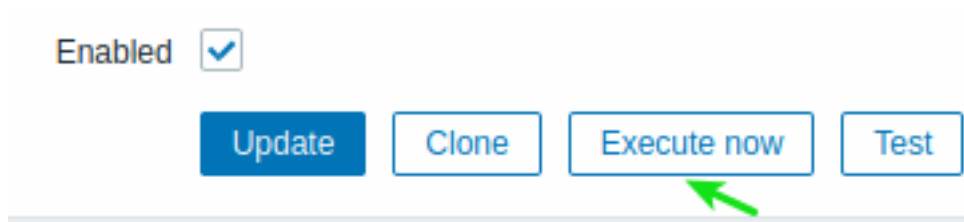
**Attention:**

The check must be present in the configuration cache in order to get executed; for more information see [CacheUpdateFrequency](#). Before executing the check, the configuration cache is **not** updated, thus very recent changes to item/discovery rule configuration will not be picked up. Therefore, it is also not possible to check for a new value for an item/rule that is being created or has been created just now; use the Test option while configuring an item for that.

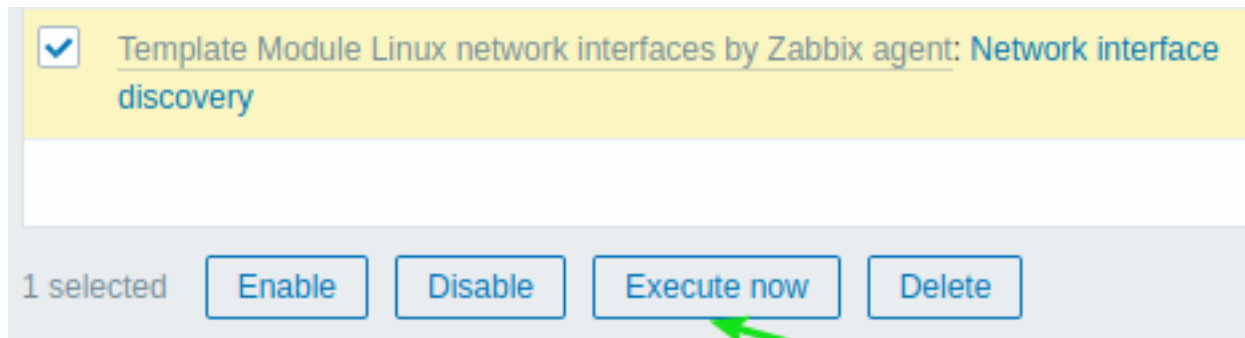
Configuration

To execute a passive check immediately:

- click on Execute now in an existing item (or discovery rule) configuration form:



- click on Execute now for selected items/rules in the list of items/discovery rules:



In the latter case several items/rules can be selected and "executed now" at once.

## 14 Plugins

Plugins provide an option to extend the monitoring capabilities of Zabbix. The plugins are written in Go programming language and supported for Zabbix agent 2 only. They provide an alternative to **loadable modules** (written in C), and other methods for extending Zabbix functionality, such as **user parameters** (agent metrics), **external checks** (agent-less monitoring), and `system.run [] Zabbix agent item`.

The following features are specific to agent 2 and its plugins:

- single configuration file (all plugin configuration parameters are located in the same file as parameters of the agent itself);
- task queue management with respect to schedule and task concurrency;
- plugin-level timeouts.

## Plugins supplied out-of-the-box

All metrics supported for Zabbix agent 2 are collected by plugins. The following plugins for Zabbix agent 2 are available out-of-the-box:

Plugin name	Description	Supported item keys	Comments
Agent	Metrics of the Zabbix agent being used.	agent.hostname, agent.ping, agent.version	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Ceph	Ceph monitoring.	ceph.df.details, ceph.osd.stats, ceph.osd.discovery, ceph.osd.dump, ceph.ping, ceph.pool.discovery, ceph.status	Supported <b>keys</b> can be used with Zabbix agent 2 only.
CPU	System CPU monitoring (number of CPUs/CPU cores, discovered CPUs, utilization percentage).	system.cpu.discovery, system.cpu.num, system.cpu.util	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Docker	Monitoring of Docker containers.	docker.container_info, docker.container_stats, docker.containers, docker.containers.discovery, docker.data_usage, docker.images, docker.images.discovery, docker.info, docker.ping	App Docker monitoring template is available.  Supported <b>keys</b> can be used with Zabbix agent 2 only.
File	File metrics collection.	vfs.file.cksum, vfs.file.contents, vfs.file.exists, vfs.file.md5sum, vfs.file.regexp, vfs.file.regmatch, vfs.file.size, vfs.file.time	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Kernel	Kernel monitoring.	kernel.maxfiles, kernel.maxproc	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Log	Log file monitoring.	log, log.count, logrt, logrt.count	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Memcached	Memcached server monitoring.	memcached.ping, memcached.stats	App Memcached monitoring template is available.  Supported <b>keys</b> can be used with Zabbix agent 2 only.

Plugin name	Description	Supported item keys	Comments
Modbus	Reads Modbus data.	modbus.get	Supported keys have the same parameters as Zabbix agent keys.  See also: - <a href="#">Plugin documentation</a> - Plugin configuration parameters ( <a href="#">Unix/Windows</a> )
Mongo DB	Monitoring of MongoDB servers and clusters (document-based, distributed database).	mongodb.collection.stats, mongodb.collections.discovery, mongodb.collections.usage, mongodb.connpool.stats, mongodb.db.stats, mongodb.db.discovery, mongodb.jumbo_chunks.count, mongodb.oplog.stats, mongodb.ping, mongodb.rs.config, mongodb.rs.status, mongodb.server.status, mongodb.sh.discovery	Supported MongoDB versions: 3.6, 4.0, 4.2, 4.4.  Requires a local read-only user in the admin database - follow the instructions for your configuration: STANDALONE - create a user for each single MongoDB node; REPLICASET - create a user on the primary node of the replica set; SHARDING - create a user for each shard in the cluster (on the primary node of the replica set). Then, create the same user on a mongos router. It will be automatically passed to configuration servers. servers.use admindb.auth("Supported keys can be used with Zabbix agent 2 only. Supported since 5.2.6

Plugin name	Description	Supported item keys	Comments
MQTT	Receives published values of MQTT topics.	mqtt.get	Supported <b>keys</b> can be used with Zabbix agent 2 only.  See also: - <a href="#">Plugin documentation</a> - Plugin configuration parameters ( <b>Unix/Windows</b> )
MySQL	Monitoring of MySQL and its forks.	mysql.db.discovery, mysql.db.size, mysql.get_status_variables, mysql.ping, mysql.replication.discovery, mysql.replication.get_slave_status, mysql.version	DB MySQL by Zabbix agent 2 monitoring template is available.  Supported <b>keys</b> can be used with Zabbix agent 2 only.  Default configuration: URI=tcp://localhost:3306, username=root, "password= " Supported keys have the same parameters as Zabbix agent <b>keys</b> .
NetIf	Monitoring of network interfaces.	net.if.collisions, net.if.discovery, net.if.in, net.if.out, net.if.total	Supported keys have the same parameters as Zabbix agent <b>keys</b> .



Plugin name	Description	Supported item keys	Comments
Oracle	Oracle Database monitoring.	oracle.diskgroups.stats, oracle.diskgroups.discovery, oracle.archive.info, oracle.archive.discovery, oracle.cdb.info, oracle.custom.query, oracle.datafiles.stats, oracle.db.discovery, oracle.fra.stats, oracle.instance.info, oracle.pdb.info, oracle.pdb.discovery, oracle.pga.stats, oracle.ping, oracle.proc.stats, oracle.redolog.info, oracle.sga.stats, oracle.sessions.stats, oracle.sys.metrics, oracle.sys.params, oracle.ts.stats, oracle.ts.discovery, oracle.user.info	<p>DB Oracle by Zabbix agent 2 monitoring template is available.</p> <p>Install the <a href="#">Oracle Instant Client</a> before using the plugin.</p> <p>Supported <b>keys</b> can be used with Zabbix agent 2 only.</p> <p>Default configuration: URI=tcp://localhost:1521, service=XE (service name).</p> <p>Functionality of the plugin can be extended with custom user-defined queries - see <a href="#">plugin documentation</a> for configuration examples.</p>
PostgreSQL	Monitoring of PostgreSQL and its forks.	pgsql.ping, pgsql.db.discovery, pgsql.db.size, pgsql.db.age, pgsql.database.bloating_tables, pgsql.replication_lag.sec, pgsql.replication_lag.b, pgsql.replication.count, pgsql.replication.status, pgsql.replication.recovery_role, pgsql.cache.hit, pgsql.connections, pgsql.archive, pgsql.bgwriter, pgsql.dbstat.sum, pgsql.dbstat, pgsql.wal.stat, pgsql.locks, pgsql.pgsql.oldest.xid, pgsql.uptime	<p>DB PostgreSQL by Zabbix agent 2 monitoring template is available.</p> <p>Supported <b>keys</b> can be used with Zabbix agent 2 only.</p>
Proc	Process CPU utilization percentage.	proc.cpu.util	Supported key has the same parameters as Zabbix agent <b>key</b> .
Redis	Redis server monitoring.	redis.config, redis.info, redis.ping, redis.slowlog.count	<p>DB Redis monitoring template is available.</p> <p>Supported <b>keys</b> can be used with Zabbix agent 2 only.</p>

Plugin name	Description	Supported item keys	Comments
Smart	S.M.A.R.T. monitoring.	smart.attribute.discovery, smart.disk.discovery, smart.disk.get	Sudo/root access rights to smartctl are required for the user executing Zabbix agent 2. The minimum required smartctl version is 7.1.  Supported <b>keys</b> can be used with Zabbix agent 2 only on Linux/Windows, both as a passive and active check. Supported since Zabbix 5.2.5. Supported key has the same parameters as Zabbix agent <b>key</b> .
Swap	Swap space size in bytes/percentage.	system.swap.size	Supported key has the same parameters as Zabbix agent <b>key</b> .
SystemRun	Runs specified command.	system.run	Supported key has the same parameters as Zabbix agent <b>key</b> .
Systemd	Monitoring of systemd services.	systemd.unit.discovery, systemd.unit.get, systemd.unit.info	Supported <b>keys</b> can be used with Zabbix agent 2 only.
TCP	TCP connection availability check.	net.tcp.port	Supported key has the same parameters as Zabbix agent <b>key</b> .
UDP	Monitoring of the UDP services availability and performance.	net.udp.service, net.udp.service.perf	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Uname	Retrieval of information about the system.	system.hostname, system.sw.arch, system.uname	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Uptime	System uptime metrics collection.	system.uptime	Supported key has the same parameters as Zabbix agent <b>key</b> .
VFSDev	VFS metrics collection.	vfs.dev.discovery, vfs.dev.read, vfs.dev.write	Supported keys have the same parameters as Zabbix agent <b>keys</b> .
Web	Web page monitoring.	web.page.get, web.page.perf, web.page.regexp	Supported keys have the same parameters as Zabbix agent <b>keys</b> .

Plugin name	Description	Supported item keys	Comments
ZabbixAsync	Asynchronous metrics collection.	net.tcp.listen, net.udp.listen, sensor, system.boottime, system.cpu.intr, system.cpu.load, system.cpu.switches, system.hw.cpu, system.hw.macaddr, system.localtime, system.sw.os, system.swap.in, system.swap.out, vfs.fs.discovery	Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .
ZabbixStats	Zabbix server/proxy internal metrics or number of delayed items in a queue.	zabbix.stats	Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .
ZabbixSync	Synchronous metrics collection.	net.dns, net.dns.record, net.tcp.service, net.tcp.service.perf, proc.mem, proc.num, system.hw.chassis, system.hw.devices, system.sw.packages, system.users.num, vfs.dir.count, vfs.dir.size, vfs.fs.get, vfs.fs.inode, vfs.fs.size, vm.memory.size.	Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .

## Configuring plugins

Common configuration principles and best practices are described in this section.

For specific examples of plugin configuration see also:

- [Ceph](#)
- [Memcached](#)
- [Modbus](#)
- [MySQL](#)
- [Oracle](#)
- [PostgreSQL](#)
- [Redis](#)

All plugins are configured using `Plugins.*` parameter of the Zabbix agent 2 [configuration file](#). Unlike other agent parameters, it is not a key/value type of parameter. It is a separate section where specific parameters of the plugin can be described. Each parameter should have the following structure:

```
Plugins.<PluginName>.<Parameter>=<Value>
```

Parameter names should adhere to the following requirements:

- it is recommended to capitalize the names of your plugins;
- the parameter should be capitalized;
- special characters are not allowed;
- nesting isn't limited by a maximum level;
- the number of parameters is not limited.

## Named sessions

Named sessions represent an additional level of plugin parameters and can be used to define separate sets of authentication parameters for each of the instances being monitored. Each named session parameter should have the following structure:

```
Plugins.<PluginName>.<SessionName>.<Parameter>=<Value>
```

A session name can be used as a `connString` item key parameter instead of specifying a URI, username, and password separately. In item keys, the first parameter can be either a `connString` or a `Uri`. If the first key parameter matches a session name specified in the configuration file, the check will be executed using named session parameters. If the first key parameter doesn't match any session name, it will be treated as a `Uri`.

Note, that:

- when providing a `connString` (session name) in key parameters, key parameters for username and password must be empty;
- passing embedded URI credentials is not supported, consider using named sessions instead;
- in case an authentication parameter is not specified for the named session, a hardcoded default value will be used.

The list of available named session parameters depends on the plugin, see [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#) for details.

**Example:** Monitoring of two instances “MySQL1” and “MySQL2” can be configured in the following way:

```
Plugins.Mysql.Sessions.MySQL1.Uri=tcp://127.0.0.1:3306
Plugins.Mysql.Sessions.MySQL1.User=<UsernameForMySQL1>
Plugins.Mysql.Sessions.MySQL1.Password=<PasswordForMySQL1>
Plugins.Mysql.Sessions.MySQL2.Uri=tcp://127.0.0.1:3307
Plugins.Mysql.Sessions.MySQL2.User=<UsernameForMySQL2>
Plugins.Mysql.Sessions.MySQL2.Password=<PasswordForMySQL2>
```

Now, these names may be used as connStrings in keys instead of URIs:

```
mysql.ping[MySQL1]
mysql.ping[MySQL2]
```

Hardcoded defaults

If a parameter required for authentication is not provided in an item key or in the named session parameters, the plugin will use a hardcoded default value.

Connections

Some plugins support gathering metrics from multiple instances simultaneously. Both local and remote instances can be monitored. TCP and Unix-socket connections are supported.

It is recommended to configure plugins to keep connections to instances in an open state. The benefits are reduced network congestion, latency, and CPU and memory usage due to the lower number of connections. The client library takes care of this.

**Note:**

Time period for which unused connections should remain open can be determined by `Plugins.<PluginName>.KeepAlive` parameter.

Example: `Plugins.Memcached.KeepAlive`

Writing plugins

A plugin is a Go package that defines the structure and implements one or several plugin interfaces (Exporter, Collector, Runner, Watcher):

- **plugin.Exporter**

Exporter is the simplest interface that performs a poll and returns a value (values), nothing, error. It accepts a prepared item key, parameters and context. Exporter interface is the only interface that can be accessed concurrently. All other plugin interface access is exclusive and no method can be called when a plugin is already performing some task. Also, there is a limit of 100 maximum concurrent `Export()` calls per plugin, which can be reduced as necessary for each plugin.

- **plugin.Collector**

Collector is used when a plugin needs to collect data at regular intervals. This interface usually is used together with the Exporter interface to export the collected data.

- **plugin.Configurator**

Configurator is used to provide plugin its configuration parameters from the agent 2 [configuration file](#).

- **plugin.Runner**

Runner interface provides the means of performing some initialization when a plugin is started (activated) and deinitialization when a plugin is stopped (deactivated). For example, a plugin could start/stop some background goroutine by implementing the Runner interface.

- **plugin.Watcher**

Watcher allows the plugin to implement its own metric polling, without using the agent’s internal scheduler, for example in trap-based plugins.

Plugins by default are inactive and activated only when a metric provided by the plugin is being monitored.

Plugins are located in the plugin directory tree, grouped by meaning, for example `plugins/system/uptime/uptime.go`.

Implementation steps

A plugin must import the `zabbix.com/pkg/plugin` package.

```
import "zabbix.com/pkg/plugin"
```

A plugin must define the structure and embed the `plugin.Base` structure.

```
type Plugin struct {
    plugin.Base
}
var impl Plugin
```

A plugin must implement one or several plugin interfaces.

```
func (p *Plugin) Export(key string, params []string, ctx plugin.ContextProvider) (result interface{}, err error) {
    if len(params) > 0 {
        p.Debugf("received %d parameters while expected none", len(params))
        return nil, errors.New("Too many parameters")
    }
    return time.Now().Format(time.RFC3339)
}
```

A plugin must register itself during initialization.

```
func init() {
    plugin.RegisterMetrics(&impl, "Time", "system.time", "Returns time string in RFC 3999 format.")
}
```

where `RegisterMetrics` parameters are:

- Pointer to the plugin implementation
- Plugin name (upper camel case)
- Metric #1 name (item key)
- Metric #1 description (starting with an uppercase character and ending with a dot)
- Metric #2 name (item key) (optional)
- Metric #2 description (starting with an uppercase character and ending with a dot) (optional)
- ...

If logging is necessary the plugin must use the logging functionality provided by `plugin.Base` (see the example above). It's basically a wrapper around standard logging, but it will prefix log messages with [`<plugin name>`].

## 15 Restricting agent checks

### Overview

It is possible to restrict checks on the agent side by creating an item blacklist, a whitelist, or a combination of whitelist/blacklist.

To do that use a combination of two agent **configuration** parameters:

- `AllowKey=<pattern>` - which checks are allowed; `<pattern>` is specified using a wildcard (\*) expression
- `DenyKey=<pattern>` - which checks are denied; `<pattern>` is specified using a wildcard (\*) expression

Note that:

- All `system.run[*]` items (remote commands, scripts) are disabled by default, even when no deny keys are specified;
- Since Zabbix 5.0.2 the `EnableRemoteCommands` agent parameter is:
  - \* deprecated by Zabbix agent
  - \* unsupported by Zabbix agent2

Therefore, to allow all remote commands, specify an `AllowKey=system.run[*]` parameter. To allow only some remote commands, create a whitelist of specific `system.run[]` commands. To disallow specific remote commands, add `DenyKey` parameters with `system.run[]` commands before the `AllowKey=system.run[*]` parameter.

### Important rules

- A whitelist without a deny rule is only allowed for `system.run[*]` items. For all other items, `AllowKey` parameters are not allowed without a `DenyKey` parameter; in this case Zabbix agent **will not start** with only `AllowKey` parameters.
- The order matters. The specified parameters are checked one by one according to their appearance order in the configuration file:
  - As soon as an item key matches an allow/deny rule, the item is either allowed or denied; and rule checking stops. So if an item matches both an allow rule and a deny rule, the result will depend on which rule comes first.
  - The order affects also `EnableRemoteCommands` parameter (if used).

- Unlimited numbers of AllowKey/DenyKey parameters is supported.
- AllowKey, DenyKey rules do not affect HostnameItem, HostMetadataItem, HostInterfaceItem configuration parameters.
- Key pattern is a wildcard expression where the wildcard (\*) character matches any number of any characters in certain position. It might be used in both the key name and parameters.
- If a specific item key is disallowed in the agent configuration, the item will be reported as unsupported (no hint is given as to the reason);
- Zabbix agent with --print (-p) command line option will not show keys that are not allowed by configuration;
- Zabbix agent with --test (-t) command line option will return "Unsupported item key." status for keys that are not allowed by configuration;
- Denied remote commands will not be logged in the agent log (if LogRemoteCommands=1).

#### Use cases

##### Deny specific check

- Blacklist a specific check with DenyKey parameter. Matching keys will be disallowed. All non-matching keys will be allowed, except system.run[] items.

For example:

```
# Deny secure data access
DenyKey=vfs.file.contents[/etc/passwd,*]
```

#### Attention:

A blacklist may not be a good choice, because a new Zabbix version may have new keys that are not explicitly restricted by the existing configuration. This could cause a security flaw.

##### Deny specific command, allow others

- Blacklist a specific command with DenyKey parameter. Whitelist all other commands, with the AllowKey parameter.

```
# Disallow specific command
DenyKey=system.run[ls -l /]
```

```
# Allow other scripts
AllowKey=system.run[*]
```

##### Allow specific check, deny others

- Whitelist specific checks with AllowKey parameters, deny others with DenyKey=\*

For example:

```
# Allow reading logs:
AllowKey=vfs.file.*[/var/log/*]
```

```
# Allow localtime checks
AllowKey=system.localtime[*]
```

```
# Deny all other keys
DenyKey=*
```

##### Pattern examples

Pattern	Description	Matches	No match
*	Matches all possible keys with or without parameters.	Any	None
vfs.file.contents	Matches <code>vfs.file.contents</code> without parameters.	<code>vfs.file.contents</code>	<code>vfs.file.contents[/etc/passwd]</code>
vfs.file.contents[]	Matches <code>vfs.file.contents</code> with empty parameters.	<code>vfs.file.contents[]</code>	<code>vfs.file.contents</code>
vfs.file.contents[*]	Matches <code>vfs.file.contents</code> with any parameters; will not match <code>vfs.file.contents</code> without square brackets.	<code>vfs.file.contents[]</code> <code>vfs.file.contents[/path/to/file]</code>	<code>vfs.file.contents</code>

Pattern	Description	Matches	No match
<code>vfs.file.contents[/etc/passwd]</code>	Matches <code>vfs.file.contents</code> with first parameters matching <code>/etc/passwd</code> and all other parameters having any value (also empty).	<code>vfs.file.contents[/etc/passwd]</code> <code>vfs.file.contents[/etc/passwd,utf8]</code>	<code>vfs.file.contents[/etc/passwd]</code> <code>vfs.file.contents[/var/log/zabbix_server.log]</code> <code>vfs.file.contents[]</code>
<code>vfs.file.contents[*passwd*]</code>	Matches <code>vfs.file.contents</code> with first parameter matching <code>*passwd*</code> and no other parameters.	<code>vfs.file.contents[/etc/passwd]</code>	<code>vfs.file.contents[/etc/passwd,]</code> <code>vfs.file.contents[/etc/passwd,utf8]</code>
<code>vfs.file.contents[*passwd*,*]</code>	Matches <code>vfs.file.contents</code> with only first parameter matching <code>*passwd*</code> and all following parameters having any value (also empty).	<code>vfs.file.contents[/etc/passwd]</code> <code>vfs.file.contents[/etc/passwd,utf8]</code>	<code>vfs.file.contents[/etc/passwd]</code> <code>vfs.file.contents[/tmp/test]</code>
<code>vfs.file.contents[/var/log/zabbix_server.log,abc]</code>	Matches <code>vfs.file.contents</code> with first parameter matching <code>/var/log/zabbix_server.log</code> , third parameter matching <code>'abc'</code> and any (also empty) second parameter.	<code>vfs.file.contents[/var/log/zabbix_server.log,abc]</code> <code>vfs.file.contents[/var/log/zabbix_server.log,utf8,abc]</code>	<code>vfs.file.contents[/var/log/zabbix_server.log]</code>
<code>vfs.file.contents[/etc/passwd,utf8]</code>	Matches <code>vfs.file.contents</code> with first parameter matching <code>/etc/passwd</code> , second parameter matching <code>'utf8'</code> and no other arguments.	<code>vfs.file.contents[/etc/passwd,utf8]</code>	<code>vfs.file.contents[/etc/passwd,]</code> <code>vfs.file.contents[/etc/passwd,utf16]</code>
<code>vfs.file.*</code>	Matches any keys starting with <code>vfs.file.</code> without any parameters.	<code>vfs.file.contents</code> <code>vfs.file.size</code>	<code>vfs.file.contents[]</code> <code>vfs.file.size[/var/log/zabbix_server.log]</code>
<code>vfs.file.*[*]</code>	Matches any keys starting with <code>vfs.file.</code> with any parameters.	<code>vfs.file.size.bytes[]</code> <code>vfs.file.size[/var/log/zabbix_server.log,utf8]</code>	<code>vfs.file.size.bytes</code>
<code>vfs.*.contents</code>	Matches any key starting with <code>vfs.</code> and ending with <code>.contents</code> without any parameters.	<code>vfs.mount.point.file.contents</code> <code>vfs..contents</code>	<code>vfs.contents</code>

### system.run and AllowKey

A hypothetical script like `'myscript.sh'` may be executed on a host via Zabbix agent in several ways:

1. As an item key in a passive or active check, for example:

- `system.run[myscript.sh]`
- `system.run[myscript.sh,wait]`
- `system.run[myscript.sh.nowait]`

Here the user may add `"wait"`, `"nowait"` or omit the 2nd argument to use its default value in `system.run[]`.

2. As a global script (initiated by user in frontend or API).

A user configures this script in Administration → Scripts, sets "Execute on: Zabbix agent" and puts `"myscript.sh"` into the script's "Commands" input field. When invoked from frontend or API the Zabbix server sends to agent:

- `system.run[myscript.sh,wait]` - up to Zabbix 5.0.4
- `system.run[myscript.sh]` - since 5.0.5

Here the user does not control the `"wait"/"nowait"` parameters.

3. As a remote command from an action. The Zabbix server sends to agent:

- `system.run[myscript.sh.nowait]`

Here again the user does not control the `"wait"/"nowait"` parameters.

What that means is if we set `AllowKey` like:

```
AllowKey=system.run[myscript.sh]
```

then

- `system.run[myscript.sh]` - will be allowed
- `system.run[myscript.sh,wait]`, `system.run[myscript.sh.nowait]` will not be allowed - the script will not be run if invoked as a step of action

To allow all described variants you may add:

```
AllowKey=system.run[myscript.sh,*]
DenyKey=system.run[*]
```

to the agent/agent2 parameters.

### 3 Triggers

#### Overview

Triggers are logical expressions that "evaluate" data gathered by items and represent the current system state.

While items are used to gather system data, it is highly impractical to follow these data all the time waiting for a condition that is alarming or deserves attention. The job of "evaluating" data can be left to trigger expressions.

Trigger expressions allow to define a threshold of what state of data is "acceptable". Therefore, should the incoming data surpass the acceptable state, a trigger is "fired" - or changes status to PROBLEM.

A trigger may have the following status:

VALUE	DESCRIPTION
OK	This is a normal trigger state.
PROBLEM	Normally means that something happened. For example, the processor load is too high.

Trigger status (the expression) is recalculated every time Zabbix server receives a new value that is part of the expression.

Most trigger functions are evaluated based on **history** data, while some trigger functions for long-term analytics, e.g. **trendavg()**, **trendcount()**, etc, use trend data.

If time-based functions (**nodata()**, **date()**, **dayofmonth()**, **dayofweek()**, **time()**, **now()**) are used in the expression, the trigger is recalculated every 30 seconds by a Zabbix history syncer process. If both time-based and non-time-based functions are used in an expression, it is recalculated when a new value is received **and** every 30 seconds.

You can **build trigger expressions** with different degrees of complexity.

#### 1 Configuring a trigger

#### Overview

To configure a trigger, do the following:

- Go to: Configuration → Hosts
- Click on Triggers in the row of the host
- Click on Create trigger to the right (or on the trigger name to edit an existing trigger)
- Enter parameters of the trigger in the form

#### Configuration

The **Trigger** tab contains all the essential trigger attributes.



Trigger Tags Dependencies 1

\* Name

Event name

Operational data

Severity

\* Expression

[Expression constructor](#)

OK event generation

PROBLEM event generation mode

OK event closes

\* Tag for matching

Allow manual close

URL

Description

Enabled

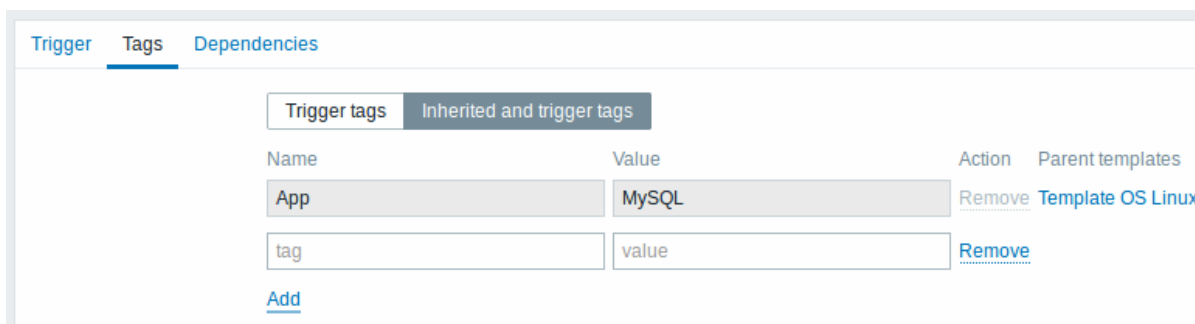
All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	<p>Trigger name.</p> <p>Supported <b>macros</b> are: {HOST.HOST}, {HOST.NAME}, {HOST.PORT}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {ITEM.VALUE}, {ITEM.LASTVALUE}, {ITEM.LOG.*} and {MACRO} user macros.</p> <p><b>\$1, \$2...\$9</b> macros can be used to refer to the first, second...ninth constant of the expression.</p> <p>Note: \$1-\$9 macros will resolve correctly if referring to constants in relatively simple, straightforward expressions. For example, the name "Processor load above \$1 on {HOST.NAME}" will automatically change to "Processor load above 5 on New host" if the expression is {New host:system.cpu.load[percpu,avg1].last()}&gt;5</p>

Parameter	Description
Event name	<p>If defined, this name will be used to create the problem event name, instead of the trigger name.</p> <p>The event name may be used to build meaningful alerts containing problem data (see <a href="#">example</a>).</p> <p>The same set of macros is supported as in the trigger name, plus {TIME} and {?EXPRESSION} expression macros.</p> <p>Supported since Zabbix 5.2.0.</p>
Operational data	<p>Operational data allow to define arbitrary strings along with macros. The macros will resolve dynamically to real time data in Monitoring → <a href="#">Problems</a>. While macros in the trigger name (see above) will resolve to their values at the moment of a problem happening and will become the basis of a static problem name, the macros in the operational data maintain the ability to display the very latest information dynamically.</p> <p>The same set of macros is supported as in the trigger name.</p> <p>Supported since Zabbix 4.4.0.</p>
Severity Expression	<p>Set the required trigger <a href="#">severity</a> by clicking the buttons.</p> <p>Logical <a href="#">expression</a> used to define the conditions of a problem. A problem is created after all the conditions included in the expression are met, i.e. the expression evaluates to TRUE. The problem will be resolved as soon as the expression evaluates to FALSE, unless additional recovery conditions are specified in Recovery expression.</p>
OK event generation	<p>OK event generation options:</p> <p><b>Expression</b> - OK events are generated based on the same expression as problem events;</p> <p><b>Recovery expression</b> - OK events are generated if the problem expression evaluates to FALSE and the recovery expression evaluates to TRUE;</p> <p><b>None</b> - in this case the trigger will never return to an OK state on its own.</p> <p>Supported since Zabbix 3.2.0.</p>
Recovery expression	<p>Logical <a href="#">expression</a> (optional) defining additional conditions that have to be met before the problem is resolved, after the original problem expression has already been evaluated as FALSE.</p> <p>Recovery expression is useful for trigger <a href="#">hysteresis</a>. It is <b>not</b> possible to resolve a problem by recovery expression alone if the problem expression is still TRUE.</p> <p>This field is only available if 'Recovery expression' is selected for OK event generation.</p> <p>Supported since Zabbix 3.2.0.</p>
PROBLEM event generation mode	<p>Mode for generating problem events:</p> <p><b>Single</b> - a single event is generated when a trigger goes into the 'Problem' state for the first time;</p> <p><b>Multiple</b> - an event is generated upon every 'Problem' evaluation of the trigger.</p>
OK event closes	<p>Select if OK event closes:</p> <p><b>All problems</b> - all problems of this trigger</p> <p><b>All problems if tag values match</b> - only those trigger problems with matching event tag values</p> <p>Supported since Zabbix 3.2.0.</p>
Tag for matching	<p>Enter event tag name to use for event correlation.</p> <p>This field is displayed if 'All problems if tag values match' is selected for the OK event closes property and is mandatory in this case.</p> <p>Supported since Zabbix 3.2.0.</p>
Allow manual close	<p>Check to allow <a href="#">manual closing</a> of problem events generated by this trigger. Manual closing is possible when acknowledging problem events.</p> <p>Supported since Zabbix 3.2.0.</p>

Parameter	Description
URL	If not empty, the URL entered here is available as a link in several frontend locations, e.g. when clicking on the problem name in Monitoring → Problems (URL option in the Trigger menu) and Problems dashboard widget. The same set of macros is supported as in the trigger name, plus {EVENT.ID}, {HOST.ID} and {TRIGGER.ID}. Note that user macros with secret values will not be resolved in the URL.
Description	Text field used to provide more information about this trigger. May contain instructions for fixing specific problem, contact detail of responsible staff, etc.
Enabled	The same set of macros is supported as in the trigger name. Unchecking this box will disable the trigger if required. Problems of a disabled trigger are no longer displayed in the frontend, but are not deleted.

The **Tags** tab allows you to define trigger-level **tags**. All problems of this trigger will be tagged with the values entered here.



In addition the Inherited and trigger tags option allows to view tags defined on template level, if the trigger comes from that template. If there are multiple templates with the same tag, these tags are displayed once and template names are separated with commas. A trigger does not “inherit” and display host-level tags.

Parameter	Description
Name/Value	Set custom tags to mark trigger events. Tags are a pair of tag name and value. You can use only the name or pair it with a value. A trigger may have several tags with the same name, but different values. User macros, user macro context, low-level discovery macros and macro <b>functions</b> with {{ITEM.VALUE}}, {{ITEM.LASTVALUE}} and low-level discovery macros are supported in event tags. Low-level discovery macros can be used inside macro context. {TRIGGER.ID} macro is supported in trigger tag values. It may be useful for identifying triggers created from trigger prototypes and, for example, suppressing problems from these triggers during maintenance. If the total length of expanded value exceeds 255, it will be cut to 255 characters. See all <b>macros</b> supported for event tags. <b>Event tags</b> can be used for event correlation, in action conditions and will also be seen in Monitoring → Problems or the Problems widget. Supported since Zabbix 3.2.0.

The **Dependencies** tab contains all the **dependencies** of the trigger.

Click on Add to add a new dependency.

**Note:**

You can also configure a trigger by opening an existing one, pressing the Clone button and then saving under a different name.

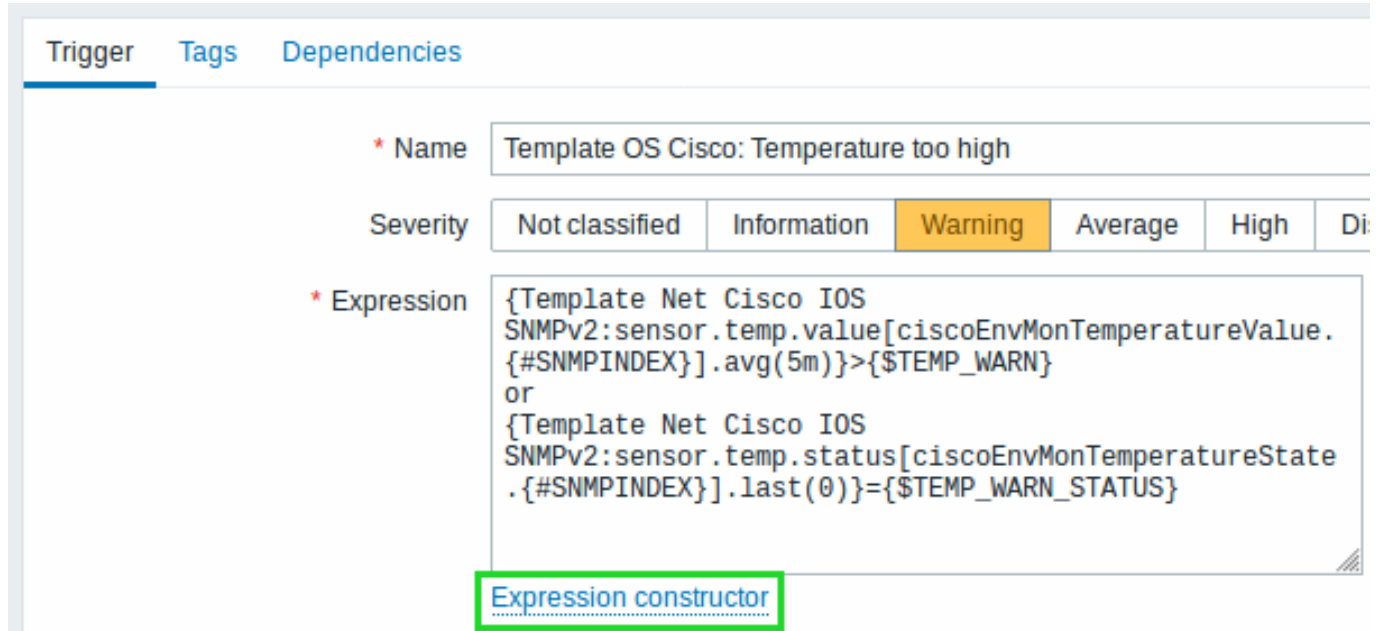
## Testing expressions

It is possible to test the configured trigger expression as to what the expression result would be depending on the received value.

Following expression from an official template is taken as an example:

```
{Cisco IOS SNMPv2:sensor.temp.value[ciscoEnvMonTemperatureValue.#{SNMPINDEX}].avg(5m)}>{TEMP_WARN}  
or  
{Cisco IOS SNMPv2:sensor.temp.status[ciscoEnvMonTemperatureState.#{SNMPINDEX}].last(0)}={TEMP_WARN_STATUS}
```

To test the expression, click on Expression constructor under the expression field.

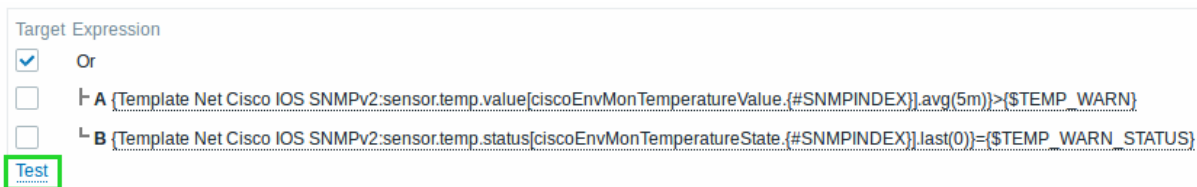


The screenshot shows a configuration window with tabs for Trigger, Tags, and Dependencies. The Trigger tab is active. The Name field contains "Template OS Cisco: Temperature too high". The Severity field has a dropdown menu with options: Not classified, Information, Warning (selected), Average, High, and Disabling. The Expression field contains the following text:

```
{Template Net Cisco IOS  
SNMPv2:sensor.temp.value[ciscoEnvMonTemperatureValue.  
#{SNMPINDEX}].avg(5m)}>{TEMP_WARN}  
or  
{Template Net Cisco IOS  
SNMPv2:sensor.temp.status[ciscoEnvMonTemperatureState  
.#{SNMPINDEX}].last(0)}={TEMP_WARN_STATUS}
```

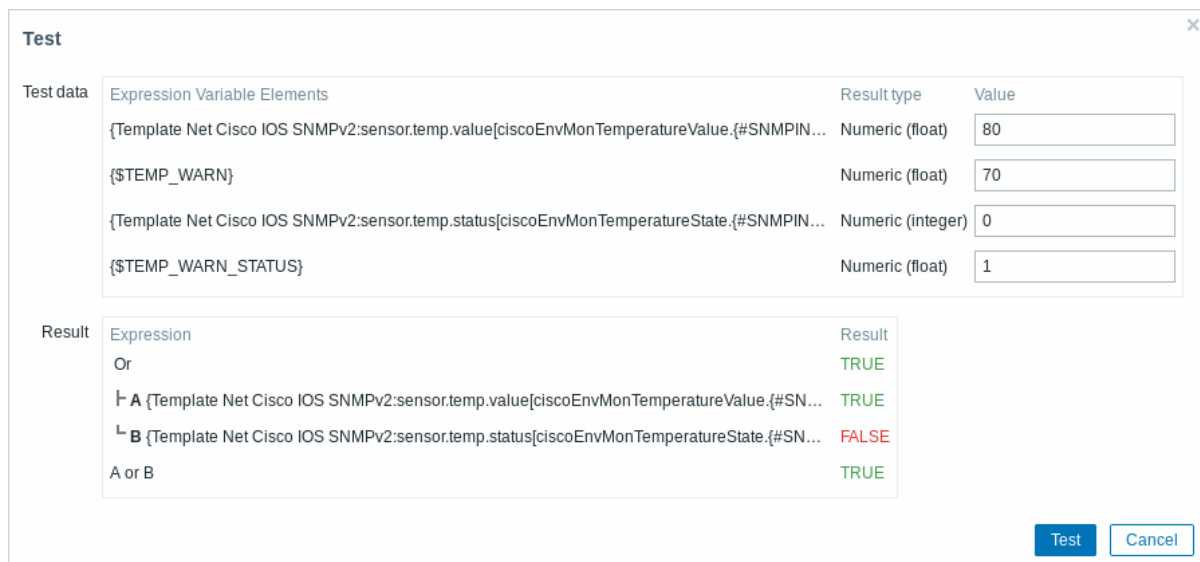
A green box highlights the "Expression constructor" link below the expression field.

In the Expression constructor, all individual expressions are listed. To open the testing window, click on Test below the expression list.



The screenshot shows the "Target Expression" section with a dropdown menu set to "Or". Below it are two expressions, A and B, each with a checkbox. Expression A is: `{Template Net Cisco IOS SNMPv2:sensor.temp.value[ciscoEnvMonTemperatureValue.#{SNMPINDEX}].avg(5m)}>{TEMP_WARN}`. Expression B is: `{Template Net Cisco IOS SNMPv2:sensor.temp.status[ciscoEnvMonTemperatureState.#{SNMPINDEX}].last(0)}={TEMP_WARN_STATUS}`. A green box highlights the "Test" button at the bottom left.

In the testing window you can enter sample values ("80, 70, 0, 1" in this example) and then see the expression result, by clicking on the Test button.



The screenshot shows the "Test" window with a table of test data and a result table.

Test data	Expression Variable Elements	Result type	Value
	{Template Net Cisco IOS SNMPv2:sensor.temp.value[ciscoEnvMonTemperatureValue.#{SNMPINDEX}].avg(5m)}	Numeric (float)	80
	{TEMP_WARN}	Numeric (float)	70
	{Template Net Cisco IOS SNMPv2:sensor.temp.status[ciscoEnvMonTemperatureState.#{SNMPINDEX}].last(0)}	Numeric (integer)	0
	{TEMP_WARN_STATUS}	Numeric (float)	1

Result	Expression	Result
	Or	TRUE
	A {Template Net Cisco IOS SNMPv2:sensor.temp.value[ciscoEnvMonTemperatureValue.#{SNMPINDEX}].avg(5m)}>{TEMP_WARN}	TRUE
	B {Template Net Cisco IOS SNMPv2:sensor.temp.status[ciscoEnvMonTemperatureState.#{SNMPINDEX}].last(0)}={TEMP_WARN_STATUS}	FALSE
	A or B	TRUE

Buttons for "Test" and "Cancel" are at the bottom right.

The result of the individual expressions as well as the whole expression can be seen.

"TRUE" result means the specified expression is correct. In this particular case A, "80" is greater than {TEMP\_WARN} specified

value, "70" in this example. Respectively, "TRUE" result appears.

"FALSE" result means the specified expression is incorrect. In this particular case B, {TEMP\_WARN\_STATUS}, "1" in this example, needs to be equal with specified "0" value, that is wrong. Respectively, "FALSE" result appears.

Chosen Expression type is "OR"/"TRUE". If at least one of the specified conditions (A or B in this case) is TRUE, overall result will be TRUE as well. That means, current value exceeds the warning value and a Problem has occurred.

## 2 Trigger expression

### Overview

The expressions used in triggers are very flexible. You can use them to create complex logical tests regarding monitored statistics.

A simple useful expression might look like:

{<server>:<key>.<function>( <parameter> )}<operator><constant>

While the syntax is exactly the same, from the functional point of view there are two types of trigger expressions:

- problem expression - defines the conditions of the problem
- recovery expression (optional) - defines additional conditions of the problem resolution

When defining a problem expression alone, this expression will be used both as the problem threshold and the problem recovery threshold. As soon as the problem expression evaluates to TRUE, there is a problem. As soon as the problem expression evaluates to FALSE, the problem is resolved.

When defining both problem expression and the supplemental recovery expression, problem resolution becomes more complex: not only the problem expression has to be FALSE, but also the recovery expression has to be TRUE. This is useful to create **hysteresis** and avoid trigger flapping.

### Functions

Trigger functions allow to reference the collected values, current time and other factors.

A complete list of **supported functions** is available.

Typically functions return numeric values. However, returning strings for string comparison is also possible with = and <> operators; see **operators** and trigger **examples** for more details.

### Function parameters

Most of numeric functions accept the number of seconds as a parameter.

You may use the prefix # to specify that a parameter has a different meaning:

FUNCTION CALL	MEANING
<b>sum(600)</b>	Sum of all values in no more than the latest 600 seconds
<b>sum(#5)</b>	Sum of all values in no more than the latest 5 values

The function **last** uses a different meaning for values when prefixed with the hash mark - it makes it choose the n-th previous value, so given the values 3, 7, 2, 6, 5 (from most recent to least recent), **last(#2)** would return 7 and **last(#5)** would return 5.

Several functions support an additional, second `time_shift` parameter. This parameter allows to reference data from a period of time in the past. For example, **avg(1h,1d)** will return the average value for an hour one day ago.

You can use the supported **unit symbols** in trigger expressions, for example '5m' (minutes) instead of '300' seconds or '1d' (day) instead of '86400' seconds. '1K' will stand for '1024' bytes.

Numbers with a '+' sign are not supported.

### Operators

The following operators are supported for triggers (**in descending priority of execution**):

Priority	Operator	Definition	Notes for unknown values	Force cast operand to float <sup>1</sup>
1	-	Unary minus	-Unknown → Unknown	Yes
2	not	Logical NOT	not Unknown → Unknown	Yes

Priority	Operator	Definition	Notes for unknown values	Force cast operand to float <sup>1</sup>
3	*	Multiplication	Unknown → Unknown (yes, Unknown, not 0 - to not lose Unknown in arithmetic operations) 1.2 * Unknown → Unknown	Yes
	/	Division	Unknown / 0 → error Unknown / 1.2 → Unknown 0.0 / Unknown → Unknown	Yes
4	+	Arithmetic plus	1.2 + Unknown → Unknown	Yes
	-	Arithmetic minus	1.2 - Unknown → Unknown	Yes
5	<	Less than.	1.2 < Unknown → Unknown The operator is defined as:  A < B ⇔ (A < B - 0.000001)	Yes
	<=	Less than or equal to.	Unknown <= Unknown → Unknown The operator is defined as:  A <= B ⇔ (A ≤ B + 0.000001)	Yes
	>	More than.	The operator is defined as:  A > B ⇔ (A > B + 0.000001)	Yes

Priority	Operator	Definition	Notes for unknown values	Force cast operand to float <sup>1</sup>
	>=	More than or equal to. The operator is defined as:		Yes
		$A \geq B$ $\Leftrightarrow$ ( $A \geq B - 0.000001$ )		
6	=	Is equal. The operator is defined as:		No <sup>1</sup>
		$A = B$ $\Leftrightarrow$ ( $A \geq B - 0.000001$ ) and ( $A \leq B + 0.000001$ )		
	<>	Not equal. The operator is defined as:		No <sup>1</sup>
		$A <> B$ $\Leftrightarrow$ ( $A < B - 0.000001$ ) or ( $A > B + 0.000001$ )		
7	and	Logical AND	0 <b>and</b> Unknown → 0 1 <b>and</b> Unknown → Unknown Unknown <b>and</b> Unknown → Unknown	Yes
8	or	Logical OR	1 <b>or</b> Unknown → 1 0 <b>or</b> Unknown → Unknown Unknown <b>or</b> Unknown → Unknown	Yes

<sup>1</sup> String operand is still cast to numeric if:

- another operand is numeric
- operator other than = or <> is used on an operand

(If the cast fails - numeric operand is cast to a string operand and both operands get compared as strings.)

**not**, **and** and **or** operators are case-sensitive and must be in lowercase. They also must be surrounded by spaces or parentheses.

All operators, except unary - and **not**, have left-to-right associativity. Unary - and **not** are non-associative (meaning **-(1)** and **not (not 1)** should be used instead of **--1** and **not not 1**).

Evaluation result:

- <, <=, >, >=, =, <> operators shall yield '1' in the trigger expression if the specified relation is true and '0' if it is false. If at least one operand is Unknown the result is Unknown;
- **and** for known operands shall yield '1' if both of its operands compare unequal to '0'; otherwise, it yields '0'; for unknown operands **and** yields '0' only if one operand compares equal to '0'; otherwise, it yields 'Unknown';
- **or** for known operands shall yield '1' if either of its operands compare unequal to '0'; otherwise, it yields '0'; for unknown operands **or** yields '1' only if one operand compares unequal to '0'; otherwise, it yields 'Unknown';
- The result of the logical negation operator **not** for a known operand is '0' if the value of its operand compares unequal to '0'; '1' if the value of its operand compares equal to '0'. For unknown operand **not** yields 'Unknown'.

Value caching

Values required for trigger evaluation are cached by Zabbix server. Because of this trigger evaluation causes a higher database load for some time after the server restarts. The value cache is not cleared when item history values are removed (either manually or by housekeeper), so the server will use the cached values until they are older than the time periods defined in trigger functions or server is restarted.

Examples of triggers

Example 1

Processor load is too high on www.zabbix.com

```
{www.zabbix.com:system.cpu.load[all,avg1].last()}>5
```

'www.zabbix.com:system.cpu.load[all,avg1]' gives a short name of the monitored parameter. It specifies that the server is 'www.zabbix.com' and the key being monitored is 'system.cpu.load[all,avg1]'. By using the function 'last()', we are referring to the most recent value. Finally, '>5' means that the trigger is in the PROBLEM state whenever the most recent processor load measurement from www.zabbix.com is greater than 5.

Example 2

www.zabbix.com is overloaded

```
{www.zabbix.com:system.cpu.load[all,avg1].last()}>5 or {www.zabbix.com:system.cpu.load[all,avg1].min(10m)}
```

The expression is true when either the current processor load is more than 5 or the processor load was more than 2 during last 10 minutes.

Example 3

/etc/passwd has been changed

Use of function diff:

```
{www.zabbix.com:vfs.file.cksum[/etc/passwd].diff()}=1
```

The expression is true when the previous value of checksum of /etc/passwd differs from the most recent one.

Similar expressions could be useful to monitor changes in important files, such as /etc/passwd, /etc/inetd.conf, /kernel, etc.

Example 4

Someone is downloading a large file from the Internet

Use of function min:

```
{www.zabbix.com:net.if.in[eth0,bytes].min(5m)}>100K
```

The expression is true when number of received bytes on eth0 is more than 100 KB within last 5 minutes.

Example 5

Both nodes of clustered SMTP server are down

Note use of two different hosts in one expression:

```
{smtp1.zabbix.com:net.tcp.service[smtp].last()}=0 and {smtp2.zabbix.com:net.tcp.service[smtp].last()}=0
```

The expression is true when both SMTP servers are down on both smtp1.zabbix.com and smtp2.zabbix.com.

Example 6

Zabbix agent needs to be upgraded



Use of function str():

```
{zabbix.zabbix.com:agent.version.str("beta8")}=1
```

The expression is true if Zabbix agent has version beta8 (presumably 1.0beta8).

Example 7

Server is unreachable

```
{zabbix.zabbix.com:icmping.count(30m,0)}>5
```

The expression is true if host "zabbix.zabbix.com" is unreachable more than 5 times in the last 30 minutes.

Example 8

No heartbeats within last 3 minutes

Use of function nodata():

```
{zabbix.zabbix.com:tick.nodata(3m)}=1
```

To make use of this trigger, 'tick' must be defined as a Zabbix **trapper** item. The host should periodically send data for this item using zabbix\_sender. If no data is received within 180 seconds, the trigger value becomes PROBLEM.

Note that 'nodata' can be used for any item type.

Example 9

CPU activity at night time

Use of function time():

```
{zabbix:system.cpu.load[all,avg1].min(5m)}>2 and {zabbix:system.cpu.load[all,avg1].time()}>000000 and {zabbix:system.cpu.load[all,avg1].time()}<000000
```

The trigger may change its status to true, only at night (00:00-06:00) time.

Example 10

Check if client local time is in sync with Zabbix server time

Use of function fuzzytime():

```
{MySQL_DB:system.localtime.fuzzytime(10)}=0
```

The trigger will change to the problem state in case when local time on server MySQL\_DB and Zabbix server differs by more than 10 seconds. Note that 'system.localtime' must be configured as a **passive check**.

Example 11

Comparing average load today with average load of the same time yesterday (using a second time\_shift parameter).

```
{server:system.cpu.load.avg(1h)}/{server:system.cpu.load.avg(1h,1d)}>2
```

This expression will fire if the average load of the last hour tops the average load of the same hour yesterday more than two times.

Example 12

Using the value of another item to get a trigger threshold:

```
{Template PfSense:hrStorageFree[#{SNMPVALUE}].last()}<{Template PfSense:hrStorageSize[#{SNMPVALUE}].last()}/10
```

The trigger will fire if the free storage drops below 10 percent.

Example 13

Using **evaluation result** to get the number of triggers over a threshold:

```
((server1:system.cpu.load[all,avg1].last())>5) + ((server2:system.cpu.load[all,avg1].last())>5) + ((server3:system.cpu.load[all,avg1].last())>5)
```

The trigger will fire if at least two of the triggers in the expression are over 5.

Example 14

Comparing string values of two items - operands here are functions that return strings.

Problem: create an alert if Ubuntu version is different on different hosts

```
{Riga Zabbix server:vfs.file.contents[/etc/os-release].last()}<>{London Zabbix server:vfs.file.contents[/etc/os-release].last()}
```

Example 15

Comparing two string values - operands are:

- a function that returns a string
- a combination of macros and strings

Problem: detect changes in the DNS query

The item key is:

```
net.dns.record[8.8.8.8,{$WEBSITE_NAME},{$DNS_RESOURCE_RECORD_TYPE},2,1]
```

with macros defined as

```
{$WEBSITE_NAME} = zabbix.com
{$DNS_RESOURCE_RECORD_TYPE} = MX
```

and normally returns:

```
zabbix.com          MX          0 mail.zabbix.com
```

So our trigger expression to detect if the DNS query result deviated from the expected result is:

```
{Zabbix server:net.dns.record[8.8.8.8,{$WEBSITE_NAME},{$DNS_RESOURCE_RECORD_TYPE},2,1].last()}<> "{$WEBSITE
```

Notice the quotes around the second operand.

Example 16

Comparing two string values - operands are:

- a function that returns a string
- a string constant with special characters \ and "

Problem: detect if the /tmp/hello file content is equal to:

```
\ " //hello ?\"
```

Option 1) write the string directly

```
{Zabbix server:vfs.file.contents[/tmp/hello].last()}="\\ \" //hello ?\\ \"
```

Notice how \ and " characters are escaped when the string gets compared directly.

Option 2) use a macro

```
{$HELLO_MACRO} = \ " //hello ?\"
```

in the expression:

```
{Zabbix server:vfs.file.contents[/tmp/hello].last()}={$HELLO_MACRO}
```

Example 17

Comparing long-term periods.

Problem: Load of Exchange server increased by more than 10% last month

```
{Exchange:system.cpu.load.trendavg(1M,now/M)}>1.1*{Exchange:system.cpu.load.trendavg(1M,now/M-1M)}
```

You may also use the **Event name** field in trigger configuration to build a meaningful alert message, for example to receive something like

```
"Load of Exchange server increased by 24% in July (0.69) comparing to June (0.56)"
```

the event name must be defined as:

```
Load of {HOST.HOST} server increased by {{?100*{HOST.HOST}:system.cpu.load.trendavg(1M,now/M)}/{HOST.HOST
```

It is also useful to allow manual closing in trigger configuration for this kind of problem.

Hysteresis

Sometimes an interval is needed between problem and recovery states, rather than a simple threshold. For example, if we want to define a trigger that reports a problem when server room temperature goes above 20°C and we want it to stay in the problem state until the temperature drops below 15°C, a simple trigger threshold at 20°C will not be enough.

Instead, we need to define a trigger expression for the problem event first (temperature above 20°C). Then we need to define an additional recovery condition (temperature below 15°C). This is done by defining an additional Recovery expression parameter when **defining** a trigger.

In this case, problem recovery will take place in two steps:

- First, the problem expression (temperature above 20°C) will have to evaluate to FALSE

- Second, the recovery expression (temperature below 15°C) will have to evaluate to TRUE

The recovery expression will be evaluated only when the problem event is resolved first.

**Warning:**

The recovery expression being TRUE alone does not resolve a problem if the problem expression is still TRUE!

Example 1

Temperature in server room is too high.

Problem expression:

```
{server:temp.last()}>20
```

Recovery expression:

```
{server:temp.last()}<=15
```

Example 2

Free disk space is too low.

Problem expression: it is less than 10GB for last 5 minutes

```
{server:vfs.fs.size[/,free].max(5m)}<10G
```

Recovery expression: it is more than 40GB for last 10 minutes

```
{server:vfs.fs.size[/,free].min(10m)}>40G
```

Expressions with unsupported items and unknown values

Versions before Zabbix 3.2 are very strict about unsupported items in a trigger expression. Any unsupported item in the expression immediately renders trigger value to `Unknown`.

Since Zabbix 3.2 there is a more flexible approach to unsupported items by admitting unknown values into expression evaluation:

- For some functions their values are not affected by whether an item is supported or unsupported. Such functions are now evaluated even if they refer to unsupported items. See the list in [functions and unsupported items](#).
- Logical expressions with OR and AND can be evaluated to known values in two cases regardless of unknown operands:
  - "1 or `Unsupported_item1.some_function()` or `Unsupported_item2.some_function()` or ..." can be evaluated to '1' (True),
  - "0 and `Unsupported_item1.some_function()` and `Unsupported_item2.some_function()` and ..." can be evaluated to '0' (False).
 Zabbix tries to evaluate logical expressions taking unsupported items as `Unknown` values. In the two cases mentioned above a known value will be produced; in other cases trigger value will be `Unknown`.
- If a function evaluation for supported item results in error, the function value is `Unknown` and it takes part in further expression evaluation.

Note that unknown values may "disappear" only in logical expressions as described above. In arithmetic expressions unknown values always lead to result `Unknown` (except division by 0).

If a trigger expression with several unsupported items evaluates to `Unknown` the error message in the frontend refers to the last unsupported item evaluated.

### 3 Trigger dependencies

#### Overview

Sometimes the availability of one host depends on another. A server that is behind some router will become unreachable if the router goes down. With triggers configured for both, you might get notifications about two hosts down - while only the router was the guilty party.

This is where some dependency between hosts might be useful. With dependency set notifications of the dependents could be withheld and only the notification for the root problem sent.

While Zabbix does not support dependencies between hosts directly, they may be defined with another, more flexible method - trigger dependencies. A trigger may have one or more triggers it depends on.

So in our simple example we open the server trigger configuration form and set that it depends on the respective trigger of the router. With such dependency the server trigger will not change state as long as the trigger it depends on is in 'PROBLEM' state - and thus no dependent actions will be taken and no notifications sent.

If both the server and the router are down and dependency is there, Zabbix will not execute actions for the dependent trigger.

Actions on dependent triggers will not be executed if the trigger they depend on:

- changes its state from 'PROBLEM' to 'UNKNOWN'
- is closed manually, by correlation or with the help of time- based functions
- is resolved by a value of an item not involved in dependent trigger
- is disabled, has disabled item or disabled item host

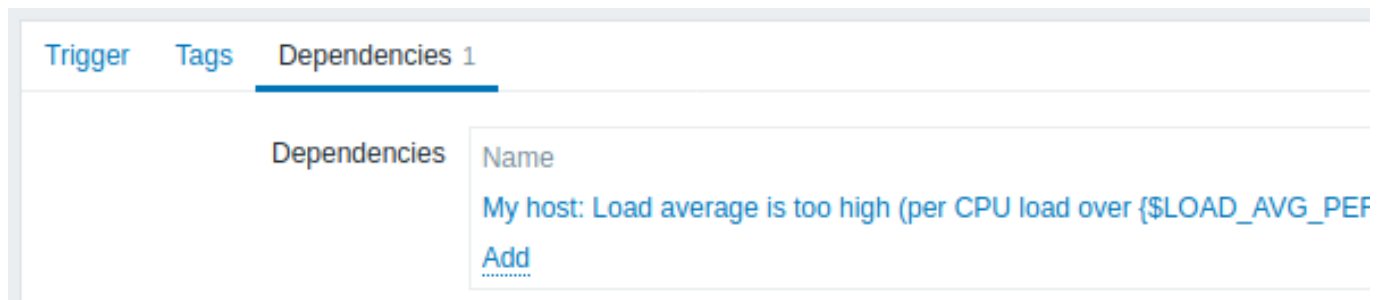
Note that "secondary" (dependent) trigger in the above-mentioned cases will not be immediately updated. While parent trigger is in PROBLEM state, it's dependents may report values, which we cannot trust. Thus, dependent trigger will only be re-evaluated, and change it's state, only after parent trigger is in OK state and we have received trusty metrics.

Also:

- Trigger dependency may be added from any host trigger to any other host trigger, as long as it wouldn't result in a circular dependency.
- Trigger dependency may be added from a template to a template. If a trigger from template A depends on a trigger from template B, template A may only be linked to a host (or another template) together with template B, but template B may be linked to a host (or another template) alone.
- Trigger dependency may be added from template trigger to a host trigger. In this case, linking such a template to a host will create a host trigger that depends on the same trigger template trigger was depending on. This allows to, for example, have a template where some triggers depend on router (host) triggers. All hosts linked to this template will depend on that specific router.
- Trigger dependency from a host trigger to a template trigger may not be added.
- Trigger dependency may be added from a trigger prototype to another trigger prototype (within the same low-level discovery rule) or a real trigger. A trigger prototype may not depend on a trigger prototype from a different LLD rule or on a trigger created from trigger prototype. Host trigger prototype cannot depend on a trigger from a template.

Configuration

To define a dependency, open the Dependencies tab in a trigger **configuration form**. Click on Add in the 'Dependencies' block and select one or more triggers that our trigger will depend on.



Click Update. Now the trigger has an indication of its dependency in the list.

[Template Module Linux CPU by Zabbix agent: High CPU utilization \(over { \\$CPU\\_UTIL\\_CRIT }% for 5m\)](#)

**Depends on:**

[My host: Load average is too high \(per CPU load over { \\$LOAD\\_AVG\\_PER\\_CPU\\_MAX\\_WARN } for 5m\)](#)

Example of several dependencies

For example, a Host is behind a Router2 and the Router2 is behind a Router1.

Zabbix - Router1 - Router2 - Host

If Router1 is down, then obviously Host and Router2 are also unreachable yet we don't want to receive three notifications about Host, Router1 and Router2 all being down.

So in this case we define two dependencies:

```
'Host is down' trigger depends on 'Router2 is down' trigger
'Router2 is down' trigger depends on 'Router1 is down' trigger
```

Before changing the status of the 'Host is down' trigger, Zabbix will check for corresponding trigger dependencies. If found, and one of those triggers is in 'Problem' state, then the trigger status will not be changed and thus actions will not be executed and notifications will not be sent.

Zabbix performs this check recursively. If Router1 or Router2 is unreachable, the Host trigger won't be updated.

#### 4 Trigger severity

Trigger severity defines how important a trigger is. Zabbix supports the following trigger severities:

SEVERITY	DEFINITION	COLOR
<b>Not classified</b>	Unknown severity.	Gray
<b>Information</b>	For information purposes.	Light blue
<b>Warning</b>	Be warned.	Yellow
<b>Average</b>	Average problem.	Orange
<b>High</b>	Something important has happened.	Light red
<b>Disaster</b>	Disaster. Financial losses, etc.	Red

The severities are used for:

- visual representation of triggers. Different colors for different severities.
- audio in global alarms. Different audio for different severities.
- user media. Different media (notification channel) for different severities. For example, SMS - high severity, email - other.
- limiting actions by conditions against trigger severities

It is possible to [customize trigger severity names and colors](#).

#### 5 Customizing trigger severities

Trigger severity names and colors for severity related GUI elements can be configured in Administration → General → Trigger displaying options. Colors are shared among all GUI themes.

Translating customized severity names

**Attention:**

If Zabbix frontend translations are used, custom severity names will override translated names by default.

Default trigger severity names are available for translation in all locales. If a severity name is changed, custom name is used in all locales and additional manual translation is needed.

Custom severity name translation procedure:

- set required custom severity name, for example 'Important'
- edit `<frontend_dir>/locale/<required_locale>/LC_MESSAGES/frontend.po`
- add 2 lines:

```
msgid "Important"  
msgstr "<translation string>"
```

and save file.

- create .mo files as described in `<frontend_dir>/locale/README`

Here **msgid** should match the new custom severity name and **msgstr** should be the translation for it in the specific language.

This procedure should be performed after each severity name change.

#### 6 Mass update

Overview

With mass update you may change some attribute for a number of triggers at once, saving you the need to open each individual trigger for editing.

Using mass update

To mass-update some triggers, do the following:

- Mark the checkboxes of the triggers you want to update in the list
- Click on Mass update below the list

- Navigate to the tab with required attributes (Trigger, Tags or Dependencies)
- Mark the checkboxes of any attribute to update

The screenshot shows the 'Trigger' tab selected. There are three tabs: 'Trigger', 'Tags', and 'Dependencies'. Under the 'Trigger' tab, there are two checkboxes: 'Severity' and 'Allow manual close', both of which are checked. To the right of the 'Severity' checkbox is a row of buttons: 'Not classified' (highlighted), 'Information', 'Warning', 'Average', 'High', and 'Dis'. Below the 'Allow manual close' checkbox are two buttons: 'No' and 'Yes'. At the bottom of the interface are two buttons: 'Update' and 'Cancel'.

The screenshot shows the 'Tags' tab selected. There are three tabs: 'Trigger', 'Tags', and 'Dependencies'. Under the 'Tags' tab, there is a 'Tags' checkbox which is checked. To its right are three buttons: 'Add' (highlighted), 'Replace', and 'Remove'. Below these buttons is a table with two columns: 'Name' and 'Value'. The 'Name' column contains the text 'tag' and the 'Value' column contains the text 'value'. Below the table is a blue link labeled 'Add'.

The following options are available when selecting the respective button for tag update:

- Add - allows to add new tags for the triggers;
- Replace - will remove any existing tags from the trigger and replace them with the one(s) specified below;
- Remove - will remove specified tags from triggers.

Note, that tags with the same name, but different values are not considered 'duplicates' and can be added to the same trigger.

The screenshot shows the 'Dependencies' tab selected. There are three tabs: 'Trigger', 'Tags', and 'Dependencies'. Under the 'Dependencies' tab, there is a 'Replace dependencies' checkbox which is checked. To its right is a text area containing two lines of text: 'My host: Zabbix agent on {HOST.NAME} is unreachable for 5 minutes' and 'My host: {HOST.NAME} has just been restarted'. Below the text area is a blue link labeled 'Add'. At the bottom of the interface are two buttons: 'Update' and 'Cancel'.

Replace dependencies - will remove any existing dependencies from the trigger and replace them with the one(s) specified.

Click on Update to apply the changes.

## 7 Predictive trigger functions

### Overview

Sometimes there are signs of the upcoming problem. These signs can be spotted so that actions may be taken in advance to prevent or at least minimize the impact of the problem.

Zabbix has tools to predict the future behavior of the monitored system based on historic data. These tools are realized through predictive trigger functions.

### 1 Functions

Two things one needs to know is how to define a problem state and how much time is needed to take action. Then there are two ways to set up a trigger signaling about a potential unwanted situation. First: trigger must fire when the system after "time to act" is expected to be in problem state. Second: trigger must fire when the system is going to reach the problem state in less than "time to act". Corresponding trigger functions to use are **forecast** and **timeleft**. Note that underlying statistical analysis is basically identical for both functions. You may set up a trigger whichever way you prefer with similar results.

## 2 Parameters

Both functions use almost the same set of parameters. Use the list of [supported functions](#) for reference.

### 2.1 Time interval

First of all you should specify the historic period Zabbix should analyze to come up with prediction. You do it in a familiar way by means of `sec` or `#num` parameter and optional `time_shift` like you do it with **avg**, **count**, **delta**, **max**, **min** and **sum** functions.

### 2.2 Forecasting horizon

#### (**forecast** only)

Parameter `time` specifies how far in the future Zabbix should extrapolate dependencies it finds in historic data. No matter if you use `time_shift` or not, `time` is always counted starting from the current moment.

### 2.3 Threshold to reach

#### (**timeleft** only)

Parameter `threshold` specifies a value the analyzed item has to reach, no difference if from above or from below. Once we have determined  $f(t)$  (see below) we should solve equation  $f(t) = \text{threshold}$  and return the root which is closer to now and to the right from now or 9999999999.9999 if there is no such root.

#### Note:

When item values approach the threshold and then cross it, **timeleft** assumes that intersection is already in the past and therefore switches to the next intersection with `threshold` level, if any. Best practice should be to use predictions as a complement to ordinary problem diagnostics, not as a substitution.<sup>a</sup>

<sup>a</sup>According to [specification](#) these are voltages on chip pins and generally speaking may need scaling.

### 2.4 Fit functions

Default `fit` is the linear function. But if your monitored system is more complicated you have more options to choose from.

<code>fit</code>	$x = f(t)$
linear	$x = a + b*t$
polynomialN <sup>1</sup>	$x = a_0 + a_1*t + a_2*t^2 + \dots + a_n*t^n$
exponential	$x = a*\exp(b*t)$
logarithmic	$x = a + b*\log(t)$
power	$x = a*t^b$

### 2.5 Modes

#### (**forecast** only)

Every time a trigger function is evaluated it gets data from the specified history period and fits a specified function to the data. So, if the data is slightly different the fitted function will be slightly different. If we simply calculate the value of the fitted function at a specified time in the future you will know nothing about how the analyzed item is expected to behave between now and that moment in the future. For some `fit` options (like polynomial) a simple value from the future may be misleading.

mode	<b>forecast</b> result
value	$f(\text{now} + \text{time})$
max	$\max_{\text{now} \leq t \leq \text{now} + \text{time}} f(t)$
min	$\min_{\text{now} \leq t \leq \text{now} + \text{time}} f(t)$
delta	max - min
avg	average of $f(t)$ ( $\text{now} \leq t \leq \text{now} + \text{time}$ ) according to <a href="#">definition</a>

## 3 Details

<sup>1</sup>Secure indicates that the cookie should only be transmitted over a secure HTTPS connection from the client. When set to 'true', the cookie will only be set if a secure connection exists.

To avoid calculations with huge numbers we consider the timestamp of the first value in specified period plus 1 ns as a new zero-time (current epoch time is of order  $10^9$ , epoch squared is  $10^{18}$ , double precision is about  $10^{-16}$ ). 1 ns is added to provide all positive time values for logarithmic and power fits which involve calculating  $\log(t)$ . Time shift does not affect linear, polynomial, exponential (apart from easier and more precise calculations) but changes the shape of logarithmic and power functions.

#### 4 Potential errors

Functions return -1 in such situations:

- specified evaluation period contains no data;
- result of mathematical operation is not defined<sup>2</sup>;
- numerical complications (unfortunately, for some sets of input data range and precision of double-precision floating-point format become insufficient)<sup>3</sup>.

#### Note:

No warnings or errors are flagged if chosen fit poorly describes provided data or there is just too few data for accurate prediction.

#### 5 Examples and dealing with errors

To get a warning when you are about to run out of free disk space on your host you may use a trigger expression like this:

```
{host:vfs.fs.size[/,free].timeleft(1h,,0)}<1h
```

However, error code -1 may come into play and put your trigger in a problem state. Generally it's good because you get a warning that your predictions don't work correctly and you should look at them more thoroughly to find out why. But sometimes it's bad because -1 can simply mean that there was no data about the host free disk space obtained in the last hour. If you are getting too many false positive alerts consider using more complicated trigger expression<sup>4</sup>:

```
{host:vfs.fs.size[/,free].timeleft(1h,,0)}<1h and {host:vfs.fs.size[/,free].timeleft(1h,,0)}<>-1
```

Situation is a bit more difficult with **forecast**. First of all, -1 may or may not put the trigger in a problem state depending on whether you have expression like `{host:item.forecast(...)}<...` or like `{host:item.forecast(...)}>...`

Furthermore, -1 may be a valid forecast if it's normal for the item value to be negative. But probability of this situation in the real world situation is negligible (see **how** operator = works). So add `...` or `{host:item.forecast(...)}=-1` or `...` and `{host:item.forecast(...)}<>-1` if you want or don't want to treat -1 as a problem respectively.

#### 4 Events

##### Overview

There are several types of events generated in Zabbix:

- trigger events - whenever a trigger changes its status (OK→PROBLEM→OK)
- discovery events - when hosts or services are detected
- autoregistration events - when active agents are auto-registered by server
- internal events - when an item/low-level discovery rule becomes unsupported or a trigger goes into an unknown state

#### Note:

Internal events are supported starting with Zabbix 2.2 version.

Events are time-stamped and can be the basis of actions such as sending notification e-mail etc.

To view details of events in the frontend, go to Monitoring → Problems. There you can click on the event date and time to view details of an event.

More information is available on:

- [trigger events](#)

<sup>2</sup>For example fitting exponential or power functions involves calculating  $\log()$  of item values. If data contains zeros or negative numbers you will get an error since  $\log()$  is defined for positive values only.

<sup>3</sup>For linear, exponential, logarithmic and power fits all necessary calculations can be written explicitly. For polynomial only value can be calculated without any additional steps. Calculating avg involves computing polynomial antiderivative (analytically). Computing max, min and delta involves computing polynomial derivative (analytically) and finding its roots (numerically). Solving  $f(t) = 0$  involves finding polynomial roots (numerically).

<sup>4</sup>But in this case -1 can cause your trigger to recover from the problem state. To be fully protected use: `{host:vfs.fs.size[/,free].timeleft(1h,,0)}<1h` and `({TRIGGER.VALUE}=0 and {host:vfs.fs.size[/,free].timeleft(1h,,0)}<>-1 or {TRIGGER.VALUE}=1)`



- **other event sources**

## 1 Trigger event generation

### Overview

Change of trigger status is the most frequent and most important source of events. Each time the trigger changes its state, an event is generated. The event contains details of the trigger state's change - when it happened and what the new state is.

Two types of events are created by triggers - Problem and OK.

### Problem events

A problem event is created:

- when a trigger expression evaluates to TRUE if the trigger is in OK state;
- each time a trigger expression evaluates to TRUE if multiple problem event generation is enabled for the trigger.

### OK events

An OK event closes the related problem event(s) and may be created by 3 components:

- triggers - based on 'OK event generation' and 'OK event closes' settings;
- event correlation
- task manager - when an event is **manually closed**

### Triggers

Triggers have an 'OK event generation' setting that controls how OK events are generated:

- Expression - an OK event is generated for a trigger in problem state when its expression evaluates to FALSE. This is the simplest setting, enabled by default.
- Recovery expression - an OK event is generated for a trigger in problem state when its expression evaluates to FALSE and the recovery expression evaluates to TRUE. This can be used if trigger recovery criteria is different from problem criteria.
- None - an OK event is never generated. This can be used in conjunction with multiple problem event generation to simply send a notification when something happens.

Additionally triggers have an 'OK event closes' setting that controls which problem events are closed:

- All problems - an OK event will close all open problems created by the trigger
- All problems if tag values match - an OK event will close open problems created by the trigger and having at least one matching tag value. The tag is defined by 'Tag for matching' trigger setting. If there are no problem events to close then OK event is not generated. This is often called trigger level event correlation.

### Event correlation

Event correlation (also called global event correlation) is a way to set up custom event closing (resulting in OK event generation) rules.

The rules define how the new problem events are paired with existing problem events and allow to close the new event or the matched events by generating corresponding OK events.

However, event correlation must be configured very carefully, as it can negatively affect event processing performance or, if misconfigured, close more events than intended (in the worst case even all problem events could be closed). A few configuration tips:

1. always reduce the correlation scope by setting a unique tag for the control event (the event that is paired with old events) and use the 'new event tag' correlation condition
2. don't forget to add a condition based on the old event when using 'close old event' operation, or all existing problems could be closed
3. avoid using common tag names used by different correlation configurations

### Task manager

If the 'Allow manual close' setting is enabled for trigger, then it's possible to manually close problem events generated by the trigger. This is done in the frontend when **updating a problem**. The event is not closed directly - instead a 'close event' task is created, which is handled by the task manager shortly. The task manager will generate a corresponding OK event and the problem event will be closed.

## 2 Other event sources

### Discovery events

Zabbix periodically scans the IP ranges defined in network discovery rules. Frequency of the check is configurable for each rule individually. Once a host or a service is discovered, a discovery event (or several events) are generated.

Zabbix generates the following events:

Event	When generated
Service Up	Every time Zabbix detects active service.
Service Down	Every time Zabbix cannot detect service.
Host Up	If at least one of the services is UP for the IP.
Host Down	If all services are not responding.
Service Discovered	If the service is back after downtime or discovered for the first time.
Service Lost	If the service is lost after being up.
Host Discovered	If host is back after downtime or discovered for the first time.
Host Lost	If host is lost after being up.

### Active agent auto-discovery events

Active agent autoregistration creates events in Zabbix.

If configured, active agent autoregistration event is created when a previously unknown active agent asks for checks or if the host metadata has changed. The server adds a new auto-registered host, using the received IP address and port of the agent.

For more information, see the [active agent autoregistration](#) page.

### Internal events

Internal events happen when:

- an item changes state from 'normal' to 'unsupported'
- an item changes state from 'unsupported' to 'normal'
- a low-level discovery rule changes state from 'normal' to 'unsupported'
- a low-level discovery rule changes state from 'unsupported' to 'normal'
- a trigger changes state from 'normal' to 'unknown'
- a trigger changes state from 'unknown' to 'normal'

Internal events are supported since Zabbix 2.2. The aim of introducing internal events is to allow users to be notified when any internal event takes place, for example, an item becomes unsupported and stops gathering data.

Internal events are only created when internal actions for these events are enabled. To stop generation of internal events (for example, for items becoming unsupported), disable all actions for internal events in Configuration → Actions → Internal actions.

#### Note:

If internal actions are disabled, while an object is in the 'unsupported' state, recovery event for this object will still be created.

If internal actions are enabled, while an object is in the 'unsupported' state, recovery event for this object will be created, even though 'problem event' has not been created for the object.

## 3 Manual closing of problems

### Overview

While generally problem events are resolved automatically when trigger status goes from 'Problem' to 'OK', there may be cases when it is difficult to determine if a problem has been resolved by means of a trigger expression. In such cases, the problem needs to be resolved manually.

For example, syslog may report that some kernel parameters need to be tuned for optimal performance. In this case the issue is reported to Linux administrators, they fix it and then close the problem manually.

Problems can be closed manually only for triggers with the Allow manual close option enabled.

When a problem is "manually closed", Zabbix generates a new internal task for Zabbix server. Then the task manager process executes this task and generates an OK event, therefore closing problem event.

A manually closed problem does not mean that the underlying trigger will never go into a 'Problem' state again. The trigger expression is re-evaluated and may result in a problem:

- When new data arrive for any item included in the trigger expression (note that the values discarded by a throttling preprocessing step are not considered as received and will not cause trigger expression to be re-evaluated);
- When time-based functions are used in the expression. Complete time-based function list can be found on [Triggers page](#).

#### Configuration

Two steps are required to close a problem manually.

#### Trigger configuration

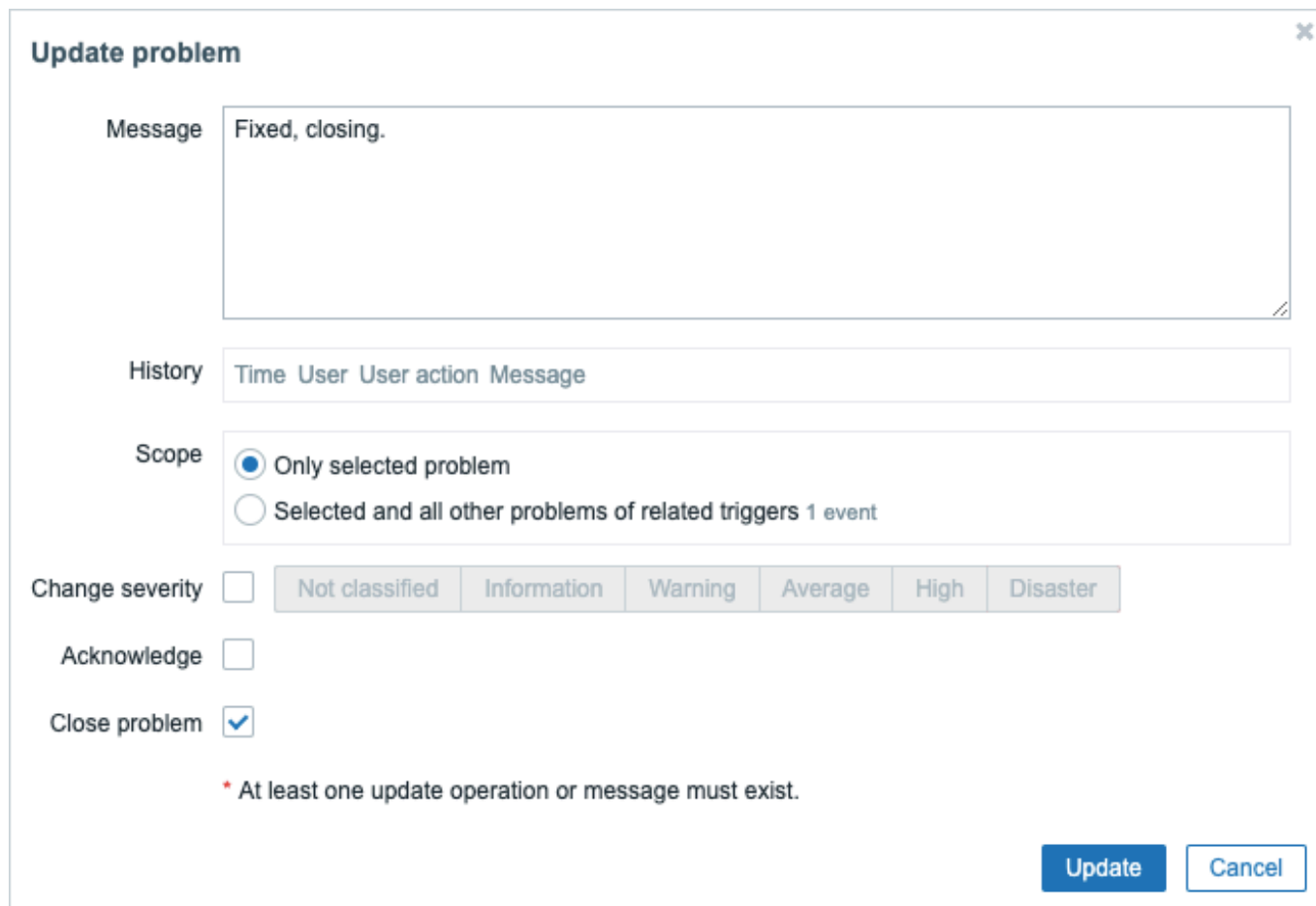
In trigger configuration, enable the Allow manual close option.



#### Problem update window

If a problem arises for a trigger with the Manual close flag, you can open the **problem update** popup window of that problem and close the problem manually.

To close the problem, check the Close problem option in the form and click on Update.

A screenshot of the "Update problem" popup window. The window has a title bar with a close button (X) in the top right corner. The main content area includes:

- Message:** A text input field containing "Fixed, closing."
- History:** A table with columns "Time", "User", "User action", and "Message".
- Scope:** Two radio button options: "Only selected problem" (selected) and "Selected and all other problems of related triggers 1 event".
- Change severity:** A checkbox followed by a row of buttons: "Not classified", "Information", "Warning", "Average", "High", and "Disaster".
- Acknowledge:** A checkbox.
- Close problem:** A checkbox with a blue checkmark.

At the bottom, there is a red asterisk warning: "\* At least one update operation or message must exist." and two buttons: "Update" (blue) and "Cancel" (white).

All mandatory input fields are marked with a red asterisk.

The request is processed by Zabbix server. Normally it will take a few seconds to close the problem. During that process CLOSING is displayed in Monitoring → Problems as the status of the problem.

#### Verification

It can be verified that a problem has been closed manually:

- in event details, available through Monitoring → Problems;
- by using the {EVENT.UPDATE.HISTORY} macro in notification messages that will provide this information.

## 5 Event correlation

### Overview

Event correlation allows to correlate problem events to their resolution in a manner that is very precise and flexible.

Event correlation can be defined:

- **on trigger level** - one trigger may be used to relate separate problems to their solution
- **globally** - problems can be correlated to their solution from a different trigger/polling method using global correlation rules

### 1 Trigger-based event correlation

#### Overview

Trigger-based event correlation allows to correlate separate problems reported by one trigger.

While generally an OK event can close all problem events created by one trigger, there are cases when a more detailed approach is needed. For example, when monitoring log files you may want to discover certain problems in a log file and close them individually rather than all together.

This is the case with triggers that have Multiple Problem Event Generation enabled. Such triggers are normally used for log monitoring, trap processing, etc.

It is possible in Zabbix to relate problem events based on the **event tags**. Tags are used to extract values and create identification for problem events. Taking advantage of that, problems can also be closed individually based on matching tag.

In other words, the same trigger can create separate events identified by the event tag. Therefore problem events can be identified one-by-one and closed separately based on the identification by the event tag.

#### How it works

In log monitoring you may encounter lines similar to these:

```
Line1: Application 1 stopped
Line2: Application 2 stopped
Line3: Application 1 was restarted
Line4: Application 2 was restarted
```

The idea of event correlation is to be able to match the problem event from Line1 to the resolution from Line3 and the problem event from Line2 to the resolution from Line4, and close these problems one by one:

```
Line1: Application 1 stopped
Line3: Application 1 was restarted #problem from Line 1 closed
```

```
Line2: Application 2 stopped
Line4: Application 2 was restarted #problem from Line 2 closed
```

To do this you need to tag these related events as, for example, "Application 1" and "Application 2". That can be done by applying a regular expression to the log line to extract the tag value. Then, when events are created, they are tagged "Application 1" and "Application 2" respectively and problem can be matched to the resolution.

#### Configuration

##### Item

To begin with, you may want to set up an item that monitors a log file, for example:

```
log[/var/log/syslog]
```

**Item**    Preprocessing

---

\* Name    Syslog item

Type    Zabbix agent (active) ▾

\* Key    log[/var/log/syslog]

Type of information    Text ▾

\* Update interval    30s

With the item set up, wait a minute for the configuration changes to be picked up and then go to **Latest data** to make sure that the item has started collecting data.

#### Trigger

With the item working you need to configure the **trigger**. It's important to decide what entries in the log file are worth paying attention to. For example, the following trigger expression will search for a string like 'Stopping' to signal potential problems:

```
{My host:log[/var/log/syslog].regex("Stopping")}=1
```

**Attention:**

To make sure that each line containing the string "Stopping" is considered a problem also set the Problem event generation mode in trigger configuration to 'Multiple'.

Then define a recovery expression. The following recovery expression will resolve all problems if a log line is found containing the string "Starting":

```
{My host:log[/var/log/syslog].regex("Starting")}=1
```

Since we do not want that it's important to make sure somehow that the corresponding root problems are closed, not just all problems. That's where tagging can help.

Problems and resolutions can be matched by specifying a tag in the trigger configuration. The following settings have to be made:

- Problem event generation mode: Multiple
- OK event closes: All problems if tag values match
- enter the name of the tag for event matching
- configure the **tags** to extract tag values from log lines

Trigger Dependencies

\* Name

Severity

\* Expression

[Expression constructor](#)

OK event generation

Recovery expression

[Expression constructor](#)

PROBLEM event generation mode

OK event closes

Tag for matching

Tags

<input type="text" value="Service"/>	<input "1")"="" ([a-za-z]*)="" .*="" .*",="" service="" type="text" value="{{ITEM.VALUE}.regex("/>	<input type="button" value="Remove"/>
<input type="text" value="Datacenter"/>	<input type="text" value="value"/>	<input type="button" value="Remove"/>

If configured successfully you will be able to see problem events tagged by application and matched to their resolution in Monitoring → Problems.

≡ Problems

Time	Severity	Recovery time	Status	Info	Host	Problem	Duration	Ack	Actions	Tags
15:28:13	<input type="checkbox"/> High	15:28:25	RESOLVED	Zabbix server	Service Apache stopped	12s	No		Service: Apache	Webserver

**Warning:**

Because misconfiguration is possible, when similar event tags may be created for **unrelated** problems, please review the cases outlined below!

- With two applications writing error and recovery messages to the same log file a user may decide to use two Application tags in the same trigger with different tag values by using separate regular expressions in the tag values to extract the names of, say, application A and application B from the {ITEM.VALUE} macro (e.g. when the message formats differ). However, this may not work as planned if there is no match to the regular expressions. Non-matching regexps will yield empty tag values and a single empty tag value in both problem and OK events is enough to correlate them. So a recovery message from application A may accidentally close an error message from application B.
- Actual tags and tag values only become visible when a trigger fires. If the regular expression used is invalid, it is silently replaced with an \*UNKNOWN\* string. If the initial problem event with an \*UNKNOWN\* tag value is missed, there may appear subsequent OK events with the same \*UNKNOWN\* tag value that may close problem events which they shouldn't have closed.
- If a user uses the {ITEM.VALUE} macro without macro functions as the tag value, the 255-character limitation applies. When log messages are long and the first 255 characters are non-specific, this may also result in similar event tags for unrelated problems.

**Event tags**

Overview

There is an option to define custom event tags in Zabbix. Tags can be defined on template, host and trigger levels. After the tags are defined, corresponding new events get marked with tag data:

- with template level tags - host problems that are created by triggers from this template will be marked
- with host level tags - all problems of the host will be marked
- with trigger level tags - problem of this trigger will be marked

An event inherits all tags from the whole chain of templates, hosts, triggers. Completely identical tag:value combinations (after resolved macros) are merged into one rather than being duplicated, when marking the event.

Having custom event tags allows for more flexibility. Most importantly, events can be **correlated** based on event tags. In other uses, actions can be defined based on event tags.

Event tags are realized as a pair of the tag name and value. You can use only the name or pair it with a value:

MySQL, Service:MySQL, Services, Services:Customer, Applications, Application:Java, Priority:High

An entity (trigger, template, host or event) may have several tags with the same name, but different values - these tags will not be considered 'duplicates'. Similarly, a tag with no value and the same tag with a value can be used simultaneously.

Use cases

Some use cases for this functionality are as follows:

1. Mark trigger events in the frontend
  - \* Define tags on trigger level;
  - \* See how all trigger problems are marked with these tags in //Monitoring// → //Problems//.
- Mark all template-inherited problems
  - \* Define a tag on template level, for example 'App=MySQL';
  - \* See how those host problems that are created by triggers from this template are marked with these tags
- Mark all host problems
  - \* Define a tag on host level, for example 'Service=JIRA';
  - \* See how all problems of the host triggers are marked with these tags in //Monitoring// → //Problems//
- Identify problems in a log file and close them separately
  - \* Define tags in the log trigger that will identify events using value extraction by the '%ITEM.VALUE'
  - \* In trigger configuration, have multiple problem event generation mode;
  - \* In trigger configuration, use [[:manual/config/event\_correlation|event correlation]]: select the option
  - \* See problem events created with a tag and closed individually.
- Use it to filter notifications
  - \* Define tags on the trigger level to mark events by different tags;
  - \* Use tag filtering in action conditions to receive notifications only on the events that match tag data
- Use information extracted from item value as tag value
  - \* Use an '%ITEM.VALUE<N>.regsub()' macro in the tag value;
  - \* See tag values in //Monitoring// → //Problems// as extracted data from item value.
- Identify problems better in notifications
  - \* Define tags on the trigger level;
  - \* Use an {EVENT.TAGS} macro in the problem notification;
  - \* Easier identify which application/service the notification belongs to.
- Simplify configuration tasks by using tags on the template level
  - \* Define tags on the template trigger level;
  - \* See these tags on all triggers created from template triggers.
- Create triggers with tags from low-level discovery (LLD)
  - \* Define tags on trigger prototypes;
  - \* Use LLD macros in the tag name or value;
  - \* See these tags on all triggers created from trigger prototypes.

Configuration

Event tags can be defined in:

- template configuration - affecting all triggers from the template when linked to hosts
- host configuration - affecting all triggers of the host
- individual trigger configuration:

Trigger Tags 4 Dependencies

Trigger tags Inherited and trigger tags

Name	Value	Action
Cloud	value	<a href="#">Remove</a>
Service	MySQL	<a href="#">Remove</a>
Customers	value	<a href="#">Remove</a>
Host	{{ITEM.VALUE2}.iregsub(pattern, output)}	<a href="#">Remove</a>

[Add](#)

Event tags can be defined for triggers, template triggers and trigger prototypes.

#### Macro support

The following macros may be used in trigger-level tags:

- {ITEM.VALUE}, {ITEM.LASTVALUE}, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros can be used to populate the tag name or tag value.
- {INVENTORY:\*} macros can be used to reference host inventory values from one or several hosts in a trigger expression (supported since 4.0.0).
- User macros and user macro context is supported for the tag name/value. User macro context may include low-level discovery macros.
- Low-level discovery macros can be used for the tag name/value in trigger prototypes.

The following macros may be used in trigger-based notifications:

- {EVENT.TAGS} and {EVENT.RECOVERY.TAGS} macros will resolve to a comma separated list of event tags or recovery event tags.
- {EVENT.TAGSJSON} and {EVENT.RECOVERY.TAGSJSON} macros will resolve to a JSON array containing event tag objects or recovery event tag objects.

The following macros may be used in template and host-level tags:

- {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros
- {INVENTORY:\*} macros
- User macros

The following macros may be used in host-prototype tags:

- {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros
- {INVENTORY:\*} macros
- User macros
- Low-level discovery macros will be resolved during discovery process and then added to the discovered host

#### Substring extraction in trigger tags

Substring extraction is supported for populating the tag name or tag value, using a macro function - applying a regular expression to the value obtained by the {ITEM.VALUE}, {ITEM.LASTVALUE} macro or a low-level discovery macro. For example:

```
{{ITEM.VALUE}.regsub(pattern, output)}
{{ITEM.VALUE}.iregsub(pattern, output)}
```

```
{#LLDMACRO}.regsub(pattern, output)}
{#LLDMACRO}.iregsub(pattern, output)}
```

Tag name and value will be cut to 255 characters if their length exceeds 255 characters after macro resolution.

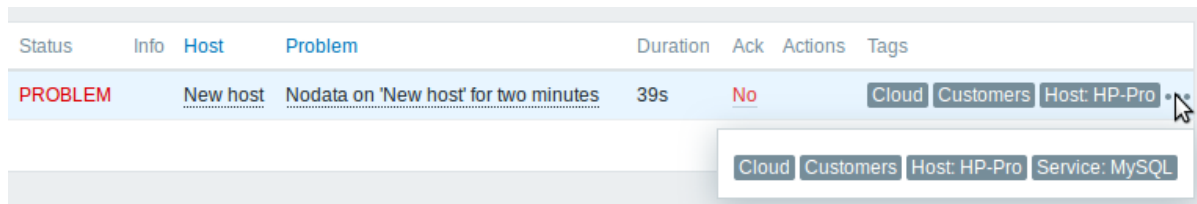
See also: Using macro functions in low-level discovery macros for event tagging.

#### Viewing event tags



Event tags, if defined, can be seen with new events in:

- Monitoring → Problems
- Monitoring → Problems → Event details
- Monitoring → Dashboard → Problems widget (in popup window that opens when rolling the mouse over problem name)



Only the first three tag entries are displayed. If there are more than three tag entries, it is indicated by three dots. If you roll your mouse over these three dots, all tag entries are displayed in a pop-up window.

Note that the order in which tags are displayed is affected by tag filtering and the Tag display priority option in the filter of Monitoring → Problems or the Problems dashboard widget.

## 2 Global event correlation

### Overview

Global event correlation allows to reach out over all metrics monitored by Zabbix and create correlations.

It is possible to correlate events created by completely different triggers and apply the same operations to them all. By creating intelligent correlation rules it is actually possible to save yourself from thousands of repetitive notifications and focus on root causes of a problem!

Global event correlation is a powerful mechanism, which allows you to untie yourself from one-trigger based problem and resolution logic. So far, a single problem event was created by one trigger and we were dependent on that same trigger for the problem resolution. We could not resolve a problem created by one trigger with another trigger. But with event correlation based on event tagging, we can.

For example, a log trigger may report application problems, while a polling trigger may report the application to be up and running. Taking advantage of event tags you can tag the log trigger as Status: Down while tag the polling trigger as Status: Up. Then, in a global correlation rule you can relate these triggers and assign an appropriate operation to this correlation such as closing the old events.

In another use, global correlation can identify similar triggers and apply the same operation to them. What if we could get only one problem report per network port problem? No need to report them all. That is also possible with global event correlation.

Global event correlation is configured in **correlation rules**. A correlation rule defines how the new problem events are paired with existing problem events and what to do in case of a match (close the new event, close matched old events by generating corresponding OK events). If a problem is closed by global correlation, it is reported in the Info column of Monitoring → Problems.

Configuring global correlation rules is available to Super Admin level users only.

#### Attention:

Event correlation must be configured very carefully, as it can negatively affect event processing performance or, if mis-configured, close more events than was intended (in the worst case even all problem events could be closed).

To configure global correlation **safely**, observe the following important tips:

- Reduce the correlation scope. Always set a unique tag for the new event that is paired with old events and use the New event tag correlation condition;
- Add a condition based on the old event when using the Close old event operation (or else all existing problems could be closed);
- Avoid using common tag names that may end up being used by different correlation configurations;
- Keep the number of correlation rules limited to the ones you really need.

See also: [known issues](#).

### Configuration

To configure event correlation rules globally:

- Go to Configuration → Event correlation
- Click on Create correlation to the right (or on the correlation name to edit an existing rule)
- Enter parameters of the correlation rule in the form

Correlation **Operations**

\* Name

Type of calculation  A and (B and C) and D

\* Conditions

Label	Name
A	Old event tag <i>Application</i> equals new event tag <i>Application</i>
B	Old event tag <i>Application</i> equals <i>ABC</i>
C	Old event tag <i>State</i> equals <i>Down</i>
D	New event tag <i>State</i> equals <i>Up</i>

[Add](#)

Description

Enabled

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Unique correlation rule name.
Type of calculation	The following options of calculating conditions are available: <b>And</b> - all conditions must be met <b>Or</b> - enough if one condition is met <b>And/Or</b> - AND with different condition types and OR with the same condition type <b>Custom expression</b> - a user-defined calculation formula for evaluating action conditions. It must include all conditions (represented as uppercase letters A, B, C, ...) and may include spaces, tabs, brackets ( ), <b>and</b> (case sensitive), <b>or</b> (case sensitive), <b>not</b> (case sensitive).
Conditions	List of conditions. See below for details on configuring a condition.
Description	Correlation rule description.
Enabled	If you mark this checkbox, the correlation rule will be enabled.

To configure details of a new condition, click on [Add](#) in the Conditions block. A popup window will open where you can edit the condition details.

### New condition ✕

Type

Tag

Operator equals does not equal contains does not contain

Value

Add
Cancel

Parameter	Description
New condition	<p>Select a condition for correlating events.            Note that if no old event condition is specified, all old events may be matched and closed. Similarly if no new event condition is specified, all new events may be matched and closed.            The following conditions are available:</p> <p><b>Old event tag</b> - specify the old event tag for matching.  <b>New event tag</b> - specify the new event tag for matching.  <b>New event host group</b> - specify the new event host group for matching.  <b>Event tag pair</b> - specify new event tag and old event tag for matching. In this case there will be a match if the <b>values</b> of the tags in both events match. Tag names need not match. This option is useful for matching runtime values, which may not be known at the time of configuration (see also <a href="#">Example 1</a>).  <b>Old event tag value</b> - specify the old event tag name and value for matching, using the following operators:            equals - has the old event tag value            does not equal - does not have the old event tag value            contains - has the string in the old event tag value            does not contain - does not have the string in the old event tag value  <b>New event tag value</b> - specify the new event tag name and value for matching, using the following operators:            equals - has the new event tag value            does not equal - does not have the new event tag value            contains - has the string in the new event tag value            does not contain - does not have the string in the new event tag value</p>

- Select the operation of the correlation rule in the form

## Correlation

## Operations

Close old events

Close new event

\* At least one operation must be selected.

Parameter	Description
Operations	List of operations, selected from the New operation field.
New operation	Select operation to perform when event is correlated and click on Add. The following operations are available: <b>Close old events</b> - close old events when a new event happens. Always add a condition based on the old event when using the Close old events operation or all existing problems could be closed. <b>Close new event</b> - close the new event when it happens

### Warning:

Because misconfiguration is possible, when similar event tags may be created for **unrelated** problems, please review the cases outlined below!

- Actual tags and tag values only become visible when a trigger fires. If the regular expression used is invalid, it is silently replaced with an \*UNKNOWN\* string. If the initial problem event with an \*UNKNOWN\* tag value is missed, there may appear subsequent OK events with the same \*UNKNOWN\* tag value that may close problem events which they shouldn't have closed.
- If a user uses the {ITEM.VALUE} macro without macro functions as the tag value, the 255-character limitation applies. When log messages are long and the first 255 characters are non-specific, this may also result in similar event tags for unrelated problems.

### Examples

#### Example 1

Stop repetitive problem events from the same network port.

**Correlation** **Operations**

\* Name

Type of calculation  A and B

\* Conditions

Label	Name
A	Old event tag <i>Port</i> equals new event tag <i>Port</i>
B	Old event tag <i>Host</i> equals new event tag <i>Host</i>

[Add](#)

Description

Enabled

This global correlation rule will correlate problems if Host and Port tag values exist on the trigger and they are the same in the original event and the new one.

**Correlation** **Operations**

Close old events

Close new event

\* At least one operation must be selected.

This operation will close new problem events on the same network port, keeping only the original problem open.

## 6 Visualization

### 1 Graphs

#### Overview

With lots of data flowing into Zabbix, it becomes much easier for the users if they can look at a visual representation of what is going on rather than only numbers.

This is where graphs come in. Graphs allow to grasp the data flow at a glance, correlate problems, discover when something started or make a presentation of when something might turn into a problem.

Zabbix provides users with:

- built-in **simple graphs** of one item data
- the possibility to create more complex **customized graphs**

- access to a comparison of several items quickly in **ad-hoc graphs**
- modern customisable **vector graphs**

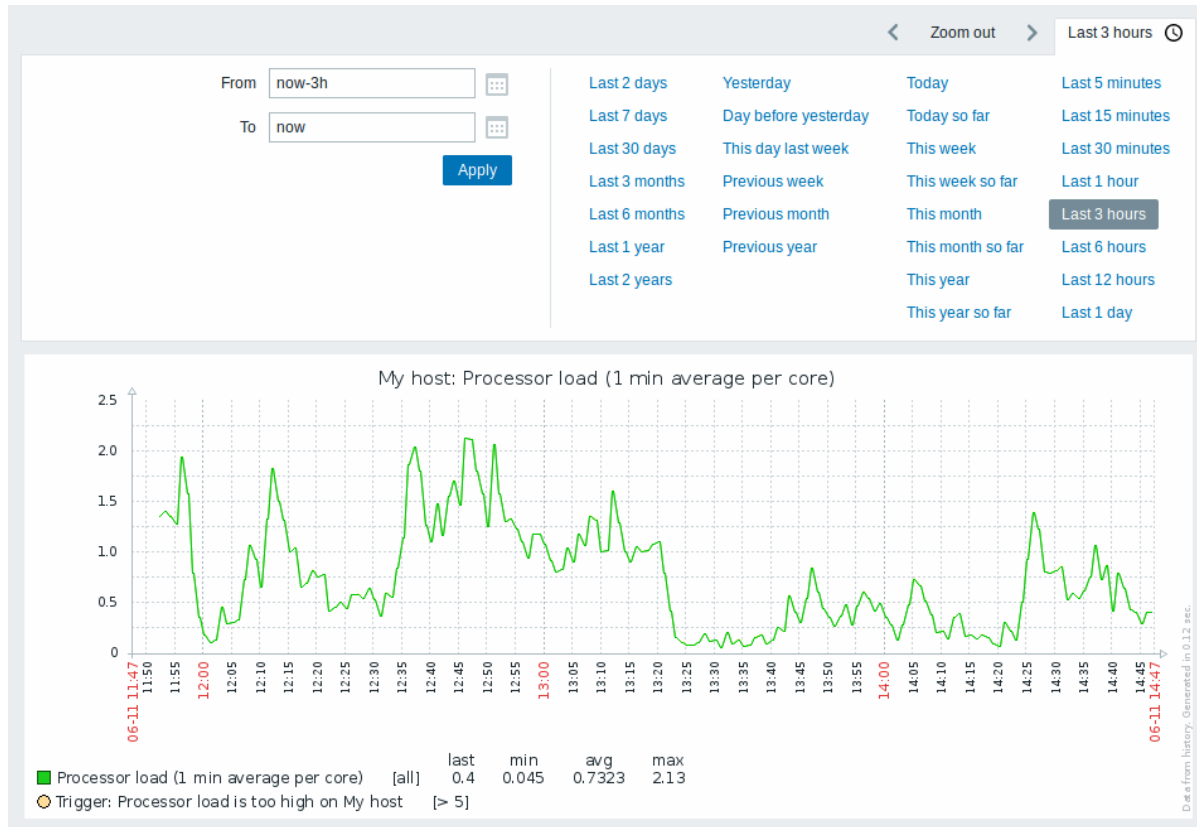
## 1 Simple graphs

### Overview

Simple graphs are provided for the visualization of data gathered by items.

No configuration effort is required on the user part to view simple graphs. They are freely made available by Zabbix.

Just go to Monitoring → Latest data and click on the Graph link for the respective item and a graph will be displayed.



#### Note:

Simple graphs are provided for all numeric items. For textual items, a link to History is available in Monitoring → Latest data.

### Time period selector

Take note of the time period selector above the graph. It allows to select often required periods with one mouse click.

Note that such options as Today, This week, This month, This year display the whole period, including the hours/days in the future. Today so far, in contrast, only displays the hours passed.

Once a period is selected, it can be moved back and forth in time by clicking on the arrow buttons. The Zoom out button allows to zoom out the period two times or by 50% in each direction. Zoom out is also possible by double-clicking in the graphs. The whole time period selector can be collapsed by clicking on the tab label containing the selected period string.

The From/To fields display the selected period in either:

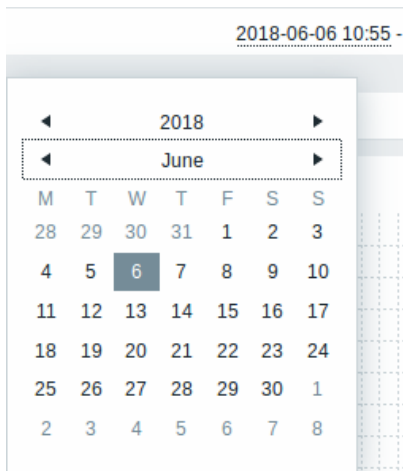
- absolute time syntax in format `Y-m-d H:i:s`
- relative time syntax, e.g.: `now-1d`

A date in relative format can contain one or several mathematical operations (- or +), e.g. `now-1d` or `now-1d-2h+5m`. For relative time the following abbreviations are supported:

- now
- s (seconds)
- m (minutes)
- h (hours)

- d (days)
- w (weeks)
- M (months)
- y (years)

It is possible to pick a specific start/end date by clicking on the calendar icon next to the From/To fields. In this case, the date picker pop up will open.



Within the date picker, it is possible to navigate between the blocks of year/month/date using Tab and Shift+Tab. Keyboard arrows or arrow buttons allow to select the desired value. Pressing Enter (or clicking on the desired value) activates the choice.

Another way of controlling the displayed time is to highlight an area in the graph with the left mouse button. The graph will zoom into the highlighted area once you release the left mouse button.

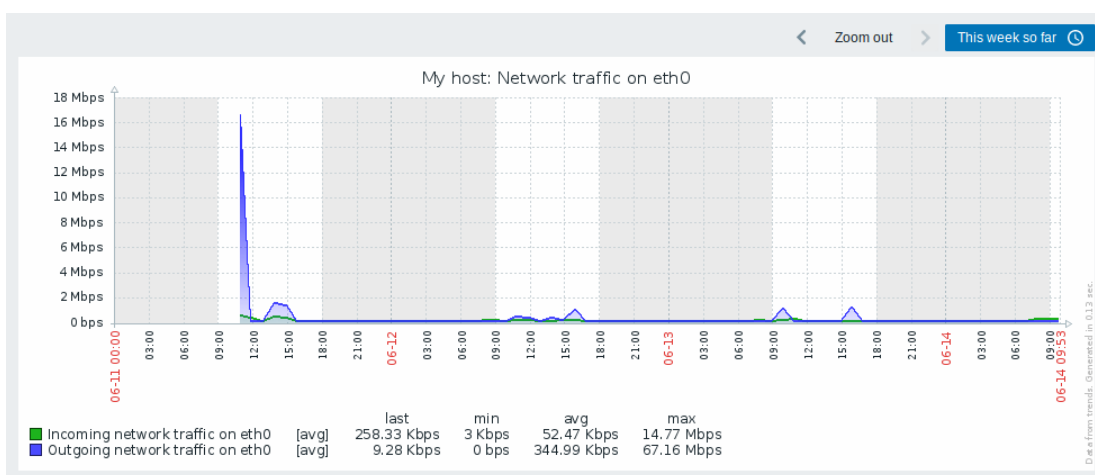
In case no time value is specified or field is left blank, time value will be set to "00:00:00". This doesn't apply to today's date selection: in that case time will be set to current value.

#### Recent data vs longer periods

For very recent data a **single** line is drawn connecting each received value. The single line is drawn as long as there is at least one horizontal pixel available for one value.

For data that show a longer period **three lines** are drawn - a dark green one shows the average, while a light pink and a light green line shows the maximum and minimum values at that point in time. The space between the highs and the lows is filled with yellow background.

Working time (working days) is displayed in graphs as a white background, while non-working time is displayed in gray (with the Original blue default frontend theme).



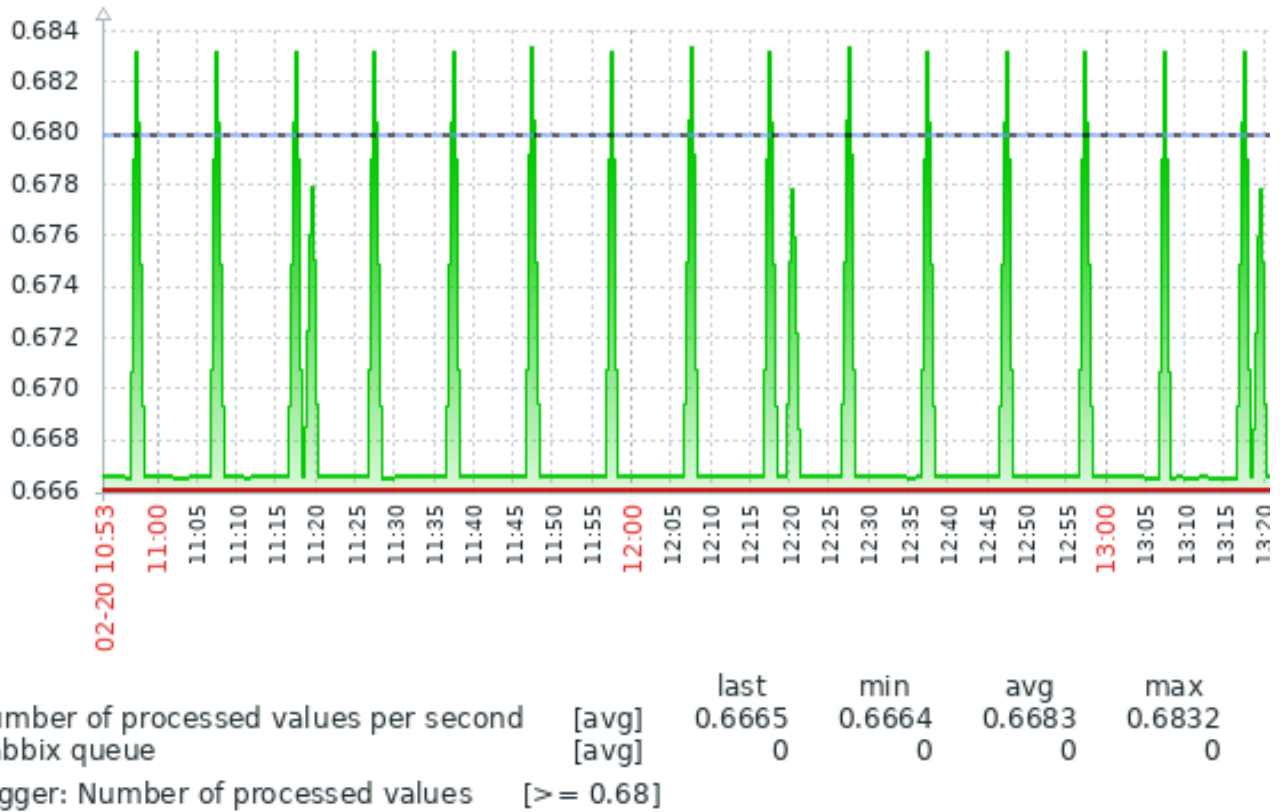
Working time is always displayed in simple graphs, whereas displaying it in **custom graphs** is a user preference.

Working time is not displayed if the graph shows more than 3 months.

#### Trigger lines

Simple triggers are displayed as lines with black dashes over trigger severity color -- take note of the blue line on the graph and the trigger information displayed in the legend. Up to 3 trigger lines can be displayed on the graph; if there are more triggers then

the triggers with lower severity are prioritized. Triggers are always displayed in simple graphs, whereas displaying them in **custom graphs** is a user preference.



Generating from history/trends

Graphs can be drawn based on either item **history** or **trends**.

For the users who have frontend **debug mode** activated, a gray, vertical caption is displayed at the bottom right of a graph indicating where the data come from.

Several factors influence whether history of trends is used:

- longevity of item history. For example, item history can be kept for 14 days. In that case, any data older than the fourteen days will be coming from trends.
- data congestion in the graph. If the amount of seconds to display in a horizontal graph pixel exceeds 3600/16, trend data are displayed (even if item history is still available for the same period).
- if trends are disabled, item history is used for graph building - if available for that period. This is supported starting with Zabbix 2.2.1 (before, disabled trends would mean an empty graph for the period even if item history was available).

Absence of data

For items with a regular update interval, nothing is displayed in the graph if item data are not collected.

However, for trapper items and items with a scheduled update interval (and regular update interval set to 0), a straight line is drawn leading up to the first collected value and from the last collected value to the end of graph; the line is on the level of the first/last value respectively.

Switching to raw values

A dropdown on the upper right allows to switch from the simple graph to the Values/500 latest values listings. This can be useful for viewing the numeric values making up the graph.

The values represented here are raw, i.e. no units or postprocessing of values is used. Value mapping, however, is applied.

Known issues

See **known issues** for graphs.

## 2 Custom graphs

Overview



Custom graphs, as the name suggests, offer customization capabilities.

While simple graphs are good for viewing data of a single item, they do not offer configuration capabilities.

Thus, if you want to change graph style or the way lines are displayed or compare several items, for example incoming and outgoing traffic in a single graph, you need a custom graph.

Custom graphs are configured manually.

They can be created for a host or several hosts or for a single template.

### Configuring custom graphs

To create a custom graph, do the following:

- Go to Configuration → Hosts (or Templates)
- Click on Graphs in the row next to the desired host or template
- In the Graphs screen click on Create graph
- Edit graph attributes

All mandatory input fields are marked with a red asterisk.

### Graph attributes:

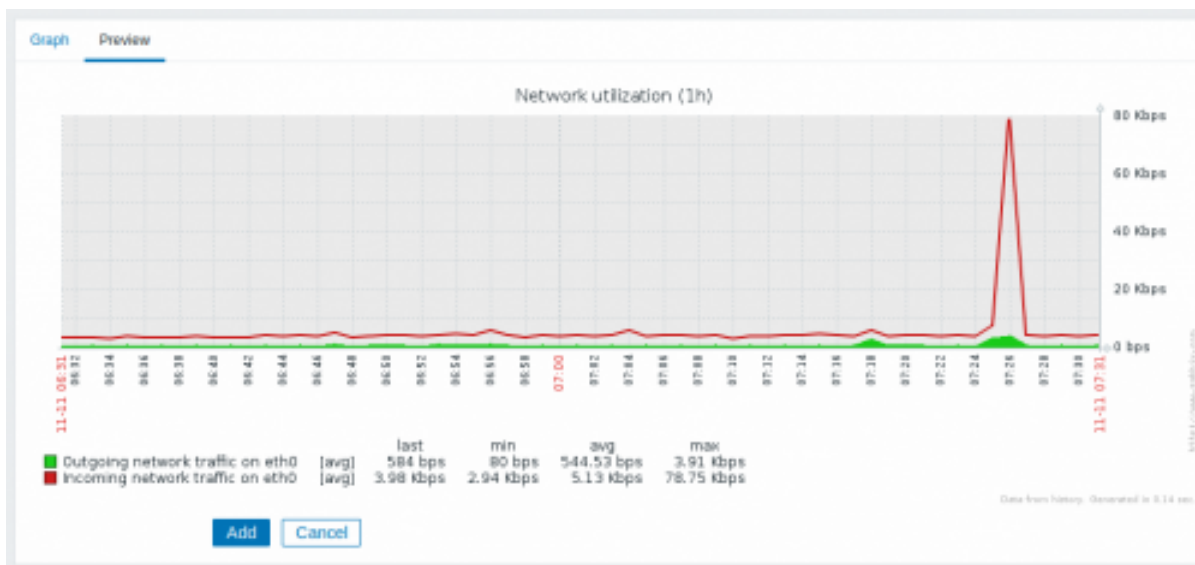
Parameter	Description
Name	Unique graph name. Starting with Zabbix 2.2, item values can be referenced in the name by using simple macros with the standard <code>{host:key.func(param)}</code> syntax. Only <b>avg</b> , <b>last</b> , <b>max</b> and <b>min</b> as functions with seconds as parameter are supported within this macro. <code>{HOST.HOST&lt;1-9&gt;}</code> macros are supported for the use within this macro, referencing the first, second, third, etc. host in the graph, for example <code>{{HOST.HOST1}:key.func(param)}</code> .
Width	Graph width in pixels (for preview and pie/exploded graphs only).
Height	Graph height in pixels.

Parameter	Description
Graph type	<p>Graph type:</p> <p><b>Normal</b> - normal graph, values displayed as lines</p> <p><b>Stacked</b> - stacked graph, filled areas displayed</p> <p><b>Pie</b> - pie graph</p> <p><b>Exploded</b> - "exploded" pie graph, portions displayed as "cut out" of the pie</p>
Show legend	Checking this box will set to display the graph legend.
Show working time	If selected, non-working hours will be shown with gray background. Not available for pie and exploded pie graphs.
Show triggers	If selected, simple triggers will be displayed as lines with black dashes over trigger severity color. Not available for pie and exploded pie graphs.
Percentile line (left)	Display percentile for left Y axis. If, for example, 95% percentile is set, then the percentile line will be at the level where 95 per cent of the values fall under. Displayed as a bright green line. Only available for normal graphs.
Percentile line (right)	Display percentile for right Y axis. If, for example, 95% percentile is set, then the percentile line will be at the level where 95 per cent of the values fall under. Displayed as a bright red line. Only available for normal graphs.
Y axis MIN value	<p>Minimum value of Y axis:</p> <p><b>Calculated</b> - Y axis minimum value will be automatically calculated</p> <p><b>Fixed</b> - fixed minimum value for Y axis. Not available for pie and exploded pie graphs.</p> <p><b>Item</b> - last value of the selected item will be the minimum value</p>
Y axis MAX value	<p>Maximum value of Y axis:</p> <p><b>Calculated</b> - Y axis maximum value will be automatically calculated</p> <p><b>Fixed</b> - fixed maximum value for Y axis. Not available for pie and exploded pie graphs.</p> <p><b>Item</b> - last value of the selected item will be the maximum value</p>
3D view	Enable 3D style. For pie and exploded pie graphs only.
Items	<p>Items, data of which are to be displayed in this graph. Click on Add to select items. You can also select various displaying options (function, draw style, left/right axis display, color).</p> <p>Sort order      Draw order. 0 will be processed first. Can be used to draw lines or regions behind (or in front of) another. You can drag and drop items by the arrow in the beginning of (0→100)line to set the sort order or which item is displayed in front of the other.</p> <p>Name            Name of the selected item is displayed as a link. Clicking on the link opens the list of other available items.</p> <p>Type            Type (only available for pie and exploded pie graphs):</p> <p><b>Simple</b> - value of the item is represented proportionally on the pie</p> <p><b>Graph sum</b> - value of the item represents the whole pie</p> <p>Note that colouring of the "graph sum" item will only be visible to the extent that it is not taken up by "proportional" items.</p>

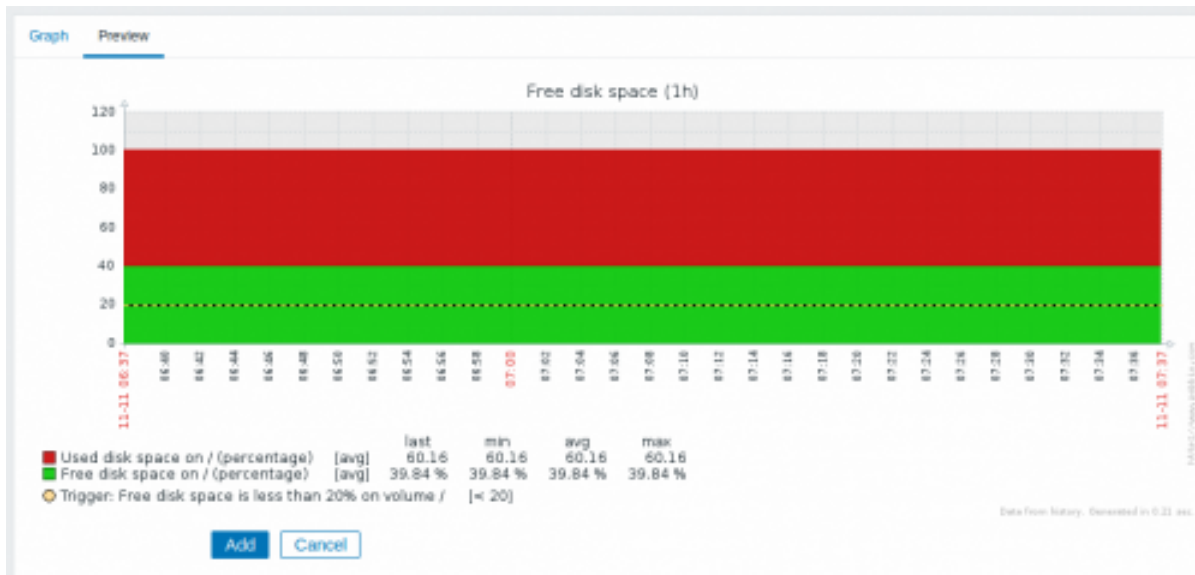
Parameter	Description
Function	Select what values will be displayed when more than one value exists per vertical graph pixel for an item: <b>all</b> - display all possible values (minimum, maximum, average) in the graph. Note that for shorter periods this setting has no effect; only for longer periods, when data congestion in a vertical graph pixel increases, 'all' starts displaying minimum, maximum and average values. This function is only available for Normal graph type. See also: <a href="#">Generating graphs from history/trends.</a> <b>avg</b> - display the average values <b>last</b> - display the latest values. This function is only available if either Pie/Exploded pie is selected as graph type. <b>max</b> - display the maximum values <b>min</b> - display the minimum values
Draw style	Select the draw style (only available for normal graphs; for stacked graphs filled region is always used) to apply to the item data - Line, Bold line, Filled region, Dot, Dashed line, Gradient line.
Y axis side	Select the Y axis side to show the item data - Left, Right.
Color	Select the color to apply to the item data.

### Graph preview

In the Preview tab, a preview of the graph is displayed so you can immediately see what you are creating.



Note that the preview will not show any data for template items.



In this example, pay attention to the dashed bold line displaying the trigger level and the trigger information displayed in the legend.

**Note:**

No more than 3 trigger lines can be displayed. If there are more triggers then the triggers with lower severity are prioritized for display.

If graph height is set as less than 120 pixels, no trigger will be displayed in the legend.

**3 Ad-hoc graphs**

Overview

While a **simple graph** is great for accessing data of one item and **custom graphs** offer customization options, none of the two allow to quickly create a comparison graph for multiple items with little effort and no maintenance.

To address this issue, since Zabbix 2.4 it is possible to create ad-hoc graphs for several items in a very quick way.

Configuration

To create an ad-hoc graph, do the following:

- Go to Monitoring → Latest data
- Use filter to display items that you want
- Mark checkboxes of the items you want to graph
- Click on Display stacked graph or Display graph buttons

## Latest data

▼  Host ▲
Name

---

▼ New host
- other - (1 Item)

CPU load average

---

▼ Zabbix server
CPU (3 Items)

Load average (1m avg)

Load average (5m avg)

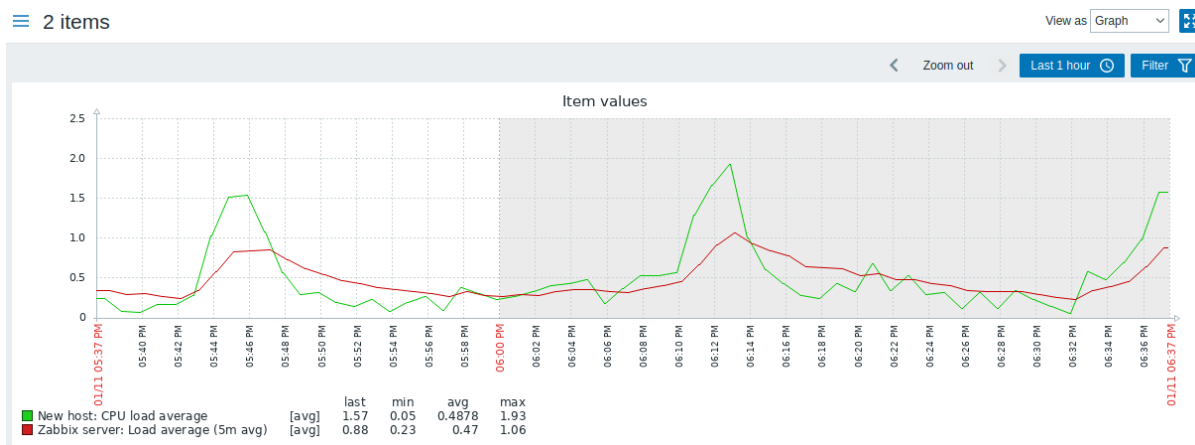
Load average (15m avg)

---

2 selected

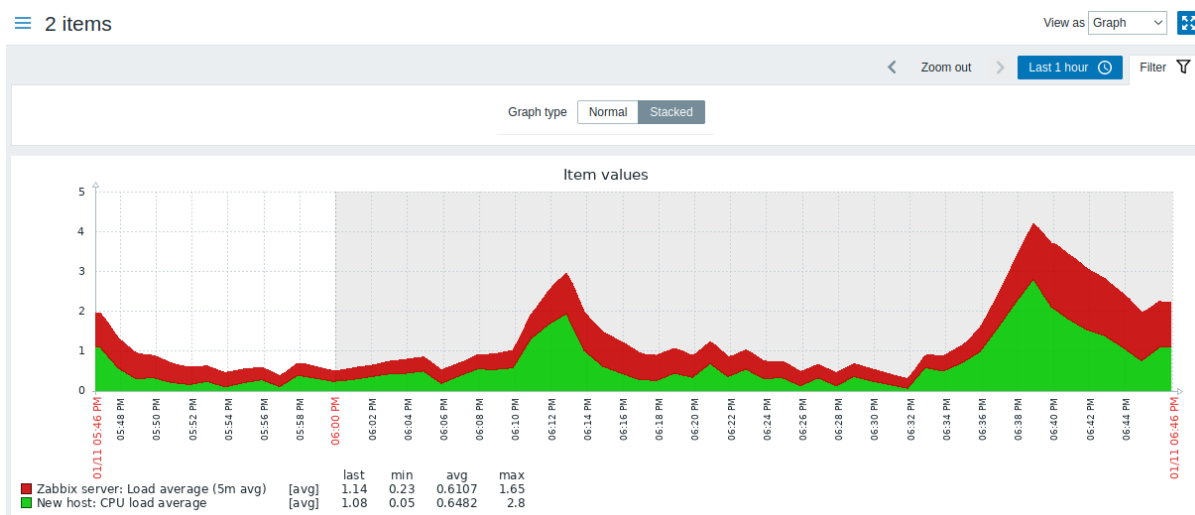
Display stacked graph
Display graph

Your graph is created instantly:



Note that to avoid displaying too many lines in the graph, only the average value for each item is displayed (min/max value lines are not displayed). Triggers and trigger information is not displayed in the graph.

In the created graph window you have the **time period selector** available and the possibility to switch from the "normal" line graph to a stacked one (and back).



## 4 Aggregation in graphs

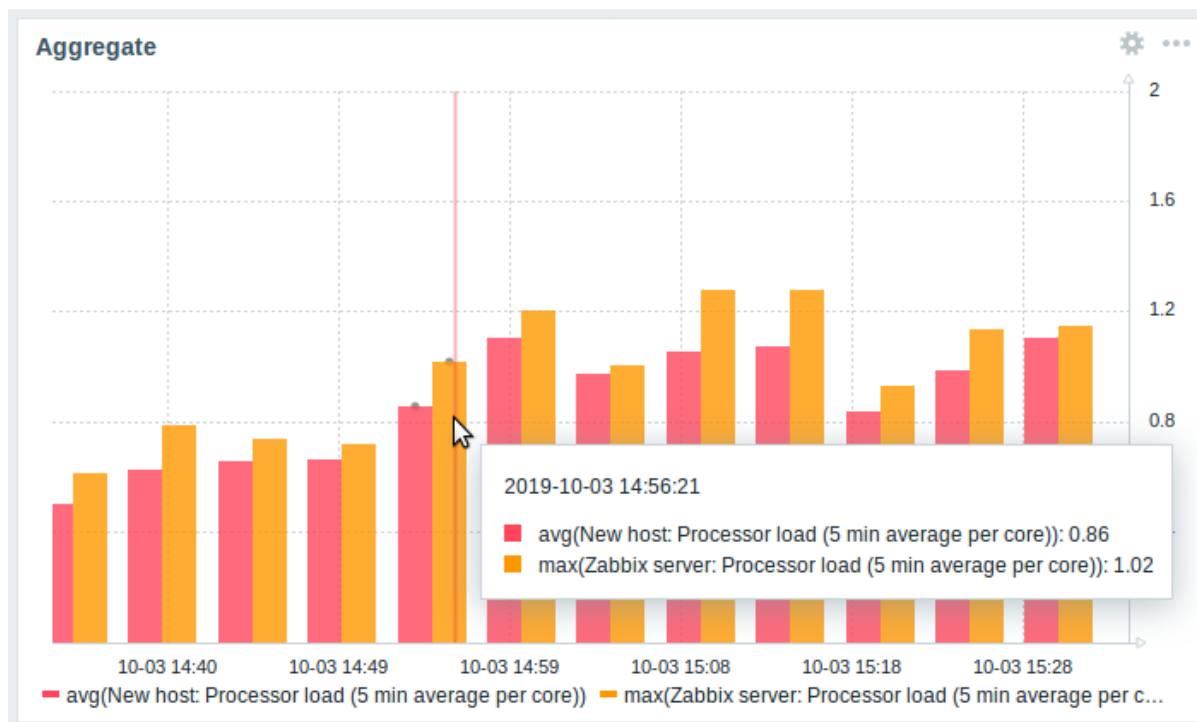
### Overview

The aggregation functions, available in the graph widget of the dashboard, allow to display an aggregated value for the chosen interval (5 minutes, an hour, a day), instead of all values.

The aggregation options are as follows:

- min
- max
- avg
- count
- sum
- first (first value displayed)
- last (last value displayed)

The most exciting use of data aggregation is the possibility to create nice side-by-side comparisons of data for some period:



When hovering over a point in time in the graph, date and time is displayed, in addition to items and their aggregated values. Items are displayed in parentheses, prefixed by the aggregation function used. Note that this is the date and time of the point in graph, not of the actual values.

### Configuration

The options for aggregation are available in data set settings when configuring a graph widget.

Missing data  None  Connected  T

Y-axis  Left  Right

Time shift

Aggregation function

Aggregation interval

Aggregate  Each item  Data set

You may pick the aggregation function and the time interval. As the data set may comprise several items, there is also another option allowing to show aggregated data for each item separately or for all data set items as one aggregated value.

See the [widget configuration](#) page for more details.

Use cases

Average request count to Nginx server

View the average request count per second per day to Nginx server:

- add the request count per second item to the data set
- select the aggregate function `avg` and specify interval `1d`
- a bar graph is displayed, where each bar represents the average number of requests per second per day

Minimum weekly disk space among clusters

View the lowest disk space among clusters over a week.

- add to the data set: hosts `cluster*`, key "Free disk space on /data"
- select the aggregate function `min` and specify interval `1w`
- a bar graph is displayed, where each bar represents the minimum disk space per week for each /data volume of the cluster

## 2 Network maps

Overview

If you have a network to look after, you may want to have an overview of your infrastructure somewhere. For that purpose you can create maps in Zabbix - of networks and of anything you like.

All users can create network maps. The maps can be public (available to all users) or private (available to selected users).

Proceed to [configuring a network map](#).

### 1 Configuring a network map

Overview

Configuring a map in Zabbix requires that you first create a map by defining its general parameters and then you start filling the actual map with elements and their links.

You can populate the map with elements that are a host, a host group, a trigger, an image or another map.

Icons are used to represent map elements. You can define the information that will be displayed with the icons and set that recent problems are displayed in a special way. You can link the icons and define information to be displayed on the links.

You can add custom URLs to be accessible by clicking on the icons. Thus you may link a host icon to host properties or a map icon to another map.

Maps are managed in Monitoring → [Maps](#), where they can be configured, managed and viewed. In the monitoring view, you can click on the icons and take advantage of the links to some scripts and URLs.

Network maps are based on vector graphics (SVG) since Zabbix 3.4.

#### Public and private maps

All users in Zabbix (including non-admin users) can create network maps. Maps have an owner - the user who created them. Maps can be made public or private.

- Public maps are visible to all users, although to see it the user must have read access to at least one map element. Public maps can be edited in case a user/ user group has read-write permissions for this map and at least read permissions to all elements of the corresponding map including triggers in the links.
- Private maps are visible only to their owner and the users/user groups the map is **shared** with by the owner. Regular (non-Super admin) users can only share with the groups and users they are member of. Admin level users can see private maps regardless of being the owner or belonging to the shared user list. Private maps can be edited by the owner of the map and in case a user/ user group has read-write permissions for this map and at least read permissions to all elements of the corresponding map including triggers in the links.

Map elements that the user does not have read permission to are displayed with a grayed-out icon and all textual information on the element is hidden. However, a trigger label is visible even if the user has no permission to the trigger.

To add an element to the map the user must also have at least read permission to it.

#### Creating a map

To create a map, do the following:

- Go to Monitoring → Maps
- Go to the view with all maps
- Click on Create map

You can also use the Clone and Full clone buttons in the configuration form of an existing map to create a new map. Clicking on Clone will retain general layout attributes of the original map, but no elements. Full clone will retain both the general layout attributes and all elements of the original map.

The **Map** tab contains general map attributes:



Map **Sharing**

\* Owner

\* Name

\* Width

\* Height

Background image

Automatic icon mapping  [show icon mappings](#)

Icon highlight

Mark elements on trigger status change

Display problems  Expand single problem  Number of problems  Number of p

Advanced labels

Host group label type

Host label type

Trigger label type

Map label type

Image label type

Map element label location

Problem display

Minimum severity  Not classified  Information  Warning  Average  High

Show suppressed problems

URLs

Name	URL
<input type="text" value="Latest data"/>	<input type="text" value="https://localhost/zabbix/latest.php"/>

[Add](#)

All mandatory input fields are marked with a red asterisk.

General map attributes:

Parameter	Description
Owner	Name of map owner.
Name	Unique map name.
Width	Map width in pixels.
Height	Map height in pixels.
Background image	Use background image: <b>No image</b> - no background image (white background) <b>Image</b> - selected image to be used as a background image. No scaling is performed. You may use a geographical map or any other image to enhance your map.
Automatic icon mapping	You can set to use an automatic icon mapping, configured in Administration → General → Icon mapping. Icon mapping allows to map certain icons against certain host inventory fields.
Icon highlighting	If you check this box, map elements will receive highlighting. Elements with an active trigger will receive a round background, in the same color as the highest severity trigger. Moreover, a thick green line will be displayed around the circle, if all problems are acknowledged. Elements with "disabled" or "in maintenance" status will get a square background, gray and orange respectively. See also: <a href="#">Viewing maps</a>
Mark elements on trigger status change	A recent change of trigger status (recent problem or resolution) will be highlighted with markers (inward-pointing red triangles) on the three sides of the element icon that are free of the label. Markers are displayed for 30 minutes.
Display problems	Select how problems are displayed with a map element: <b>Expand single problem</b> - if there is only one problem, the problem name is displayed. Otherwise, the total number of problems is displayed. <b>Number of problems</b> - the total number of problems is displayed <b>Number of problems and expand most critical one</b> - name of the most critical problem and the total number of problems is displayed. 'Most critical' is determined based on problem severity and, if equal, problem event ID (higher ID or later problem displayed first). For a trigger map element it is based on problem severity and, if equal, trigger position in the trigger list. In case of multiple problems of the same trigger, the most recent one will be displayed.
Advanced labels	If you check this box you will be able to define separate label types for separate element types.
Map element label type	Label type used for map elements: <b>Label</b> - map element label <b>IP address</b> - IP address <b>Element name</b> - element name (for example, host name) <b>Status only</b> - status only (OK or PROBLEM) <b>Nothing</b> - no labels are displayed
Map element label location	Label location in relation to the map element: <b>Bottom</b> - beneath the map element <b>Left</b> - to the left <b>Right</b> - to the right <b>Top</b> - above the map element
Problem display	Display problem count as: <b>All</b> - full problem count will be displayed <b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count <b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed
Minimum trigger severity	Problems below the selected minimum severity level will not be displayed in the map. For example, with Warning selected, changes with Information and Not classified level triggers will not be reflected in the map. This parameter is supported starting with Zabbix 2.2.

Parameter	Description
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.
URLs	URLs for each element type can be defined (with a label). These will be displayed as links when a user clicks on the element in the map viewing mode. Macros can be used in map URL names and values. For a full list, see <a href="#">supported macros</a> and search for 'map URL names and values'.

## Sharing

The **Sharing** tab contains the map type as well as sharing options (user groups, users) for private maps:

Parameter	Description
Type	Select map type: <b>Private</b> - map is visible only to selected user groups and users <b>Public</b> - map is visible to all
List of user group shares	Select user groups that the map is accessible to. You may allow read-only or read-write access.
List of user shares	Select users that the map is accessible to. You may allow read-only or read-write access.

When you click on Add to save this map, you have created an empty map with a name, dimensions and certain preferences. Now you need to add some elements. For that, click on Constructor in the map list to open the editable area.

### Adding elements

To add an element, click on Add next to Map element. The new element will appear at the top left corner of the map. Drag and drop it wherever you like.

Note that with the Grid option "On", elements will always align to the grid (you can pick various grid sizes from the dropdown, also hide/show the grid). If you want to put elements anywhere without alignment, turn the option to "Off". (Random elements can later again be aligned to the grid with the Align map elements button.)

Now that you have some elements in place, you may want to start differentiating them by giving names etc. By clicking on the element, a form is displayed and you can set the element type, give a name, choose a different icon etc.

Map element: [Add / Remove](#) Shape: [Add / Remove](#) Link: [Add / Remove](#) Expand macros: [Off](#) Grid: [Shown / On](#) 50x50 [Align map elements](#) [Update](#)

**Map element**

Type:

Label:

Label location:

\* Host:

Application:

Automatic icon selection:

Icons:

- Default:
- Problem:
- Maintenance:
- Disabled:

Coordinates X:  Y:

URLs:

Name	URL	Action
<input type="text"/>	<input type="text"/>	<a href="#">Remove</a>

[Add](#)

Map element attributes:

Parameter	Description
Type	Type of the element: <b>Host</b> - icon representing status of all triggers of the selected host <b>Map</b> - icon representing status of all elements of a map <b>Trigger</b> - icon representing status of one or more triggers <b>Host group</b> - icon representing status of all triggers of all hosts belonging to the selected group
Label	<b>Image</b> - an icon, not linked to any resource Icon label, any string. Macros and multi-line strings can be used in labels. For a full list of supported macros, see <a href="#">supported macros</a> and search for 'map element labels'.
Label location	Label location in relation to the icon: <b>Default</b> - map's default label location <b>Bottom</b> - beneath the icon <b>Left</b> - to the left <b>Right</b> - to the right <b>Top</b> - above the icon

Parameter	Description
Host	Enter the host, if the element type is 'Host'. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.
Map	Select the map, if the element type is 'Map'.
Triggers	<p>If the element type is 'Trigger', select one or more triggers in the New triggers field below and click on Add.</p> <p>The order of selected triggers can be changed, but only within the same severity of triggers. Multiple trigger selection also affects {HOST.*} macro resolution both in the construction and view modes.</p> <p>// 1 In construction mode// the first displayed {HOST.*} macros will be resolved depending on the first trigger in the list (based on trigger severity).</p> <p>// 2 View mode// depends on the <b>Display problems</b> parameter in General map attributes.</p> <p>* If Expand single problem mode is chosen the first displayed {HOST.*} macros will be resolved depending on the latest detected problem trigger (not mattering the severity) or the first trigger in the list (in case no problem detected);</p> <p>* If Number of problems and expand most critical one mode is chosen the first displayed {HOST.*} macros will be resolved depending on the trigger severity.</p>
Host group	Enter the host group, if the element type is 'Host group'. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected.
Application	<p>You can select an application, allowing to only display problems of triggers that belong to the given application.</p> <p>This field is available for host and host group element types, and supported since Zabbix <b>2.4.0</b>.</p>
Automatic icon selection	In this case an icon mapping will be used to determine which icon to display.
Icons	You can choose to display different icons for the element in these cases: default, problem, maintenance, disabled.
Coordinate X	X coordinate of the map element.
Coordinate Y	Y coordinate of the map element.
URLs	<p>Element-specific URLs can be set for the element. These will be displayed as links when a user clicks on the element in the map viewing mode. If the element has its own URLs and there are map level URLs for its type defined, they will be combined in the same menu.</p> <p>Macros can be used in map element names and values. For a full list, see <b>supported macros</b> and search for 'map URL names and values'.</p>

**Attention:**

Added elements are not automatically saved. If you navigate away from the page, all changes may be lost. Therefore it is a good idea to click on the **Update** button in the top right corner. Once clicked, the changes are saved regardless of what you choose in the following popup. Selected grid options are also saved with each map.

Selecting elements

To select elements, select one and then hold down Ctrl to select the others.

You can also select multiple elements by dragging a rectangle in the editable area and selecting all elements in it.

Once you select more than one element, the element property form shifts to the mass-update mode so you can change attributes of selected elements in one go. To do so, mark the attribute using the checkbox and enter a new value for it. You may use macros here (such as, say, {HOST.NAME} for the element label).

Map element: [Add](#) / [Remove](#) Shape: [Add](#) / [Remove](#) Link: [Add](#) / [Remove](#) Expand macros: [Off](#) Grid: [Shown](#) / [On](#) 50x50 [Align map elements](#) [Update](#)

Y X: 50 100 150 200 250 300 350 400 450 500 550 600 650 700

(MAP.NAME)

(HOST.NAME)  
(HOST.CONN)

New element

### Mass update elements

Selected elements

Type	Name
Host	My host
Host	vcenter.zabbix.lan

Label {HOST.NAME}  
{HOST.CONN}

Label location Top

Automatic icon selection

Icon (default) Cloud\_(24)

Icon (problem) Default

Icon (maintenance) Default

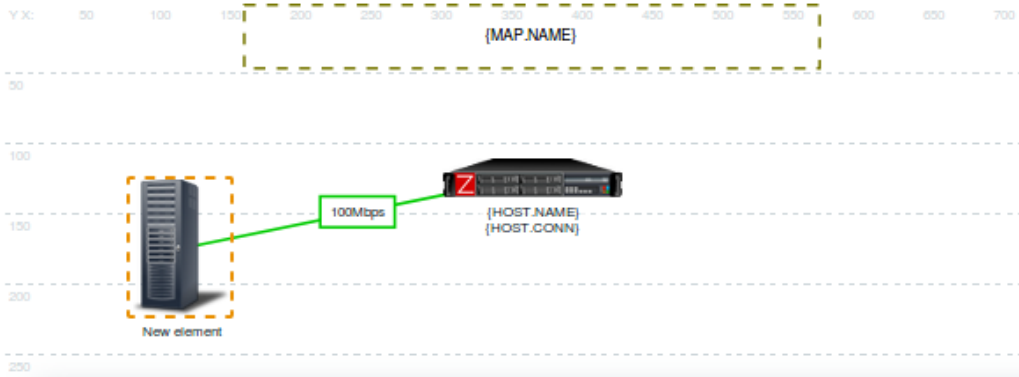
Icon (disabled) Default

[Apply](#) [Remove](#) [Close](#)

## Linking elements

Once you have put some elements on the map, it is time to start linking them. To link two elements you must first select them. With the elements selected, click on Add next to Link.

With a link created, the single element form now contains an additional Links section. Click on Edit to edit link attributes.



### Map element

Type **Host**

Label

Label location **Default**

\* Host  [Select](#)

Application  [Select](#)

Automatic icon selection

Icons

Default	<input type="text" value="Server_(96)"/>
Problem	<input type="text" value="Default"/>
Maintenance	<input type="text" value="Default"/>
Disabled	<input type="text" value="Default"/>

Coordinates X  Y

Name	URL	Action
<input type="text"/>	<input type="text"/>	<a href="#">Remove</a>

[Add](#)

[Apply](#) [Remove](#) [Close](#)

Element name	Link indicators	Action
vcenter.zabbix.lan		<a href="#">Edit</a>

Label

Connect to

Type (OK) **Bold line**

Color (OK)

Trigger	Type	Color	Action
<a href="#">Add</a>			

[Apply](#) [Remove](#) [Close](#)

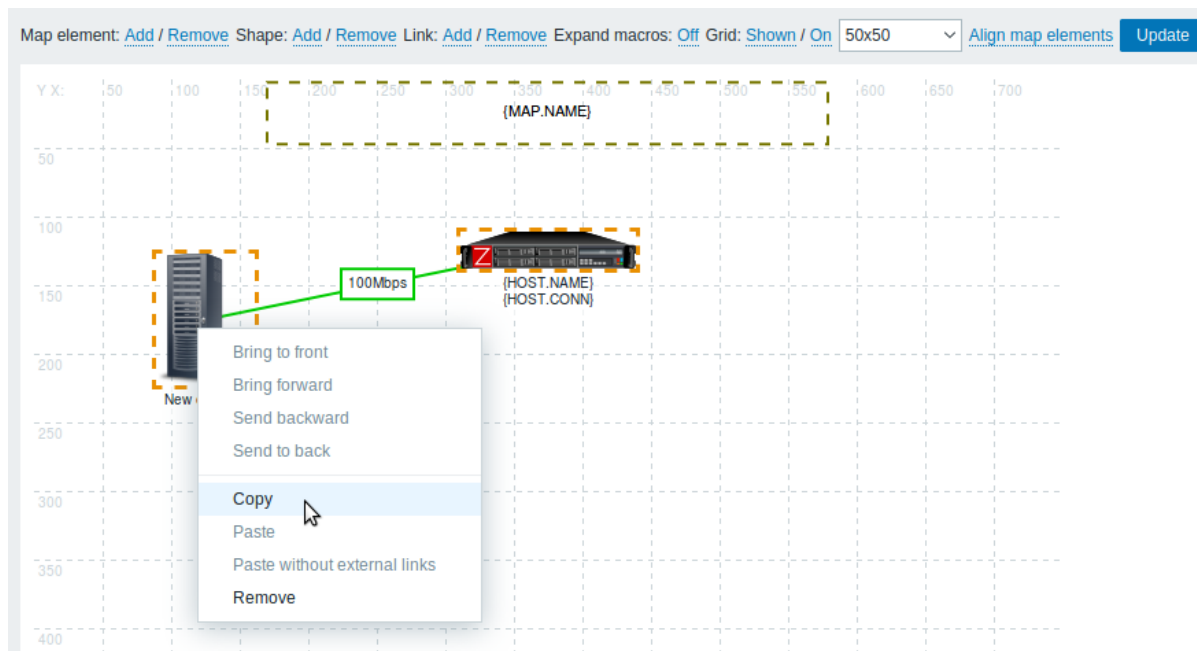
Link attributes:

Parameter	Description
Label	Label that will be rendered on top of the link. The <code>{host:key.func(param)}</code> macro is supported in this field, but only with <code>avg</code> , <code>last</code> , <code>min</code> and <code>max</code> trigger functions, with seconds as parameter.
Connect to Type (OK)	The element that the link connects to. Default link style: <b>Line</b> - single line <b>Bold line</b> - bold line <b>Dot</b> - dots <b>Dashed line</b> - dashed line
Color (OK)	Default link color.
Link indicators	List of triggers linked to the link. In case a trigger has status <b>PROBLEM</b> , its style is applied to the link.

### Moving and copy-pasting elements

Several selected elements can be **moved** to another place in the map by clicking on one of the selected elements, holding down the mouse button and moving the cursor to the desired location.

One or more elements can be **copied** by selecting the elements, then clicking on a selected element with the right mouse button and selecting Copy from the menu.



To paste the elements, click on a map area with the right mouse button and select Paste from the menu. The Paste without external links option will paste the elements retaining only the links that are between the selected elements.

Copy-pasting works within the same browser window. Keyboard shortcuts are not supported.

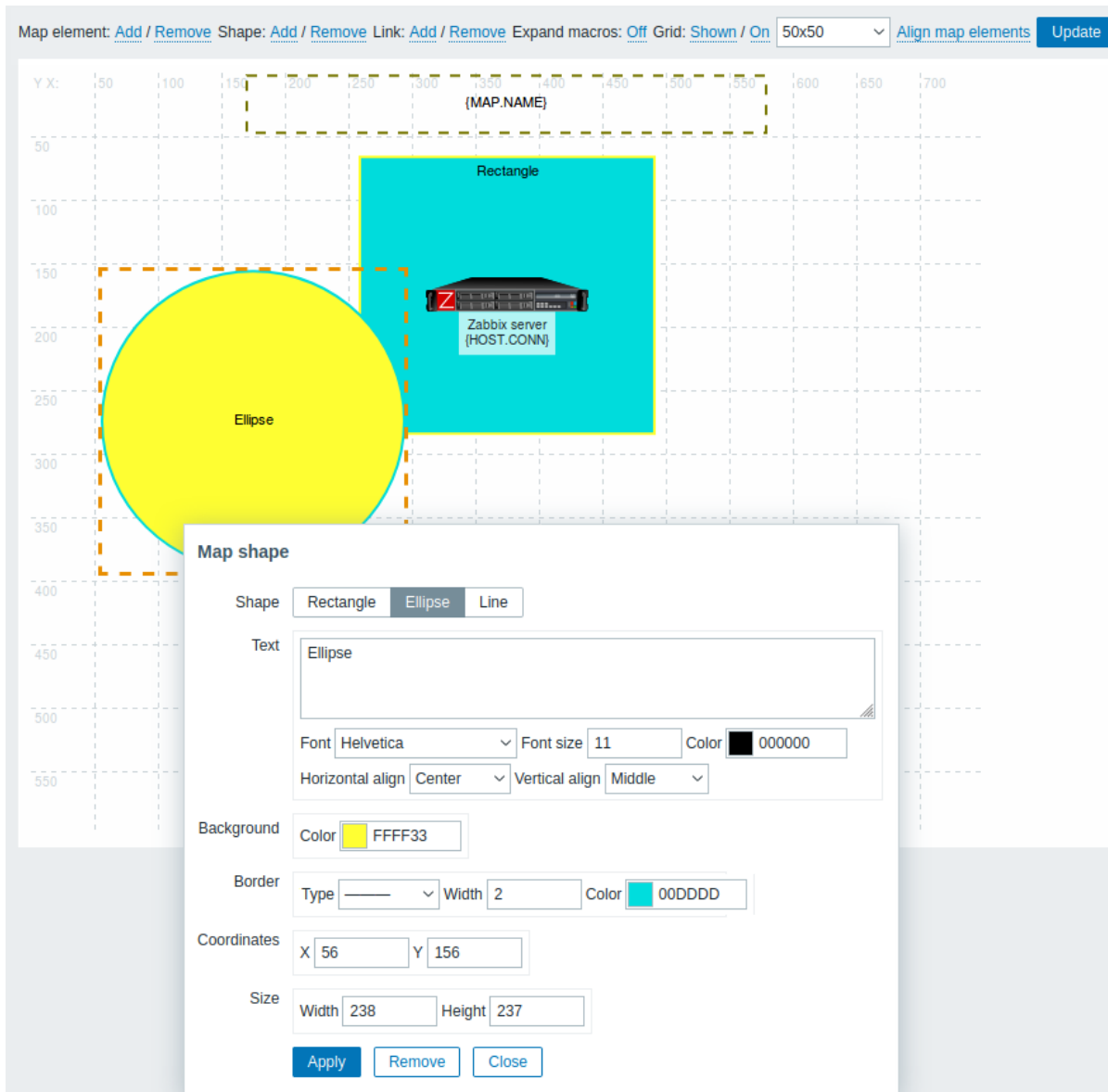
### Adding shapes

In addition to map elements, it is also possible to add some shapes. Shapes are not map elements; they are just a visual representation. For example, a rectangle shape can be used as a background to group some hosts. Rectangle and ellipse shapes can be added.

To add a shape, click on Add next to Shape. The new shape will appear at the top left corner of the map. Drag and drop it wherever you like.

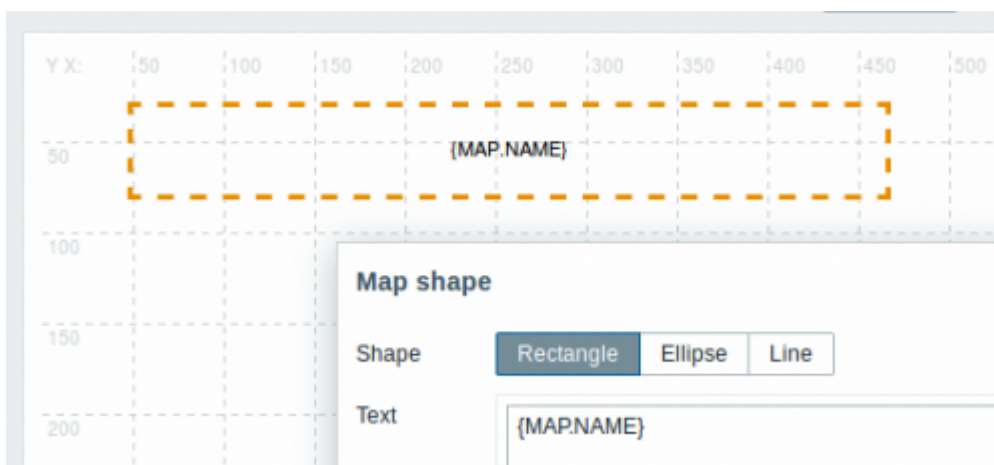
A new shape is added with default colors. By clicking on the shape, a form is displayed and you can customize the way a shape looks, add text, etc.





To select shapes, select one and then hold down Ctrl to select the others. With several shapes selected, common properties can be mass updated, similarly as with elements.

Text can be added in the shapes. To display text only the shape can be made invisible by removing the shape border (select 'None' in the Border field). For example, take note of how the {MAP.NAME} macro, visible in the screenshot above, is actually a rectangle shape with text, which can be seen when clicking on the macro:



{MAP.NAME} resolves to the configured map name, when viewing the map.

If hyperlinks are used in the text, they become clickable when viewing the map.

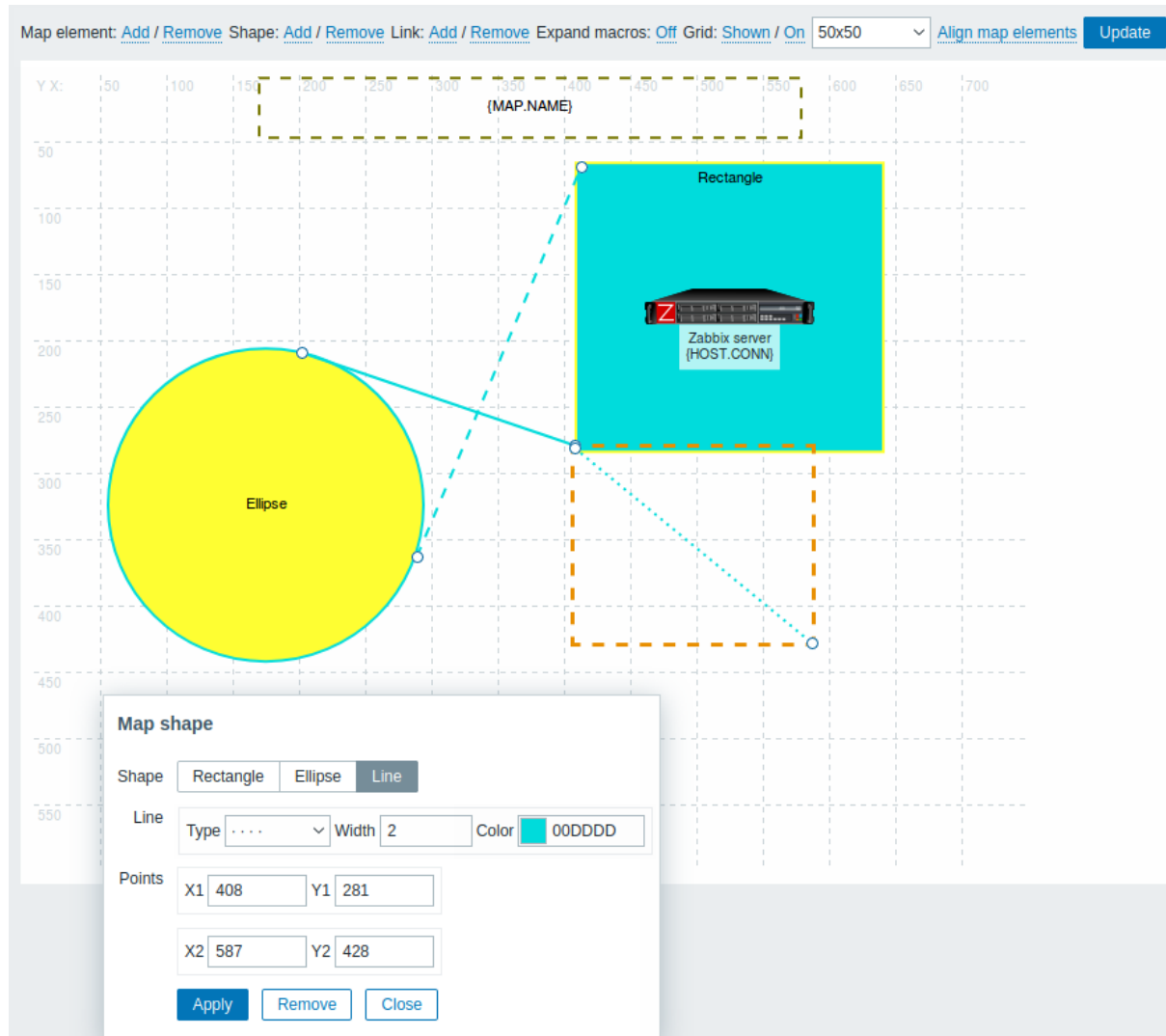
Line wrapping for text is always "on" within shapes. However, within an ellipse the lines are wrapped as though the ellipse were

a rectangle. Word wrapping is not implemented, so long words (words that do not fit the shape) are not wrapped, but are masked (constructor page) or clipped (other pages with maps).

### Adding lines

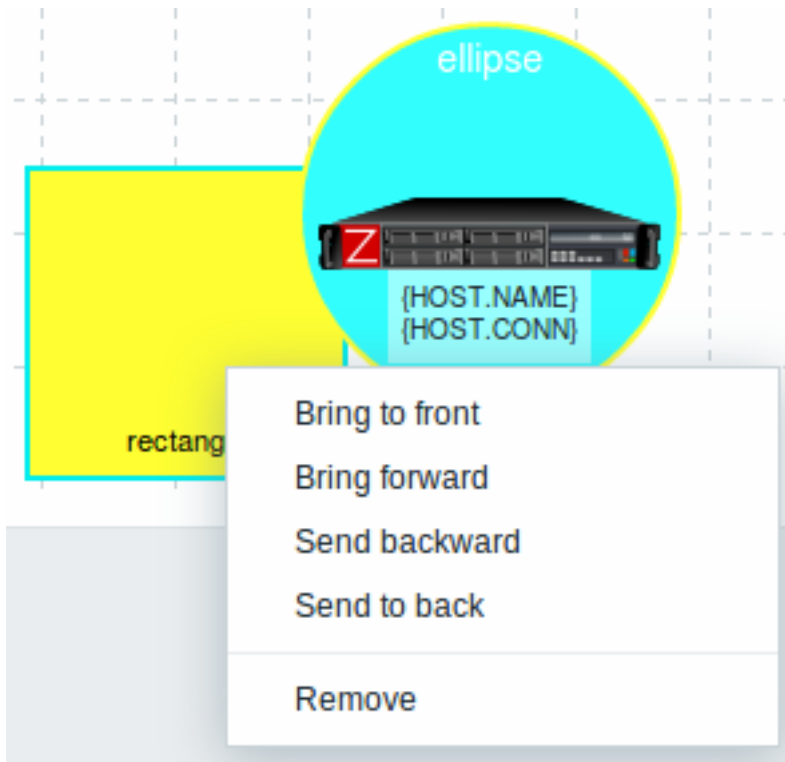
In addition to shapes, it is also possible to add some lines. Lines can be used to link elements or shapes in a map.

To add a line, click on Add next to Shape. A new shape will appear at the top left corner of the map. Select it and click on Line in the editing form to change the shape into a line. Then adjust line properties, such as line type, width, color, etc.



### Ordering shapes and lines

To bring one shape in front of the other (or vice versa) click on the shape with the right mouse button bringing up the map shape menu.

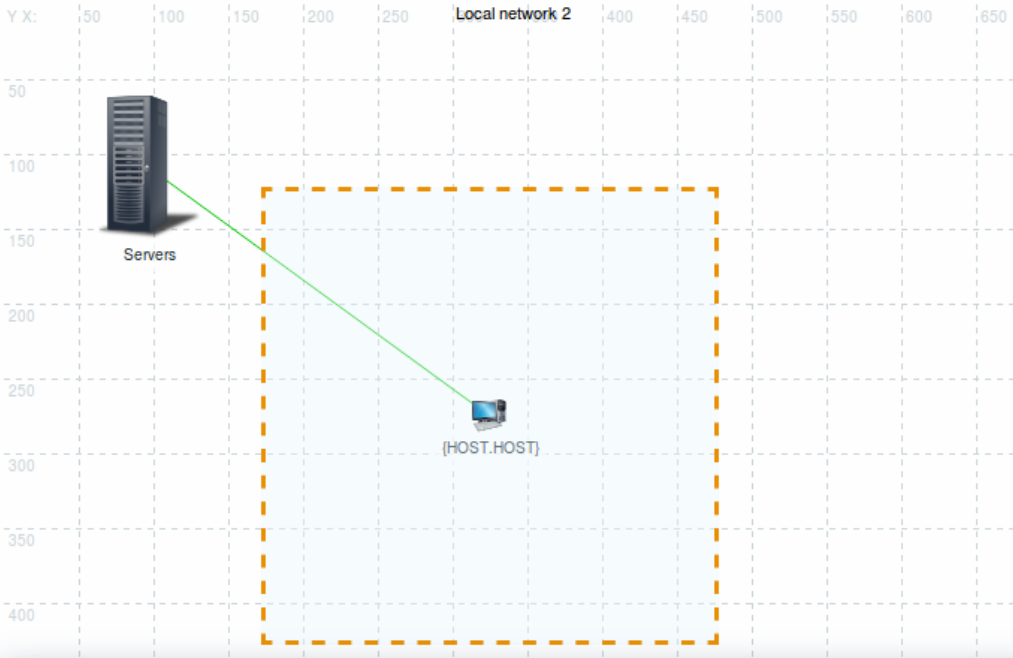


## 2 Host group elements

Overview

This section explains how to add a “Host group” type element when configuring a [network map](#).

Configuration



**Map element**

Type

Show

Area type

Area size Width  Height

Placing algorithm

Label

Label location

\* Host group

Application

All mandatory input fields are marked with a red asterisk.

This table consists of parameters typical for Host group element type:

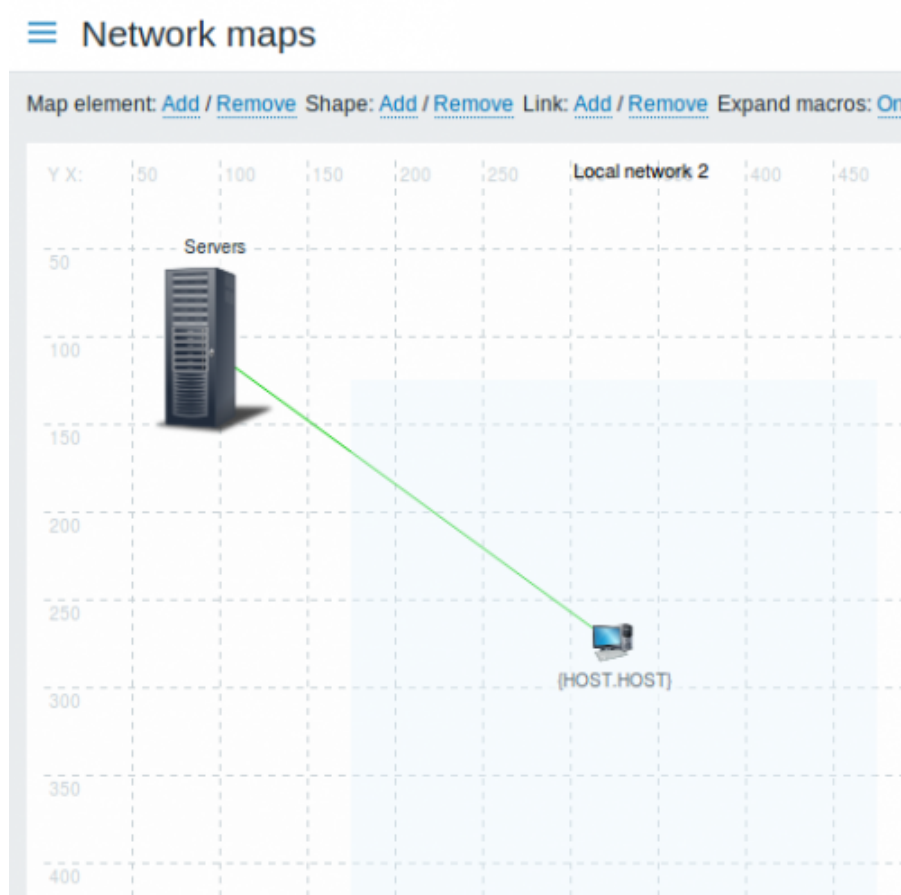
Parameter	Description
Type	Select Type of the element: <b>Host group</b> - icon representing status of all triggers of all hosts belonging to the selected group
Show	Show options: <b>Host group</b> - selecting this option will result as one single icon displaying corresponding information about the certain host group <b>Host group elements</b> - selecting this option will result as multiple icons displaying corresponding information about each single element (host) of the certain host group
Area type	This setting is available if "Host group elements" parameter is selected: <b>Fit to map</b> - all host group elements are equally placed within the map <b>Custom size</b> - manual setting of the map area for all the host group elements to be displayed

Parameter	Description
Area size	This setting is available if “Host group elements” parameter and “Area type” parameter are selected: <b>Width</b> - numeric value to be entered to specify map area width <b>Height</b> - numeric value to be entered to specify map area height
Placing algorithm	<b>Grid</b> - only available option of displaying all the host group elements
Label	Icon label, any string. <b>Macros</b> and multi-line strings can be used in labels. If the type of the map element is “Host group” specifying certain macros has impact on the map view displaying corresponding information about each single host. For example, if {HOST.IP} macro is used, edit map view will only display the macro {HOST.IP} itself while map view will include and display each host’s unique IP address

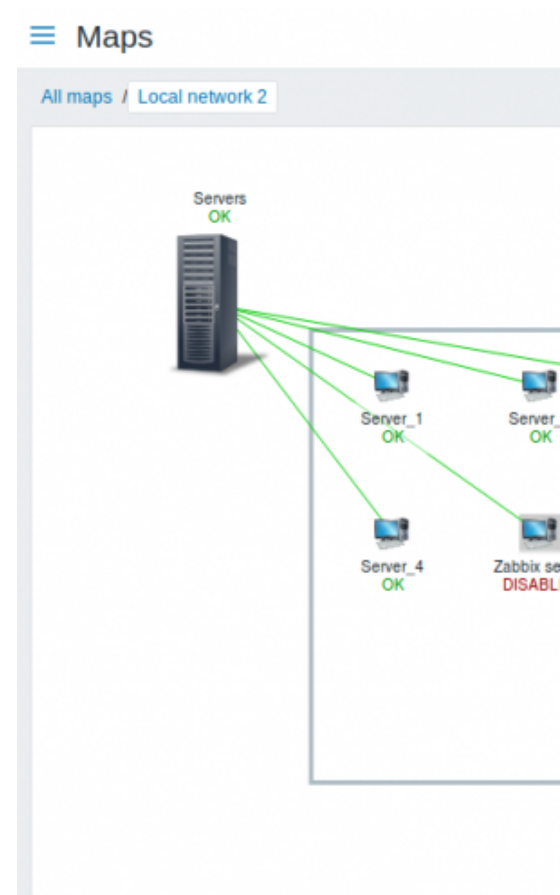
### Viewing host group elements

This option is available if “Host group elements” show option is chosen. When selecting “Host group elements” as the show option, you will at first see only one icon for the host group. However, when you save the map and then go to the map view, you will see that the map includes all the elements (hosts) of the certain host group:

Map editing view



Map view



Notice how the {HOST.NAME} macro is used. In map editing the macro name is unresolved, while in map view all the unique names of the hosts are displayed.

### 3 Link indicators

#### Overview

You can assign some triggers to a **link** between elements in a network map. When these triggers go into a problem state, the link can reflect that.

When you configure a link, you set the default link type and color. When you assign triggers to a link, you can assign different link types and colors with these triggers.

Should any of these triggers go into a problem state, their link style and color will be displayed on the link. So maybe your default link was a green line. Now, with the trigger in problem state, your link may become bold red (if you have defined it so).

### Configuration

To assign triggers as link indicators, do the following:

- select a map element
- click on Edit in the Links section for the appropriate link
- click on Add in the Link indicators block and select one or more triggers

**Map element**

Type: Host

Label: New element

Label location: Default

\* Host: New host

Application:

Automatic icon selection:

Icons:

Default	Server_(96)
Problem	Server_(128)
Maintenance	Server_(24)
Disabled	Default

Coordinates X: 54 Y: 131

URLs:

Name	URL
<input type="text"/>	<input type="text"/>

[Add](#)

Apply Remove Close

Links:

Element name	Link indicators
Zabbix server	New host: Trap trigger

Label: 100MBps

Connect to: Zabbix server

Type (OK): Bold line

Color (OK): 00CC00

Link indicators:

Trigger	Type	Color
New host: Trap trigger	Line	DC

[Add](#)

Apply Remove Close

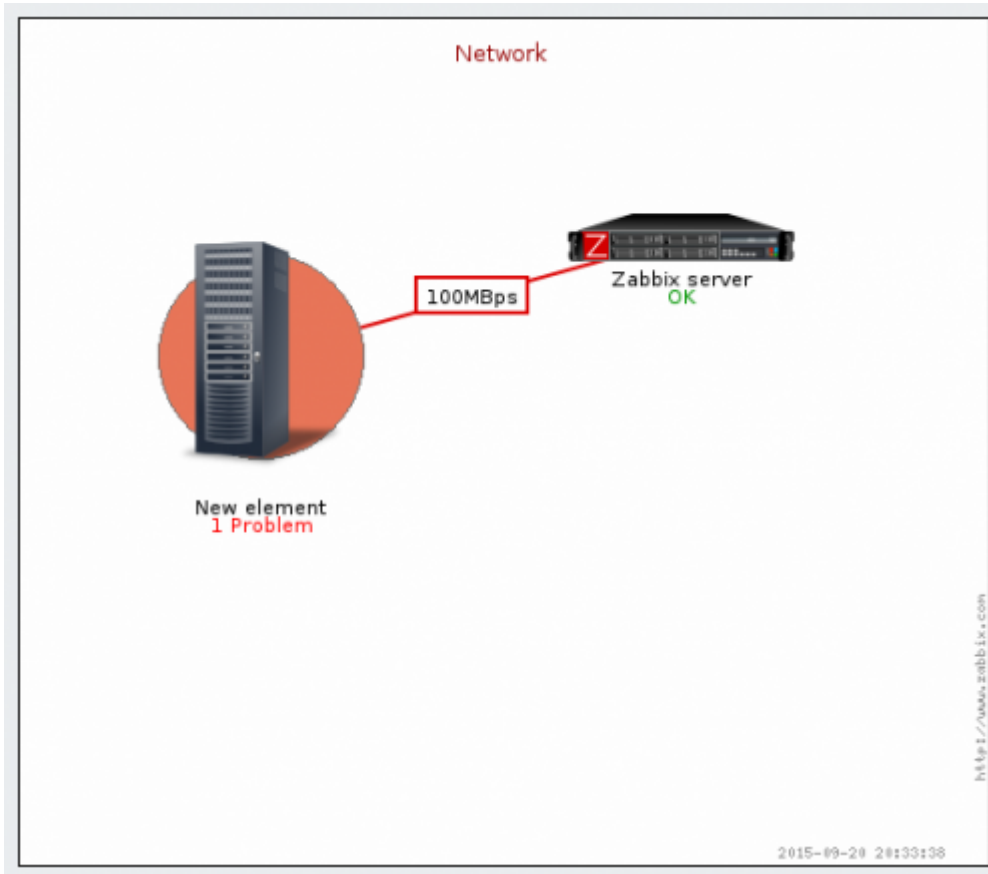
All mandatory input fields are marked with a red asterisk.

Added triggers can be seen in the Link indicators list.

You can set the link type and color for each trigger directly from the list. When done, click on Apply, close the form and click on Update to save the map changes.

### Display

In Monitoring → Maps the respective color will be displayed on the link if the trigger goes into a problem state.



**Note:**

If multiple triggers go into a problem state, the problem with the highest severity will determine the link style and color. If multiple triggers with the same severity are assigned to the same map link, the one with the lowest ID takes precedence. Note also that:

1. Minimum trigger severity and Show suppressed problem settings from map configuration affect which problems are taken into account.
2. In case with triggers with multiple problems (multiple problem generation), each problem may have severity that differs from trigger severity (changed manually), may have different tags (due to macros) and may be suppressed.

### 3 Screens

#### Overview

On Zabbix screens you can group information from various sources for a quick overview on a single screen. Building the screens is quite easy and intuitive.

Essentially a screen is a table. You choose how many cells per table and what elements to display in the cells. The following elements can be displayed:

- simple graphs
- simple graph prototypes
- user-defined custom graphs
- custom graph prototypes
- maps
- plain text information
- server information (overview)
- host information (overview)
- trigger information (overview)
- host/host group issues (status of problems)
- problems by severity
- data overview
- clock

- history of events
- history of recent actions
- URL (data taken from another location)

Global screens are managed in Monitoring → **Screens**, where they can be configured, managed and viewed. They can also be added to the favorites section of Monitoring → **Dashboard**.

To configure a screen you must first create it by defining its general properties and then add individual elements in the cells.

All users in Zabbix (including non-admin users) can create screens. Screens have an owner - the user who created them.

Screens can be made public or private. Public screens are visible to all users.

Private screens are visible only to their owner. Private screens can be shared by the owner to other users and user groups. Regular (non-Super admin) users can only share with the groups and users they are member of. Private screens will be visible to their owner and the users the screen is shared with as long as they have read permissions to all screen elements. Admin level users, as long as they have read permissions to all screen elements, can see and edit private screens regardless of being the owner or belonging to the shared user list.

**Warning:**

For both public and private screens a user must have at least read permissions to all screen elements in order to see the screen. To add an element to a screen a user must also have at least read permission to it.

Creating a screen

To create a screen, do the following:

- Go to Monitoring → Screens
- Go to the view with all screens
- Click on Create screen

The **Screen** tab contains general screen attributes:

All mandatory input fields are marked with a red asterisk.

Give your screen a unique name and set the number of columns (vertical cells) and rows (horizontal cells).

The **Sharing** tab contains the screen type as well as sharing options (user groups, users) for private screens:

Parameter	Description
Owner	Select the screen owner.
Type	Select screen type: <b>Private</b> - screen is visible only to selected user groups and users <b>Public</b> - screen is visible to all
List of user group shares	Select user groups that the screen is accessible to. You may allow read-only or read-write access.
List of user shares	Select users that the screen is accessible to. You may allow read-only or read-write access.

Click on Add to save the screen.

Adding elements

To add elements to the screen, click on Constructor next to the screen name in the list.

On a new screen you probably only see links named Change. Clicking those links opens a form whereby you set what to display in each cell.

On an existing screen you click on the existing elements to open the form whereby you set what to display.

All mandatory input fields are marked with a red asterisk.

Screen element attributes:



Parameter	Description
Resource	<p>Information displayed in the cell:</p> <p><b>Action log</b> - history of recent actions</p> <p><b>Clock</b> - digital or analog clock displaying current server or local time</p> <p><b>Data overview</b> - latest data for a group of hosts</p> <p><b>Graph</b> - single custom graph</p> <p><b>Graph prototype</b> - custom graph from low-level discovery rule</p> <p><b>History of events</b> - latest events</p> <p><b>Host group issues</b> - status of triggers filtered by the host group (includes triggers without events, since Zabbix 2.2)</p> <p><b>Host info</b> - high level host related information</p> <p><b>Host issues</b> - status of triggers filtered by the host (includes triggers without events, since Zabbix 2.2)</p> <p><b>Map</b> - single map</p> <p><b>Plain text</b> - plain text data</p> <p><b>Simple graph</b> - single simple graph</p> <p><b>Simple graph prototype</b> - simple graph based on item generated by low-level discovery</p> <p><b>System information</b> - high-level information about Zabbix server</p> <p><b>Problems by severity</b> - displays problems by severity (similar to the Dashboard)</p> <p><b>Trigger info</b> - high level trigger related information</p> <p><b>Trigger overview</b> - status of triggers for a host group</p> <p><b>URL</b> - include content from the specified resource</p> <p>See also more information on configuring <a href="#">each resource</a>.</p>
Horizontal align	<p>Possible values:</p> <p><b>Center</b></p> <p><b>Left</b></p> <p><b>Right</b></p>
Vertical align	<p>Possible values:</p> <p><b>Middle</b></p> <p><b>Top</b></p> <p><b>Bottom</b></p>
Column span	Extend cell to a number of columns, same way as HTML column spanning works.
Row span	Extend cell to a number of rows, same way as HTML row spanning works.

Take note of the '+' and '-' controls on each side of the table.

Clicking on '+' above the table will add a column. Clicking on '-' beneath the table will remove a column.

Clicking on '+' on the left side of the table will add a row. Clicking on '-' on the right side of the table will remove a row.

**Attention:**

If graph height is set as less than 120 pixels, no trigger will be displayed in the legend.

**Dynamic elements**

For some of the elements there is an extra option called Dynamic item. Checking this box at first does not seem to change anything.

However, once you go to Monitoring → Screens, you may realize that now you have an extra multiselect field there for selecting the host. Thus you have a screen where some elements display the same information while others display information depending on the currently selected host.

The benefit of this is that you do not need to create extra screens just because you want to see the same graphs containing data from various hosts.

Dynamic item option is available for several screen elements:

- Graphs (custom graphs)
- Graph prototypes
- Simple graphs

- Simple graph prototypes
- Plain text
- URL

**Note:**

Clicking on a dynamic graph opens it in full view; although with custom graphs and graph prototypes that is currently supported with the default host only (i.e. with host 'not selected' in the dropdown). When selecting another host in the dropdown, the dynamic graph is created using item data of that host and the resulting graph is not clickable.

**Note:**

Dynamic URL elements will not be displayed in Monitoring → Screens, unless a host is selected. Without a selected host the "No host selected" message will be visible only.

## 1 Screen elements

### Overview

This section lists available **screen** elements and provides details for screen element configuration.

#### 1 Action log

In the action log element you can display details of action operations (notifications, remote commands). It replicates information from Reports → Audit.

To configure, select Action log as resource:

All mandatory input fields are marked with a red asterisk.

You may set the following specific options:

Show lines	Set how many action log lines will be displayed in the screen cell.
Sort entries by	Sort entries by: <b>Time</b> (descending or ascending) <b>Type</b> (descending or ascending) <b>Status</b> (descending or ascending) <b>Recipient</b> (descending or ascending).

#### 2 Clock

In the clock element you may display local, server or specified host time.

To configure, select Clock as resource:

You may set the following specific options:

Time type	Select local, server or specified host time.
Item	Select the item for displaying time. To display host time, use the <code>system.localtime[local]</code> item. This item must exist on the host.
Width	This field is available only when Host time is selected.
Height	Select clock width.
	Select clock height.

#### 3 Data overview

In the data overview element you can display the latest data for a group of hosts. It replicates information from Monitoring → Overview (when Data is selected as Type there).

To configure, select Data overview as resource:

You may set the following specific options:

Group	Select host group.
Application	Enter application name.

---

Hosts location    Select host location - left or top.

---

#### 4 Graph

In the graph element you can display a single custom graph.

To configure, select Graph as resource:

You may set the following specific options:

---

Graph	Select the graph to display.
Width	Select graph width. Note that a line graph may actually take up more space due to legend text.
Height	Select graph height. Note that a line graph may actually take up more space due to legend text.
Dynamic item	Set graph to display different data depending on the selected host.

---

#### 5 Graph prototype

In the graph prototype element you can display a custom graph from a low-level discovery rule.

To configure, select Graph prototype as resource:

You may set the following specific options:

---

Graph prototype	Select the graph prototype to display.
Max columns	In how many columns generated graphs should be displayed in the screen cell. Useful when there are many LLD-generated graphs.
Width	Select graph width. Note that a line graph may actually take up more space due to legend text.
Height	Select graph height. Note that a line graph may actually take up more space due to legend text.
Dynamic item	Set graph to display different data depending on the selected host.

---

#### 6 History of events

In the history of events element you can display latest events.

To configure, select History of events as resource:

You may set the following specific option:

---

Show lines    Set how many event lines will be displayed in the screen cell.

---

#### 7 Host group issues

In the host group issue element you can display problem details filtered by the selected host group.

The problem severity color displayed is originally from the underlying trigger, but can be adjusted in the [problem update](#) screen.

To configure, select Host group issues as resource:

You may set the following specific options:

---

Group	Select host group.
Show lines	Set how many problem lines will be displayed in the screen cell.

---

---

Sort triggers by	Select from the dropdown to sort problems by last change, severity (both descending) or host (ascending).
------------------	---

---

### 8 Host info

In the host information element you can display high-level information about host availability.

To configure, select Host info as resource:

You may set the following specific options:

---

Group	Select host group(s).
Style	Select vertical or horizontal display.

---

### 9 Host issues

In the host issue element you can display problem details filtered by the selected host.

The problem severity color displayed is originally from the underlying trigger, but can be adjusted in the [problem update](#) screen.

To configure, select Host issues as resource:

You may set the following specific options:

---

Host	Select the host.
Show lines	Set how many problem lines will be displayed in the screen cell.
Sort triggers by	Select from the dropdown to sort problems by last change, severity (both descending) or host (ascending).

---

### 10 Map

In the map element you can display a configured network map.

To configure, select Map as resource:

You may set the following specific options:

---

Map	Select the map to display.
-----	----------------------------

---

### 11 Plain text

In the plain text element you can display latest item data in plain text.

To configure, select Plain text as resource:

You may set the following specific options:

---

Item	Select the item.
Show lines	Set how many latest data lines will be displayed in the screen cell.
Show text as HTML	Set to display text as HTML.
Dynamic item	Set to display different data depending on the selected host.

---

### 12 Problems by severity

In this element you can display problems by severity similarly as in the Dashboard widget.

To configure, select Problems by severity as resource:

Resource: Problems by severity

Vertical align: Top Middle Bottom

\* Column span: 1

\* Row span: 1

Add Cancel

### 13 Simple graph

In the simple graph element you can display a single simple graph.

To configure, select Simple graph as resource:

You may set the following specific options:

Item	Select the item for the simple graph.
Width	Select graph width. Note that a line graph may actually take up more space due to legend text.
Height	Select graph height. Note that a line graph may actually take up more space due to legend text.
Dynamic item	Set graph to display different data depending on the selected host.

### 14 Simple graph prototype

In the simple graph prototype element you can display a simple graph based on an item generated by low-level discovery.

To configure, select Simple graph prototype as resource:

You may set the following specific options:

Item prototype	Select the item prototype for the simple graph.
Max columns	In how many columns generated graphs should be displayed in the screen cell. Useful when there are many LLD-generated graphs.
Width	Select graph width. Note that a line graph may actually take up more space due to legend text.
Height	Select graph height. Note that a line graph may actually take up more space due to legend text.
Dynamic item	Set graph to display different data depending on the selected host.

### 15 System information

In the system information element you can display high-level Zabbix and Zabbix server information.

To configure, select System information as resource:

#### 16 Trigger info

In the trigger info element you can display high-level information about trigger states.

To configure, select Trigger info as resource:

You may set the following specific options:

Group	Select the host group(s).
Style	Select vertical or horizontal display.

#### 17 Trigger overview

In the trigger overview element you can display the trigger states for a group of hosts. It replicates information from Monitoring → Overview (when Triggers is selected as Type there).

To configure, select Trigger overview as resource:

You may set the following specific options:

Group	Select the host group(s).
Application	Enter the application name.
Hosts location	Select host location - left or top.

#### 18 URL

The URL element displays the content retrieved from the specified URL.

To configure, select URL as resource:

You may set the following specific options:

URL	Enter the URL to display. Relative paths are allowed since Zabbix 4.4.8.
Width	Select window width.
Height	Select window width.
Dynamic item	Set to display different URL content depending on the selected host.

#### **Attention:**

Browsers might not load an HTTP page included in a screen (using URL element), if Zabbix frontend is accessed over HTTPS.

## 4 Slide shows

### Overview

In a slide show you can configure that a number of **screens** are displayed one after another at set intervals.

Sometimes you might want to switch between some configured screens. While that can be done manually, doing that more than once or twice may become very tedious. This is where the slide show function comes to rescue.

All users in Zabbix (including non-admin users) can create slide shows. Slide shows have an owner - the user who created them.

Slide shows can be made public or private. Public slide shows are visible to all users, however, they must have at least read permissions to all slide show elements (screens) to see it. To add a screen to the slide show the user must also have at least read permission to it.

Private slide shows are visible only to their owner. Private slide shows can be shared by the owner to other users and user groups. Regular (non-Super admin) users can only share with the groups and users they are member of. Private slide shows will be visible to their owner and the users the slide show is shared with as long as they have read permissions to all included screens. Admin level users, as long as they have read permissions to all included screens, can see and edit private slide shows regardless of being the owner or belonging to the shared user list.

#### Configuration

To create a slide show, do the following:

- Go to Monitoring → Screens
- Select Slide shows in the title dropdown
- Click on Create slide show

The **Slide** tab contains general slide show attributes:

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Owner	Select the slide show owner. Specifying owner is mandatory.
Name	Unique name of the slide show.
Default delay	How long one screen is displayed by default, before rotating to the next. <b>Time suffixes</b> are supported, e.g. 30s, 5m, 2h, 1d.
Slides	List of screens to be rotated. Click on Add to select screens. The Up/Down arrow before the screen allows to drag a screen up and down in the sort order of display. If you want to display only, say, a single graph in the slide show, create a screen containing just that one graph.
Screen	Screen name.
Delay	A custom value for how long the screen will be displayed, in seconds. If set to 0, the Default delay value will be used.
Action	Click on Remove to remove a screen from the slide show.

The slide show in this example consists of two screens which will be displayed in the following order:

Zabbix server ⇒ Displayed for 30 seconds ⇒ Zabbix server2 ⇒ Displayed for 15 seconds ⇒ Zabbix server ⇒ Displayed for 30 seconds ⇒ Zabbix server2 ⇒ ...

The **Sharing** tab contains the slide show type as well as sharing options (user groups, users) for private slide shows:

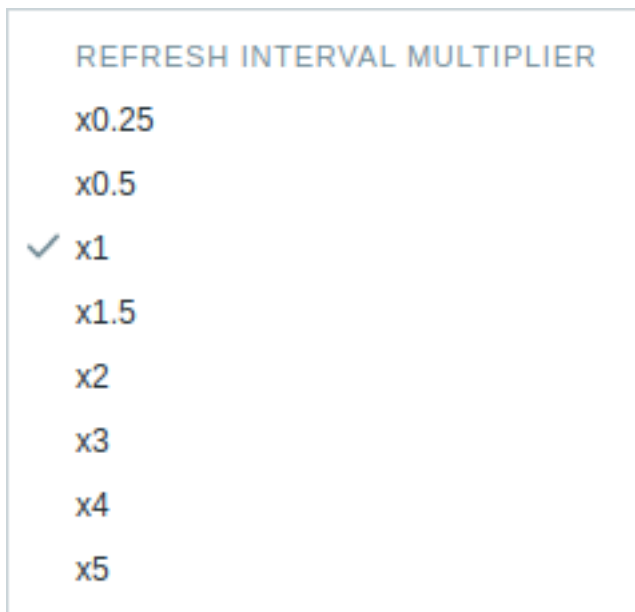
Parameter	Description
Type	Select slide show type: <b>Private</b> - slide show is visible only to selected user groups and users <b>Public</b> - slide show is visible to all
List of user group shares	Select user groups that the slide show is accessible to. You may allow read-only or read-write access.
List of user shares	Select users that the slide show is accessible to. You may allow read-only or read-write access.

Click on Add to save the slide show.

#### Display

Slide shows that are ready can be viewed in Monitoring → Screens, then choosing Slide shows in the title dropdown and clicking on the slide show name.

With the Menu option next to the dropdown, you can accelerate or slow down the display by choosing a slide delay multiplier:



**Attention:**

If a delay ends up as being less than 5 seconds (either by having entered a delay less than 5 seconds or by using the slide delay multiplier), a 5-second minimum delay will be used.

## 5 Dashboards

**Dashboards** and their widgets provide a strong visualization platform with such tools as modern graphs, maps and many more.



## 6 Host dashboards

### Overview

Host dashboards look similar to **global dashboards**, however, host dashboards display data about the host only. Host dashboards have no owner.

Host dashboards are configured on the **template** level and then are generated for a host, once the template is linked to the host. Widgets of host dashboards can only be copied to host dashboards of the same template. Widgets from global dashboards cannot be copied onto host dashboards.

Host dashboards cannot be configured or directly accessed in the Monitoring → **Dashboard** section, which is reserved for global dashboards. The ways to access host dashboards are listed below in this section.





When viewing host dashboards you may switch between the configured dashboards using the dropdown in the upper right corner. To switch to Monitoring→Hosts section, click All hosts navigation link below the dashboard name in the upper left corner (available since version 5.2.4).

Widgets of the host dashboards cannot be edited.

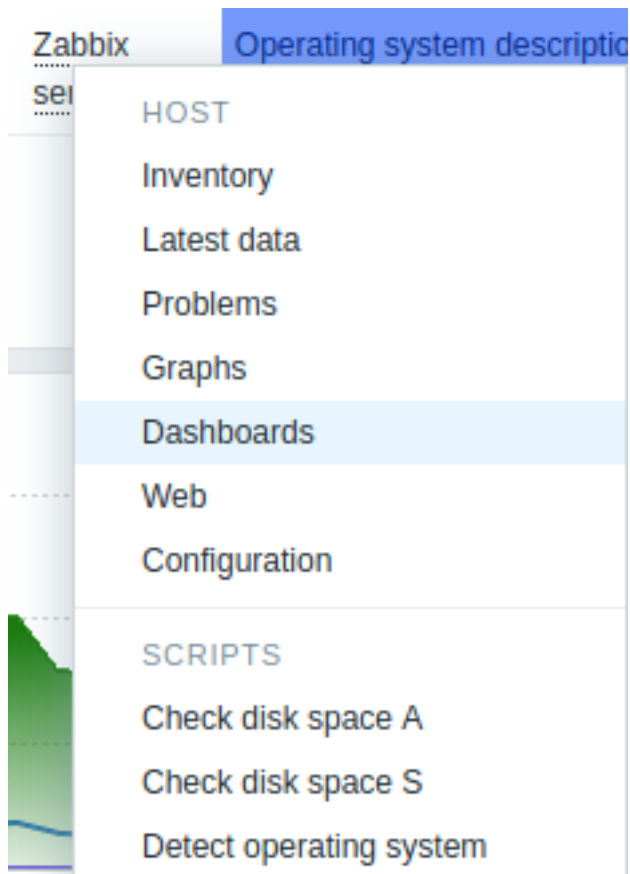
Note that host dashboards used to be host screens before Zabbix 5.2.

When importing an older template containing screens, the screens will be converted to dashboards preserving the original name and configuration of screen elements (widgets). However, it is not guaranteed that all screen elements will find their place on the converted dashboards, since screens can have a significantly larger width and height comparing to dashboards. In such cases Zabbix will discard the out-of-range screen elements, after trying to accommodate as many screen elements as possible by manipulating the size of newly created widgets.

#### Accessing host dashboards

Access to host dashboards is provided:

- From the **host menu** that is available in many frontend locations:
  - click on the host name and then select Dashboards from the drop-down menu



- When searching for a host name in **global search**:
  - click on the Dashboards link provided in search results
- When clicking on a host name in Inventory → **Hosts**:
  - click on the Dashboards link provided

## 7 Templates

### Overview

A template is a set of entities that can be conveniently applied to multiple hosts.

The entities may be:

- items
- triggers
- graphs
- applications
- dashboards
- low-level discovery rules
- web scenarios

As many hosts in real life are identical or fairly similar so it naturally follows that the set of entities (items, triggers, graphs,...) you have created for one host, may be useful for many. Of course, you could copy them to each new host, but that would be a lot of manual work. Instead, with templates you can copy them to one template and then apply the template to as many hosts as needed.

When a template is linked to a host, all entities (items, triggers, graphs,...) of the template are added to the host. Templates are assigned to each individual host directly (and not to a host group).

Templates are often used to group entities for particular services or applications (like Apache, MySQL, PostgreSQL, Postfix...) and then applied to hosts running those services.

Another benefit of using templates is when something has to be changed for all the hosts. Changing something on the template level once will propagate the change to all the linked hosts.

Thus, the use of templates is an excellent way of reducing one's workload and streamlining the Zabbix configuration.

Proceed to [creating and configuring a template](#).

## 8 Templates out of the box

### Overview

Zabbix strives to provide a growing list of useful out-of-the-box [templates](#). Out-of-the-box templates come preconfigured and thus are a useful way for speeding up the deployment of monitoring jobs.

The templates are available:

- In new installations - in Configuration → Templates;
- If you are upgrading from previous versions, you can find these templates in the `templates` directory of the downloaded latest Zabbix version. While in Configuration → Templates you can import them manually from this directory.
- It is also possible to download the template from [Zabbix git repository](#) directly (make sure the template is compatible with your Zabbix version).

Please use the sidebar to access information about specific template types and operation requirements.

See also:

- [Template import](#)
- [Linking a template](#)

## Standardized templates for network devices

### Overview

In order to provide monitoring for network devices such as switches and routers, we have created two so-called models: for the network device itself (its chassis basically) and for network interface.

Since Zabbix 3.4 templates for many families of network devices are provided. All templates cover (where possible to get these items from the device):

- Chassis fault monitoring (power supplies, fans and temperature, overall status)
- Chassis performance monitoring (CPU and memory items)
- Chassis inventory collection (serial numbers, model name, firmware version)
- Network interface monitoring with IF-MIB and EtherLike-MIB (interface status, interface traffic load, duplex status for Ethernet)

These templates are available:

- In new installations - in Configuration → Templates;
- If you are upgrading from previous versions, you can find these templates in the `templates` directory of the downloaded latest Zabbix version. While in Configuration → Templates you can import them manually from this directory.

If you are importing the new out-of-the-box templates, you may want to also update the `@Network interfaces for discovery` global regular expression to:

```
Result is FALSE: ^Software Loopback Interface
Result is FALSE: ^(In)?[lL]oop[bB]ack[0-9._]*$
Result is FALSE: ^NULL[0-9.]*$
Result is FALSE: ^[lL]o[0-9.]*$
Result is FALSE: ^[sS]ystem$
Result is FALSE: ^Nu[0-9.]*$
```

to filter out loopbacks and null interfaces on most systems.

### Devices

List of device families for which templates are available:

Template name	Vendor	Device family	Known models	OS used	MIBs used	Tags
Alcatel Timetra TIMOS SNMP	Alcatel	Alcatel Timetra	ALCATEL SR 7750	TIMOS	CISCO-METRA-SYSTEM-MIB,TIMETRA-CHASSIS-MIB	Certified
Brocade FC SNMP	Brocade	Brocade FC switches	Brocade 300 SAN Switch-	-	SW-MIB,ENTITY-MIB	Performance, Fault
Brocade_Foundation Stackable SNMP	Brocade	Brocade ICX	Brocade ICX6610, Brocade ICX7250-48, Brocade ICX7450-48F	-	FOUNDRY-SN-AGENT-MIB, FOUNDRY-SN-STACKING-MIB	Certified
Brocade_Foundation Nonstackable SNMP	Brocade Foundry	Brocade MLX, Foundry	Brocade MLXe, Foundry FLS648, Foundry FWSX424	-	FOUNDRY-SN-AGENT-MIB	Performance, Fault
Cisco Catalyst 3750<device model> SNMP	Cisco	Cisco Catalyst 3750	Cisco Catalyst 3750V2-24FS, Cisco Catalyst 3750V2-24PS, Cisco Catalyst 3750V2-24TS, Cisco Catalyst SNMP, Cisco Catalyst SNMP	-	CISCO-MEMORY-POOL-MIB, IF-MIB, EtherLike-MIB, SNMPv2-MIB, CISCO-PROCESS-MIB, CISCO-ENVMON-MIB, ENTITY-MIB	Certified
Cisco IOS SNMP	Cisco	Cisco IOS ver > 12.2 3.5	Cisco C2950	IOS	CISCO-PROCESS-MIB,CISCO-MEMORY-POOL-MIB,CISCO-ENVMON-MIB	Certified
Cisco IOS versions 12.0_3_T-12.2_3.5 SNMP	Cisco	Cisco IOS > 12.0 3 T and 12.2 3.5	-	IOS	CISCO-PROCESS-MIB,CISCO-MEMORY-POOL-MIB,CISCO-ENVMON-MIB	Certified

Template name	Vendor	Device family	Known models	OS	MIBs used	Tags
Cisco IOS prior to 12.0_3_T SNMP	Cisco	Cisco IOS 12.0 3 T	-	IOS	OLD-CISCO-CPU-MIB,CISCO-MEMORY-POOL-MIB	Certified
D-Link DES_DGS Switch SNMP	D-Link	DES/DGX switches	D-Link DES-xxxx/DGS-xxxx,DLINK DGS-3420-26SC	-	DLINK-AGENT-MIB,EQUIPMENT-MIB,ENTITY-MIB	Certified
D-Link DES 7200 SNMP	D-Link	DES-7xxx	D-Link DES 7206	-	ENTITY-MIB,MY-SYSTEM-MIB,MY-PROCESS-MIB,MY-MEMORY-MIB	Performance Fault Interfaces
Dell Force S-Series SNMP	Dell	Dell Force S-Series	S4810	-	F10-S-SERIES-CHASSIS-MIB	Certified
Extreme Exos SNMP	Extreme	Extreme EXOS	X670V-48x	EXOS	EXTREME-SYSTEM-MIB,EXTREME-SOFTWARE-MONITOR-MIB	Certified
Huawei VRP SNMP	Huawei	Huawei VRP	S2352P-EI	-	ENTITY-MIB,HUAWEI-ENTITY-EXTENT-MIB	Certified
Intel_Qlogic Infiniband SNMP	Intel/QLogic	Intel/QLogic Infiniband devices	Infiniband 12300	-	ICS-CHASSIS-MIB	Fault Inventory
Juniper SNMP	Juniper	MX,SRX,EX models	Juniper MX240, Juniper EX4200-24F	JunOS	JUNIPER-MIB	Certified
Mellanox SNMP	Mellanox	Mellanox Infiniband devices	SX1036	MLNX-OS	MLNX-OS-RESOURCES-MIB,ENTITY-MIB,ENTITY-SENSOR-MIB,MELLANOX-MIB	Certified

Template name	Vendor	Device family	Known models	OS	MIBs used	Tags
Mikrotik SNMP	Mikrotik	Mikrotik RouterOS devices	Mikrotik CCR1016-12G, Mikrotik RB2011UAS-2HnD, Mikrotik 912UAG-5HPnD, Mikrotik 941-2nD, Mikrotik 951G-2HnD, Mikrotik 1100AHx2	RouterOS	MIB,HOST-RESOURCES-MIB	Mikrotik- Certified
QTech QSW SNMP	QTech	Qtech devices	Qtech QSW-2800-28T	-	QTECH-MIB,ENTITY-MIB	Performance Inventory
Ubiquiti AirOS SNMP	Ubiquiti	Ubiquiti AirOS wireless devices	NanoBridge, NanoStation	UniFi OS	UBNT-MIB,ENTITY-MIB,IEEE802dot11-MIB	Performance Inventory
HP Comware HH3C SNMP	HP	HP (H3C) Comware	HP A5500-24G-4SFP HI Switch	-	HH3C-ENTITY-EXT-MIB,ENTITY-MIB	Certified
HP Enterprise Switch SNMP	HP	HP Enterprise Switch	HP ProCurve J4900B Switch 2626, HP J9728A 2920-48G Switch	-	STATISTICS-MIB,NETSWITCH-MIB,HP-ICF-CHASSIS,ENTITY-MIB,SEMI-MIB	Certified
TP-LINK SNMP	TP-LINK	TP-LINK	T2600G-28TS v2.0	-	TPLINK-SYSMONITOR-MIB,TPLINK-SYSINFO-MIB	Performance Inventory
Netgear Fastpath SNMP	Netgear	Netgear Fastpath	M5300-28G	-	FASTPATH-SWITCHING-MIB,FASTPATH-BOXSERVICES-PRIVATE-MIB	Fault Inventory

### Template design

Templates were designed with the following in mind:

- User macros are used as much as possible so triggers can be tuned by the user;
- Low-level discovery is used as much as possible to minimize the number of unsupported items;
- All templates depend on Template ICMP Ping so all devices are also checked by ICMP;
- Items don't use any MIBs - SNMP OIDs are used in items and low-level discoveries. So it's not necessary to load any MIBs into Zabbix for templates to work;
- Loopback network interfaces are filtered when discovering as well as interfaces with ifAdminStatus = down(2)
- 64bit counters are used from IF-MIB::ifXTable where possible. If it is not supported, default 32bit counters are used instead;
- All discovered network interfaces have a trigger that controls its operational status(link).

- If you do not want to monitor this condition for a specific interface create a user macro with context with the value 0. For example:

The screenshot shows the Zabbix 'Macros' configuration page. The 'Host macros' tab is selected. A table with two columns, 'Macro' and 'Value', contains one entry: the macro '{\$IFCONTROL: "Gi0/0"}' is set to the value '0'.

Macro	Value
{\$IFCONTROL: "Gi0/0"}	0

where Gi0/0 is {#IFNAME}. That way the trigger is not used any more for this specific interface.

\* You can also change the default behavior for all triggers not to fire and activate this trigger only t

The screenshot shows the Zabbix 'Macros' configuration page with three entries in the table:

Macro	Value
{\$IFCONTROL}	0
{\$IFCONTROL: "Gi0/0"}	1
{\$IFCONTROL: "Gi0/1"}	1

#### Tags

- Performance - device family MIBs provide a way to monitor CPU and memory items;
- Fault - device family MIBs provide a way to monitor at least one temperature sensor;
- Inventory - device family MIBs provide a way to collect at least the device serial number and model name;
- Certified - all three main categories above are covered.

### HTTP template operation

Steps to ensure correct operation of templates that collect metrics with **HTTP agent**:

1. Create a host in Zabbix and specify an IP address or DNS name of the monitoring target as the main interface. This is needed for the {HOST.CONN} macro to resolve properly in the template items.
2. [Link](#) the template to the host created in step 1 (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).
3. Adjust the values of mandatory macros as needed.
4. Configure the instance being monitored to allow sharing data with Zabbix - see instructions in the Additional steps/comments column.

#### Note:

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

Template	Mandatory macros	Additional steps/comments
<a href="#">Asterisk by HTTP</a>	<p><b>{\$AMI.PORT}</b> - AMI port number for checking service availability (default: 8088).</p> <p><b>{\$AMI.SECRET}</b> - the Asterisk Manager secret (default: zabbix).</p> <p><b>{\$AMI.URL}</b> - the Asterisk Manager API URL in the format.  <code>&lt;scheme&gt;://&lt;host&gt;:&lt;port&gt;/&lt;prefix&gt;/rawman</code>            (default:  <code>http://asterisk:8088/asterisk/rawman</code>).</p> <p><b>{\$AMI.USERNAME}</b> - the Asterisk Manager name.</p>	<ol style="list-style-type: none"> <li>1. Enable the <a href="#">mini-HTTP Server</a>.</li> <li>2. Add the option <code>webenabled=yes</code> to the general section of <code>manager.conf</code> file.</li> <li>3. Create Asterisk Manager user in the Asterisk instance.</li> </ol>
<a href="#">ClickHouse by HTTP</a>	<p><b>{\$CLICKHOUSE.PORT}</b> - the port of ClickHouse HTTP endpoint (default: 8123).</p> <p><b>{\$CLICKHOUSE.SCHEME}</b> - the request scheme. Supported: <code>http</code> (default), <code>https</code>.</p> <p><b>{\$CLICKHOUSE.USER}</b>,  <b>{\$CLICKHOUSE.PASSWORD}</b> - ClickHouse login credentials (default username: <code>zabbix</code>, password: <code>zabbix_pass</code>).</p> <p>If you don't need authentication, remove headers from HTTP agent type items.</p>	<p>Create a ClickHouse user with a 'web' profile and permission to view databases (see <a href="#">ClickHouse documentation</a> for details).</p> <p>See template's <code>Readme.md</code> file for a ready-to-use <code>zabbix.xml</code> file configuration.</p>
<a href="#">Elasticsearch Cluster by HTTP</a>	<p><b>{\$ELASTICSEARCH.PORT}</b> - the port of the Elasticsearch host (default: 9200).</p> <p><b>{\$ELASTICSEARCH.SCHEME}</b> - the request scheme. Supported: <code>http</code> (default), <code>https</code>.</p> <p><b>{\$ELASTICSEARCH.USERNAME}</b>,  <b>{\$ELASTICSEARCH.PASSWORD}</b> - login credentials, required only if used for Elasticsearch authentication.</p>	-
<a href="#">Etcd by HTTP</a>	<p><b>{\$ETCD.PORT}</b> - the port used by Etcd API endpoint (default: 2379).</p> <p><b>{\$ETCD.SCHEME}</b> - the request scheme. Supported: <code>http</code> (default), <code>https</code>.</p> <p><b>{\$ETCD.USER}</b>,  <b>{\$ETCD.PASSWORD}</b> - login credentials, required only if used for Etcd authentication.</p>	<p>Metrics are collected from <code>/metrics</code> endpoint; to specify the endpoint's location use <code>--listen-metrics-urls</code> flag (see <a href="#">Etcd documentation</a> for details).</p> <p>To verify, whether Etcd is configured to allow metric collection, run:  <code>curl -L http://localhost:2379/metrics</code></p> <p>To check, if Etcd is accessible from Zabbix proxy or Zabbix server run:  <code>curl -L http://%&lt;etcd_node_adress&gt;:2379/metrics%%</code></p>
<a href="#">GitLab by HTTP</a>	<p><b>{\$GITLAB.PORT}</b> - the port of GitLab web endpoint (default: 80)</p> <p><b>{\$GITLAB.URL}</b> - GitLab instance URL (default: <code>localhost</code>)</p>	<p>The template should be added to each node with Etcd. This template works with self-hosted GitLab instances; metrics are collected from the <code>/metrics</code> endpoint.</p> <p>To access the metrics, the client IP address must be explicitly allowed (see <a href="#">GitLab documentation</a> for details).</p> <p>Note, that certain metrics may not be available for a particular GitLab instance version and configuration.</p>



Template	Mandatory macros	Additional steps/comments
<a href="#">Hadoop by HTTP</a>	<p><b>`\${HADOOP.NAMENODE.HOST}`</b> - the Hadoop NameNode host IP address or FQDN (default: NameNode).</p> <p><b>`\${HADOOP.NAMENODE.PORT}`</b> - the Hadoop NameNode web-UI port (default: 9870).</p> <p><b>`\${HADOOP.RESOURCEMANAGER.HOST}`</b> - the Hadoop ResourceManager host IP address or FQDN (default: ResourceManager).</p> <p><b>`\${HADOOP.RESOURCEMANAGER.PORT}`</b> - the Hadoop ResourceManager web-UI port (default: 8088).</p>	<p>Metrics are collected by polling the Hadoop API remotely using an HTTP agent and JSONPath preprocessing. Zabbix server (or proxy) executes direct requests to ResourceManager, NodeManagers, NameNode, DataNodes APIs.</p>
<a href="#">HAProxy by HTTP</a>	<p><b>`\${HAPROXY.STATS.PATH}`</b> - the path of HAProxy Stats page (default: stats).</p> <p><b>`\${HAPROXY.STATS.PORT}`</b> - the port of the HAProxy Stats host or container (default: 8404).</p> <p><b>`\${HAPROXY.STATS.SCHEME}`</b> - the request scheme. Supported: http (default), https.</p>	<p>HAProxy Stats page should be set up (see HAProxy <a href="#">blog post</a> for details or template's <a href="#">Readme.md</a> for configuration example).</p>
<a href="#">HashiCorp Vault by HTTP</a>	<p><b>`\${VAULT.API.PORT}`</b> - the port on which the Vault listens for API requests (default: 8200).</p> <p><b>`\${VAULT.API.SCHEME}`</b> - the API request scheme. Supported: http (default), https.</p> <p><b>`\${VAULT.HOST}`</b> - Vault host name (default: &lt;PUT YOUR VAULT HOST&gt;).</p> <p><b>`\${VAULT.TOKEN}`</b> - Vault authorization token (default: &lt;PUT YOUR AUTH TOKEN&gt;).</p>	<ol style="list-style-type: none"> <li>1. Configure the Vault API (see <a href="#">official documentation</a> for details).</li> <li>2. Create a Vault service token, then copy and paste it into `\${VAULT.TOKEN}` macro value in Zabbix.</li> </ol>
<a href="#">Jenkins by HTTP</a>	<p><b>`\${JENKINS.API.KEY}`</b> - API key to access Metrics Servlet; required for common metrics (default: "").</p> <p><b>`\${JENKINS.API.TOKEN}`</b> - API token for HTTP BASIC authentication; required for monitoring computers and builds (default: "").</p> <p><b>`\${JENKINS.URL}`</b> - Jenkins URL in the format &lt;scheme&gt;://&lt;host&gt;:&lt;port&gt;; required for monitoring computers and builds (default: "").</p> <p><b>`\${JENKINS.USER}`</b> - username for HTTP BASIC authentication; required for monitoring computers and builds (default: zabbix).</p>	<p>Metrics are collected by requests to Metrics API.</p> <p>For common metrics: install and configure Metrics plugin parameters according to the <a href="#">official documentation</a>. Issue an API key for access to the Metrics Servlet, then use it as `\${JENKINS.API.KEY}` macro value.</p> <p>For monitoring computers and builds: create an API token for the Jenkins user that will be used for monitoring, then use it as `\${JENKINS.API.TOKEN}` macro value. See <a href="#">Jenkins documentation</a> for details.</p>
<a href="#">Microsoft SharePoint by HTTP</a>	<p><b>`\${SHAREPOINT.URL}`</b> - portal page URL, for example http://sharepoint.companyname.local/ (default: "").</p> <p><b>`\${SHAREPOINT.ROOT}`</b> - a root directory; only the specified directory and all its subfolders will be monitored (default: /Shared Documents)</p> <p><b>`\${SHAREPOINT.USER}`</b>,</p> <p><b>`\${SHAREPOINT.PASSWORD}`</b> - SharePoint login credentials (default: not set).</p>	<p>The template contains additional macros, which can be used to filter out certain dictionaries and types during LLD process (see template's <a href="#">Readme.md</a> for the description of available filter macros).</p>

Template	Mandatory macros	Additional steps/comments
<a href="#">NetApp AFF A700 by HTTP</a>	<p><b>{ \$URL }</b> - AFF700 cluster URL address (default: ' ' )</p> <p><b>{ \$USERNAME }, { PASSWORD }</b> - AFF700 login credentials (default: not set).</p>	Create a host for AFF A700 with cluster management IP as the Zabbix agent interface.
<a href="#">Nginx by HTTP</a>	<p><b>{ \$NGINX.STUB_STATUS.HOST }</b> - the hostname or IP address of Nginx stub_status host or container (default: localhost).</p> <p><b>{ \$NGINX.STUB_STATUS.PATH }</b> - the path of Nginx stub_status page (default: basic_status).</p> <p><b>{ \$NGINX.STUB_STATUS.PORT }</b> - the port of Nginx stub_status host or container (default: 80).</p> <p><b>{ \$NGINX.STUB_STATUS.SCHEME }</b> - the request scheme. Supported: http (default), https.</p>	<p>'ngx_http_stub_status_module' should be set up (see <a href="#">Nginx documentation</a> for details or template's Readme.md for configuration example).</p> <p>To check availability, run:  <pre>nginx -V 2&gt;&amp;1 \   grep -o with-http_stub_status_module</pre></p>
<a href="#">PHP-FPM by HTTP</a>	<p><b>{ \$PHP_FPM.HOST }</b> - a hostname or an IP of PHP-FPM status host or container (default: localhost).</p> <p><b>{ \$PHP_FPM.PING.PAGE }</b> - PHP-FPM ping page path (default: ping).</p> <p><b>{ \$PHP_FPM.PORT }</b> - the port of PHP-FPM status host or container (default: 80).</p> <p><b>{ \$PHP_FPM.PROCESS_NAME }</b> - PHP-FPM process name (default: php-fpm).</p> <p><b>{ \$PHP_FPM.SCHEME }</b> - the request scheme. Supported: http (default), https.</p> <p><b>{ \$PHP_FPM.STATUS.PAGE }</b> - PHP-FPM status page path (default: status).</p>	<ol style="list-style-type: none"> <li>Open the php-fpm configuration file and enable the status page:  <pre>pm.status_path = /status ping.path = /ping</pre></li> <li>Validate the syntax: <code>\$ php-fpm7 -t</code></li> <li>Reload the php-fpm service.</li> <li>In the Nginx Server Block (virtual host) configuration file, add (see template's Readme.md for an expanded example with comments):  <pre>location ~ ^/(status ping)\$ {     access_log off;     fastcgi_param SCRIPT_FILENAME     \$document_root\$fastcgi_script_name;     fastcgi_index index.php;     include fastcgi_params;     fastcgi_pass 127.0.0.1:9000; }</pre></li> <li>Check the syntax: <code>\$ nginx -t</code></li> <li>Reload Nginx</li> <li>Verify: <code>curl -L 127.0.0.1/status</code></li> </ol>
<a href="#">RabbitMQ cluster by HTTP</a>	<p><b>{ \$RABBITMQ.API.CLUSTER_HOST }</b> - the hostname or IP address of RabbitMQ cluster API endpoint (default: 127.0.0.1).</p> <p><b>{ \$RABBITMQ.API.SCHEME }</b> - the request scheme. Supported: http (default), https.</p> <p><b>{ \$RABBITMQ.API.USER }, { \$RABBITMQ.API.PASSWORD }</b> - RabbitMQ login credentials (default username: zbx_monitor, password: zabbix).</p>	<p>Enable RabbitMQ management plugin (see <a href="#">RabbitMQ documentation</a>).</p> <p>To create a RabbitMQ user with necessary permissions for monitoring, run:  <pre>" rabbitmqctl add_user zbx_monitor &lt;PASSWORD&gt; " rabbitmqctl set_permissions -p / zbx_monitor %% " " " .*"%% rabbitmqctl set_user_tags zbx_monitor monitoring</pre></p> <p>If the cluster consists of several nodes, it is recommended to assign the cluster template to a separate balancing host. In case of a single-node installation, the cluster template can be assigned to the host with a node template.</p>

Template	Mandatory macros	Additional steps/comments
<a href="#">TiDB by HTTP</a>	<b>{ \$TiDB.PORT }</b> - The port of TiDB server metrics web endpoint (default: 10080) <b>{ \$TiDB.URL }</b> - TiDB server URL (default: localhost).	This template works with TiDB server of PingCAP TiDB cluster. Internal service metrics are collected from TiDB /metrics endpoint and TiDB monitoring API.
<a href="#">TiDB PD by HTTP</a>	<b>{ \$TiDB.PORT }</b> - The port of TiDB server metrics web endpoint (default: 2379) <b>{ \$TiDB.URL }</b> - TiDB server URL (default: localhost).	This template works with PD server of PingCAP TiDB cluster. Internal service metrics are collected from PD /metrics endpoint and TiDB monitoring API.
<a href="#">TiDB TiKV by HTTP</a>	<b>{ \$TiDB.PORT }</b> - The port of TiDB server metrics web endpoint (default: 20180) <b>{ \$TiDB.URL }</b> - TiDB server URL (default: localhost).	This template works with TiKV server of PingCAP TiDB cluster. Internal service metrics are collected from TiKV /metrics endpoint.
<a href="#">ZooKeeper by HTTP</a>	<b>{ \$ZOOKEEPER.COMMAND_URL }</b> - admin.commandURL; the URL for listing and issuing commands relative to the root URL (default: commands). <b>{ \$ZOOKEEPER.PORT }</b> - admin.serverPort; the port the embedded Jetty server listens on (default: 8080). <b>{ \$ZOOKEEPER.SCHEME }</b> - the request scheme. Supported: http (default), https.	Metrics are collected from each ZooKeeper node by requests to AdminServer (enabled by default). See <a href="#">ZooKeeper documentation</a> to enable or configure AdminServer.

## IPMI template operation

IPMI templates do not require any specific setup. To start monitoring, [link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).

### Note:

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

Template	Mandatory macros	Additional steps/comments
<a href="#">Chassis by IPMI</a>	<b>{ \$IPMI.USER }</b> , <b>{ \$IPMI.PASSWORD }</b> - credentials for access to BMC (default: none)	-

## JMX template operation

Steps to ensure correct operation of templates that collect metrics by JMX:

1. Make sure Zabbix [Java gateway](#) is installed and set up properly.
2. [Link](#) the template to the target host. The host should have JMX interface set up.  
If the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions.
3. Adjust the values of mandatory macros as needed.
4. Configure the instance being monitored to allow sharing data with Zabbix - see instructions in the Additional steps/comments column.

**Note:**

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items, and triggers, is available in the template's `Readme.md` file (accessible by clicking on a template name).

Template	Mandatory macros	Additional steps/comments
<a href="#">Apache ActiveMQ by JMX</a>	<b>`\${ACTIVEMQ.PORT}`</b> - port for JMX (default: 1099). <b>`\${ACTIVEMQ.USERNAME}`</b> , <b>`\${ACTIVEMQ.PASSWORD}`</b> - login credentials for JMX (default username: admin, password: activemq).	JMX access to Apache ActiveMQ should be enabled and configured per instructions in <a href="#">the official documentation</a> .
<a href="#">Apache Cassandra by JMX</a>	<b>`\${CASSANDRA.USER}`</b> , <b>`\${CASSANDRA.PASSWORD}`</b> - Apache Cassandra login credentials (default username: zabbix, password: zabbix)	JMX access to Apache Cassandra should be enabled and configured per instructions in <a href="#">the official documentation</a> .
<a href="#">Apache Kafka by JMX</a>	<b>`\${KAFKA.USER}`</b> , <b>`\${KAFKA.PASSWORD}`</b> - Apache Kafka login credentials (default username: zabbix, password: zabbix)	JMX access to Apache Kafka should be enabled and configured per instructions in <a href="#">the official documentation</a> .
<a href="#">Apache Tomcat by JMX</a>	<b>`\${TOMCAT.USER}`</b> , <b>`\${TOMCAT.PASSWORD}`</b> - Apache Tomcat login credentials; leave blank if Tomcat installation does not require authentication (default: not set).	JMX access to Apache Tomcat should be enabled and configured per instructions in <a href="#">the official documentation</a> (choose the correct version).
<a href="#">Ignite by JMX</a>	<b>`\${IGNITE.USER}`</b> , <b>`\${IGNITE.PASSWORD}`</b> - Apache Ignite login credentials (default username: zabbix, password: <secret>).	<p>Enable and configure JMX access to Apache Ignite.</p> <p>JMX tree hierarchy contains <code>ClassLoader</code> by default. Adding the following Java Virtual Machine option <code>-DIGNITE_MBEAN_APPEND_CLASS_LOADER_ID=false</code> will exclude one level with <code>ClassLoader</code> name.</p> <p>Cache and Data Region metrics can be configured as needed - see <a href="#">Ignite documentation</a> for details.</p> <p>See also: <a href="#">Monitoring and Management Using JMX Technology</a></p>

**ODBC template operation**

Steps to ensure correct operation of templates that collect metrics via [ODBC monitoring](#):

1. Make sure that required ODBC driver is installed on Zabbix server or proxy.
2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's `.xml` file first - see [Templates out-of-the-box](#) section for instructions).
3. Adjust the values of mandatory macros as needed.
4. Configure the instance being monitored to allow sharing data with Zabbix - see instructions in the Additional steps/comments column.

**Note:**

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items and triggers, is available in the template's `Readme.md` file (accessible by clicking on a template name).

Template	Mandatory macros	Additional steps/comments
<a href="#">MSSQL by ODBC</a>	<p><b>{\$MSSQL.DSN}</b> - the system data source name (default: &lt;Put your DSN here&gt;)</p> <p><b>{\$MSSQL.PORT}</b> - the TCP port of Microsoft SQL Server (default: 1433)</p> <p><b>{\$MSSQL.USER}</b>,</p> <p><b>{\$MSSQL.PASSWORD}</b> - Microsoft SQL login credentials (default: not set)</p>	<p>Create a Microsoft SQL user for monitoring and grant the user the following permissions: View Server State; View Any Definition (see Microsoft SQL <a href="#">documentation</a> for details).</p> <p>The "Service's TCP port state" item uses {HOST.CONN} and {\$MSSQL.PORT} macros to check the availability of the Microsoft SQL instance.</p>
<a href="#">MySQL by ODBC</a>	<p><b>{\$MYSQL.DSN}</b> - the system data source name (default: &lt;Put your DSN here&gt;)</p> <p><b>{\$MYSQL.USER}</b>,</p> <p><b>{\$MYSQL.PASSWORD}</b> - MySQL login credentials; password can be blank (default: not set)</p>	<p>To grant required privileges to MySQL user that will be used for monitoring, run:</p> <pre>GRANT USAGE,REPLICATION CLIENT,PROCESS,SHOW DATABASES,SHOW VIEW ON %% *.* TO '&lt;username&gt;'@'%' ;%%</pre> <p>See <a href="#">MYSQL documentation</a> for details.</p>

Template	Mandatory macros	Additional steps/comments
Oracle by ODBC	<p><b>{\$ORACLE.DSN}</b> - the system data source name (default: &lt;Put your DSN here&gt;)</p> <p><b>{\$ORACLE.PORT}</b> - the TCP port of Oracle DB (default: 1521)</p> <p><b>{\$ORACLE.USER}</b>,</p> <p><b>{\$ORACLE.PASSWORD}</b> - Oracle login credentials (default: not set)</p>	<ol style="list-style-type: none"> <li>To create an Oracle user for monitoring, run: <pre>CREATE USER zabbix_mon IDENTIFIED BY &lt;PASSWORD&gt;;</pre> -- Grant access to the zabbix_mon user. <pre>GRANT CONNECT, CREATE SESSION TO zabbix_mon; GRANT SELECT ON V_\$instance TO zabbix_mon; GRANT SELECT ON V_\$database TO zabbix_mon; GRANT SELECT ON v_\$sysmetric TO zabbix_mon; GRANT SELECT ON v\$recovery_file_dest TO zabbix_mon; GRANT SELECT ON v\$active_session_history TO zabbix_mon; GRANT SELECT ON v\$osstat TO zabbix_mon; GRANT SELECT ON v\$restore_point TO zabbix_mon; GRANT SELECT ON v\$process TO zabbix_mon; GRANT SELECT ON v\$datafile TO zabbix_mon; GRANT SELECT ON v\$pgastat TO zabbix_mon; GRANT SELECT ON v\$sgastat TO zabbix_mon; GRANT SELECT ON v\$log TO zabbix_mon; GRANT SELECT ON v\$archive_dest TO zabbix_mon; GRANT SELECT ON v\$asm_diskgroup TO zabbix_mon; GRANT SELECT ON sys.dba_data_files TO zabbix_mon; GRANT SELECT ON DBA_TABLESPACES TO zabbix_mon; GRANT SELECT ON DBA_TABLESPACE_USAGE_METRICS TO zabbix_mon; GRANT SELECT ON DBA_USERS TO zabbix_mon;</pre> </li> <li>Make sure, that ODBC connects to Oracle with session parameter NLS_NUMERIC_CHARACTERS= '.,'</li> <li>Add a new record to odbc.ini: <pre>[\$ORACLE.DSN] Driver = Oracle 19 ODBC driver Servername = \$ORACLE.DSN DSN = \$ORACLE.DSN</pre> </li> <li>Check the connection via isql: <pre>isql \$TNS_NAME \$DB_USER \$DB_PASSWORD</pre> </li> <li>Configure Zabbix server or Zabbix proxy for Oracle ENV Usage. Edit or add a new file: /etc/sysconfig/zabbix-server, or for the proxy: /etc/sysconfig/zabbix-proxy. Then add the following lines to the file: <pre>export ORACLE_HOME=/usr/lib/oracle/19.6/client64 export PATH=\$PATH:\$ORACLE_HOME/bin export LD_LIBRARY_PATH=\$ORACLE_HOME/lib:/usr/lib64:/usr/lib:\$ORACLE_HOME/bin export TNS_ADMIN=\$ORACLE_HOME/network/admin</pre> </li> <li>Restart Zabbix server or proxy.</li> </ol>

## Zabbix agent 2 template operation

Steps to ensure correct operation of templates that collect metrics with **Zabbix agent 2**:

- Make sure that the agent 2 is installed on the host, and that the installed version contains required plugin. Follow the steps on

this page if you need to update the agent 2.

2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's import file first - see [Templates out-of-the-box](#) section for instructions).
3. Adjust the values of mandatory macros as needed. Note, that user macros can be used to override configuration parameters.
4. Configure the instance being monitored to allow sharing data with Zabbix - see instructions in the Additional steps/comments column.

**Attention:**

Zabbix agent 2 templates work in conjunction with the plugins. While the basic configuration can be done by simply adjusting user macros, the deeper customization can be achieved by [configuring the plugin](#) itself. For example, if a plugin supports named sessions, it is possible to monitor several entities of the same kind (e.g. MySQL1 and MySQL2) by specifying named session with own URI, username and password for each entity in the configuration file.

**Note:**

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items and triggers, is available in the template's [Readme.md](#) file (accessible by clicking on a template name).

Template name	Mandatory macros	Additional steps/comments
<a href="#">Ceph by Zabbix agent 2</a>	<p><b>{\$CEPH.API.KEY}</b> - the API key (default: zabbix_pass). Required, if {\$CEPH.CONNSTRING} is a URI. Must be empty, if {\$CEPH.CONNSTRING} is a session name.</p> <p><b>{\$CEPH.CONNSTRING}</b> - connection string; can be a session name or a URI defined in the following format: &lt;protocol(host:port)&gt;. For URI only HTTPS schema is supported. Examples: Prod, https://localhost:8003 (default)</p> <p><b>{\$CEPH.USER}</b> - user to be used for monitoring (default:zabbix). Required, if {\$CEPH.CONNSTRING} is a URI. Must be empty, if {\$CEPH.CONNSTRING} is a session name.</p>	<p>Works with Ceph plugin; named sessions are supported.</p> <ol style="list-style-type: none"> <li>1. Configure the Ceph RESTful Module according to <a href="#">documentation</a>.</li> <li>2. Make sure a RESTful API endpoint is available for connection.</li> </ol>
<a href="#">Docker</a>	-	<p>Works with Docker plugin; named sessions are not supported.</p> <p>To set path to Docker API endpoint edit Plugins.Docker.Endpoint parameter in the agent 2 <a href="#">configuration file</a> (default: <code>Plugins.Docker.Endpoint=unix:///var/run/docker.sock</code>)</p> <p>To test availability, run: <code>zabbix_get -s docker-host -k docker.info</code></p>
<a href="#">Memcached</a>	<p><b>{\$MEMCACHED.CONN.URI}</b> - connection string in the URI format; port is optional; password is not used. If not set, the plugin's default value is used: tcp://localhost:11211. Examples: tcp://127.0.0.1:11211, tcp://localhost, unix:/var/run/memcached.sock.</p>	<p>Works with Memcached plugin; named sessions are supported.</p> <p>To test availability, run: <code>zabbix_get -s memcached-host -k memcached.ping</code></p>

Template name	Mandatory macros	Additional steps/comments
<a href="#">MongoDB cluster by Zabbix agent 2</a>	<p><b>{ \$MONGODB.CONNSTRING }</b> - connection string in the URI format; password is not used (default: tcp://localhost:27017). Can be a session name or a URI defined in the following format: %% &lt;protocol(host:port)&gt;%% For URI only TCP scheme is supported. Examples: MongoDB1, tcp://172.16.0.10</p> <p><b>{ \$MONGODB.USER },</b> <b>{ \$MONGODB.PASSWORD }</b> - MongoDB credentials (default: none). If not set and { \$MONGODB.CONNSTRING } is a URI, parameters from the configuration file will be used. Must be empty, if { \$MONGODB.CONNSTRING } is a session name.</p>	<p>Works with MongoDB plugin; named sessions are supported. For MongoDB configuration instructions, see <a href="#">plugins</a>. To test availability, run: zabbix_get -s mongos.node -k 'mongodb.ping["{ \$MONGODB.CONNSTRING }", "{ \$MONGODB.USER }"]</p>
<a href="#">MongoDB node by Zabbix agent 2</a>	<p><b>{ \$MONGODB.CONNSTRING }</b> - connection string in the URI format; password is not used (default: tcp://localhost:27017). Can be a session name or a URI defined in the following format: %% &lt;protocol(host:port)&gt;%% For URI only TCP scheme is supported. Examples: MongoDB1, tcp://172.16.0.10</p> <p><b>{ \$MONGODB.USER },</b> <b>{ \$MONGODB.PASSWORD }</b> - MongoDB credentials (default: none). If not set and { \$MONGODB.CONNSTRING } is a URI, parameters from the configuration file will be used. Must be empty, if { \$MONGODB.CONNSTRING } is a session name.</p>	<p>Works with MongoDB plugin; named sessions are supported. For MongoDB configuration instructions, see <a href="#">plugins</a>. To test availability, run: zabbix_get -s mongodb.node -k 'mongodb.ping["{ \$MONGODB.CONNSTRING }", "{ \$MONGODB.USER }"]</p>



Template name	Mandatory macros	Additional steps/comments
MySQL by Zabbix agent 2	<p><b>{\$MYSQL.DSN}</b> - the system data source name of the MySQL instance (default: &lt;Put your DSN&gt;).</p> <p>Can be a session name or a URI defined in the following format:  %% &lt;protocol(host:port or /path/to/socket)/&gt;%%  For URI only TCP and Unix schemas are supported.  Examples: MySQL1,  tcp://localhost:3306,  tcp://172.16.0.10,  unix:/var/run/mysql.sock</p> <p><b>{\$MYSQL.USER}</b>,  <b>{\$MYSQL.PASSWORD}</b> - MySQL credentials (default: none).  Required, if {\$MYSQL.DSN} is a URI.  Must be empty, if {\$MYSQL.DSN} is a session name.</p>	<p>Works with MySQL plugin; named sessions are supported.</p> <p>To grant required privileges to a MySQL user that will be used for monitoring, run:  GRANT USAGE,REPLICATION  CLIENT,PROCESS,SHOW DATABASES,SHOW VIEW  ON *.* TO '&lt;username&gt;'@'%';</p> <p>See MySQL documentation for information about <a href="#">user privileges</a> and <a href="#">Unix sockets</a>.</p>

Template name	Mandatory macros	Additional steps/comments
<a href="#">Oracle by Zabbix agent 2</a>	<p><b>{ORACLE.CONNSTRING}</b> - connection string; can be a session name or a URI defined in the following format: &lt;protocol(host:port or /path/to/socket)/&gt; For URI only TCP schema is supported. Examples: Oracle1, tcp://localhost:1521</p> <p><b>{ORACLE.SERVICE}</b> - Oracle Service name (default: ORA). Required, if {ORACLE.CONNSTRING} is a URI. Must be empty, if {ORACLE.CONNSTRING} is a session name.</p> <p><b>{ORACLE.USER}</b>, <b>{ORACLE.PASSWORD}</b> - Oracle credentials (default username: zabbix, password: zabbix_password). Required, if {ORACLE.CONNSTRING} is a URI. Must be empty, if {ORACLE.CONNSTRING} is a session name.</p>	<p>Works with Oracle plugin; named sessions are supported.</p> <p>Install <a href="#">Oracle Instant Client</a>. To create Oracle user with required privileges, run: CREATE USER zabbix_mon IDENTIFIED BY &lt;PASSWORD&gt;; -- Grant access to the zabbix_mon user. GRANT CONNECT, CREATE SESSION TO zabbix_mon; GRANT SELECT ON DBA_TABLESPACE_USAGE_METRICS TO zabbix_mon; GRANT SELECT ON DBA_TABLESPACES TO zabbix_mon; GRANT SELECT ON DBA_USERS TO zabbix_mon; GRANT SELECT ON SYS.DBA_DATA_FILES TO zabbix_mon; GRANT SELECT ON V\$ACTIVE_SESSION_HISTORY TO zabbix_mon; GRANT SELECT ON V\$ARCHIVE_DEST TO zabbix_mon; GRANT SELECT ON V\$ASM_DISKGROUP TO zabbix_mon; GRANT SELECT ON V\$DATABASE TO zabbix_mon; GRANT SELECT ON V\$DATAFILE TO zabbix_mon; GRANT SELECT ON V\$INSTANCE TO zabbix_mon; GRANT SELECT ON V\$LOG TO zabbix_mon; GRANT SELECT ON V\$OSSTAT TO zabbix_mon; GRANT SELECT ON V\$PGASTAT TO zabbix_mon; GRANT SELECT ON V\$PROCESS TO zabbix_mon; GRANT SELECT ON V\$RECOVERY_FILE_DEST TO zabbix_mon; GRANT SELECT ON V\$RESTORE_POINT TO zabbix_mon; GRANT SELECT ON V\$SESSION TO zabbix_mon; GRANT SELECT ON V\$SGASTAT TO zabbix_mon; GRANT SELECT ON V\$SYSMETRIC TO zabbix_mon; GRANT SELECT ON V\$SYSTEM_PARAMETER TO zabbix_mon;</p>
<a href="#">PostgreSQL Agent 2</a>	<p><b>{PG.URI}</b> - connection string; can be a session name or a URI defined in the following format: %% &lt;protocol(host:port or /path/to/socket)/&gt;%%. For URI only TCP and Unix schemas are supported. Examples: Postgres1, tcp://localhost:5432, tcp://172.16.0.10</p> <p><b>{PG.USER}</b>, <b>{PG.PASSWORD}</b> - PostgreSQL credentials (default username: postgres, password:postgres). Required, if {PG.URI} is a URI. Must be empty, if {PG.URI} is a session name.</p>	<p>Works with PostgreSQL plugin; named sessions are supported.</p> <p>To create a user with required privileges, for PostgreSQL 10 and newer, run: CREATE USER 'zbx_monitor' IDENTIFIED BY '&lt;password&gt;'; GRANT EXECUTE ON FUNCTION pg_catalog.pg_ls_dir(text) TO zbx_monitor;\GRANT EXECUTE ON FUNCTION pg_catalog.pg_stat_file(text) TO zbx_monitor;</p> <p>Edit pg_hba.conf to allow connections from Zabbix agent (see <a href="#">PostgreSQL documentation</a> for details).</p>

Template name	Mandatory macros	Additional steps/comments
<a href="#">Redis</a>	<b>{REDIS.CONN.URI}</b> -connection string in the URI format; port is optional; password is not used. If not set, the plugin's default value is used: tcp://localhost:6379	Works with Redis plugin; named sessions are supported.  To test availability, run: <code>zabbix_get -s redis-master -k redis.ping</code>
<a href="#">SMART by Zabbix agent 2 / SMART by Zabbix agent 2 active</a>	-	Sudo/root access rights to smartctl are required for the user executing Zabbix agent 2. The minimum required smartctl version is 7.1.  Disk discovery LLD rule finds all HDD, SSD, NVMe disks with S.M.A.R.T. enabled.  Attribute discovery LLD rule finds all Vendor Specific Attributes for each disk.  To skip some attributes, set regular expressions with disk names in <code>{SMART.DISK.NAME.MATCHES}</code> and with attribute IDs in <code>{SMART.ATTRIBUTE.ID.MATCHES}</code> on the host level.

## Zabbix agent template operation

Steps to ensure correct operation of templates that collect metrics with [Zabbix agent](#):

1. Make sure that Zabbix agent is installed on the host. For active checks, also make sure that the host is added to the 'ServerActive' parameter of the agent [configuration file](#).
2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).
3. Adjust the values of mandatory macros as needed.
4. Configure the instance being monitored to allow sharing data with Zabbix - see instructions in the Additional steps/comments column.

### Note:

This page contains only a minimum set of macros and setup steps that are required for proper template operation. A detailed description of a template, including the full list of macros, items and triggers, is available in the template's `Readme.md` file (accessible by clicking on a template name).

Template name	Mandatory macros	Additional steps/comments
<a href="#">Apache by Zabbix agent</a>	<b>{APACHE.STATUS.HOST}</b> - the hostname or IP address of Apache status page (default: 127.0.0.1) <b>{APACHE.STATUS.PATH}</b> - the URL path (default: <code>server-status?auto</code> ) <b>{APACHE.STATUS.PORT}</b> - the port of Apache status page (default: 80)	Apache module <code>mod_status</code> should be set (see Apache <a href="#">documentation</a> for details). To check availability, run: <code>httpd -M 2&gt;/dev/null \   grep status_module</code>  Apache configuration example: <pre>&lt;Location "/server-status"&gt; SetHandler server-status Require host example.com &lt;/Location&gt;</pre>
<a href="#">HAProxy by Zabbix agent</a>	<b>{HAPROXY.STATS.PATH}</b> - the path of HAProxy Stats page (default: <code>stats</code> ) <b>{HAPROXY.STATS.PORT}</b> - the port of HAProxy Stats host or container (default: 8404) <b>{HAPROXY.STATS.SCHEME}</b> - the scheme of HAProxy Stats page. Supported: <code>http</code> (default), <code>https</code>	HAProxy Stats page should be set up (see HAProxy <a href="#">blog post</a> for details or template's <code>Readme.md</code> for configuration example).

Template name	Mandatory macros	Additional steps/comments
<a href="#">IIS by Zabbix agent / IIS by Zabbix agent active</a>	<p><b>{IIS.PORT}</b> - the port IIS Server listens on (default: 80)</p> <p><b>{IIS.SERVICE}</b> - the service for port check (default: http). See <a href="#">net.tcp.service</a> section for details.</p>	<p>The server should have the following roles:  <a href="#">Web Server</a>  <a href="#">IIS Management Scripts and Tools</a></p> <p>See IIS documentation for details.</p> <p>Note, that the template doesn't provide information about Windows services state. It is recommended to use it together with OS Windows by Zabbix agent or OS Windows by Zabbix agent active template.</p>
<a href="#">Microsoft Exchange Server 2016 by Zabbix agent/Microsoft Exchange Server 2016 by Zabbix agent active</a> <a href="#">Nginx by Zabbix agent</a>	<p><b>{NGINX.STUB_STATUS.HOST}</b> - the hostname or IP address of Nginx stub_status host or container (default: localhost)</p> <p><b>{NGINX.STUB_STATUS.PATH}</b> - the path of Nginx stub_status page (default: basic_status)</p> <p><b>{NGINX.STUB_STATUS.PORT}</b> - the port of Nginx stub_status host or container (default: 80)</p>	<p>ngx_http_stub_status_module should be set up (see Nginx <a href="#">documentation</a> for details or template's Readme.md for configuration example).</p> <p>To check availability, run:  <pre>nginx -V 2&gt;&amp;1 \   grep -o with-http_stub_status_module</pre></p>
<a href="#">PHP-FPM by Zabbix agent</a>	<p><b>{PHP_FPM.HOST}</b> - a hostname or an IP of PHP-FPM status host or container (default: localhost)</p> <p><b>{PHP_FPM.PING.PAGE}</b> - PHP-FPM ping page path (default:ping)</p> <p><b>{PHP_FPM.PORT}</b> - the port of PHP-FPM status host or container (default: 80)</p> <p><b>{PHP_FPM.PROCESS_NAME}</b> - PHP-FPM process name (default:php-fpm)</p> <p><b>{PHP_FPM.STATUS.PAGE}</b> - PHP-FPM status page path (default:status)</p>	<ol style="list-style-type: none"> <li>Open the php-fpm configuration file and enable the status page:  <pre>pm.status_path = /status ping.path = /ping</pre></li> <li>Validate the syntax: <code>\$ php-fpm7 -t</code></li> <li>Reload the php-fpm service.</li> <li>In the Nginx Server Block (virtual host) configuration file, add (see template's Readme.md for an expanded example with comments):  <pre>location ~ ^/(status ping)\$ {     access_log off;     fastcgi_param SCRIPT_FILENAME     \$document_root\$fastcgi_script_name;     fastcgi_index index.php;     include fastcgi_params;     fastcgi_pass 127.0.0.1:9000; }</pre></li> <li>Check the syntax: <code>\$ nginx -t</code></li> <li>Reload Nginx</li> <li>Verify: <code>curl -L 127.0.0.1/status</code></li> </ol>
<a href="#">RabbitMQ cluster by Zabbix agent</a>	<p><b>{RABBITMQ.API.CLUSTER_HOST}</b> - the hostname or IP address of RabbitMQ cluster API endpoint (default:127.0.0.1)</p> <p><b>{RABBITMQ.API.USER}</b>,  <b>{RABBITMQ.API.PASSWORD}</b> - RabbitMQ login credentials (default username: zbx_monitor, password: zabbix)</p>	<p>Enable RabbitMQ management plugin (see <a href="#">RabbitMQ documentation</a>).</p> <p>To create a RabbitMQ user with necessary permissions for monitoring, run:  <pre>" rabbitmqctl add_user zbx_monitor &lt;PASSWORD&gt; " rabbitmqctl set_permissions -p / zbx_monitor %% "" "" ".*"%% rabbitmqctl set_user_tags zbx_monitor monitoring</pre></p> <p>If the cluster consists of several nodes, it is recommended to assign the cluster template to a separate balancing host. In case of a single-node installation, the cluster template can be assigned to the host with a node template.</p>

Template name	Mandatory macros	Additional steps/comments
MySQL by Zabbix agent	<p><b>{MYSQL.HOST}</b> - the hostname or IP address of MySQL host or container (default: localhost)</p> <p><b>{MYSQL.PORT}</b> - the database service port (default: 3306)</p>	<ol style="list-style-type: none"> <li>If necessary, add the path to the mysql and mysqladmin utilities to the global environment variable PATH.</li> <li>Copy the <code>template_db_mysql.conf</code> file from templates directory of Zabbix into folder with Zabbix agent configuration (<code>/etc/zabbix/zabbix_agentd.d/</code> by default) and restart Zabbix agent.</li> <li>Create MySQL user <code>zbx_monitor</code>. To grant required privileges to the user, run: <pre>GRANT USAGE,REPLICATION CLIENT,PROCESS,SHOW DATABASES,SHOW VIEW ON %% *.* TO '&lt;username&gt;'@'%' ;%%</pre> (see <a href="#">MySQL documentation</a> for details).</li> <li>Create <code>.my.cnf</code> in the home directory of Zabbix agent for Linux (<code>/var/lib/zabbix</code> by default ) or <code>my.cnf</code> in <code>c:\</code> for Windows. The file must have three strings: <pre>[client] "user='zbx_monitor' " "password='&lt;password&gt;' "</pre> </li> </ol>
PostgreSQL	<p><b>{PG.DB}</b> - the database name to connect to the server (default: postgres)</p> <p><b>{PG.HOST}</b> - the database server host or socket directory (default:127.0.0.1)</p> <p><b>{PG.PORT}</b> - the database server port (default: 5432)</p> <p><b>{PG.USER}</b> - the database username (default: zbx_monitor)</p>	<ol style="list-style-type: none"> <li>Create a read-only user <code>zbx_monitor</code> with proper access to PostgreSQL server. For PostgreSQL 10 and newer, run: <pre>CREATE USER zbx_monitor WITH PASSWORD '&lt;PASSWORD&gt;' INHERIT; GRANT pg_monitor TO zbx_monitor;</pre> For older PostgreSQL versions, run: <pre>CREATE USER zbx_monitor WITH PASSWORD '&lt;PASSWORD&gt;'; GRANT SELECT ON pg_stat_database TO zbx_monitor;</pre> </li> <li>Copy <code>postgresql/</code> to Zabbix agent home directory (<code>/var/lib/zabbix/</code>).</li> <li>Copy <code>template_db_postgresql.conf</code> from templates directory of Zabbix to Zabbix agent configuration directory (<code>/etc/zabbix/zabbix_agentd.d/</code>) and restart Zabbix agent.</li> <li>Edit <code>pg_hba.conf</code> to allow connections from Zabbix agent (see <a href="#">PostgreSQL documentation</a> for details). Row examples: <pre>host all zbx_monitor 127.0.0.1/32 trust host all zbx_monitor 0.0.0.0/0 md5 host all zbx_monitor ::0/0 md5</pre> </li> <li>To monitor a remote server, create a <code>.pgpass</code> file in Zabbix agent home directory (<code>/var/lib/zabbix/</code>) and add rows with the instance, port, database, user and password information (see <a href="#">PostgreSQL documentation</a> for details). Row examples: <pre>&lt;REMOTE_HOST1&gt;:5432:postgres:zbx_monitor:&lt;PASSWORD&gt; *:5432:postgres:zbx_monitor:&lt;PASSWORD&gt;</pre> </li> </ol>

## 9 Notifications upon events

### Overview

Assuming that we have configured some items and triggers and now are getting some events happening as a result of triggers changing state, it is time to consider some actions.

To begin with, we would not want to stare at the triggers or events list all the time. It would be much better to receive notification if something significant (such as a problem) has happened. Also, when problems occur, we would like to see that all the people concerned are informed.

That is why sending notifications is one of the primary actions offered by Zabbix. Who and when should be notified upon a certain event can be defined.

To be able to send and receive notifications from Zabbix you have to:

- **define some media**
- **configure an action** that sends a message to one of the defined media

Actions consist of conditions and operations. Basically, when conditions are met, operations are carried out. The two principal operations are sending a message (notification) and executing a remote command.

For discovery and autoregistration created events, some additional operations are available. Those include adding or removing a host, linking a template etc.

### 1 Media types

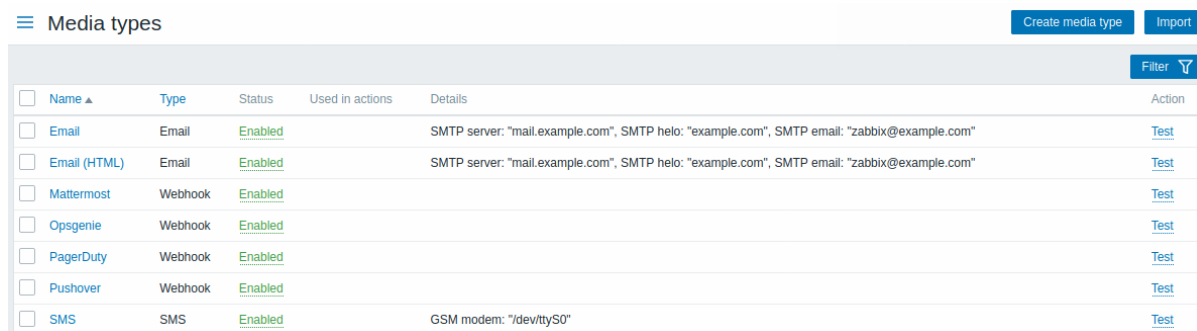
#### Overview

Media are the delivery channels used for sending notifications and alerts from Zabbix.

You can configure several media types:

- **E-mail**
- **SMS**
- **Custom alertscripts**
- **Webhook**

Media types are configured in Administration → Media types.



<input type="checkbox"/>	Name ▲	Type	Status	Used in actions	Details	Action
<input type="checkbox"/>	Email	Email	Enabled		SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"	Test
<input type="checkbox"/>	Email (HTML)	Email	Enabled		SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"	Test
<input type="checkbox"/>	Mattermost	Webhook	Enabled			Test
<input type="checkbox"/>	Opsgenie	Webhook	Enabled			Test
<input type="checkbox"/>	PagerDuty	Webhook	Enabled			Test
<input type="checkbox"/>	Pushover	Webhook	Enabled			Test
<input type="checkbox"/>	SMS	SMS	Enabled		GSM modem: "/dev/ttyS0"	Test

Some media types come pre-defined in the default dataset. You just need to finetune their parameters to get them working.

It is possible to test if a configured media type works, by clicking on Test in the last column (see **Media type testing** for more details).

To create a new media type, click on the Create media type button. A media type configuration form is opened.

#### Common parameters

Some parameters are common for all media types.

Media type **Message templates** 5 Options

\* Name

Type

\* GSM modem

Description

Enabled

In the **Media type** tab the common general attributes are:

Parameter	Description
Name	Name of the media type.
Type	Select the type of media.
Description	Enter a description.
Enabled	Mark the checkbox to enable the media type.

See the individual pages of media types for media-specific parameters.

The **Message templates** tab allows to set default notification messages for all or some of the following event types:

- Problem
- Problem recovery
- Problem update
- Discovery
- Autoregistration
- Internal problem
- Internal problem recovery

Media type **Message templates** 5 Options

Message type	Template	Actions
Problem	Problem started at {EVENT.TIME} on {EVENT.DATE} Pro...	<a href="#">Edit</a> <a href="#">Remove</a>
Problem recovery	Problem has been resolved at {EVENT.RECOVERY.TIME...}	<a href="#">Edit</a> <a href="#">Remove</a>
Problem update	{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem ...	<a href="#">Edit</a> <a href="#">Remove</a>
Discovery	Discovery rule: {DISCOVERY.RULE.NAME} Device IP: {D...	<a href="#">Edit</a> <a href="#">Remove</a>
Autoregistration	Host name: {HOST.HOST} Host IP: {HOST.IP} Agent port:...	<a href="#">Edit</a> <a href="#">Remove</a>
<a href="#">Add</a>		

To customize message templates:

- In the Message templates tab click on [Add](#): a Message template popup window will open.
- Select required Message type and edit Subject and Message texts.
- Click on Add to save the message template

### Message template ✕

Message type

Subject

Message

Message template parameters:

Parameter	Description
Message type	Type of event for which default message will be defined. Only one default message can be defined for each event type.
Subject	Subject of the default message. The subject may contain macros. It is limited to 255 characters. Subject is not available for SMS media type.
Message	The default message. The message may contain macros. It is limited to certain amount of characters depending on the type of database (see <a href="#">Sending messages</a> for more information).

To make changes to an existing message template: In the Actions column click on [Edit](#) to edit the template or click on [Remove](#) to delete the message template.

A notification message template can also be defined for each action individually (see [action operations](#) for details). Custom messages in actions can override message templates configured for a media type.

**Warning:**

Message templates must be defined for all media types, including webhooks or custom alert scripts that are not using default messages for notifications. For example, an action "Send message to Pushover webhook" will fail to send problem notifications, if problem message has not been defined for the Pushover webhook.

The **Options** tab contains alert processing settings. The same set of options is configurable for each media type.

All media types are processed in parallel. While the maximum number of concurrent sessions is configurable per media type, the total number of alerter processes on server can only be limited by the StartAlerters **parameter**. Alerts generated by one trigger are processed sequentially. So multiple notifications may be processed simultaneously only if they are generated by multiple triggers.



Concurrent sessions    **One**    Unlimited    Custom

\* Attempts   

\* Attempt interval   

Parameter	Description
Concurrent sessions	Select the number of parallel alerter sessions for the media type: <b>One</b> - one session <b>Unlimited</b> - unlimited number of sessions <b>Custom</b> - select a custom number of sessions Unlimited/high values mean more parallel sessions and increased capacity for sending notifications. Unlimited/high values should be used in large environments where lots of notifications may need to be sent simultaneously. If more notifications need to be sent than there are concurrent sessions, the remaining notifications will be queued; they will not be lost.
Attempts	Number of attempts for trying to send a notification. Up to 10 attempts can be specified; default value is '3'. If '1' is specified Zabbix will send the notification only once and will not retry if the sending fails.
Attempt interval	Frequency of trying to resend a notification in case the sending failed, in seconds (0-60). If '0' is specified, Zabbix will retry immediately. Time suffixes are supported, e.g. 5s, 1m.

Media type testing

It is possible to test if a configured media type works.


**E-mail**

For example, to test an e-mail media type:

- Locate the relevant e-mail in the **list** of media types
- Click on Test in the last column of the list (a testing window will open)
- Enter a Send to recipient address and with body and optional subject
- Send a test message by clicking on Test

Test success or failure message will be displayed in the same window:

## Test media type

 Media type test successful.

\* Send to

Subject

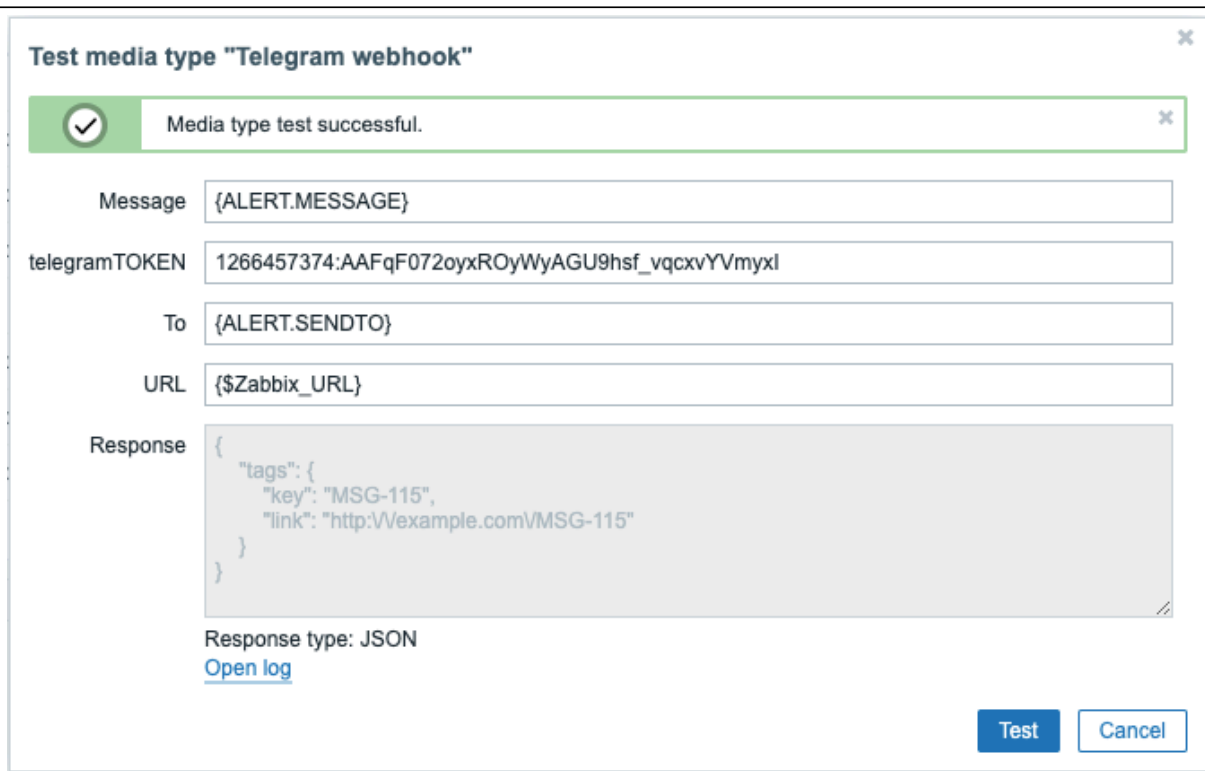
\* Message

### \*\*Webhook \*\*

To test a webhook media type:

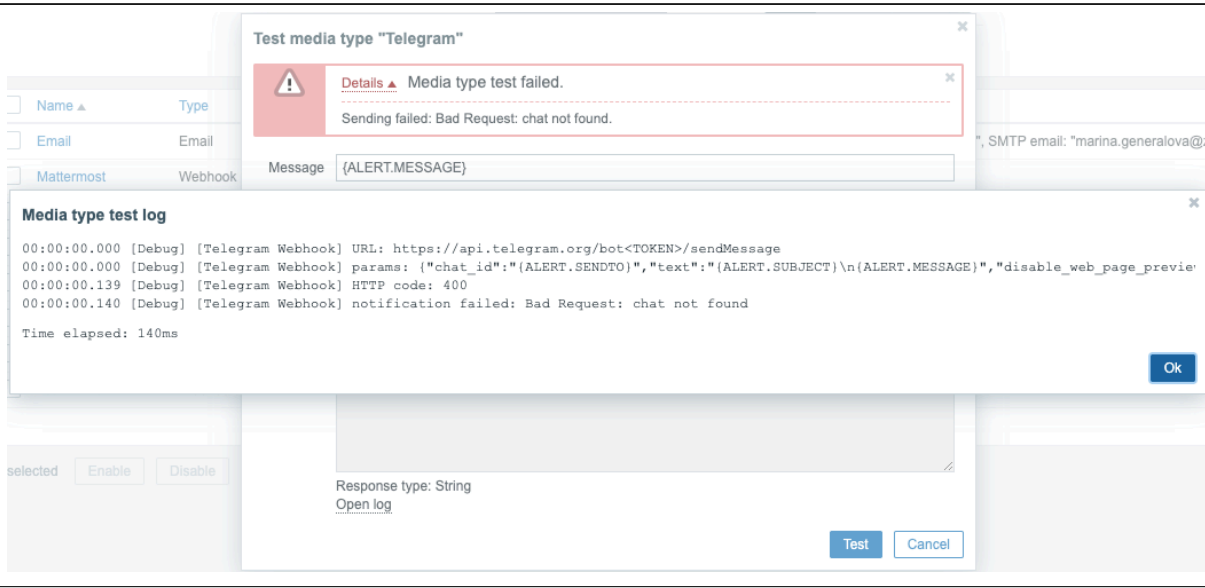
- Locate the relevant webhook in the **list** of media types
- Click on Test in the last column of the list (a testing window will open)
- Edit the webhook parameter values, if needed
- Click on Test

By default, webhook tests are performed with parameters entered during configuration. However, it is possible to change attribute values for testing. Replacing or deleting values in the testing window affects the test procedure only, the actual webhook attribute values will remain unchanged.



To view media type test log entries without leaving the test window:

- Click on Open log (a new popup window will open).



If the webhook test is successful

- "Media type test successful." message is displayed
- Server response appears in the gray Response field
- Response type (JSON or String) is specified below the Response field

If the webhook test fails

- "Media type test failed." message is displayed, followed by additional failure details.

User media

To receive notifications of a media type, a medium (e-mail address/phone number/webhook user ID etc) for this media type must be defined in the user profile. For example, an action sending messages to user "Admin" using webhook "X" will always fail to send anything if the webhook "X" medium is not defined in the user profile.

To define user media:

- Go to your user profile, or go to Administration → Users and open the user properties form
- In the Media tab, click on [Add](#)

### Media ✕

Type

\* Send to  [Remove](#)

[Remove](#)

[Add](#)

\* When active

Use if severity  Not classified

Information

Warning

Average

High

Disaster

Enabled

User media attributes:

Parameter	Description
Type	The drop-down list contains names of all configured media types.

Parameter	Description	
Send to	<p>Provide required contact information where to send messages.</p> <p>For an e-mail media type it is possible to add several addresses by clicking on <a href="#">Add</a> below the address field. In this case, the notification will be sent to all e-mail addresses provided. It is also possible to specify recipient name in the Send to field of the e-mail recipient in a format 'Recipient name &lt;address1@company.com&gt;'. Note, that if a recipient name is provided, an e-mail address should be wrapped in angle brackets (&lt;&gt;). UTF-8 characters in the name are supported, quoted pairs and comments are not. For example: John Abercroft &lt;manager@nycdatcenter.com&gt; and manager@nycdatcenter.com are both valid formats. Incorrect examples: John Doe zabbix@company.com, //%%"Zabbix\@\<h(comment)q\&gt;" %%="" .="" <="" active="" p="" zabbix@company.com=""  =""  when=""> </h(comment)q\&gt;"></p>	<p>You can limit the time when messages are sent, for example, set the working days only (1-5,09:00-18:00). Note that this limit is based on the user <b>time zone</b>. If the user time zone is changed and is different from the system time zone this limit may need to be adjusted accordingly so as not to miss im-</p>

Parameter	Description
Use if severity	<p>Mark the checkboxes of trigger severities that you want to receive notifications for.</p> <p>Note that the default severity ('Not classified') <b>must be checked</b> if you want to receive notifications for non-trigger events.</p> <p>After saving, the selected trigger severities will be displayed in the corresponding severity colors, while unselected ones will be grayed out.</p>
Status	<p>Status of the user media.</p> <p><b>Enabled</b> - is in use.</p> <p><b>Disabled</b> - is not being used.</p>

## 1 E-mail

### Overview

To configure e-mail as the delivery channel for messages, you need to configure e-mail as the media type and assign specific addresses to users.

**Note:**

Multiple notifications for single event will be grouped together on the same email thread.

### Configuration

To configure e-mail as the media type:

- Go to Administration → Media types
- Click on Create media type (or click on E-mail in the list of pre-defined media types).

The **Media type** tab contains general media type attributes:

Media type [Message templates](#) 5 [Options](#)

---

\* Name

Type  ▼

\* SMTP server

SMTP server port

\* SMTP helo

\* SMTP email

Connection security None STARTTLS SSL/TLS

Authentication None Username and password

Message format HTML Plain text

Description

Enabled

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the e-mail media type:

Parameter	Description
SMTP server	Set an SMTP server to handle outgoing messages.
SMTP server port	Set the SMTP server port to handle outgoing messages. This option is supported starting with Zabbix 3.0.
SMTP helo	Set a correct SMTP helo value, normally a domain name.

Parameter	Description
SMTP email	<p>The address entered here will be used as the <b>From</b> address for the messages sent.</p> <p>Adding a sender display name (like "Zabbix_info" in Zabbix_info &lt;zabbix@company.com&gt; in the screenshot above) with the actual e-mail address is supported since Zabbix 2.2 version.</p> <p>There are some restrictions on display names in Zabbix emails in comparison to what is allowed by RFC 5322, as illustrated by examples:</p> <p>Valid examples:</p> <p>zabbix@company.com (only email address, no need to use angle brackets)</p> <p>Zabbix_info &lt;zabbix@company.com&gt; (display name and email address in angle brackets)</p> <p>ΣΩ-monitoring &lt;zabbix@company.com&gt; (UTF-8 characters in display name)</p> <p>Invalid examples:</p> <p>Zabbix HQ zabbix@company.com (display name present but no angle brackets around email address)</p> <p>"Zabbix\@\&lt;H(comment)Q\&gt;" &lt;zabbix@company.com&gt; (although valid by RFC 5322, quoted pairs and comments are not supported in Zabbix emails)</p>
Connection security	<p>Select the level of connection security:</p> <p><b>None</b> - do not use the <a href="#">CURLOPT_USE_SSL</a> option</p> <p><b>STARTTLS</b> - use the <a href="#">CURLOPT_USE_SSL</a> option with <a href="#">CURLUSESSL_ALL</a> value</p> <p><b>SSL/TLS</b> - use of <a href="#">CURLOPT_USE_SSL</a> is optional</p> <p>This option is supported starting with Zabbix 3.0.</p>
SSL verify peer	<p>Mark the checkbox to verify the SSL certificate of the SMTP server. The value of "SSLCAlocation" server configuration directive should be put into <a href="#">CURLOPT_CAPATH</a> for certificate validation. This sets cURL option <a href="#">CURLOPT_SSL_VERIFYPEER</a>.</p>
SSL verify host	<p>This option is supported starting with Zabbix 3.0.</p> <p>Mark the checkbox to verify that the Common Name field or the Subject Alternate Name field of the SMTP server certificate matches. This sets cURL option <a href="#">CURLOPT_SSL_VERIFYHOST</a>.</p>
Authentication	<p>This option is supported starting with Zabbix 3.0.</p> <p>Select the level of authentication:</p> <p><b>None</b> - no cURL options are set (since 3.4.2) <b>Username and password</b> - implies "AUTH=*" leaving the choice of authentication mechanism to cURL (until 3.4.2) <b>Normal password</b> - <a href="#">CURLOPT_LOGIN_OPTIONS</a> is set to "AUTH=PLAIN"</p>
Username	<p>This option is supported starting with Zabbix 3.0.</p> <p>User name to use in authentication. This sets the value of <a href="#">CURLOPT_USERNAME</a>.</p>
Password	<p>This option is supported starting with Zabbix 3.0.</p> <p>Password to use in authentication. This sets the value of <a href="#">CURLOPT_PASSWORD</a>.</p>
Message format	<p>This option is supported starting with Zabbix 3.0.</p> <p>Select message format:</p> <p><b>HTML</b> - send as HTML</p> <p><b>Plain text</b> - send as plain text</p>

**Attention:**

To make SMTP authentication options available, Zabbix server should be compiled with the `--with-libcurl` **compilation** option with cURL 7.20.0 or higher.

See also [common media type parameters](#) for details on how to configure default messages and alert processing options.

User media



Once the e-mail media type is configured, go to the Administration → Users section and edit user profile to assign e-mail media to the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

## 2 SMS

### Overview

Zabbix supports the sending of SMS messages using a serial GSM modem connected to Zabbix server's serial port.

Make sure that:

- The speed of the serial device (normally /dev/ttyS0 under Linux) matches that of the GSM modem. Zabbix does not set the speed of the serial link. It uses default settings.
- The 'zabbix' user has read/write access to the serial device. Run the command `ls -l /dev/ttyS0` to see current permissions of the serial device.
- The GSM modem has PIN entered and it preserves it after power reset. Alternatively you may disable PIN on the SIM card. PIN can be entered by issuing command `AT+CPIN="NNNN"` (NNNN is your PIN number, the quotes must be present) in a terminal software, such as Unix minicom or Windows HyperTerminal.

Zabbix has been tested with these GSM modems:

- Siemens MC35
- Teltonika ModemCOM/G10

To configure SMS as the delivery channel for messages, you also need to configure SMS as the media type and enter the respective phone numbers for the users.

### Configuration

To configure SMS as the media type:

- Go to Administration → Media types
- Click on Create media type (or click on SMS in the list of pre-defined media types).

The following parameters are specific for the SMS media type:

Parameter	Description
GSM modem	Set the serial device name of the GSM modem.

See [common media type parameters](#) for details on how to configure default messages and alert processing options. Note that parallel processing of sending SMS notifications is not possible.

### User media

Once the SMS media type is configured, go to the Administration → Users section and edit user profile to assign SMS media to the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

## 3 Custom alertscripts

### Overview

If you are not satisfied with existing media types for sending alerts there is an alternative way to do that. You can create a script that will handle the notification your way.

Alert scripts are executed on Zabbix server. These scripts are located in the directory defined in the server [configuration file](#) **AlertScriptsPath** variable.

Here is an example alert script:

```
#####!/bin/bash

to=$1
subject=$2
body=$3

cat <<EOF | mail -s "$subject" "$to"
$body
EOF
```

**Attention:**

Starting from version 3.4 Zabbix checks for the exit code of the executed commands and scripts. Any exit code which is different from **0** is considered as a **command execution** error. In such case Zabbix will try to repeat failed execution.

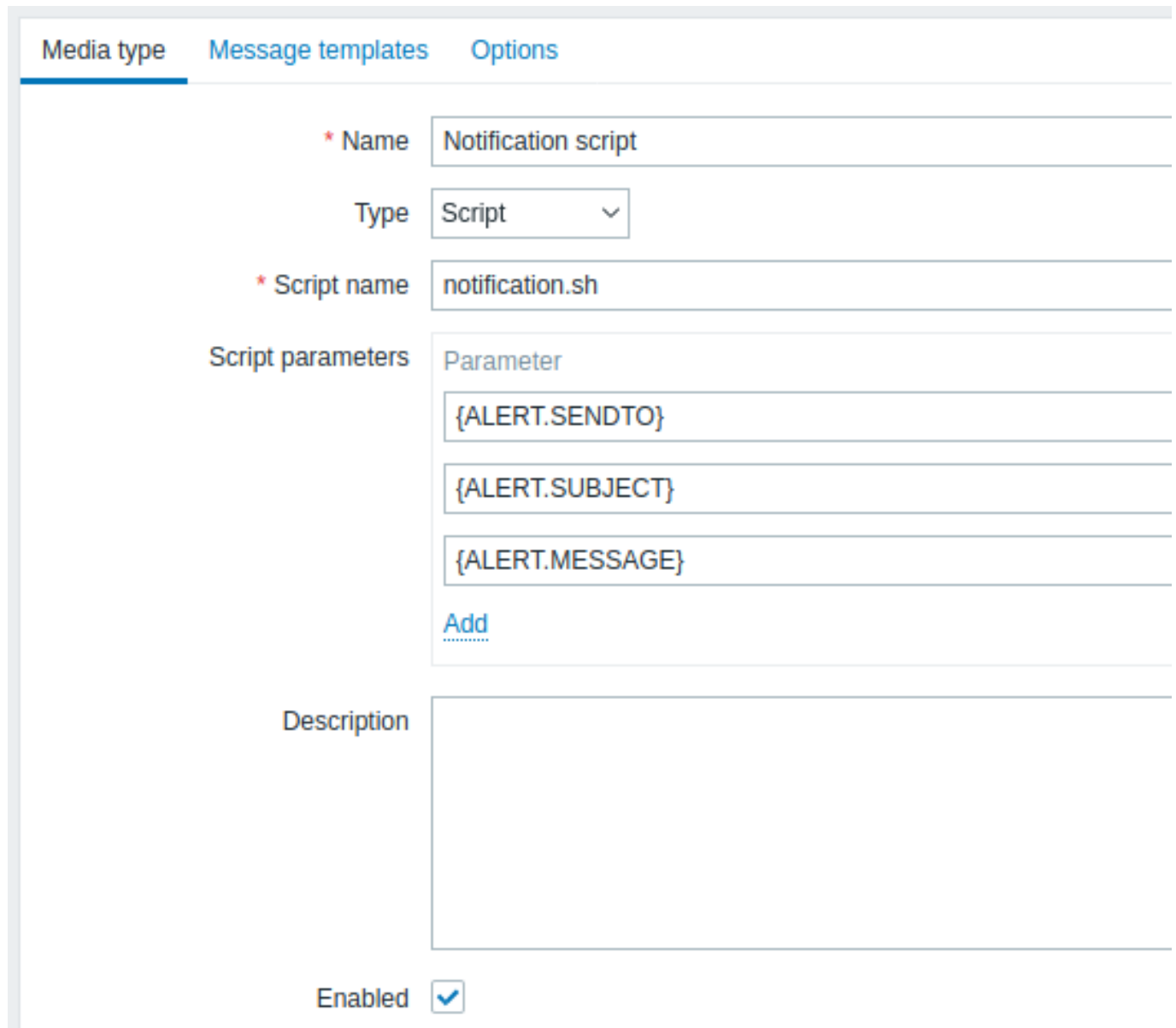
Environment variables are not preserved or created for the script, so they should be handled explicitly.

Configuration

To configure custom alertscripts as the media type:

- Go to Administration → Media types
- Click on Create media type

The **Media type** tab contains general media type attributes:



The screenshot shows the 'Media type' configuration form in Zabbix. It has three tabs: 'Media type' (selected), 'Message templates', and 'Options'. The form contains the following fields:

- Name:** Notification script (marked with a red asterisk)
- Type:** Script (dropdown menu)
- Script name:** notification.sh (marked with a red asterisk)
- Script parameters:** A list of parameters: {ALERT.SENDTO}, {ALERT.SUBJECT}, {ALERT.MESSAGE}. There is an 'Add' button below the list.
- Description:** A large empty text area.
- Enabled:** A checked checkbox.

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the script media type:

Parameter	Description
Script name	Enter the name of the script.
Script parameters	Add command-line parameters to the script. {ALERT.SENDTO}, {ALERT.SUBJECT} and {ALERT.MESSAGE} macros are supported in script parameters. Customizing script parameters is supported since Zabbix 3.0.

See [common media type parameters](#) for details on how to configure default messages and alert processing options.

**Warning:**

Even if an alertscript doesn't use default messages, message templates for operation types used by this media type must still be defined, otherwise a notification will not be sent.

**Attention:**

As parallel processing of media types is implemented since Zabbix 3.4.0, it is important to note that with more than one script media type configured, these scripts may be processed in parallel by alerter processes. The total number of alerter processes is limited by the `StartAlerters` [parameter](#).

### User media

Once the media type is configured, go to the Administration → Users section and edit user profile to assign media of this type to the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

Note, that when defining a user media, a Send to field cannot be empty. If this field will not be used in an alertscript, enter any combination of supported characters to bypass validation requirements.

## 4 Webhook

### Overview

The webhook media type is useful for making HTTP calls using custom JavaScript code for straightforward integration with external software such as helpdesk systems, chats, or messengers. You may choose to import an integration provided by Zabbix or create a custom integration from scratch.

### Integrations

The following integrations are available allowing to use predefined webhook media types for pushing Zabbix notifications to:

- [brevis.one](#)
- [Discord](#)
- [iLert](#)
- [iTop](#)
- [Jira](#)
- [Jira Service Desk](#)
- [Mattermost](#)
- [Microsoft Teams](#)
- [Opsgenie](#)
- [OTRS](#)
- [Pagerduty](#)
- [Pushover](#)
- [Redmine](#)
- [Rocket.Chat](#)
- [ServiceNow](#)
- [SIGNL4](#)
- [Slack](#)
- [SolarWinds](#)
- [SysAid](#)
- [Telegram](#)
- [TOPdesk](#)
- [VictorOps](#)
- [Zammad](#)
- [Zendesk](#)

**Note:**

In addition to the services listed here, Zabbix can be integrated with **Spiceworks** (no webhook is required). To convert Zabbix notifications into Spiceworks tickets, create an [email media type](#) and enter Spiceworks helpdesk email address (e.g. `help@zabbix.on.spiceworks.com`) in the profile settings of a designated Zabbix user.

### Configuration

To start using a webhook integration:

1. Locate required .xml file in the `templates/media` directory of the downloaded Zabbix version or download it from [Zabbix git repository](#)
2. **Import** the file into your Zabbix installation. The webhook will appear in the list of media types.
3. Configure the webhook according to instructions in the `Readme.md` file (you may click on a webhook's name above to quickly access `Readme.md`).

To create a custom webhook from scratch:

- Go to Administration → Media types
- Click on Create media type

The **Media type** tab contains various attributes specific for this media type:

\* Name

Type

Parameters	Name	Value	Action
	<input type="text" value="endpoint"/>	<input type="text" value="https://api.pushover.net/1/messagi"/>	<a href="#">Remove</a>
	<input type="text" value="eventid"/>	<input type="text" value="{EVENT.ID}"/>	<a href="#">Remove</a>
	<input type="text" value="expire"/>	<input type="text" value="1200"/>	<a href="#">Remove</a>
	<input type="text" value="message"/>	<input type="text" value="{ALERT.MESSAGE}"/>	<a href="#">Remove</a>
	<input type="text" value="priority"/>	<input type="text" value="0"/>	<a href="#">Remove</a>
	<input type="text" value="retry"/>	<input type="text" value="60"/>	<a href="#">Remove</a>
	<input type="text" value="title"/>	<input type="text" value="{ALERT.SUBJECT}"/>	<a href="#">Remove</a>
	<input type="text" value="token"/>	<input type="text" value="&lt;PUSHOVER TOKEN HERE&gt;"/>	<a href="#">Remove</a>
	<input type="text" value="triggerid"/>	<input type="text" value="{TRIGGER.ID}"/>	<a href="#">Remove</a>
	<input type="text" value="url"/>	<input "{\$zabbix.url}"="" type="text" value=""/>	<a href="#">Remove</a>
	<input type="text" value="url_title"/>	<input type="text" value="Zabbix"/>	<a href="#">Remove</a>
	<input type="text" value="user"/>	<input type="text" value="{ALERT.SENDTO}"/>	<a href="#">Remove</a>
	<a href="#">Add</a>		

\* Script

Timeout

Process tags

Include event menu entry

\* Menu entry name

\* Menu entry URL

Description   
 Set token parameter to your Pushover application key.  
 When assigning Pushover media to the Zabbix user - add the user key into send to field.

Enabled

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the webhook media type:

Parameter	Description
Parameters	<p>Specify the webhook variables as the attribute and value pairs. For preconfigured webhooks, a list of parameters varies, depending on the service. Check the webhook's Readme.md file for parameter description.</p> <p>For new webhooks, several common variables are included by default (URL:&lt;empty&gt;, HTTPProxy:&lt;empty&gt;, To:{ALERT.SENDTO}, Subject:{ALERT.SUBJECT}, <b>Message:%7BALERT.MESSAGE</b>), feel free to keep or remove them.</p> <p>All macros that are supported in problem notifications are supported in the parameters.</p> <p>If you specify an HTTP proxy, the field supports the same functionality as in the item configuration <b>HTTP proxy</b> field. The proxy string may be prefixed with <code>[scheme]://</code> to specify which kind of proxy is used (e.g. https, socks4, socks5; see <a href="#">documentation</a>).</p>
Script	<p>Enter JavaScript code in the block that appears when clicking in the parameter field (or on the view/edit button next to it). This code will perform the webhook operation.</p> <p>The script is a function code that accepts parameter - value pairs. The values should be converted into JSON objects using <code>JSON.parse()</code> method, for example: <code>var params = JSON.parse(value);</code>.</p> <p>The code has access to all parameters, it may perform HTTP GET, POST, PUT and DELETE requests and has control over HTTP headers and request body.</p> <p>The script must contain a return operator, otherwise it will not be valid. It may return OK status along with an optional list of tags and tag values (see Process tags option) or an error string.</p> <p>Note, that the script is executed only after an alert is created. If the script is configured to return and process tags, these tags will not get resolved in <code>{EVENT.TAGS}</code> and <code>{EVENT.RECOVERY.TAGS}</code> macros in the initial problem message and recovery messages because the script has not had the time to run yet.</p> <p>See also: <a href="#">Webhook development guidelines</a>, <a href="#">Webhook script examples</a>, <a href="#">Additional JavaScript objects</a>.</p>
Timeout	<p>JavaScript execution timeout (1-60s, default 30s). Time suffixes are supported, e.g. 30s, 1m.</p>
Process tags	<p>Mark the checkbox to process returned JSON property values as tags. These tags are added to the already existing (if any) problem event tags in Zabbix.</p> <p>If a webhook uses tags (the Process tags checkbox is marked), the webhook should always return a JSON object containing at least an empty object for tags:<code>var result = {tags: {}};</code></p> <p>Examples of tags that can be returned: Jira ID: PROD-1234, Responsible: John Smith, Processed:&lt;no value&gt;, etc.</p>
Include event menu entry	<p>Mark the checkbox to include an entry in the <b>event menu</b> linking to the created external ticket.</p> <p>If marked, the webhook should not be used to send notifications to different users (consider creating a <b>dedicated user</b> instead) or in several alert actions <b>related to a single problem event</b>.</p>
Menu entry name	<p>Specify the menu entry name.</p> <p><code>{EVENT.TAGS.&lt;tag name&gt;}</code> macro is supported.</p> <p>This field is only mandatory if Include event menu entry is selected.</p>

Parameter	Description
Menu entry URL	Specify the underlying URL of the menu entry. {EVENT.TAGS.<tag name>} macro is supported. This field is only mandatory if Include event menu entry is selected.

See [common media type parameters](#) for details on how to configure default messages and alert processing options.

**Warning:**

Even if a webhook doesn't use default messages, message templates for operation types used by this webhook must still be defined.

### User media

Once the media type is configured, go to the Administration → Users section and assign the webhook media to an existing user or create a new user to represent the webhook. Steps for setting up user media for an existing user, being common for all media types, are described on the [Media types](#) page.

If a webhook uses tags to store ticket\message ID, avoid assigning the same webhook as a media to different users as doing so may cause webhook errors (applies to the majority of webhooks that utilize Include event menu entry option). In this case, the best practice is to create a dedicated user to represent the webhook:

1. After configuring the webhook media type, go to the Administration → Users section and create a dedicated Zabbix user to represent the webhook - for example, with an alias Slack for the Slack webhook. All settings, except media, can be left at their defaults as this user will not be logging into Zabbix.
2. In the user profile, go to a tab Media and **add a webhook** with the required contact information. If the webhook does not use a Send to field, enter any combination of supported characters to bypass validation requirements.
3. Grant this user at least read **permissions** to all hosts for which it should send the alerts.

When configuring alert action, add this user in the Send to users field in Operation details - this will tell Zabbix to use the webhook for notifications from this action.

### Configuring alert actions

Actions determine which notifications should be sent via the webhook. Steps for [configuring actions](#) involving webhooks are the same as for all other media types with these exceptions:

- If a webhook uses tags to store ticket\message ID and to follow up with update\resolve operations, this webhook should not be used in several alert actions for a single problem event. If {EVENT.TAGS.<name>} already exists, and is updated in the webhook, then its resulting value is not defined. For such a case, a new tag name should be used in the webhook to store updated values. This applies to Jira, Jira Service Desk, Mattermost, Opsgenie, OTRS, Redmine, ServiceNow, Slack, Zammad, and Zendesk webhooks provided by Zabbix and to the majority of webhooks that utilize Include event menu entry option. Using the webhook in several operations is allowed if those operations or escalation steps belong to the same action. It is also ok to use this webhook in different actions if the actions will not be applied to the same problem event due to different filter conditions.
- When using a webhook in actions for **internal events**: in the action operation configuration, check the Custom message checkbox and define the custom message, otherwise, a notification will not be sent.

### Webhook script examples

#### Overview

Though Zabbix offers a large number of webhook integrations available out-of-the-box, you may want to create your own webhooks instead. This section provides examples of custom webhook scripts (used in the Script parameter). See [webhook](#) section for description of other webhook parameters.

#### Jira webhook (custom)

\* Name

Type

Parameters	Name	Value	Action
	<input type="text" value="HTTPProxy"/>	<input type="text"/>	<a href="#">Remove</a>
	<input type="text" value="Message"/>	<input type="text" value="{ALERT.MESSAGE}"/>	<a href="#">Remove</a>
	<input type="text" value="Subject"/>	<input type="text" value="{ALERT.SUBJECT}"/>	<a href="#">Remove</a>
	<input type="text" value="To"/>	<input type="text" value="{ALERT.SENDTO}"/>	<a href="#">Remove</a>
	<input type="text" value="URL"/>	<input type="text"/>	<a href="#">Remove</a>
	<a href="#">Add</a>		

\* Script

Timeout

Process tags

Include event menu entry

\* Menu entry name

\* Menu entry URL

Description

Enabled

This script will create a JIRA issue and return some info on the created issue.

```
try {
  Zabbix.Log(4, '[ Jira webhook ] Started with params: ' + value);

  var result = {
    'tags': {
      'endpoint': 'jira'
    }
  },
  params = JSON.parse(value),
  req = new CurlHttpRequest(),
  fields = {},
  resp;

  if (params.HTTPProxy) {
```



```

    req.SetProxy(params.HTTPProxy);
}

req.AddHeader('Content-Type: application/json');
req.AddHeader('Authorization: Basic ' + params.authentication);

fields.summary = params.summary;
fields.description = params.description;
fields.project = {key: params.project_key};
fields.issuetype = {id: params.issue_id};

resp = req.Post('https://tsupport.zabbix.lan/rest/api/2/issue/',
    JSON.stringify({"fields": fields})
);

if (req.Status() != 201) {
    throw 'Response code: ' + req.Status();
}

resp = JSON.parse(resp);
result.tags.issue_id = resp.id;
result.tags.issue_key = resp.key;

return JSON.stringify(result);
}
catch (error) {
    Zabbix.Log(4, '[ Jira webhook ] Issue creation failed json : ' + JSON.stringify({"fields": fields}));
    Zabbix.Log(3, '[ Jira webhook ] issue creation failed : ' + error);

    throw 'Failed with error: ' + error;
}
}

```

#### Slack webhook (custom)

This webhook will forward notifications from Zabbix to a Slack channel.

```

try {
    var params = JSON.parse(value),
        req = new CurlHttpRequest(),
        response;

    if (params.HTTPProxy) {
        req.SetProxy(params.HTTPProxy);
    }

    req.AddHeader('Content-Type: application/x-www-form-urlencoded');

    Zabbix.Log(4, '[ Slack webhook ] Webhook request with value=' + value);

    response = req.Post(params.hook_url, 'payload=' + encodeURIComponent(value));
    Zabbix.Log(4, '[ Slack webhook ] Responded with code: ' + req.Status() + '. Response: ' + response);

    try {
        response = JSON.parse(response);
    }
    catch (error) {
        if (req.getStatus() < 200 || req.getStatus() >= 300) {
            throw 'Request failed with status code ' + req.Status();
        }
        else {
            throw 'Request success, but response parsing failed.';
        }
    }
}
}

```

```

if (req.Status() !== 200 || !response.ok || response.ok === 'false') {
    throw response.error;
}

return 'OK';
}
catch (error) {
    Zabbix.Log(3, '[ Jira webhook ] Sending failed. Error: ' + error);

    throw 'Failed with error: ' + error;
}

```

## 2 Actions

### Overview

If you want some operations taking place as a result of events (for example, notifications sent), you need to configure actions.

Actions can be defined in response to events of all supported types:

- Trigger actions - for events when trigger status changes from OK to PROBLEM and back
- Discovery actions - for events when network discovery takes place
- Autoregistration actions - for events when new active agents auto-register (or host metadata changes for registered ones)
- Internal actions - for events when items become unsupported or triggers go into an unknown state

### Configuring an action

To configure an action, do the following:

- Go to Configuration → Actions
- Select action type (Trigger, Discovery, Autoregistration, Internal) from the title dropdown
- Click on Create action
- Name the action
- Choose **conditions** upon which operations are carried out
- Choose the **operations** to carry out

General action attributes:

Action
Operations

**\* Name**

Type of calculation  A and B

Conditions	Label	Name
A		Trigger severity is greater than or equals <i>Not classified</i>
B		Trigger severity does not equal <i>Information</i>
<a href="#" style="color: #007bff; text-decoration: none;">Add</a>		

Enabled

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Unique action name.

Parameter	Description
Type of calculation	Select the evaluation <b>option</b> for action conditions (with more than one condition): <b>And</b> - all conditions must be met <b>Or</b> - enough if one condition is met <b>And/Or</b> - combination of the two: AND with different condition types and OR with the same condition type <b>Custom expression</b> - a user-defined calculation formula for evaluating action conditions.
Conditions	List of action conditions. Click on Add to add a new <b>condition</b> .
Enabled	Mark the checkbox to enable the action. Otherwise it will be disabled.

## 1 Conditions

### Overview

It is possible to define that an action is executed only if the event matches a defined set of conditions. Conditions are set when configuring the **action**.

Condition matching is case-sensitive.

### Trigger actions

The following conditions can be set for trigger-based actions:

Condition type	Supported operators	Description
Application	equals contains does not contain	Specify an application or an application to exclude. <b>equals</b> - event belongs to a trigger of the item that is linked to the specified application. <b>contains</b> - event belongs to a trigger of the item that is linked to an application containing the string. <b>does not contain</b> - event belongs to a trigger of the item that is linked to an application not containing the string.
Host group	equals does not equal	Specify host groups or host groups to exclude. <b>equals</b> - event belongs to this host group. <b>does not equal</b> - event does not belong to this host group. Specifying a parent host group implicitly selects all nested host groups. To specify the parent group only, all nested groups have to be additionally set with the <b>does not equal</b> operator.

Condition type	Supported operators	Description
Template	<p>equals</p> <p>does not equal</p>	<p>Specify templates or templates to exclude.</p> <p><b>equals</b> - event belongs to a trigger inherited from this template.</p> <p><b>does not equal</b> - event does not belong to a trigger inherited from this template.</p>
Host	<p>equals</p> <p>does not equal</p>	<p>Specify hosts or hosts to exclude.</p> <p><b>equals</b> - event belongs to this host.</p> <p><b>does not equal</b> - event does not belong to this host.</p>
Tag name	<p>equals</p> <p>does not equal</p> <p>contains</p> <p>does not contain</p>	<p>Specify event tag or event tag to exclude.</p> <p><b>equals</b> - event has this tag</p> <p><b>does not equal</b> - event does not have this tag</p> <p><b>contains</b> - event has a tag containing this string</p> <p><b>does not contain</b> - event does not have a tag containing this string</p>
Tag value	<p>equals</p> <p>does not equal</p> <p>contains</p> <p>does not contain</p>	<p>Specify event tag and value combination or tag and value combination to exclude.</p> <p><b>equals</b> - event has this tag and value</p> <p><b>does not equal</b> - event does not have this tag and value</p> <p><b>contains</b> - event has a tag and value containing these strings</p> <p><b>does not contain</b> - event does not have a tag and value containing these strings</p>
Trigger	<p>equals</p> <p>does not equal</p>	<p>Specify triggers or triggers to exclude.</p> <p><b>equals</b> - event is generated by this trigger.</p> <p><b>does not equal</b> - event is generated by any other trigger, except this one.</p>
Trigger name	<p>contains</p> <p>does not contain</p>	<p>Specify a string in the trigger name or a string to exclude.</p> <p><b>contains</b> - event is generated by a trigger, containing this string in the name.</p> <p><b>does not contain</b> - this string cannot be found in the trigger name.</p> <p>Note: Entered value will be compared to trigger name with all macros expanded.</p>

Condition type	Supported operators	Description
Trigger severity	equals does not equal is greater than or equals is less than or equals	Specify trigger severity. <b>equals</b> - equal to trigger severity <b>does not equal</b> - not equal to trigger severity <b>is greater than or equals</b> - more or equal to trigger severity <b>is less than or equals</b> - less or equal to trigger severity
Time period	in not in	Specify a time period or a time period to exclude. <b>in</b> - event time is within the time period. <b>not in</b> - event time is not within the time period. See the <a href="#">time period specification</a> page for description of the format. <b>User macros</b> are supported, since Zabbix 3.4.0.
Problem is suppressed	no yes	Specify if the problem is suppressed (not shown) because of host maintenance. <b>no</b> - problem is not suppressed. <b>yes</b> - problem is suppressed.

#### Discovery actions

The following conditions can be set for discovery-based events:

Condition type	Supported operators	Description
Host IP	equals does not equal	Specify an IP address range or a range to exclude for a discovered host. <b>equals</b> - host IP is in the range. <b>does not equal</b> - host IP is not in the range. It may have the following formats: Single IP: 192.168.1.33 Range of IP addresses: 192.168.1-10.1-254 IP mask: 192.168.4.0/24 List: 192.168.1.1-254, 192.168.2.1-100, 192.168.2.200, 192.168.4.0/24 Support for spaces in the list format is provided since Zabbix 3.0.0.

Condition type	Supported operators	Description
Service type	<p>equals</p> <p>does not equal</p>	<p>Specify a service type of a discovered service or a service type to exclude.</p> <p><b>equals</b> - matches the discovered service.</p> <p><b>does not equal</b> - does not match the discovered service.</p> <p>Available service types: SSH, LDAP, SMTP, FTP, HTTP, HTTPS (available since Zabbix 2.2 version), POP, NNTP, IMAP, TCP, Zabbix agent, SNMPv1 agent, SNMPv2 agent, SNMPv3 agent, ICMP ping, telnet (available since Zabbix 2.2 version).</p>
Service port	<p>equals</p> <p>does not equal</p>	<p>Specify a TCP port range of a discovered service or a range to exclude.</p> <p><b>equals</b> - service port is in the range.</p> <p><b>does not equal</b> - service port is not in the range.</p>
Discovery rule	<p>equals</p> <p>does not equal</p>	<p>Specify a discovery rule or a discovery rule to exclude.</p> <p><b>equals</b> - using this discovery rule.</p> <p><b>does not equal</b> - using any other discovery rule, except this one.</p>
Discovery check	<p>equals</p> <p>does not equal</p>	<p>Specify a discovery check or a discovery check to exclude.</p> <p><b>equals</b> - using this discovery check.</p> <p><b>does not equal</b> - using any other discovery check, except this one.</p>
Discovery object	<p>equals</p>	<p>Specify the discovered object.</p> <p><b>equals</b> - equal to discovered object (a device or a service).</p>
Discovery status	<p>equals</p>	<p><b>Up</b> - matches 'Host Up' and 'Service Up' events</p> <p><b>Down</b> - matches 'Host Down' and 'Service Down' events</p> <p><b>Discovered</b> - matches 'Host Discovered' and 'Service Discovered' events</p> <p><b>Lost</b> - matches 'Host Lost' and 'Service Lost' events</p>

Condition type	Supported operators	Description
Uptime/Downtime	is greater than or equals is less than or equals	Uptime for 'Host Up' and 'Service Up' events. Downtime for 'Host Down' and 'Service Down' events. <b>is greater than or equals</b> - is more or equal to. Parameter is given in seconds. <b>is less than or equals</b> - is less or equal to. Parameter is given in seconds.
Received value	equals does not equal is greater than or equals is less than or equals contains does not contain	Specify the value received from an agent (Zabbix, SNMP) check in a discovery rule. String comparison. If several Zabbix agent or SNMP checks are configured for a rule, received values for each of them are checked (each check generates a new event which is matched against all conditions). <b>equals</b> - equal to the value. <b>does not equal</b> - not equal to the value. <b>is greater than or equals</b> - more or equal to the value. <b>is less than or equals</b> - less or equal to the value. <b>contains</b> - contains the substring. Parameter is given as a string. <b>does not contain</b> - does not contain the substring. Parameter is given as a string.
Proxy	equals does not equal	Specify a proxy or a proxy to exclude. <b>equals</b> - using this proxy. <b>does not equal</b> - using any other proxy except this one.

**Note:**

Service checks in a discovery rule, which result in discovery events, do not take place simultaneously. Therefore, if **multiple** values are configured for `Service type`, `Service port` or `Received value` conditions in the action, they will be compared to one discovery event at a time, but **not** to several events simultaneously. As a result, actions with multiple values for the same check types may not be executed correctly.

Autoregistration actions

The following conditions can be set for actions based on active agent autoregistration:

Condition type	Supported operators	Description
Host metadata	contains does not contain matches does not match	Specify host metadata or host metadata to exclude. <b>contains</b> - host metadata contains the string. <b>does not contain</b> - host metadata does not contain the string. Host metadata can be specified in an <b>agent configuration file</b> . <b>matches</b> - host metadata matches regular expression. <b>does not match</b> - host metadata does not match regular expression.
Host name	contains does not contain matches does not match	Specify a host name or a host name to exclude. <b>contains</b> - host name contains the string. <b>does not contain</b> - host name does not contain the string. <b>matches</b> - host name matches regular expression. <b>does not match</b> - host name does not match regular expression.
Proxy	equals does not equal	Specify a proxy or a proxy to exclude. <b>equals</b> - using this proxy. <b>does not equal</b> - using any other proxy except this one.

#### Internal event actions

The following conditions can be set for actions based on internal events:

Condition type	Supported operators	Description
Application	equals contains does not contain	Specify an application or an application to exclude. <b>equals</b> - event belongs to an item that is linked to the specified application. <b>contains</b> - event belongs to an item that is linked to an application containing the string. <b>does not contain</b> - event belongs to an item that is linked to an application not containing the string.



Condition type	Supported operators	Description
Event type	equals	<p><b>Item in "not supported" state</b> - matches events where an item goes from a 'normal' to 'not supported' state</p> <p><b>Low-level discovery rule in "not supported" state</b> - matches events where a low-level discovery rule goes from a 'normal' to 'not supported' state</p> <p><b>Trigger in "unknown" state</b> - matches events where a trigger goes from a 'normal' to 'unknown' state</p>
Host group	equals does not equal	<p>Specify host groups or host groups to exclude.</p> <p><b>equals</b> - event belongs to this host group.</p> <p><b>does not equal</b> - event does not belong to this host group.</p>
Template	equals does not equal	<p>Specify templates or templates to exclude.</p> <p><b>equals</b> - event belongs to an item/trigger/low-level discovery rule inherited from this template.</p> <p><b>does not equal</b> - event does not belong to an item/trigger/low-level discovery rule inherited from this template.</p>
Host	equals does not equal	<p>Specify hosts or hosts to exclude.</p> <p><b>equals</b> - event belongs to this host.</p> <p><b>does not equal</b> - event does not belong to this host.</p>

#### Type of calculation

The following options of calculating conditions are available:

- **And** - all conditions must be met

Note that using "And" calculation is disallowed between several triggers when they are selected as a Trigger= condition. Actions can only be executed based on the event of one trigger.

- **Or** - enough if one condition is met
- **And/Or** - combination of the two: AND with different condition types and OR with the same condition type, for example:

Host group equals Oracle servers

Host group equals MySQL servers

Trigger name contains 'Database is down'

Trigger name contains 'Database is unavailable'

is evaluated as

**(Host group equals Oracle servers or Host group equals MySQL servers) and (Trigger name contains 'Database is down' or Trigger name contains 'Database is unavailable')**

- **Custom expression** - a user-defined calculation formula for evaluating action conditions. It must include all conditions (represented as uppercase letters A, B, C, ...) and may include spaces, tabs, brackets ( ), **and** (case sensitive), **or** (case sensitive), **not** (case sensitive).

While the previous example with `And/Or` would be represented as `(A or B) and (C or D)`, in a custom expression you may as well have multiple other ways of calculation:

`(A and B) and (C or D)`  
`(A and B) or (C and D)`  
`((A or B) and C) or D`  
`(not (A or B) and C) or not D`  
etc.

Actions disabled due to deleted objects

If a certain object (host, template, trigger, etc) used in an action condition/operation is deleted, the condition/operation is removed and the action is disabled to avoid incorrect execution of the action. The action can be re-enabled by the user.

This behavior takes place when deleting:

- host groups ("host group" condition, "remote command" operation on a specific host group);
- hosts ("host" condition, "remote command" operation on a specific host);
- templates ("template" condition, "link to template" and "unlink from template" operations);
- triggers ("trigger" condition);
- discovery rules (when using "discovery rule" and "discovery check" conditions).

Note: If a remote command has many target hosts, and we delete one of them, only this host will be removed from the target list, the operation itself will remain. But, if it's the only host, the operation will be removed, too. The same goes for "link to template" and "unlink from template" operations.

Actions are not disabled when deleting a user or user group used in a "send message" operation.

## 2 Operations

Overview

You can define the following operations for all events:

- send a message
- execute a remote command (including IPMI)

### Attention:

Zabbix server does not create alerts if access to the host is explicitly "denied" for the user defined as action operation recipient or if the user has no rights defined to the host at all.

For discovery and autoregistration events, there are additional operations available:

- **add host**
- remove host
- enable host
- disable host
- add to host group
- remove from host group
- link to template
- unlink from template
- set host inventory mode

Configuring an operation

To configure an operation, go to the Operations tab in **action** configuration.

[Action](#) **Operations 2**

\* Default operation step duration

Pause operations for suppressed problems

Operations [Steps](#) [Details](#)

1 **Send message to user groups: Zabbix administrators vi**  
[Add](#)

---

Recovery operations [Details](#) [Action](#)

**Notify all involved** [Edit](#)

[Add](#)

---

Update operations [Details](#) [Action](#)

[Add](#)

General operation attributes:

Parameter	Description
Default operation step duration	Duration of one operation step by default (60 seconds to 1 week). For example, an hour-long step duration means that if an operation is carried out, an hour will pass before the next step. <b>Time suffixes</b> are supported, e.g. 60s, 1m, 2h, 1d, since Zabbix 3.4.0.
Pause operations for suppressed problems	<b>User macros</b> are supported, since Zabbix 3.4.0. Mark this checkbox to delay the start of operations for the duration of a maintenance period. When operations are started, after the maintenance, all operations are performed including those for the events during the maintenance. Note that this setting affects only problem escalations; recovery and update operations will not be affected. If you unmark this checkbox, operations will be executed without delay even during a maintenance period. This option is supported since Zabbix 3.2.0.

Parameter	Description
Operations	<p>Action operations (if any) are displayed, with these details:</p> <p><b>Steps</b> - escalation step(s) to which the operation is assigned</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the alias) of a notification recipient.</p> <p><b>Start in</b> - how long after an event the operation is performed</p> <p><b>Duration (sec)</b> - step duration is displayed. Default is displayed if the step uses default duration, and a time is displayed if custom duration is used.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p>
Recovery operations	<p>Action operations (if any) are displayed, with these details:</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the alias) of a notification recipient.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p>
Update operations	<p>Action operations (if any) are displayed, with these details:</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the alias) of a notification recipient.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p>

All mandatory input fields are marked with a red asterisk.

To configure details of a new operation, click on [Add](#) in the Operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

Operation details

### Operation details ✕

Operation type

Steps  -  (0 - infinitely)

Step duration  (0 - use action default)

**\* At least one user or user group must be selected.**

Send to user groups

User group	Action
Zabbix administrators	<a href="#">Remove</a>
<a href="#">Add</a>	

Send to users

User	Action
<a href="#">Add</a>	

Send only to

Custom message

Conditions

Label	Name	Action
A	Event is not acknowledged	<a href="#">Remove</a>
<a href="#">Add</a>		

Parameter	Description
Operation type	Two operation types are available for all events: <b>Send message</b> - send message to user <b>Remote command</b> - execute a remote command More operations are available for discovery and autoregistration based events (see above).
Steps	Select the step(s) to assign the operation to in an <b>escalation</b> schedule: <b>From</b> - execute starting with this step <b>To</b> - execute until this step (0=infinity, execution will not be limited)
Step duration	Custom duration for these steps (0=use default step duration). <b>Time suffixes</b> are supported, e.g. 60s, 1m, 2h, 1d, since Zabbix 3.4.0. <b>User macros</b> are supported, since Zabbix 3.4.0. Several operations can be assigned to the same step. If these operations have different step duration defined, the shortest one is taken into account and applied to the step.

Parameter	Description
Operation type: <b>send message</b>	
Send to user groups	Click on Add to select user groups to send the message to. The user group must have at least "read" <b>permissions</b> to the host in order to be notified.
Send to users	Click on Add to select users to send the message to. The user must have at least "read" <b>permissions</b> to the host in order to be notified.
Send only to	Send message to all defined media types or a selected one only.
Custom message	If selected, the custom message can be configured. For notifications about internal events via <b>webhooks</b> , custom message is mandatory.
Subject	Subject of the custom message. The subject may contain macros. It is limited to 255 characters.
Message	The custom message. The message may contain macros. It is limited to certain amount of characters depending on the type of database (see <b>Sending message</b> for more information).
Operation type: <b>re-mote command</b>	
Target list	Select targets to execute the command on: <b>Current host</b> - command is executed on the host of the trigger that caused the problem event. This option will not work if there are multiple hosts in the trigger. <b>Host</b> - select host(s) to execute the command on. <b>Host group</b> - select host group(s) to execute the command on. Specifying a parent host group implicitly selects all nested host groups. Thus the remote command will also be executed on hosts from nested groups. A command on a host is executed only once, even if the host matches more than once (e.g. from several host groups; individually and from a host group). The target list is meaningless if a custom script is executed on Zabbix server. Selecting more targets in this case only results in the script being executed on the server more times. Note that for global scripts, the target selection also depends on the Host group setting in global script <b>configuration</b> .
Type	Select the command type: <b>IPMI</b> - execute an <b>IPMI command</b> <b>Custom script</b> - execute a custom set of commands <b>SSH</b> - execute an SSH command <b>Telnet</b> - execute a Telnet command <b>Global script</b> - execute one of the global scripts defined in Administration→Scripts.

Parameter		Description
	Execute on	Execute a custom script on: <b>Zabbix agent</b> - the script will be executed by Zabbix agent on the host <b>Zabbix server (proxy)</b> - the script will be executed by Zabbix server or proxy - depending on whether the host is monitored by server or proxy <b>Zabbix server</b> - the script will be executed by Zabbix server only To execute scripts on the agent, system.run items must be <b>allowed</b> . To execute scripts on proxy, it must be <b>configured</b> (EnableRemoteCommands parameter enabled) to allow remote commands from the server. This field is available if 'Custom script' is selected as Type.
	Commands	Enter the command(s). Supported macros will be resolved based on the trigger expression that caused the event. For example, host macros will resolve to the hosts of the trigger expression (and not of the target list).
Conditions		Condition for performing the operation: <b>Not ack</b> - only when the event is unacknowledged <b>Ack</b> - only when the event is acknowledged.

When done, click on Add to add operation to the list of Operations.

## 1 Sending message

### Overview

Sending a message is one of the best ways of notifying people about a problem. That is why it is one of the primary actions offered by Zabbix.

### Configuration

To be able to send and receive notifications from Zabbix you have to:

- **define the media** to send a message to

#### Warning:

The default trigger severity ('Not classified') **must be** checked in user media **configuration** if you want to receive notifications for non-trigger events such as discovery, active agent autoregistration or internal events.

- **configure an action operation** that sends a message to one of the defined media

#### Attention:

Zabbix sends notifications only to those users that have at least 'read' permissions to the host that generated the event. At least one host of a trigger expression must be accessible.

You can configure custom scenarios for sending messages using **escalations**.

To successfully receive and read e-mails from Zabbix, e-mail servers/clients must support standard 'SMTP/MIME e-mail' format since Zabbix sends UTF-8 data (If the subject contains ASCII characters only, it is not UTF-8 encoded.). The subject and the body of the message are base64-encoded to follow 'SMTP/MIME e-mail' format standard.

Message limit after all macros expansion is the same as message limit for **Remote commands**.

### Tracking messages

You can view the status of messages sent in Monitoring → Problems.

In the Actions column you can see summarized information about actions taken. In there green numbers represent messages sent, red ones - failed messages. In progress indicates that an action is initiated. Failed informs that no action has executed successfully.

If you click on the event time to view event details, you will also see the Message actions block containing details of messages sent (or not sent) due to the event.

In Reports → Action log you will see details of all actions taken for those events that have an action configured.

## 2 Remote commands

### Overview

With remote commands you can define that a certain pre-defined command is automatically executed on the monitored host upon some condition.

Thus remote commands are a powerful mechanism for smart pro-active monitoring.

In the most obvious uses of the feature you can try to:

- Automatically restart some application (web server, middleware, CRM) if it does not respond
- Use IPMI 'reboot' command to reboot some remote server if it does not answer requests
- Automatically free disk space (removing older files, cleaning /tmp) if running out of disk space
- Migrate a VM from one physical box to another depending on the CPU load
- Add new nodes to a cloud environment upon insufficient CPU (disk, memory, whatever) resources

Configuring an action for remote commands is similar to that for sending a message, the only difference being that Zabbix will execute a command instead of sending a message.

Remote commands can be executed by Zabbix server, proxy or agent. Remote commands on Zabbix agent can be executed directly by Zabbix server or through Zabbix proxy. Both on Zabbix agent and Zabbix proxy remote commands are disabled by default. They can be enabled by:

- adding an `AllowKey=system.run[*]` parameter in agent configuration;
- setting the `EnableRemoteCommands` parameter to '1' in proxy configuration.

Remote commands executed by Zabbix server are run as described in [Command execution](#) including exit code checking.

Remote commands are executed even if the target host is in maintenance.

### Remote command limit

Remote command limit after resolving all macros depends on the type of database and character set (non-ASCII characters require more than one byte to be stored):

Database	//Limit in characters //	//Limit in bytes //
<b>MySQL</b>	65535	65535
<b>Oracle Database</b>	2048	4000
<b>PostgreSQL</b>	65535	not limited
<b>SQLite (only Zabbix proxy)</b>	65535	not limited

The following tutorial provides step-by-step instructions on how to set up remote commands.

### Configuration

Those remote commands that are executed on Zabbix agent (custom scripts) must be first enabled in the agent [configuration](#).

Make sure that the `AllowKey=system.run[*]` parameter is added. Restart agent daemon if changing this parameter.

#### **Attention:**

Remote commands do not work with active Zabbix agents.

Then, when configuring a new action in Configuration → Actions:

- Define the appropriate conditions. In this example, set that the action is activated upon any disaster problems with one of Apache applications:



Action
Operations

\* Name

Type of calculation And A and B and C

Conditions	Label	Name
	A	Problem is not suppressed
	B	Application contains <i>Apache</i>
	C	Trigger severity is greater than or equals <i>Disaster</i>
<a href="#" style="color: #007bff; text-decoration: none;">Add</a>		

Enabled

All mandatory input fields are marked with a red asterisk.

- In the **Operations** tab, select the **Remote command** operation type
- Select the remote command type (IPMI, Custom script, SSH, Telnet, Global script)
- If Custom script type is selected choose the way how custom script will be executed (by Zabbix agent, Zabbix server (proxy) or Zabbix server only)
- Enter the remote command

For example:

```
sudo /etc/init.d/apache restart
```

In this case, Zabbix will try to restart an Apache process. With this command, make sure that the command is executed on Zabbix agent (click the Zabbix agent button against Execute on).

**Attention:**

Note the use of **sudo** - Zabbix user does not have permissions to restart system services by default. See below for hints on how to configure **sudo**.

**Note:**

Zabbix agent should run on the remote host and accept incoming connections. Zabbix agent executes commands in background.

Remote commands on Zabbix agent are executed without timeout by the `system.run[,nowait]` key and are not checked for execution results. On Zabbix server and Zabbix proxy, remote commands are executed with timeout as set in the `TrapperTimeout` parameter of `zabbix_server.conf` or `zabbix_proxy.conf` file and are **checked** for execution results.

Access permissions

Make sure that the 'zabbix' user has execute permissions for configured commands. One may be interested in using **sudo** to give access to privileged commands. To configure access, execute as root:

```
# visudo
```

Example lines that could be used in sudoers file:

```
# allows 'zabbix' user to run all commands without password.
zabbix ALL=NOPASSWD: ALL
```

```
# allows 'zabbix' user to restart apache without password.
zabbix ALL=NOPASSWD: /etc/init.d/apache restart
```

**Note:**

On some systems sudoers file will prevent non-local users from executing commands. To change this, comment out **requiretty** option in /etc/sudoers.

### Remote commands with multiple interfaces

If the target system has multiple interfaces of the selected type (Zabbix agent or IPMI), remote commands will be executed on the default interface.

It is possible to execute remote commands via SSH and Telnet using another interface than the Zabbix agent one. The available interface to use is selected in the following order:

- \* Zabbix agent default interface
- \* SNMP default interface
- \* JMX default interface
- \* IPMI default interface

### IPMI remote commands

For IPMI remote commands the following syntax should be used:

<command> [<value>]

where

- <command> - one of IPMI commands without spaces
- <value> - 'on', 'off' or any unsigned integer. <value> is an optional parameter.

### Examples

#### Example 1

Restart of Windows on certain condition.

In order to automatically restart Windows upon a problem detected by Zabbix, define the following actions:

PARAMETER	Description
Operation type	'Remote command'
Type	'Custom script'
Command	c:\windows\system32\shutdown.exe -r -f

#### Example 2

Restart the host by using IPMI control.

PARAMETER	Description
Operation type	'Remote command'
Type	'IPMI'
Command	reset

#### Example 3

Power off the host by using IPMI control.

PARAMETER	Description
Operation type	'Remote command'
Type	'IPMI'
Command	power off

## 3 Additional operations

### Overview

In this section you may find some details of **additional operations** for discovery/autoregistration events.

## Adding host

Hosts are added during the discovery process, as soon as a host is discovered, rather than at the end of the discovery process.

### Note:

As network discovery can take some time due to many unavailable hosts/services having patience and using reasonable IP ranges is advisable.

When adding a host, its name is decided by the standard **gethostbyname** function. If the host can be resolved, resolved name is used. If not, the IP address is used. Besides, if IPv6 address must be used for a host name, then all ":" (colons) are replaced by "\_" (underscores), since colons are not allowed in host names.

### Attention:

If performing discovery by a proxy, currently hostname lookup still takes place on Zabbix server.

### Attention:

If a host already exists in Zabbix configuration with the same name as a newly discovered one, versions of Zabbix prior to 1.8 would add another host with the same name. Zabbix 1.8.1 and later adds **\_N** to the hostname, where **N** is increasing number, starting with 2.

## 4 Using macros in messages

### Overview

In message subjects and message text you can use macros for more efficient problem reporting.

A [full list of macros](#) supported by Zabbix is available.

### Examples

Examples here illustrate how you can use macros in messages.

#### Example 1

Message subject:

```
Problem: {TRIGGER.NAME}
```

When you receive the message, the message subject will be replaced by something like:

```
Problem: Processor load is too high on Zabbix server
```

#### Example 2

Message:

```
Processor load is: {zabbix.zabbix.com:system.cpu.load[,avg1].last()}
```

When you receive the message, the message will be replaced by something like:

```
Processor load is: 1.45
```

#### Example 3

Message:

```
Latest value: {{HOST.HOST}}:{{ITEM.KEY}}.last()
MAX for 15 minutes: {{HOST.HOST}}:{{ITEM.KEY}}.max(900)
MIN for 15 minutes: {{HOST.HOST}}:{{ITEM.KEY}}.min(900)}
```

When you receive the message, the message will be replaced by something like:

```
Latest value: 1.45
MAX for 15 minutes: 2.33
MIN for 15 minutes: 1.01
```

#### Example 4

Message:

```
http://<server_ip_or_name>/zabbix/tr_events.php?triggerid={TRIGGER.ID}&eventid={EVENT.ID}
```

When you receive the message, it will contain a link to the Event details page, which provides information about the event, its trigger, and a list of latest events generated by the same trigger.

#### Example 5

Informing about values from several hosts in a trigger expression.

Message:

Problem name: {TRIGGER.NAME}

Trigger expression: {TRIGGER.EXPRESSION}

1. Item value on {HOST.NAME1}: {ITEM.VALUE1} ({ITEM.NAME1})
2. Item value on {HOST.NAME2}: {ITEM.VALUE2} ({ITEM.NAME2})

When you receive the message, the message will be replaced by something like:

Problem name: Processor load is too high on a local host

Trigger expression: {Myhost:system.cpu.load[percpu,avg1].last()}>5 or {Myotherhost:system.cpu.load[percpu,

1. Item value on Myhost: 0.83 (Processor load (1 min average per core))
2. Item value on Myotherhost: 5.125 (Processor load (1 min average per core))

#### Example 6

Receiving details of both the problem event and recovery event in a **recovery** message:

Message:

Problem:

Event ID: {EVENT.ID}

Event value: {EVENT.VALUE}

Event status: {EVENT.STATUS}

Event time: {EVENT.TIME}

Event date: {EVENT.DATE}

Event age: {EVENT.AGE}

Event acknowledgment: {EVENT.ACK.STATUS}

Event update history: {EVENT.UPDATE.HISTORY}

Recovery:

Event ID: {EVENT.RECOVERY.ID}

Event value: {EVENT.RECOVERY.VALUE}

Event status: {EVENT.RECOVERY.STATUS}

Event time: {EVENT.RECOVERY.TIME}

Event date: {EVENT.RECOVERY.DATE}

Operational data: {EVENT.OPDATA}

When you receive the message, the macros will be replaced by something like:

Problem:

Event ID: 21874

Event value: 1

Event status: PROBLEM

Event time: 13:04:30

Event date: 2018.01.02

Event age: 5m

Event acknowledgment: Yes

Event update history: 2018.01.02 13:05:51 "John Smith (Admin)"

Actions: acknowledged.

Recovery:

Event ID: 21896

Event value: 0

Event status: OK

Event time: 13:10:07

Event date: 2018.01.02

Operational data: Current value is 0.83

**Attention:**

Separate notification macros for the original problem event and recovery event are supported since Zabbix 2.2.0.

### 3 Recovery operations

#### Overview

Recovery operations allow you to be notified when problems are resolved.

Both messages and remote commands are supported in recovery operations. While several operations can be added, escalation is not supported - all operations are assigned to a single step and therefore will be performed simultaneously.

#### Use cases

Some use cases for recovery operations are as follows:

1. Notify all users that were notified on the problem
  - \* Select 'Send recovery message' as operation type
- Have multiple operations upon recovery: send a notification and execute a remote command
  - \* Add operation types for sending a message and executing a command
- Open a ticket in external helpdesk/ticketing system and close it when the problem is resolved
  - \* Create an external script that communicates with the helpdesk system
  - \* Create an action having operation that executes this script and thus opens a ticket
  - \* Have a recovery operation that executes this script with other parameters and closes the ticket
  - \* Use the {EVENT.ID} macro to reference the original problem

#### Configuring a recovery operation

To configure a recovery operation, go to the Operations tab in **action** configuration.

The screenshot shows the 'Operations 2' tab in the Zabbix Action configuration interface. At the top, there are two tabs: 'Action' and 'Operations 2'. Below the tabs, there are several configuration options:

- '\* Default operation step duration' is set to '1h' in a text input field.
- 'Pause operations for suppressed problems' is checked with a blue checkmark in a checkbox.
- There are three main sections for operations:
  - Operations**: Contains one step with the title '1 Send message to user groups: Zabbix administrators vi'. Below the step title is an 'Add' link.
  - Recovery operations**: Contains one operation with the title 'Notify all involved'. To the right of the title are links for 'Details' and 'Action'. Below the title is an 'Edit' link and an 'Add' link.
  - Update operations**: Contains one operation with the title 'Update operations'. To the right of the title is an 'Action' link. Below the title is an 'Add' link.

At the bottom of the configuration area, there is a note: '\* At least one operation must exist.'

To configure details of a new recovery operation, click on [Add](#) in the Recovery operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

### Operation details ✕

Operation type Send message ▼

\* At least one user or user group must be selected.

Send to user groups

User group	Action
Zabbix administrators	<a href="#">Remove</a>
<a href="#">Add</a>	

Send to users

User	Action
<a href="#">Add</a>	

Send only to Email ▼

Custom message

Add
Cancel

Parameter	Description
<p>Operation type</p> <p style="margin-left: 20px;">Operation type:</p> <p style="margin-left: 20px; color: red; font-weight: bold;">send message</p> <p style="margin-left: 20px;">Send to user groups</p> <p style="margin-left: 20px;">Send to users</p> <p style="margin-left: 20px;">Send only to</p> <p style="margin-left: 20px;">Custom message</p> <p style="margin-left: 20px;">Subject</p>	<p>Three operation types are available for recovery events:</p> <p><b>Send message</b> - send recovery message to specified user</p> <p><b>Remote command</b> - execute a remote command</p> <p><b>Notify all involved</b> - send recovery message to all users who were notified on the problem event</p> <p>Note that if the same recipient is defined in several operation types without specified Custom message, duplicate notifications are not sent.</p> <p>Click on Add to select user groups to send the recovery message to.</p> <p>The user group must have at least "read" <b>permissions</b> to the host in order to be notified.</p> <p>Click on Add to select users to send the recovery message to.</p> <p>The user must have at least "read" <b>permissions</b> to the host in order to be notified.</p> <p>Send default recovery message to all defined media types or a selected one only.</p> <p>If selected, a custom message can be defined.</p> <p>Subject of the custom message. The subject may contain macros.</p>

Parameter	Description
Message	The custom message. The message may contain macros.
Operation type: re- mote com- mand	
Target list	<p>Select targets to execute the command on:</p> <p><b>Current host</b> - command is executed on the host of the trigger that caused the problem event. This option will not work if there are multiple hosts in the trigger.</p> <p><b>Host</b> - select host(s) to execute the command on.</p> <p><b>Host group</b> - select host group(s) to execute the command on. Specifying a parent host group implicitly selects all nested host groups. Thus the remote command will also be executed on hosts from nested groups.</p> <p>A command on a host is executed only once, even if the host matches more than once (e.g. from several host groups; individually and from a host group). The target list is meaningless if the command is executed on Zabbix server. Selecting more targets in this case only results in the command being executed on the server more times.</p> <p>Note that for global scripts, the target selection also depends on the Host group setting in global script <a href="#">configuration</a>.</p>
Type	<p>Select the command type:</p> <p><b>IPMI</b> - execute an <a href="#">IPMI command</a></p> <p><b>Custom script</b> - execute a custom set of commands</p> <p><b>SSH</b> - execute an SSH command</p> <p><b>Telnet</b> - execute a Telnet command</p> <p><b>Global script</b> - execute one of the global scripts defined in Administration→Scripts.</p>
Execute on	<p>Execute a custom script on:</p> <p><b>Zabbix agent</b> - the script will be executed by Zabbix agent on the host</p> <p><b>Zabbix server (proxy)</b> - the script will be executed by Zabbix server or proxy - depending on whether the host is monitored by server or proxy</p> <p><b>Zabbix server</b> - the script will be executed by Zabbix server only</p> <p>To execute scripts on the agent, it must be <a href="#">configured</a> to allow remote commands from the server.</p> <p>This field is available if 'Custom script' is selected as Type.</p>
Commands	<p>Enter the command(s).</p> <p>Supported macros will be resolved based on the trigger expression that caused the event. For example, host macros will resolve to the hosts of the trigger expression (and not of the target list).</p>
Operation type: no- tify all in- volved	

Parameter	Description
Custom message Subject	If selected, a custom message can be defined.
Message	Subject of the custom message. The subject may contain macros.
	The custom message. The message may contain macros.

All mandatory input fields are marked with a red asterisk. When done, click on Add to add operation to the list of Recovery operations.

#### 4 Update operations

##### Overview

Update operations allow you to be notified when problems are **updated** by other users, i.e.:

- commented upon
- acknowledged
- severity changed
- closed (manually)

Update operations are available in actions with the event source as Triggers.

Both messages and remote commands are supported in update operations. While several operations can be added, escalation is not supported - all operations are assigned to a single step and therefore will be performed simultaneously.

##### Configuring an update operation

To configure an update operation go to the Operations tab in action **configuration**.

The screenshot shows the configuration interface for 'Operations 2'. At the top, there are two tabs: 'Action' and 'Operations 2'. Below the tabs, there is a form with the following elements:

- A field for '\* Default operation step duration' with a value of '1h'.
- A checkbox for 'Pause operations for suppressed problems' which is checked.
- Three sections for configuring operations:
  - Operations:** A table with columns 'Steps', 'Details', 'Start in', and 'Duration'. There is an 'Add' link below the table.
  - Recovery operations:** A table with columns 'Details' and 'Action'. There is an 'Add' link below the table.
  - Update operations:** A table with a 'Details' column. The details are expanded to show:
    - Notify all involved**
    - Send message to user groups: Zabbix administrators via SMS**
    - An 'Add' link below the details.

To configure details of a new update operation, click on [Add](#) in the Update operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

##### Update operation details



## Operation details



Operation type

\* At least one user or user group must be selected.

Send to user groups	User group	Action
	Zabbix administrators	<a href="#">Remove</a>
	<a href="#">Add</a>	

Send to users	User	Action
	<a href="#">Add</a>	

Send only to

Custom message

Add

Cancel

---

Operation type

Three operation types are available for update operations:

**Send message** - send update message to specified user when event is updated, for example, acknowledged

**Remote command** - execute a remote command when event is updated, for example, acknowledged

**Notify all involved** - send notification message to all users who received notification about the problem appearing and/or have updated the problem event. If the same recipient with unchanged default subject/message is defined in several operation types, duplicate notifications are not sent.

The person who updates a problem does not receive notification about their own update.

Operation type: **send message**

Send to user groups

Click on Add to select user groups to send the update message to.

The user group must have at least "read" **permissions** to the host in order to be notified.

Send to users

Click on Add to select users to send the update message to.

The user must have at least "read" **permissions** to the host in order to be notified.

Send only to

Send update message to all defined media types or a selected one only.

---

Custom message

Subject

Message

Operation type:  
remote command

If selected, the custom message can be defined.

Subject of the custom message. The subject may contain macros.

The custom message. The message may contain macros.

Select targets to execute the command on:

**Current host** - command is executed on the host of the trigger that caused the problem event. This option will not work if there are multiple hosts in the trigger.

**Host** - select host(s) to execute the command on.

**Host group** - select host group(s) to execute the command on. Specifying a parent host group implicitly selects all nested host groups. Thus the remote command will also be executed on hosts from nested groups.

A command on a host is executed only once, even if the host matches more than once (e.g. from several host groups; individually and from a host group).

The target list is meaningless if the command is executed on Zabbix server. Selecting more targets in this case only results in the command being executed on the server more times. Note that for global scripts, the target selection also depends on the Host group setting in global script [configuration](#).

---

Type

Select the command type:

**IPMI** - execute an **IPMI command**

**Custom script** - execute a custom set of commands

**SSH** - execute an SSH command

**Telnet** - execute a Telnet command

**Global script** - execute one of the global scripts defined in Administration→Scripts.

Execute on

Execute a custom script on:

**Zabbix agent** - the script will be executed by Zabbix agent on the host

**Zabbix server (proxy)** - the script will be executed by Zabbix server or proxy - depending on whether the host is monitored by server or proxy

**Zabbix server** - the script will be executed by Zabbix server only

To execute scripts on the agent, it must be **configured** to allow remote commands from the server.

This field is available if 'Custom script' is selected as Type.

Commands

Enter the command(s).

Supported macros will be resolved based on the trigger expression that caused the event. For example, host macros will resolve to the hosts of the trigger expression (and not of the target list).

Operation type:  
notify all involved

Default media type	Users who update a problem but have not received notifications about the problem appearing will receive notifications about further updates on the selected default media type - Email or SMS. This field is available since Zabbix 3.4.2.
Custom message	If selected, the custom message can be defined.
Subject	Subject of the custom message. The subject may contain macros.
Message	The custom message. The message may contain macros.

All mandatory input fields are marked with a red asterisk. When done, click on Add to add operation to the list of Update operations.

## 5 Escalations

### Overview

With escalations you can create custom scenarios for sending notifications or executing remote commands.

In practical terms it means that:

- Users can be informed about new problems immediately
- Notifications can be repeated until the problem is resolved
- Sending a notification can be delayed
- Notifications can be escalated to another "higher" user group
- Remote commands can be executed immediately or when a problem is not resolved for a lengthy period

Actions are escalated based on the **escalation step**. Each step has a duration in time.

You can define both the default duration and a custom duration of an individual step. The minimum duration of one escalation step is 60 seconds.

You can start actions, such as sending notifications or executing commands, from any step. Step one is for immediate actions. If you want to delay an action, you can assign it to a later step. For each step, several actions can be defined.

The number of escalation steps is not limited.

Escalations are defined when **configuring an operation**. Escalations are supported for problem operations only, not recovery.

Miscellaneous aspects of escalation behavior

Let's consider what happens in different circumstances if an action contains several escalation steps.

Situation	Behavior
The host in question goes into maintenance after the initial problem notification is sent	Depending on the Pause operations for suppressed problems setting in action <b>configuration</b> , all remaining escalation steps are executed either with a delay caused by the maintenance period or without delay. A maintenance period does not cancel operations.
The time period defined in the <b>Time period</b> action condition ends after the initial notification is sent	All remaining escalation steps are executed. The Time period condition cannot stop operations; it has effect with regard to when actions are started/not started, not operations.

Situation	Behavior
A problem starts during maintenance and continues (is not resolved) after maintenance ends	Depending on the Pause operations for suppressed problems setting in action <b>configuration</b> , all escalation steps are executed either from the moment maintenance ends or immediately.
A problem starts during a no-data maintenance and continues (is not resolved) after maintenance ends Different escalations follow in close succession and overlap	It must wait for the trigger to fire, before all escalation steps are executed. The execution of each new escalation supersedes the previous escalation, but for at least one escalation step that is always executed on the previous escalation. This behavior is relevant in actions upon events that are created with EVERY problem evaluation of the trigger.
During an escalation in progress (like a message being sent), based on any type of event: - the action is disabled - Based on trigger event: - the trigger is disabled - the host or item is disabled - Based on internal event about triggers: - the trigger is disabled - Based on internal event about items/low-level discovery rules: - the item is disabled - the host is disabled	The message in progress is sent and then one more message on the escalation is sent. The follow-up message will have the cancellation text at the beginning of the message body (NOTE: Escalation canceled) naming the reason (for example, NOTE: Escalation canceled: action '<Action name>' disabled). This way the recipient is informed that the escalation is canceled and no more steps will be executed. This message is sent to all who received the notifications before. The reason of cancellation is also logged to the server log file (starting from <b>Debug Level 3=Warning</b> ).
During an escalation in progress (like a message being sent) the action is deleted	Note that the Escalation canceled message is also sent if operations are finished, but recovery operations are configured and are not executed yet. No more messages are sent. The information is logged to the server log file (starting from <b>Debug Level 3=Warning</b> ), for example: <code>escalation canceled: action id:334 deleted</code>

## Escalation examples

### Example 1

Sending a repeated notification once every 30 minutes (5 times in total) to a 'MySQL Administrators' group. To configure:

- in Operations tab, set the Default operation step duration to '30m' (30 minutes)
- Set the escalation steps to be From '1' To '5'
- Select the 'MySQL Administrators' group as recipients of the message

The screenshot shows the configuration for an escalation action in Zabbix. The 'Operations' tab is selected. The 'Default operation step duration' is set to '30m'. The 'Pause operations for suppressed problems' checkbox is checked. Below, a table shows the escalation steps: 1-5 'Send message to user groups: MySQL Administrators via Email' with 'Immediately' start and 'Default' duration. An 'Add' button is visible below the table.

Notifications will be sent at 0:00, 0:30, 1:00, 1:30, 2:00 hours after the problem starts (unless, of course, the problem is resolved sooner).

If the problem is resolved and a recovery message is configured, it will be sent to those who received at least one problem message within this escalation scenario.

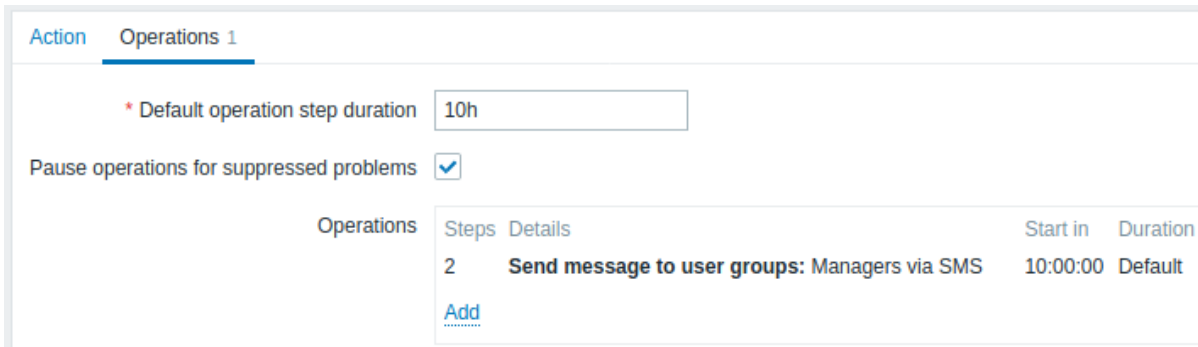
#### Note:

If the trigger that generated an active escalation is disabled, Zabbix sends an informative message about it to all those that have already received notifications.

### Example 2

Sending a delayed notification about a long-standing problem. To configure:

- In Operations tab, set the Default operation step duration to '10h' (10 hours)
- Set the escalation steps to be From '2' To '2'



The screenshot shows the configuration for 'Operations 1'. It includes a text input for 'Default operation step duration' set to '10h', a checked checkbox for 'Pause operations for suppressed problems', and a table of operations.

Steps	Details	Start in	Duration
2	Send message to user groups: Managers via SMS	10:00:00	Default

An 'Add' link is visible below the table.

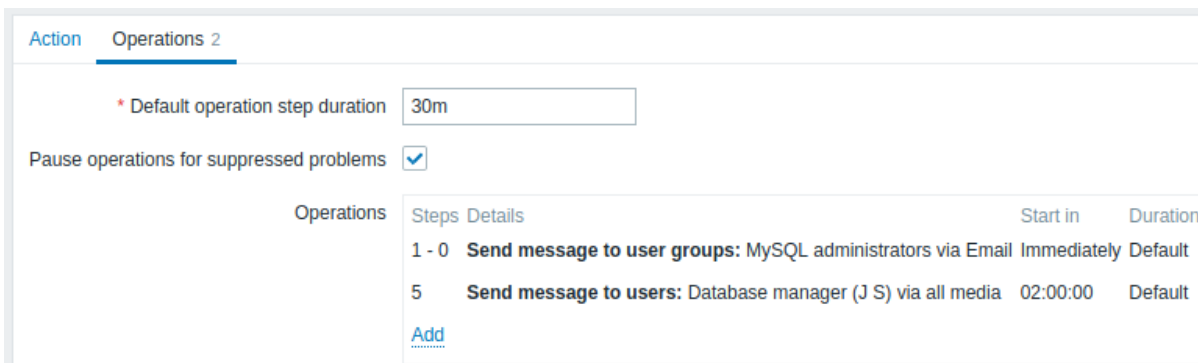
A notification will only be sent at Step 2 of the escalation scenario, or 10 hours after the problem starts.

You can customize the message text to something like 'The problem is more than 10 hours old'.

### Example 3

Escalating the problem to the Boss.

In the first example above we configured periodical sending of messages to MySQL administrators. In this case, the administrators will get four messages before the problem will be escalated to the Database manager. Note that the manager will get a message only in case the problem is not acknowledged yet, supposedly no one is working on it.



The screenshot shows the configuration for 'Operations 2'. It includes a text input for 'Default operation step duration' set to '30m', a checked checkbox for 'Pause operations for suppressed problems', and a table of operations.

Steps	Details	Start in	Duration
1 - 0	Send message to user groups: MySQL administrators via Email	Immediately	Default
5	Send message to users: Database manager (J S) via all media	02:00:00	Default

An 'Add' link is visible below the table.

Details of Operation 2:



### Operation details ✕

Operation type: Send message ▾

Steps: 5 - 5 (0 - infinitely)

Step duration: 0 (0 - use action default)

**\* At least one user or user group must be selected.**

**Send to user groups**

User group	Action
<a href="#">Add</a> .....	

**Send to users**

User	Action
Database manager	<a href="#">Remove</a> .....
<a href="#">Add</a> .....	

Send only to: - All - ▾

Custom message:

Subject: Unacknowledged problem: {EVENT.NAME}

Message: 
 Problem started at {EVENT.TIME} on {EVENT.DATE}  
 Problem name: {EVENT.NAME}  
 Host: {HOST.NAME}  
 Severity: {EVENT.SEVERITY}  
  
 Original problem ID: {EVENT.ID}  
 {TRIGGER.URL}  
 {ESC.HISTORY}

**Conditions**

Label	Name	Action
A	Event is not acknowledged	<a href="#">Remove</a> .....
<a href="#">Add</a> .....		

Update
Cancel

Note the use of {ESC.HISTORY} macro in the customized message. The macro will contain information about all previously executed steps on this escalation, such as notifications sent and commands executed.

**Example 4**

A more complex scenario. After multiple messages to MySQL administrators and escalation to the manager, Zabbix will try to restart the MySQL database. It will happen if the problem exists for 2:30 hours and it hasn't been acknowledged.

If the problem still exists, after another 30 minutes Zabbix will send a message to all guest users.

If this does not help, after another hour Zabbix will reboot server with the MySQL database (second remote command) using IPMI commands.

Action **Operations 5**

\* Default operation step duration

Pause operations for suppressed problems

Operations	Steps	Details	Start in	Duration
	1 - 0	Send message to user groups: MySQL Administrators via Email	Immediately	Default
	5	Send message to users: Database Manager (J S) via all media	02:00:00	Default
	6	Run remote commands on current host	02:30:00	Default
	7	Send message to user groups: Guests via all media	03:00:00	Default
	9	Run remote commands on current host	04:00:00	Default

[Add](#)

### Example 5

An escalation with several operations assigned to one step and custom intervals used. The default operation step duration is 30 minutes.

Action **Operations 4**

\* Default operation step duration

Pause operations for suppressed problems

Operations	Steps	Details	Start in	Duration
	1 - 4	Send message to user groups: MySQL Administrators via Email	Immediately	Default
	5 - 6	Send message to users: Database Manager (J S) via all media	02:00:00	1h
	5 - 7	Send message to user groups: Zabbix administrators via Email	02:00:00	10m
	11	Send message to user groups: Guests via Email	04:00:00	Default

[Add](#)

Notifications will be sent as follows:

- to MySQL administrators at 0:00, 0:30, 1:00, 1:30 after the problem starts
- to Database manager at 2:00 and 2:10 (and not at 3:00; seeing that steps 5 and 6 overlap with the next operation, the shorter custom step duration of 10 minutes in the next operation overrides the longer step duration of 1 hour tried to set here)
- to Zabbix administrators at 2:00, 2:10, 2:20 after the problem starts (the custom step duration of 10 minutes working)
- to guest users at 4:00 hours after the problem start (the default step duration of 30 minutes returning between steps 8 and 11)

## 3 Receiving notification on unsupported items

### Overview

Receiving notifications on unsupported items is supported since Zabbix 2.2.

It is part of the concept of internal events in Zabbix, allowing users to be notified on these occasions. Internal events reflect a change of state:

- when items go from 'normal' to 'unsupported' (and back)
- when triggers go from 'normal' to 'unknown' (and back)
- when low-level discovery rules go from 'normal' to 'unsupported' (and back)

This section presents a how-to for **receiving notification** when an item turns unsupported.

### Configuration

Overall, the process of setting up the notification should feel familiar to those who have set up alerts in Zabbix before.

#### Step 1

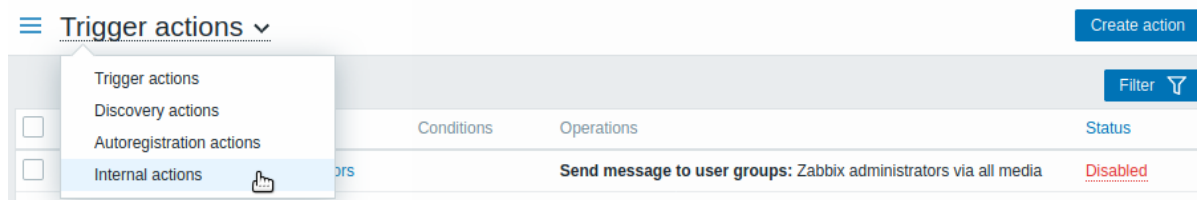
Configure **some media**, such as e-mail, SMS, or script to use for the notifications. Refer to the corresponding sections of the manual to perform this task.

**Attention:**

For notifying on internal events the default severity ('Not classified') is used, so leave it checked when configuring **user media** if you want to receive notifications for internal events.

Step 2

Go to Configuration → Actions and select Internal actions from the page title dropdown.

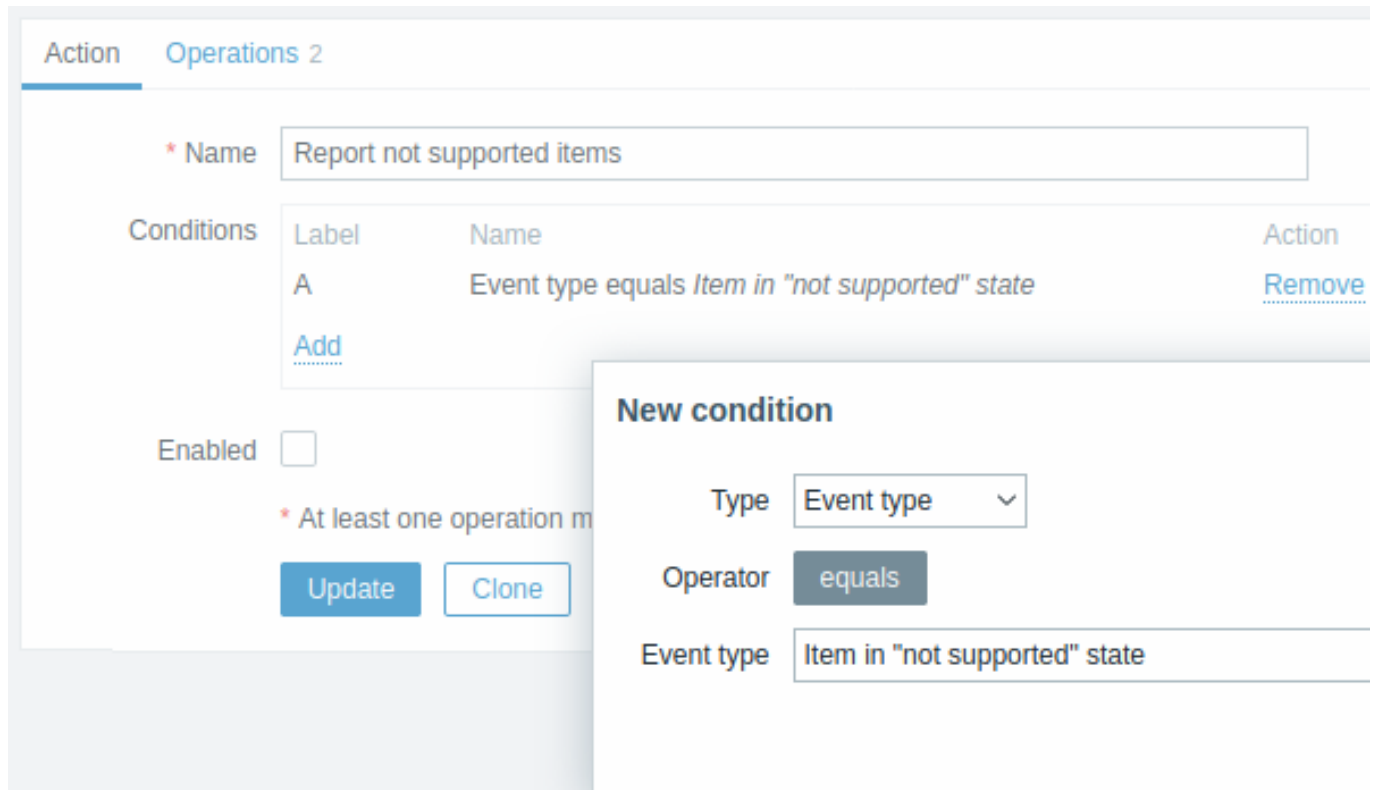


Click on Create action to the right to open an action configuration form.

Step 3

In the **Action** tab enter a name for the action. Then click on Add in the condition block to add a new condition.

In the new condition popup window select Event type as the condition type and then select Item in "not supported" state as the event type value.



Don't forget to click on Add to actually list the condition in the Conditions block.

Step 4

In the **Operations** tab, click on Add in the Operations block and select some recipients of the message (user groups/users) and the media types (or 'All') to use for delivery.

Select Custom message checkbox if you wish to enter the custom subject/content of the problem message.

\* Default operation step duration

Operations	Steps	Details
	1	<b>Send message to user groups: Zabbix administrators via all media</b>
		<a href="#">Add</a>

Recovery operations	Details	Action
	<b>Notify all involved</b>	<a href="#">Edit</a> <a href="#">Remove</a>
	<a href="#">Add</a>	

### Operation details

Operation type **Send message**

Steps  -  (0 - infinitely)

Step duration  (0 - use action default)

\* At least one user or user group must be selected.

Send to user groups	User group	Action
	Zabbix administrators	<a href="#">Remove</a>
	<a href="#">Add</a>	

Send to users	User	Action
	<a href="#">Add</a>	

Send only to

Custom message

Subject

Message

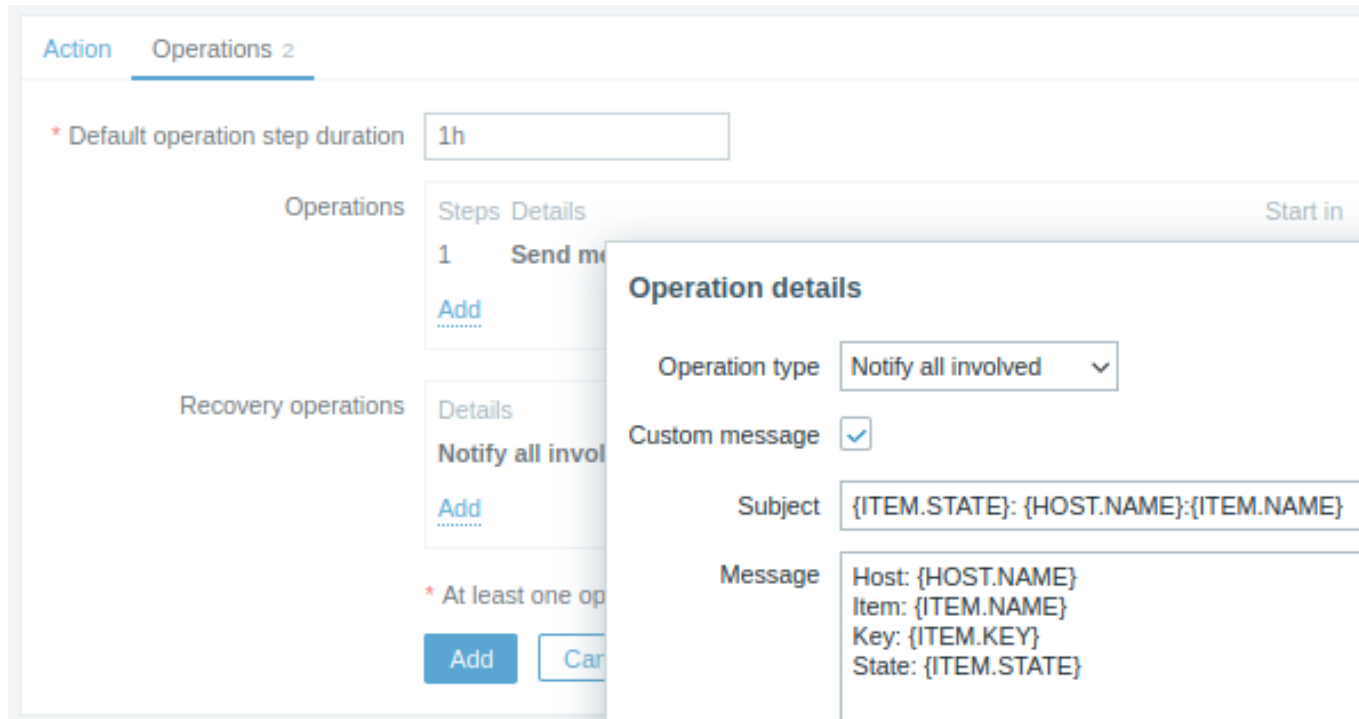
Click on Add to actually list the operation in the Operations block.

If you wish to receive more than one notification, set the operation step duration (interval between messages sent) and add another step.

#### Step 5

The **Recovery operations** block allows to configure a recovery notification when an item goes back to the normal state. Click on Add in the Recovery operations block, select the operation type, the recipients of the message (user groups/users) and the media types (or 'All') to use for delivery.

Select Custom message checkbox if you wish to enter the custom subject/content of the problem message.



Click on Add in the Operation details popup window to actually list the operation in the Recovery operations block.

#### Step 6

When finished, click on the **Add** button at the bottom of the form.

And that's it, you're done! Now you can look forward to receiving your first notification from Zabbix if some item turns unsupported.

## 10 Macros

### Overview

Zabbix supports a number of built-in macros which may be used in various situations. These macros are variables, identified by a specific syntax:

{MACRO}

Macros resolve to a specific value depending on the context.

Effective use of macros allows to save time and make Zabbix configuration more transparent.

In one of typical uses, a macro may be used in a template. Thus a trigger on a template may be named "Processor load is too high on {HOST.NAME}". When the template is applied to the host, such as Zabbix server, the name will resolve to "Processor load is too high on Zabbix server" when the trigger is displayed in the Monitoring section.

Macros may be used in item key parameters. A macro may be used for only a part of the parameter, for example `item.key[server_{HOST.HOST}_local]`. Double-quoting the parameter is not necessary as Zabbix will take care of any ambiguous special symbols, if present in the resolved macro.

Besides built-in macros Zabbix also supports user-defined macros, user-defined macros with context and macros for low-level discovery.

See also:

- full list of [built-in macros](#)

- [macro functions](#)
- [user macros](#)
- [user macros with context](#)
- [low-level discovery macros](#)

## 1 Macro functions

### Overview

Macro functions offer the ability to customize [macro](#) values.

Sometimes a macro may resolve to a value that is not necessarily easy to work with. It may be long or contain a specific substring of interest that you would like to extract. This is where macro functions can be useful.

The syntax of a macro function is:

```
{<macro>.<func>(<params>)}
```

where:

- **<macro>** - the macro to customize (for example `{ITEM.VALUE}` or `{#LLDMACRO}`)
- **<func>** - the function to apply
- **<params>** - a comma-delimited list of function parameters. Parameters must be quoted if they start with " " (space), " " or contain ), ,.

For example:

```
{{TIME}}.fmttime(format,time_shift)}
{{ITEM.VALUE}}.regsub(pattern,output)}
{{#LLDMACRO}}.regsub(pattern,output)}
```

### Supported macro functions

FUNCTION	Description	Parameters	Supported for
<b>fmtnum</b> (<digits>)	Number formatting to control the number of digits printed after the decimal point.	<b>digits</b> - the number of digits after decimal point. No trailing zeros will be produced.	{ITEM.VALUE} {ITEM.LASTVALUE} Expression macros
<b>fmttime</b> (<format>,<time_shift>)			

Time formatting. **format** - {TIME}  
 mandatory  
 format string,  
 compatible with  
 strftime function  
 formatting  
**time\_shift**  
 - the time shift  
 applied to the  
 time before  
 formatting  
 using  
 -<N><time\_unit>  
 format where  
 N - the number  
 of time units to  
 subtract  
 time\_unit  
 - h  
 (hour), d  
 (day), w  
 (week),  
 M  
 (month)  
 and y  
 (year).

**iregsub** (<pattern>,<output>)

	<p>Substring extraction by a regular expression match (case insensitive).</p>	<p><b>pattern</b> - the regular expression to match <b>output</b> - the output options. <b>\1 - \9</b> placeholders are supported to capture groups. <b>\0</b> returns the matched text.</p>	<p>{ITEM.VALUE} {ITEM.LASTVALUE} Low-level discovery macros (except in low-level discovery rule filter)</p>
<p><b>regsub</b> (&lt;pattern&gt;,&lt;output&gt;)</p>	<p>Substring extraction by a regular expression match (case sensitive).</p>	<p><b>pattern</b> - the regular expression to match <b>output</b> - the output options. <b>\1 - \9</b> placeholders are supported to capture groups. <b>\0</b> returns the matched text.</p>	<p>{ITEM.VALUE} {ITEM.LASTVALUE} Low-level discovery macros (except in low-level discovery rule filter)</p>

If a function is used in a **supported location**, but applied to a macro not supporting macro functions, then the macro evaluates to 'UNKNOWN'.

If pattern is not a correct regular expression then the macro evaluates to 'UNKNOWN' (excluding low-level discovery macros where the function will be ignored in that case and macro will remain unexpanded)

If a macro function is applied to the macro in locations not supporting macro functions then the function is ignored.

Examples

The ways in which macro functions can be used to customize macro values is illustrated in the following examples on received values:



Received value	Macro	Output
24.3413523	{{ITEM.VALUE}.fmtnum(2)}34	24.34
24.3413523	{{ITEM.VALUE}.fmtnum(4)}	24.3413523
12:36:01	{{TIME}.fmttime(%B)}October	October
12:36:01	{{TIME}.fmttime(%B,-%M)}September	September
123Log line	{{ITEM.VALUE}.regsub('([0-9]+', Problem))	123 Problem
123 Log line	{{ITEM.VALUE}.regsub('([0-9]+)', "Problem")}	123 Problem
123 Log line	{{ITEM.VALUE}.regsub('([0-9]+)', "Problem ID: \1)}	123 Problem ID: \1
Log line	{{ITEM.VALUE}.regsub('Problem ID: " "Problem ID: \1")}	Problem ID: " "Problem ID: \1"
MySQL crashed errno 123	{{ITEM.VALUE}.regsub('Problem ID: MySQL [0-9]+') " Problem ID: \1_\2 ")}	MySQL [0-9]+ " Problem ID: \1_\2 "
123 Log line	{{ITEM.VALUE}.regsub('UN([0-9])*(invalid regular "Problem ID: expression) \1")}	UN([0-9])*(invalid regular "Problem ID: expression) \1"
customername_1	{{#IFALIAS}.regsub("customername_1", \1)}	customername_1
customername_1	{{#IFALIAS}.regsub("1.*_([0-9]+)", \2)}	1.*_([0-9]+) \2
customername_1	{{#IFALIAS}.regsub("{{#IFALIAS}}.regsub(".*_([0-9]+", \1)} \1)} (invalid regular expression)	{{#IFALIAS}}.regsub(".*_([0-9]+", \1)} \1)} (invalid regular expression)
customername_1	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"customername_1", \1)}"	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"customername_1", \1)}"
customername_1	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"1"*)_([0-9]+)", \2)}"	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"1"*)_([0-9]+)", \2)}"
customername_1	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"{{#IFALIAS}}.regsub(".*_([0-9]+", \1)}") \1)}") (invalid regular expression)	`\${MACRO}`:{{#IFALIAS}}`\${MACRO}`(\1"{{#IFALIAS}}.regsub(".*_([0-9]+", \1)}") \1)}") (invalid regular expression)
customername_1	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"customername_1", \1)}\1"}"	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"customername_1", \1)}\1"}"
customername_1	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"1"*)_([0-9]+)", \2)}\1"}"	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"1"*)_([0-9]+)", \2)}\1"}"
customername_1	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"{{#IFALIAS}}.regsub(".*_([0-9]+", \1)}") \1)}\1"}") (invalid regular expression)	`\${MACRO}`:\1"{{#IFALIAS}}`\${MACRO}`(\1"{{#IFALIAS}}.regsub(".*_([0-9]+", \1)}") \1)}\1"}") (invalid regular expression)

## 2 User macros

### Overview

User macros are supported in Zabbix for greater flexibility, in addition to the macros **supported** out-of-the-box.

User macros can be defined on global, template and host level. These macros have a special syntax:

```
`${MACRO}`
```

Zabbix resolves macros according to the following precedence:

1. host level macros (checked first)
2. macros defined for first level templates of the host (i.e., templates linked directly to the host), sorted by template ID
3. macros defined for second level templates of the host, sorted by template ID
4. macros defined for third level templates of the host, sorted by template ID, etc.
5. global macros (checked last)

In other words, if a macro does not exist for a host, Zabbix will try to find it in the host templates of increasing depth. If still not found, a global macro will be used, if exists.

If Zabbix is unable to find a macro, the macro will not be resolved.

**Attention:**

Macros (including user macros) are left unresolved in the Configuration section (for example, in the trigger list) by design to make complex configuration more transparent.

User macros can be used in:

- item name
- item key parameter
- item update intervals and flexible intervals
- trigger name and description
- trigger expression parameters and constants (see [examples](#))
- many other locations - see the [full list](#)

Common use cases of global and host macros

- use a global macro in several locations; then change the macro value and apply configuration changes to all locations with one click
- take advantage of templates with host-specific attributes: passwords, port numbers, file names, regular expressions, etc.

Configuration

To define user macros, go to the corresponding location in the frontend:

- for global macros, visit Administration → General → Macros
- for host and template level macros, open host or template properties and look for the Macros tab

**Note:**





If a user macro is used in items or triggers in a template, it is suggested to add that macro to the template even if it is defined on a global level. That way, if the macro type is text exporting the template to XML and importing it in another system will still allow it to work as expected. Values of secret macros are not **exported**.

A user macro has the following attributes:

Macro	Value		Description
{MYSQL_PASSWORD}	*****		description
{MYSQL_USERNAME}	*****		description
{SECRET_PASSWORD}	path/to/secret:password		description
{SECRET_USERNAME}	path/to/secret:username		description
{SNMP_COMMUNITY}	public		description
{WORKING_HOURS}	1-5,09:00-18:00		description

[Add](#)

Parameter	Description
Macro	Macro name. The name must be wrapped in curly brackets and start with a dollar sign. Example: {\$FRONTEND_URL}. The following characters are allowed in the macro names: <b>A-Z</b> (uppercase only) , <b>0-9</b> , <b>_</b> , <b>.</b>

Parameter	Description
Value	<p>Macro value. Three value types are supported:</p> <p><b>Text</b> (default) - plain-text value</p> <p><b>Secret text</b> - the value is masked with asterisks, which could be useful to protect sensitive information such as passwords or shared keys</p> <p><b>Vault secret</b> - the value contains a reference path (as 'path:key', for example "secret/zabbix:password") to a <b>Vault secret</b> (supported since 5.2.0)</p> <p>Note that while the value of a secret macro is hidden from sight, the value can be revealed through the use in items. For example, in an external script an 'echo' statement referencing a secret macro may be used to reveal the macro value to the frontend because Zabbix server has access to the real macro value.</p> <p>To select the value type click on the button at the end of the value input field:</p> <p> icon indicates a text macro;</p> <p> icon indicates a secret text macro. Upon hovering, the value field transforms into a button, which allows to enter a new value of the macro (to exit without saving a new value, click the backwards arrow ).</p> <p> icon indicates a secret Vault macro.</p> <p>Maximum length of a user macro value is 2048 characters (255 characters in versions before 5.2.0).</p>
Description	Text field used to provide more information about this macro.

**Note:**

URLs that contain a secret macro will not work as the macro in them will be resolved as "\*\*\*\*\*".

**Attention:**

In trigger expressions user macros will resolve if referencing a parameter or constant. They will NOT resolve if referencing a host, item key, function, operator or another trigger expression. Secret macros cannot be used in trigger expressions.

Examples

Example 1

Use of host-level macro in the "Status of SSH daemon" item key:

```
net.tcp.service[ssh,,{${SSH_PORT}]
```

This item can be assigned to multiple hosts, providing that the value of **{\${SSH\_PORT}}** is defined on those hosts.

Example 2

Use of host-level macro in the "CPU load is too high" trigger:

```
{ca_001:system.cpu.load[,avg1].last()}>{${MAX_CPULOAD}}
```

Such a trigger would be created on the template, not edited in individual hosts.

**Note:**

If you want to use amount of values as the function parameter (for example, **max(#3)**), include hash mark in the macro definition like this: `SOME_PERIOD => #3`

### Example 3

Use of two macros in the "CPU load is too high" trigger:

```
{ca_001:system.cpu.load[,avg1].min({$CPULOAD_PERIOD})}>{${MAX_CPULOAD}}
```

Note that a macro can be used as a parameter of trigger function, in this example function **min()**.

### Example 4

Synchronize the agent unavailability condition with the item update interval:

- define `{$INTERVAL}` macro and use it in the item update interval;
- use `{$INTERVAL}` as parameter of the agent unavailability trigger:

```
{ca_001:agent.ping.nodata({$INTERVAL})}=1
```

### Example 5

Centralize configuration of working hours:

- create a global `{$WORKING_HOURS}` macro equal to 1-5, 09:00-18:00;
- use it in the Working time field in Administration → General → GUI;
- use it in the When active field in Administration → User → Media;
- use it to set up more frequent item polling during working hours:

Update interval

Custom intervals

Type	Interval	Period
Flexible	Scheduling	<input type="text" value="{\${SHORT_INTERVAL}" }"=""/>
		<input type="text" value="{\${WORKING_HOURS}" }"=""/>

- use it in the Time period action condition;
- adjust the working time in Administration → General → Macros, if needed.

### Example 6

Use host prototype macro to configure items for discovered hosts:

- on a host prototype define user macro `{$SNMPVALUE}` with `{#SNMPVALUE}` **low-level discovery** macro as a value:

**Host prototype macros**    Inherited and host prototype macros

Macro	Value
<code>{\$SNMPVALUE}</code>	<code>{#SNMPVALUE}</code> <span style="float: right; border: 1px solid #ccc; padding: 2px;">T ▾</span>

[Add](#)

Add
Cancel

- assign Generic SNMPv2 template to the host prototype;
- use `{$SNMPVALUE}` in the SNMP OID field of Generic SNMPv2 template items.

User macro context

See [user macros with context](#).

## 3 User macros with context

Overview

An optional context can be used in **user macros**, allowing to override the default value with a context-specific one.

The context is appended to the macro name; the syntax depends on whether the context is a static text value:

```
{${MACRO:"static text"}}
```

or a regular expression:

```
{${MACRO:regex:"regular expression"}}
```

Note that a macro with regular expression context can only be defined in user macro configuration. If the `regex:` prefix is used elsewhere as user macro context, like in a trigger expression, it will be treated as static context.

Context quoting is optional (see also [important notes](#)).

Macro context examples:

Example	Description
<code>{\${LOW_SPACE_LIMIT}}</code>	User macro without context.
<code>{\${LOW_SPACE_LIMIT:/tmp}}</code>	User macro with context (static string).
<code>{\${LOW_SPACE_LIMIT:regex:"~/tmp\$"}}</code>	User macro with context (regular expression). Same as <code>{\${LOW_SPACE_LIMIT:/tmp}}</code> .
<code>{\${LOW_SPACE_LIMIT:regex:"~/var/log/.*\$"}}</code>	User macro with context (regular expression). Matches all strings prefixed with <code>/var/log/</code> .

### Use cases

User macros with context can be defined to accomplish more flexible thresholds in trigger expressions (based on the values retrieved by low-level discovery). For example, you may define the following macros:

- `{${LOW_SPACE_LIMIT}} = 10`
- `{${LOW_SPACE_LIMIT:/home}} = 20`
- `{${LOW_SPACE_LIMIT:regex:"^[a-z]+$"} = 30`

Then a low-level discovery macro may be used as macro context in a trigger prototype for mounted file system discovery:

```
{host:vfs.fs.size[#{FSNAME},pfree].last()}<{${LOW_SPACE_LIMIT:"#{FSNAME}"}}
```

After the discovery different low-space thresholds will apply in triggers depending on the discovered mount points or file system types. Problem events will be generated if:

- `/home` folder has less than 20% of free disk space
- folders that match the regexp pattern (like `/etc`, `/tmp` or `/var`) have less than 30% of free disk space
- folders that don't match the regexp pattern and are not `/home` have less than 10% of free disk space

### Important notes

- If more than one user macro with context exists, Zabbix will try to match the simple context macros first and then context macros with regular expressions in an undefined order.

**Warning:**  
Do not create different context macros matching the same string to avoid undefined behavior.

- If a macro with its context is not found on host, linked templates or globally, then the macro without context is searched for.
- Only low-level discovery macros are supported in the context. Any other macros are ignored and treated as plain text.

Technically, macro context is specified using rules similar to [item key](#) parameters, except macro context is not parsed as several parameters if there is a `,` character:

- Macro context must be quoted with `"` if the context contains a `}` character or starts with a `"` character. Quotes inside quoted context must be escaped with the `\` character.
- The `\` character itself is not escaped, which means it's impossible to have a quoted context ending with the `\` character - the macro `{${MACRO:"a:\b\\c"}}` is invalid.
- The leading spaces in context are ignored, the trailing spaces are not:
  - For example `{${MACRO:A}}` is the same as `{${MACRO: A}}`, but not `{${MACRO:A }`.
- All spaces before leading quotes and after trailing quotes are ignored, but all spaces inside quotes are not:
  - Macros `{${MACRO:"A"}}`, `{${MACRO: "A"}}`, `{${MACRO:"A" }` and `{${MACRO: "A" }` are the same, but macros `{${MACRO:"A" }` and `{${MACRO:" A "}}` are not.

The following macros are all equivalent, because they have the same context: `{${MACRO:A}}`, `{${MACRO: A}}` and `{${MACRO:"A"}}`. This is in contrast with item keys, where `'key[a]`, `'key[ a]` and `'key["a"]` are the same semantically, but different for uniqueness purposes.

## 4 Low-level discovery macros

### Overview

There is a type of macro used within the **low-level discovery** (LLD) function:

{#MACRO}

It is a macro that is used in an LLD rule and returns real values of the file system name, network interface, SNMP OID, etc.

These macros can be used for creating item, trigger and graph prototypes. Then, when discovering real file systems, network interfaces etc., these macros are substituted with real values and are the basis for creating real items, triggers and graphs.

These macros are also used in creating host and host group prototypes in virtual machine **discovery**.

Some low-level discovery macros come "pre-packaged" with the LLD function in Zabbix - {#FSNAME}, {#FSTYPE}, {#IFNAME}, {#SNMPINDEX}, {#SNMPVALUE}. However, adhering to these names is not compulsory when creating a **custom** low-level discovery rule. Then you may use any other LLD macro name and refer to that name.

### Supported locations

LLD macros can be used:

- in the low-level discovery rule filter
- for item prototypes in
  - name
  - key parameters
  - unit
  - update interval<sup>1</sup>
  - history storage period<sup>1</sup>
  - trend storage period<sup>1</sup>
  - application prototypes
  - item value preprocessing steps
  - SNMP OID
  - IPMI sensor field
  - calculated item formula
  - SSH script and Telnet script
  - database monitoring SQL query
  - JMX item endpoint field
  - description
  - HTTP agent URL field
  - HTTP agent HTTP query fields field
  - HTTP agent request body field
  - HTTP agent required status codes field
  - HTTP agent headers field key and value
  - HTTP agent HTTP authentication username field
  - HTTP agent HTTP authentication password field
  - HTTP agent HTTP proxy field
  - HTTP agent HTTP SSL certificate file field
  - HTTP agent HTTP SSL key file field
  - HTTP agent HTTP SSL key password field
  - HTTP agent HTTP timeout<sup>1</sup> field
- for trigger prototypes in
  - name
  - operational data
  - expression (only in constants and function parameters)
  - URL
  - description
  - event tag name and value
- for graph prototypes in
  - name
- for host prototypes in
  - name
  - visible name
  - custom interface fields: IP, DNS, port, SNMP v1/v2 community, SNMP v3 context name, SNMP v3 security name, SNMP v3 authentication passphrase, SNMP v3 privacy passphrase
  - host group prototype name

- host tag value
- host macro value
- (see the [full list](#))

In all those places LLD macros can be used inside static user **macro context**.

Using macro functions

Macro functions are supported with low-level discovery macros (except in low-level discovery rule filter), allowing to extract a certain part of the macro value using a regular expression.

For example, you may want to extract the customer name and interface number from the following LLD macro for the purposes of event tagging:

```
{#IFALIAS}=customername_1
```

To do so, the `regsub` macro function can be used with the macro in the event tag value field of a trigger prototype:

Tags	
Customer	<code>{{#IFALIAS}.regsub("(.*)_([0-9]+)", \1)}</code> <a href="#">Remove</a>
Interface	<code>{{#IFALIAS}.regsub("(.*)_([0-9]+)", \2)}</code> <a href="#">Remove</a>

Note, that commas are not allowed in unquoted item **key parameters**, so the parameter containing a macro function has to be quoted. The backslash (`\`) character should be used to escape double quotes inside the parameter. Example:

```
net.if.in["{{#IFALIAS}.regsub(\"(.*)_([0-9]+)\", \1)}", bytes]
```

For more information on macro function syntax, see: [Macro functions](#)

Macro functions are supported in low-level discovery macros since Zabbix 4.0.

Footnotes

<sup>1</sup> In the fields marked with <sup>1</sup> a single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.

## 11 Users and user groups

Overview

All users in Zabbix access the Zabbix application through the web-based frontend. Each user is assigned a unique login name and a password.

All user passwords are encrypted and stored in the Zabbix database. Users cannot use their user id and password to log directly into the UNIX server unless they have also been set up accordingly to UNIX. Communication between the web server and the user browser can be protected using SSL.

With a flexible **user permission schema** you can restrict and differentiate rights to:

- access administrative Zabbix frontend functions
- perform certain actions in the frontend
- access monitored hosts in hostgroups
- use specific API methods

### 1 Configuring a user

Overview

The initial Zabbix installation has two predefined users:

- Admin - a Zabbix **superuser** with full permissions;
- guest - a special Zabbix **user**. The 'guest' user is disabled by default. If you add it to the Guests user group, you may access monitoring pages in Zabbix without being logged in. Note that by default, 'guest' has no permissions on Zabbix objects.

To configure a new user:

- Go to Administration → Users

- Click on Create user (or on the user name to edit an existing user)
- Edit user attributes in the form

General attributes

The User tab contains general user attributes:

The screenshot shows a web form for configuring a user. At the top, there are three tabs: 'User' (selected), 'Media 1', and 'Permissions'. Below the tabs, the form contains several input fields and controls:

- \* Alias:** A text input field containing 'Admin'.
- Name:** A text input field containing 'Zabbix'.
- Last Name:** A text input field containing 'Administrator'.
- \* Groups:** A dropdown menu showing 'Zabbix administrators' with a close button (x) and a search prompt 'type here to search'.
- Password:** A button labeled 'Change password'.
- Language:** A dropdown menu showing 'English (en\_US)' with an information icon (i).
- Time zone:** A dropdown menu showing 'System default: (UTC+02:00) Europe/Riga'.
- Theme:** A dropdown menu showing 'Blue'.
- Auto-login:** A checked checkbox.
- Auto-logout:** An unchecked checkbox followed by a text input field containing '15m'.
- \* Refresh:** A text input field containing '30s'.
- \* Rows per page:** A text input field containing '50'.
- URL (after login):** An empty text input field.

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Alias	Unique username, used as the login name.
Name	User first name (optional). If not empty, visible in acknowledgment information and notification recipient information.
Last name	User last name (optional). If not empty, visible in acknowledgment information and notification recipient information.
Groups	Select <b>user groups</b> the user belongs to. Starting with Zabbix 3.4.3 this field is auto-complete so starting to type the name of a user group will offer a dropdown of matching groups. Scroll down to select. Alternatively, click on Select to add groups. Click on 'x' to remove the selected. Adherence to user groups determines what host groups and hosts the user will have <b>access to</b> .



Parameter	Description
Password	Two fields for entering the user password. With an existing password, contains a Password button, clicking on which opens the password fields.
Language	Note that passwords longer than 72 characters will be truncated. Language of the Zabbix frontend.
Time zone	The php gettext extension is required for the translations to work. Select the time zone to override global <b>time zone</b> on user level or select <b>System default</b> to use global time zone settings.
Theme	Defines how the frontend looks like: <b>System default</b> - use default system settings <b>Blue</b> - standard blue theme <b>Dark</b> - alternative dark theme <b>High-contrast light</b> - light theme with high contrast <b>High-contrast dark</b> - dark theme with high contrast
Auto-login	Mark this checkbox to make Zabbix remember the user and log the user in automatically for 30 days. Browser cookies are used for this.
Auto-logout	With this checkbox marked the user will be logged out automatically, after the set amount of seconds (minimum 90 seconds, maximum 1 day). <b>Time suffixes</b> are supported, e.g. 90s, 5m, 2h, 1d. Note that this option will not work: * If the "Show warning if Zabbix server is down" global configuration option is enabled and Zabbix frontend is kept open; * When Monitoring menu pages perform background information refreshes; * If logging in with the Remember me for 30 days option checked.
Refresh	Set the refresh rate used for graphs, screens, plain text data, etc. Can be set to 0 to disable.
Rows per page	You can determine how many rows per page will be displayed in lists.
URL (after login)	You can make Zabbix transfer the user to a specific URL after successful login, for example, to Problems page.

## User media

The Media tab contains a listing of all media defined for the user. Media are used for sending notifications. Click on Add to assign media to the user.

See the [Media types](#) section for details on configuring user media.

## Permissions

The Permissions tab contains information on:

- The user role. Users cannot change their own role.
- The user type (User, Admin, Super Admin) that is defined in the role configuration.
- Host groups the user has access to. Users of type 'User' and 'Admin' do not have access to any host groups and hosts by default. To get the access they need to be included in user groups that have access to respective host groups and hosts.
- Access rights to sections and elements of Zabbix frontend, modules, and API methods. Elements to which access is allowed are displayed in green color. Light gray color means that access to the element is denied.
- Rights to perform certain actions. Actions that are allowed are displayed in green color. Light gray color means that a user does not have the rights to perform this action.

See the [User permissions](#) page for details.

## 2 Permissions

### Overview

You can differentiate user permissions in Zabbix by defining the respective user role. Then the unprivileged users need to be included in user groups that have access to host group data.

### User role

The user role defines which parts of UI, which API methods, and which actions are available to the user. The following roles are pre-defined in Zabbix:

User type	Description
Guest role	The user has access to the Monitoring, Inventory, and Reports menu sections, but without the rights to perform any actions.
User role	The user has access to the Monitoring, Inventory, and Reports menu sections. The user has no access to any resources by default. Any permissions to host groups must be explicitly assigned.
Admin role	The user has access to the Monitoring, Inventory, Reports and Configuration menu sections. The user has no access to any host groups by default. Any permissions to host groups must be explicitly given.
Super Admin role	The user has access to all menu sections. The user has a read-write access to all host groups. Permissions cannot be revoked by denying access to specific host groups.

User roles are configured in the Administration→User roles section. Super Admins can modify or delete pre-defined roles and create more roles with custom sets of permissions.

To assign a role to the user, go to the Permissions tab in the user configuration form, locate the Role field and select a role. Once a role is selected a list of associated permissions will be displayed below.

User
Media
Permissions

\* Role

User type

Host group	Permissions
All groups	None

Permissions can be assigned for user groups only.

**Access to UI elements**

Monitoring  Dashboard  Problems  Hosts  Overview  Latest data  Screens  Maps  Discovery  Services

Inventory  Overview  Hosts

Reports  Availability report  Triggers top 100  Notifications

Configuration  Host groups  Templates  Hosts  Maintenance  Actions  Discovery  Services

**Access to modules**

*No enabled modules found.*

**Access to API**

Enabled

Allowed methods  action.create  action.delete  action.get

**Access to actions**

Create and edit dashboards and screens  Create and edit maps  Create and edit maintenance

Add problem comments  Change severity  Acknowledge problems  Close problems  Execute scripts

## Permissions to host groups

Access to any host data in Zabbix are granted to **user groups** on the host group level only.

That means that an individual user cannot be directly granted access to a host (or host group). It can only be granted access to a host by being part of a user group that is granted access to the host group that contains the host.

### 3 User groups

#### Overview

User groups allow to group users both for organizational purposes and for assigning permissions to data. Permissions to monitoring data of host groups are assigned to user groups, not individual users.

It may often make sense to separate what information is available for one group of users and what - for another. This can be accomplished by grouping users and then assigning varied permissions to host groups.

A user can belong to any number of groups.

#### Configuration

To configure a user group:

- Go to Administration → User groups
- Click on Create user group (or on the group name to edit an existing group)
- Edit group attributes in the form

The **User group** tab contains general group attributes:

The screenshot shows the 'User group' configuration form in Zabbix. It has three tabs: 'User group' (selected), 'Permissions', and 'Tag filter'. The form contains the following fields and controls:

- \* Group name:** A text input field containing 'Security specialists'.
- Users:** A multi-select dropdown menu showing 'Admin (Zabbix Administrator)' and 'user (New User)'. Below the dropdown is a search prompt 'type here to search'.
- Frontend access:** A dropdown menu set to 'System default'.
- Enabled:** A checked checkbox.
- Debug mode:** An unchecked checkbox.
- Buttons:** 'Add' and 'Cancel' buttons at the bottom.

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Group name	Unique group name.
Users	To add users to the group start typing the name of an existing user. When the dropdown with matching user names appears, scroll down to select. Alternatively you may click the Select button to select users in a popup.

Parameter	Description
Frontend access	How the users of the group are authenticated. <b>System default</b> - use default authentication method (set <b>globally</b> ) <b>Internal</b> - use Zabbix internal authentication (even if LDAP authentication is used globally). Ignored if HTTP authentication is the global default. <b>LDAP</b> - use LDAP authentication (even if internal authentication is used globally). Ignored if HTTP authentication is the global default. <b>Disabled</b> - access to Zabbix frontend is forbidden for this group
Enabled	Status of user group and group members. Checked - user group and users are enabled Unchecked - user group and users are disabled
Debug mode	Mark this checkbox to activate <b>debug mode</b> for the users.

The **Permissions** tab allows you to specify user group access to host group (and thereby host) data:

The screenshot shows the 'Permissions' tab in the Zabbix web interface. It features a table with two columns: 'Host group' and 'Permissions'. The 'Host group' column lists several categories: 'All groups', 'Discovered hosts', 'Hypervisors', 'Linux servers', 'Templates (including subgroups)', 'Templates/Server hardware', and 'Templates/Virtualization'. The 'Permissions' column shows a set of four buttons for each host group: 'Read-write', 'Read', 'Deny', and 'None'. The 'Read' button is currently selected for all groups. Below the table, there is a search input field with the placeholder text 'type here to search', a 'Select' button, and a row of four permission buttons: 'Read-write', 'Read', 'Deny', and 'None'. There is also an 'Include subgroups' checkbox and an 'Add' link.

Current permissions to host groups are displayed in the Permissions block.

If current permissions of the host group are inherited by all nested host groups, that is indicated by the including subgroups text in the parenthesis after the host group name.

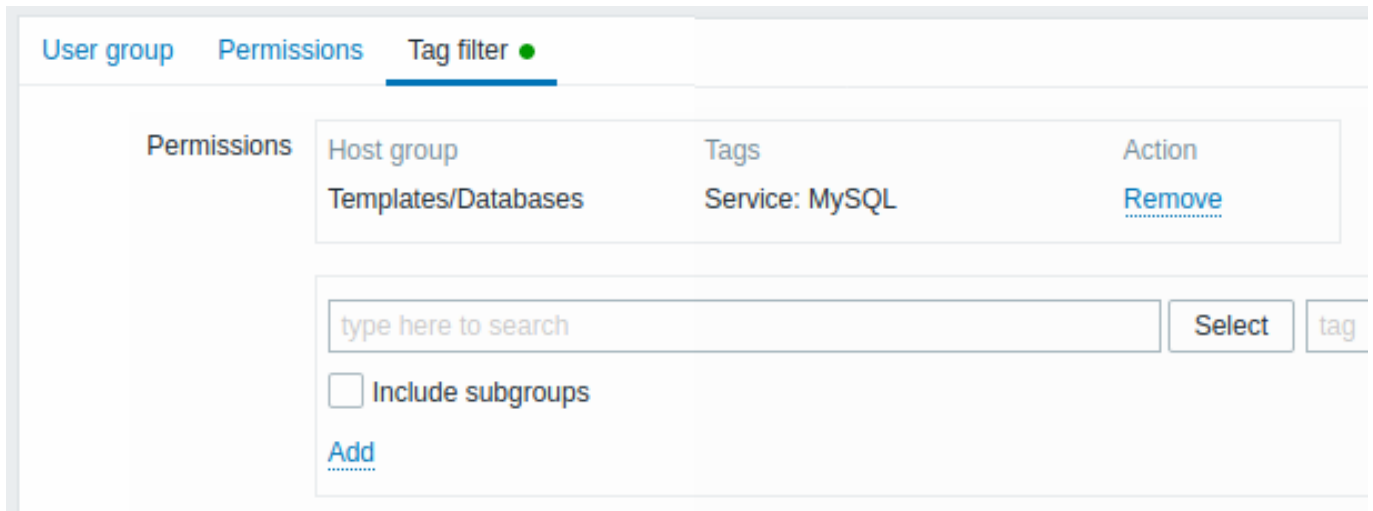
You may change the level of access to a host group:

- **Read-write** - read-write access to a host group;
- **Read** - read-only access to a host group;
- **Deny** - access to a host group denied;
- **None** - no permissions are set.

Use the selection field below to select host groups and the level of access to them (note that selecting None will remove host group from the list if the group is already in the list). If you wish to include nested host groups, mark the Include subgroups checkbox. This field is auto-complete so starting to type the name of a host group will offer a dropdown of matching groups. If you wish to see all host groups, click on Select.

Note that it is possible for Super Admin users in host group **configuration** to enforce the same level of permissions to the nested host groups as the parent host group.

The **Tag filter** tab allows you to set tag-based permissions for user groups to see problems filtered by tag name and its value:



To select a host group to apply a tag filter for, click Select to get the complete list of existing host groups or start to type the name of a host group to get a dropdown of matching groups. If you want to apply tag filters to nested host groups, mark the Include subgroups checkbox.

Tag filter allows to separate the access to host group from the possibility to see problems.

For example, if a database administrator needs to see only "MySQL" database problems, it is required to create a user group for database administrators first, than specify "Service" tag name and "MySQL" value.



If "Service" tag name is specified and value field is left blank, corresponding user group will see all problems for selected host group with tag name "Service". If both tag name and value fields are left blank but host group selected, corresponding user group will see all problems for selected host group. Make sure a tag name and tag value are correctly specified otherwise a corresponding user group will not see any problems.

Let's review an example when a user is a member of several user groups selected. Filtering in this case will use OR condition for tags.

User group A			User group B			Visible result for a user (member) of both groups
Tag filter	Host group	Tag name	Host group	Tag name	Tag value	
	Templates/Databases	Service	Templates/Databases	Service	Oracle	Service: MySQL or Oracle problems visible
	Templates/Databases	blank	Templates/Databases	Service	Oracle	All problems visible
	not selected	blank	Templates/Databases	Service	Oracle	Service:Oracle problems visible

**Attention:** Adding a filter (for example, all tags in a certain host group "Templates/Databases") results in not being able to see the problems of other host groups.

#### Host access from several user groups

A user may belong to any number of user groups. These groups may have different access permissions to hosts.

Therefore, it is important to know what hosts an unprivileged user will be able to access as a result. For example, let us consider how access to host X (in Hostgroup 1) will be affected in various situations for a user who is in user groups A and B.

- If Group A has only Read access to Hostgroup 1, but Group B Read-write access to Hostgroup 1, the user will get **Read-write** access to 'X'.

**Attention:**

“Read-write” permissions have precedence over “Read” permissions starting with Zabbix 2.2.

- In the same scenario as above, if 'X' is simultaneously also in Hostgroup 2 that is **denied** to Group A or B, access to 'X' will be **unavailable**, despite a Read-write access to Hostgroup 1.
- If Group A has no permissions defined and Group B has a Read-write access to Hostgroup 1, the user will get **Read-write** access to 'X'.
- If Group A has Deny access to Hostgroup 1 and Group B has a Read-write access to Hostgroup 1, the user will get access to 'X' **denied**.

Other details

- User level user with read-only access to a host will be able to acknowledge problems and perform other actions, if the user role assigned to this user allows doing so.
- An Admin level user with Read-write access to a host will not be able to link/unlink templates, if he has no access to the Templates group. With Read access to Templates group he will be able to link/unlink templates to the host, however, will not see any templates in the template list and will not be able to operate with templates in other places.
- An Admin level user with Read access to a host will not see the host in the configuration section host list; however, the host triggers will be accessible in IT service configuration.
- Any non-Super Admin user (including 'guest') can see network maps as long as the map is empty or has only images. When hosts, host groups or triggers are added to the map, permissions are respected. The same applies to screens and slideshows as well. The users, regardless of permissions, will see any objects that are not directly or indirectly linked to hosts.
- Zabbix server will not send notifications to users defined as action operation recipients if access to the concerned host is explicitly "denied".

## 12 Storage of secrets

Overview

It is possible to store some sensitive information secretly in HashiCorp Vault KV Secrets Engine - Version 2. Secrets can be saved for:

- user macro values
- database access credentials

Zabbix provides read-only access to the secrets in Vault, assuming that secrets are managed by someone else.

User macro values

It is possible to store user macro values secretly in Vault.

A “Vault secret” value of a user macro contains a reference path (as 'path:key', for example "secret/zabbix:password").

The following commands may be used to set the value for the path mentioned in example:

```
# Enable "secret/" mount point if not already enabled, note that "kv-v2" must be used
$ vault secrets enable -path=secret/ kv-v2
```

```
# Put new secret with key password under mount point "secret/" and path "secret/zabbix"
$ vault kv put secret/zabbix password=<password>
```

```
# Test that secret is successfully added
$ vault kv get secret/zabbix
```

```
# Finally test with Curl, note that "data" need to be manually added after mount point and "/v1" before the
$ curl --header "X-Vault-Token: <VaultToken>" https://127.0.0.1:8200/v1/secret/data/zabbix
```

The secret value is retrieved by Zabbix server on every refresh of configuration data and is stored in configuration cache. The authentication token for a read-only access to the reference paths must be provided in server configuration ('VaultToken' parameter). If the macro value cannot be retrieved successfully the corresponding item using the value will turn unsupported.

It is also possible to trigger refresh of secret values from Vault, using a 'secrets\_reload' command line **option**.

Zabbix proxy never communicates with Vault to get any secrets other than database credentials. Secret values on Zabbix proxy are retrieved from Zabbix server on each configuration sync and stored in configuration cache the same way as on Zabbix server.

That means a Zabbix proxy cannot start data collection after a restart until it receives the configuration data update from Zabbix server for the first time. Encryption must be enabled between Zabbix server and proxy; otherwise a server warning message is logged.

#### Database credentials

It is supported to store database credentials used by Zabbix server, proxies and frontend secretly in Vault:

- Vault-related parameters for retrieving database credentials can be optionally entered in the frontend [installation wizard](#).

Database credentials retrieved from Vault will be cached by the frontend. Note that the filesystem temporary file directory is used for database credential caching in frontend. You may use the `ZBX_DATA_CACHE_TTL` constant to control how often the data cache is refreshed/invalidated.

- For server/proxy the `VaultDBPath` configuration parameter may be used to specify the path from where credentials for database will be retrieved by keys 'password' and 'username' (for example: `secret/zabbix/database`).

The following commands may be used to set the values for the path mentioned in example:

```
# Enable "secret/" mount point if not already enabled, note that "kv-v2" must be used
$ vault secrets enable -path=secret/ kv-v2
```

```
# Put new secrets with keys username and password under mount point "secret/" and path "secret/zabbix/database"
$ vault kv put secret/zabbix/database username=zabbix password=<password>
```

```
# Test that secret is successfully added
$ vault kv get secret/zabbix/database
```

```
# Finally test with Curl, note that "data" need to be manually added after mount point and "/v1" before the path
$ curl --header "X-Vault-Token: <VaultToken>" https://127.0.0.1:8200/v1/secret/data/zabbix/database
```

#### Configuration parameters

For Zabbix server/proxy new configuration parameters have been added for Vault authentication and retrieving database credentials:

- \* `VaultToken` - Vault authentication token (see Zabbix [\[\[:manual/appendix/config/zabbix\\_server|server\]\]](#))/
- \* `VaultURL` - Vault server HTTP[S] URL
- \* `VaultDBPath` - Vault path from where credentials for database will be retrieved by keys 'password' and 'username'

Zabbix server and Zabbix proxy read the Vault-related configuration parameters from `zabbix_server.conf` and `zabbix_proxy.conf` upon startup.

Zabbix server and Zabbix proxy will additionally read `VAULT_TOKEN` environment variable once during startup and unset it so that it would not be available through forked scripts; it is an error if both `VaultToken` and `VAULT_TOKEN` contain value.

#### Note:

Forward slash and colon are reserved symbols. Forward slash can only be used to separate mount point from path (e.g. `secret/zabbix` where mount point is "secret" and "zabbix" is path) and, in case of Vault macros, colon can only be used to separate path from key. It is possible to URL-encode "/" and ":" if there is need to create mount point with name that is separated by forward slash (e.g. `foo/bar/zabbix` where mount point is "foo/bar" and path is "zabbix" as "foo%2Fbar/zabbix") and if mount point name or path needs to contain colon.

#### Configuring TLS

Certificate signed by a certificate authority (CA) should be added to the default CA store. Alternatively a custom CA store location can be specified using the `SSLCAlocation` configuration parameter; note that in this case the certificate directory must be prepared using the `openssl c_rehash` utility, for example configure `SSLCAlocation` and copy "ca.pem" inside that directory, then run the following command:

```
$ c_rehash .
```

## 8. Service monitoring

**Overview** Service monitoring functionality is intended for those who want to get a high-level (business) view of monitored infrastructure. In many cases, we are not interested in low-level details, like the lack of disk space, high processor load, etc. What we are interested in is the availability of service provided by our IT department. We can also be interested in identifying weak places of IT infrastructure, SLA of various IT services, the structure of existing IT infrastructure, and other information of a higher level.

Zabbix service monitoring provides answers to all mentioned questions.

Services is a hierarchy representation of monitored data.

A very simple service structure may look like:

```
Service
|
|-Workstations
| |
| |-Workstation1
| |
| |-Workstation2
|
|-Servers
```

Each node of the structure has attribute status. The status is calculated and propagated to upper levels according to the selected algorithm. At the lowest level of services are triggers. The status of individual nodes is affected by the status of their triggers.

**Note:**

Note that triggers with a Not classified or Information severity do not impact SLA calculation.

**Configuration** To configure services, go to: Configuration → Services.

On this screen you can build a hierarchy of your monitored infrastructure. The highest-level parent service is 'root'. You can build your hierarchy downward by adding lower-level parent services and then individual nodes to them.

## ☰ Services

Service	Action	Status calculation
root	<a href="#">Add child</a>	
Disc space	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem
Server1	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem
Server2	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem
Server3	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem
Server4	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem

Click on Add child to add services. To edit an existing service, click on its name. A form is displayed where you can edit the service attributes.

Configuring a service

The **Service** tab contains general service attributes:



Service **Dependencies** Time

\* Name

\* Parent service

Status calculation algorithm

Calculate SLA, acceptable SLA (in %)

Trigger

\* Sort order (0->999)

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Service name.
Parent service	Parent service the service belongs to.
Status calculation algorithm	Method of calculating service status: <b>Do not calculate</b> - do not calculate service status <b>Problem, if at least one child has a problem</b> - problem status, if at least one child service has a problem <b>Problem, if all children have problems</b> - problem status, if all child services are having problems
Calculate SLA	Enable SLA calculation and display.
Acceptable SLA (in %)	SLA percentage that is acceptable for this service. Used for reporting.
Trigger	Linkage to trigger: <b>None</b> - no linkage <b>trigger name</b> - linked to the trigger, thus depends on the trigger status Services of the lowest level must be linked to triggers. (Otherwise their state will not be represented accurately.) When triggers are linked, their state prior to linking is not counted.
Sort order	Sort order for display, lowest comes first.

The **Dependencies** tab contains services the service depends on. Click on Add to add a service from those that are configured.

Service **Dependencies 3** Time

Depends on

Services	Soft	Trigger
Server2	<input type="checkbox"/>	
Server3	<input checked="" type="checkbox"/>	
Server4	<input checked="" type="checkbox"/>	
<a href="#">Add .....</a>		

### Hard and soft dependency

Availability of a service may depend on several other services, not just one. The first option is to add all those directly as child services.

However, if some service is already added somewhere else in the services tree, it cannot be simply moved out of there to a child service here. How to create a dependency on it? The answer is "soft" linking. Add the service and mark the Soft check box. That way the service can remain in its original location in the tree, yet be depended upon from several other services. Services that are "soft-linked" are displayed in gray in the tree. Additionally, if a service has only "soft" dependencies, it can be deleted directly, without deleting child services first.

The **Time** tab contains the service time specification.

Parameter	Description
Service times	By default, all services are expected to operate 24x7x365. If exceptions needed, add new service times.
New service time	Service times: <b>Uptime</b> - service uptime <b>Downtime</b> - service state within this period does not affect SLA. <b>One-time downtime</b> - a single downtime. Service state within this period does not affect SLA. Add the respective hours. Note: Service times affect only the service they are configured for. Thus, a parent service will not take into account the service time configured on a child service (unless a corresponding service time is configured on the parent service as well). Service times are taken into account when calculating service status and SLA by the frontend. However, information on service availability is being inserted into database continuously, regardless of service times.

**Display** To monitor services, go to [Monitoring](#) → [Services](#).

## 9. Web monitoring

**Overview** With Zabbix you can check several availability aspects of web sites.

**Attention:**

To perform web monitoring Zabbix server must be initially **configured** with cURL (libcurl) support.

To activate web monitoring you need to define web scenarios. A web scenario consists of one or several HTTP requests or "steps". The steps are periodically executed by Zabbix server in a pre-defined order. If a host is monitored by proxy, the steps are executed by the proxy.

Since Zabbix 2.2 web scenarios are attached to hosts/templates in the same way as items, triggers, etc. That means that web scenarios can also be created on a template level and then applied to multiple hosts in one move.

The following information is collected in any web scenario:

- average download speed per second for all steps of whole scenario
- number of the step that failed
- last error message

The following information is collected in any web scenario step:

- download speed per second
- response time
- response code

For more details, see [web monitoring items](#).

Data collected from executing web scenarios is kept in the database. The data is automatically used for graphs, triggers and notifications.

Zabbix can also check if a retrieved HTML page contains a pre-defined string. It can execute a simulated login and follow a path of simulated mouse clicks on the page.

Zabbix web monitoring supports both HTTP and HTTPS. When running a web scenario, Zabbix will optionally follow redirects (see option Follow redirects below). Maximum number of redirects is hard-coded to 10 (using cURL option [CURLOPT\\_MAXREDIRS](#)). All cookies are preserved during the execution of a single scenario.

See also [known issues](#) for web monitoring using HTTPS protocol.

**Configuring a web scenario** To configure a web scenario:

- Go to: Configuration → Hosts (or Templates)
- Click on Web in the row of the host/template
- Click on Create scenario to the right (or on the scenario name to edit an existing scenario)
- Enter parameters of the scenario in the form

The **Scenario** tab allows you to configure the general parameters of a web scenario.

Scenario **Steps** Authentication

\* Name

Application

New application

\* Update interval

\* Attempts

Agent

HTTP proxy

Variables

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Add](#)

Headers

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Add](#)

Enabled

All mandatory input fields are marked with a red asterisk.

**Note:**

User macros are supported in many web scenario parameters, but secret macros should not be used in URLs as they will resolve as "\*\*\*\*\*" .

Scenario parameters:

Parameter	Description
Host	Name of the host/template that the scenario belongs to.
Name	Unique scenario name.
Application	Select an application the scenario will belong to. Web scenario items will be grouped under the selected application in Monitoring → Latest data.
New application	Enter the name of a new application for the scenario.

Parameter	Description
Update interval	<p>How often the scenario will be executed.</p> <p><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d, since Zabbix 3.4.0.</p> <p><b>User macros</b> are supported, since Zabbix 3.4.0.</p> <p>Note that if a user macro is used and its value is changed (e.g. 5m → 30s), the next check will be executed according to the previous value (farther in the future with the example values).</p>
Attempts	<p>The number of attempts for executing web scenario steps. In case of network problems (timeout, no connectivity, etc) Zabbix can repeat executing a step several times. The figure set will equally affect each step of the scenario. Up to 10 attempts can be specified, default value is 1.</p> <p>Note: Zabbix will not repeat a step because of a wrong response code or the mismatch of a required string.</p>
Agent	<p>This parameter is supported starting with Zabbix 2.2.</p> <p>Select a client agent.</p> <p>Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.</p>
HTTP proxy	<p>User macros can be used in this field, starting with Zabbix 2.2.</p> <p>You can specify an HTTP proxy to use, using the format <code>[protocol://] [username[:password]@]proxy.example.com[:port]</code>. This sets the <code>CURLOPT_PROXY</code> cURL option.</p> <p>The optional <code>protocol://</code> prefix may be used to specify alternative proxy protocols (the protocol prefix support was added in cURL 7.21.7). With no protocol specified, the proxy will be treated as an HTTP proxy.</p> <p>By default, 1080 port will be used.</p> <p>If specified, the proxy will overwrite proxy related environment variables like <code>http_proxy</code>, <code>HTTPS_PROXY</code>. If not specified, the proxy will not overwrite proxy-related environment variables. The entered value is passed on "as is", no sanity checking takes place. You may also enter a SOCKS proxy address. If you specify the wrong protocol, the connection will fail and the item will become unsupported.</p> <p>Note that only simple authentication is supported with HTTP proxy.</p> <p>User macros can be used in this field.</p>
Variables	<p>This parameter is supported starting with Zabbix 2.2.</p> <p>Variables that may be used in scenario steps (URL, post variables). They have the following format:</p> <p><b>{macro1}</b>=value1  <b>{macro2}</b>=value2  <b>{macro3}</b>=regex:&lt;regular expression&gt;</p> <p>For example:</p> <pre>{username}=Alexei {password}=kj3h5k]34bd {hostid}=regex:hostid is ([0-9]+)</pre> <p>The macros can then be referenced in the steps as <code>{username}</code>, <code>{password}</code> and <code>{hostid}</code>. Zabbix will automatically replace them with actual values. Note that variables with <code>regex:</code> need one step to get the value of the regular expression so the extracted value can only be applied to the step after.</p> <p>If the value part starts with <code>regex:</code> then the part after it is treated as a regular expression that searches the web page and, if found, stores the match in the variable. At least one subgroup must be present so that the matched value can be extracted.</p> <p>Regular expression match in variables is supported since Zabbix 2.2.</p> <p>User macros and <code>{HOST.*}</code> <b>macros</b> are supported, since Zabbix 2.2. Variables are automatically URL-encoded when used in query fields or form data for post variables, but must be URL-encoded manually when used in raw post or directly in URL.</p>

Parameter	Description
Headers	<p>Custom HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol, optionally using some additional features supported by the <a href="#">CURLOPT_HTTPHEADER</a> cURL option. For example:</p> <pre>Accept-Charset=utf-8 Accept-Language=en-US Content-Type=application/xml; charset=utf-8</pre> <p>User macros and {HOST.*} <b>macros</b> are supported. Specifying custom headers is supported starting with Zabbix 2.4.</p>
Enabled	The scenario is active if this box is checked, otherwise - disabled.

Note that when editing an existing scenario, two extra buttons are available in the form:

Clone	Create another scenario based on the properties of the existing one.
Clear history and trends	Delete history and trend data for the scenario. This will make the server perform the scenario immediately after deleting the data.

**Note:**

If HTTP proxy field is left empty, another way for using an HTTP proxy is to set proxy related environment variables. For HTTP checks - set the **http\_proxy** environment variable for the Zabbix server user. For example, `//http_proxy=http://%%/%%proxy_ip:proxy_port//`. For HTTPS checks - set the **HTTPS\_PROXY** environment variable. For example, `//HTTPS_PROXY=http://%%/%%proxy_ip:proxy_port//`. More details are available by running a shell command: `# man curl`.

The **Steps** tab allows you to configure the web scenario steps. To add a web scenario step, click on Add in the Steps block.

Scenario		Steps 2	Authentication		
* Steps	Name	Timeout	URL	Required	Status
	1: Home	15s	http://www.google.com		200
	2: About	15s	http://www.google.com/intl/en/about		200
Add					

### Step of web scenario ✕

**\* Name**

**\* URL**  Parse

**Query fields**

Name	⇒	Value	
<input style="width: 90%;" type="text" value="name"/>	⇒	<input style="width: 90%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Post type** Form data Raw data

**Post fields**

Name	⇒	Value	
<input style="width: 90%;" type="text" value="name"/>	⇒	<input style="width: 90%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Variables**

Name	⇒	Value	
<input style="width: 90%;" type="text" value="name"/>	⇒	<input style="width: 90%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Headers**

Name	⇒	Value	
<input style="width: 90%;" type="text" value="name"/>	⇒	<input style="width: 90%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Follow redirects**

**Retrieve mode** Body Headers Body and headers

**\* Timeout**

**Required string**

**Required status codes**

Update
Cancel

#### Configuring steps

Step parameters:

Parameter	Description
Name	Unique step name.

Parameter	Description
URL	<p>URL to connect to and retrieve data. For example:  <a href="https://www.google.com">https://www.google.com</a>  <a href="http://www.zabbix.com/download">http://www.zabbix.com/download</a></p> <p>Domain names can be specified in Unicode characters since Zabbix 3.4. They are automatically punycode-converted to ASCII when executing the web scenario step.</p> <p>The Parse button can be used to separate optional query fields (like <code>?name=Admin&amp;password=myspassword</code>) from the URL, moving the attributes and values into Query fields for automatic URL-encoding. Variables can be used in the URL, using the <code>{macro}</code> syntax. Variables can be URL-encoded manually using a <code>{{macro}}.urlencode()</code> syntax.</p> <p>User macros and <code>{HOST.*}</code> macros are supported, since Zabbix 2.2. Limited to 2048 characters starting with Zabbix 2.4.</p>
Query fields	<p>HTTP GET variables for the URL.</p> <p>Specified as attribute and value pairs.</p> <p>Values are URL-encoded automatically. Values from scenario variables, user macros or <code>{HOST.*}</code> macros are resolved and then URL-encoded automatically. Using a <code>{{macro}}.urlencode()</code> syntax will double URL-encode them.</p>
Post	<p>User macros and <code>{HOST.*}</code> macros are supported since Zabbix 2.2. HTTP POST variables.</p> <p>In <b>Form data</b> mode, specified as attribute and value pairs. Values are URL-encoded automatically. Values from scenario variables, user macros or <code>{HOST.*}</code> macros are resolved and then URL-encoded automatically.</p> <p>In <b>Raw data</b> mode, attributes/values are displayed on a single line and concatenated with a <code>&amp;</code> symbol.</p> <p>Raw values can be URL-encoded/decoded manually using a <code>{{macro}}.urlencode()</code> or <code>{{macro}}.urldecode()</code> syntax.</p> <p>For example: <code>id=2345&amp;userid={user}</code></p> <p>If <code>{user}</code> is defined as a variable of the web scenario, it will be replaced by its value when the step is executed. If you wish to URL-encode the variable, substitute <code>{user}</code> with <code>{{user}}.urlencode()</code>.</p>
Variables	<p>User macros and <code>{HOST.*}</code> macros are supported, since Zabbix 2.2.</p> <p>Step-level variables that may be used for GET and POST functions. Specified as attribute and value pairs.</p> <p>Step-level variables override scenario-level variables or variables from the previous step. However, the value of a step-level variable only affects the step after (and not the current step).</p> <p>They have the following format:</p> <p><b>{macro}=value</b>  <b>{macro}=regex:&lt;regular expression&gt;</b></p> <p>For more information see variable description on the <b>scenario</b> level. Having step-level variables is supported since Zabbix 2.2.</p> <p>Variables are automatically URL-encoded when used in query fields or form data for post variables, but must be URL-encoded manually when used in raw post or directly in URL.</p>
Headers	<p>Custom HTTP headers that will be sent when performing a request. Specified as attribute and value pairs.</p> <p>Headers on the step level will overwrite the headers specified for the scenario.</p> <p>For example, setting a 'User-Agent' attribute with no value will remove the User-Agent value set on scenario level.</p> <p>User macros and <code>{HOST.*}</code> macros are supported.</p> <p>This sets the <code>CURLOPT_HTTPHEADER</code> cURL option.</p> <p>Specifying custom headers is supported starting with Zabbix 2.4.</p>
Follow redirects	<p>Mark the checkbox to follow HTTP redirects.</p> <p>This sets the <code>CURLOPT_FOLLOWLOCATION</code> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>



Parameter	Description
Retrieve mode	Select the retrieve mode: <b>Body</b> - retrieve only body from the HTTP response <b>Headers</b> - retrieve only headers from the HTTP response <b>Body and headers</b> - retrieve body and headers from the HTTP response
Timeout	This option is supported since Zabbix 4.2. Zabbix will not spend more than the set amount of time on processing the URL (from one second to maximum of 1 hour). Actually this parameter defines the maximum time for making connection to the URL and maximum time for performing an HTTP request. Therefore, Zabbix will not spend more than <b>2 x Timeout</b> seconds on the step. Time suffixes are supported, e.g. 30s, 1m, 1h. User macros are supported.
Required string	Required regular expression pattern. Unless retrieved content (HTML) matches the required pattern the step will fail. If empty, no check on required string is performed. For example: Homepage of Zabbix Welcome.*admin Note: Referencing regular expressions created in the Zabbix frontend is not supported in this field.
Required status codes	User macros and {HOST.*} macros are supported, since Zabbix 2.2. List of expected HTTP status codes. If Zabbix gets a code which is not in the list, the step will fail. If empty, no check on status codes is performed. For example: 200,201,210-299 User macros are supported since Zabbix 2.2.

**Note:**

Any changes in web scenario steps will only be saved when the whole scenario is saved.

See also a [real-life example](#) of how web monitoring steps can be configured.

**Configuring authentication** The **Authentication** tab allows you to configure scenario authentication options. A green dot next to the tab name indicates that some type of HTTP authentication is enabled.

Authentication parameters:

Parameter	Description
Authentication	<p>Authentication options.</p> <p><b>None</b> - no authentication used.</p> <p><b>Basic</b> - basic authentication is used.</p> <p><b>NTLM</b> - NTLM (<a href="#">Windows NT LAN Manager</a>) authentication is used.</p> <p><b>Kerberos</b> - Kerberos authentication is used. See also: <a href="#">Configuring Kerberos with Zabbix</a>.</p> <p><b>Digest</b> - Digest authentication is used.</p> <p>Selecting an authentication method will provide two additional fields for entering a user name and password.</p> <p>User macros can be used in user and password fields, starting with Zabbix 2.2.</p>
SSL verify peer	<p>Mark the checkbox to verify the SSL certificate of the web server. The server certificate will be automatically taken from system-wide certificate authority (CA) location. You can override the location of CA files using Zabbix server or proxy configuration parameter <a href="#">SSLCAlocation</a>.</p> <p>This sets the <a href="#">CURLOPT_SSL_VERIFYPEER</a> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>
SSL verify host	<p>Mark the checkbox to verify that the Common Name field or the Subject Alternate Name field of the web server certificate matches. This sets the <a href="#">CURLOPT_SSL_VERIFYHOST</a> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>
SSL certificate file	<p>Name of the SSL certificate file used for client authentication. The certificate file must be in PEM<sup>1</sup> format. If the certificate file contains also the private key, leave the SSL key file field empty. If the key is encrypted, specify the password in SSL key password field. The directory containing this file is specified by Zabbix server or proxy configuration parameter <a href="#">SSLCertLocation</a>.</p> <p>HOST.* macros and user macros can be used in this field.</p> <p>This sets the <a href="#">CURLOPT_SSLCERT</a> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>
SSL key file	<p>Name of the SSL private key file used for client authentication. The private key file must be in PEM<sup>1</sup> format. The directory containing this file is specified by Zabbix server or proxy configuration parameter <a href="#">SSLKeyLocation</a>.</p> <p>HOST.* macros and user macros can be used in this field.</p> <p>This sets the <a href="#">CURLOPT_SSLKEY</a> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>
SSL key password	<p>SSL private key file password.</p> <p>User macros can be used in this field.</p> <p>This sets the <a href="#">CURLOPT_KEYPASSWD</a> cURL option.</p> <p>This option is supported starting with Zabbix 2.4.</p>

**Attention:**

[1] Zabbix supports certificate and private key files in PEM format only. In case you have your certificate and private key data in PKCS #12 format file (usually with extension \*.p12 or \*.pfx) you may generate the PEM file from it using the following commands:

```
openssl pkcs12 -in ssl-cert.p12 -clcerts -nokeys -out ssl-cert.pem
openssl pkcs12 -in ssl-cert.p12 -nocerts -nodes -out ssl-cert.key
```

**Note:**

Zabbix server picks up changes in certificates without a restart.

**Note:**

If you have client certificate and private key in a single file just specify it in a "SSL certificate file" field and leave "SSL key file" field empty. The certificate and key must still be in PEM format. Combining certificate and key is easy:

```
cat client.crt client.key > client.pem
```

**Display** To view web scenarios configured for a host, go to Monitoring → Hosts, locate the host in the list and click on the Web hyperlink in the last column. Click on the scenario name to get detailed information.

Details of web scenario: Zabbix frontend



An overview of web scenarios can also be displayed in Monitoring → Dashboard by a Web monitoring widget.

Recent results of the web scenario execution are available in the Monitoring → Latest data section.

**Extended monitoring** Sometimes it is necessary to log received HTML page content. This is especially useful if some web scenario step fails. Debug level 5 (trace) serves that purpose. This level can be set in `server` and `proxy` configuration files or using a runtime control option (`-R log_level_increase="http poller,N"`, where N is the process number). The following examples demonstrate how extended monitoring can be started provided debug level 4 is already set:

```
Increase log level of all http pollers:
shell> zabbix_server -R log_level_increase="http poller"
```

```
Increase log level of second http poller:
shell> zabbix_server -R log_level_increase="http poller,2"
```

If extended web monitoring is not required it can be stopped using the `-R log_level_decrease` option.

**1 Web monitoring items**

## Overview

Some new items are automatically added for monitoring when web scenarios are created.

### Scenario items

As soon as a scenario is created, Zabbix automatically adds the following items for monitoring, linking them to the selected application.

Item	Description
Download speed for scenario <Scenario>	This item will collect information about the download speed (bytes per second) of the whole scenario, i.e. average for all steps. Item key: web.test.in[Scenario,,bps] Type: Numeric(float)
Failed step of scenario <Scenario>	This item will display the number of the step that failed on the scenario. If all steps are executed successfully, 0 is returned. Item key: web.test.fail[Scenario] Type: Numeric(unsigned)
Last error message of scenario <Scenario>	This item returns the last error message text of the scenario. A new value is stored only if the scenario has a failed step. If all steps are ok, no new value is collected. Item key: web.test.error[Scenario] Type: Character

The actual scenario name will be used instead of "Scenario".

**Note:**

Web monitoring items are added with a 30 day history and a 90 day trend retention period.

**Note:**

If scenario name starts with a doublequote or contains comma or square bracket, it will be properly quoted in item keys. In other cases no additional quoting will be performed.

These items can be used to create triggers and define notification conditions.

#### Example 1

To create a "Web scenario failed" trigger, you can define a trigger expression:

```
{host:web.test.fail[Scenario].last()}<>0
```

Make sure to replace 'Scenario' with the real name of your scenario.

#### Example 2

To create a "Web scenario failed" trigger with a useful problem description in the trigger name, you can define a trigger with name:

```
Web scenario "Scenario" failed: {ITEM.VALUE}
```

and trigger expression:

```
{host:web.test.error[Scenario].strlen()}>0 and {host:web.test.fail[Scenario].last()}>0
```

Make sure to replace 'Scenario' with the real name of your scenario.

#### Example 3

To create a "Web application is slow" trigger, you can define a trigger expression:

```
{host:web.test.in[Scenario,,bps].last()}<10000
```

Make sure to replace 'Scenario' with the real name of your scenario.

### Scenario step items

As soon as a step is created, Zabbix automatically adds the following items for monitoring, linking them to the selected application.

Item	Description
Download speed for step <Step> of scenario <Scenario>	This item will collect information about the download speed (bytes per second) of the step. Item key: web.test.in[Scenario,Step,bps] Type: Numeric(float)
Response time for step <Step> of scenario <Scenario>	This item will collect information about the response time of the step in seconds. Response time is counted from the beginning of the request until all information has been transferred. Item key: web.test.time[Scenario,Step,resp] Type: Numeric(float)
Response code for step <Step> of scenario <Scenario>	This item will collect response codes of the step. Item key: web.test.rspcode[Scenario,Step] Type: Numeric(unsigned)

Actual scenario and step names will be used instead of "Scenario" and "Step" respectively.

**Note:**

Web monitoring items are added with a 30 day history and a 90 day trend retention period.

**Note:**

If scenario name starts with a doublequote or contains comma or square bracket, it will be properly quoted in item keys. In other cases no additional quoting will be performed.

These items can be used to create triggers and define notification conditions. For example, to create a "Zabbix GUI login is too slow" trigger, you can define a trigger expression:

```
{zabbix:web.test.time[ZABBIX GUI,Login,resp].last()}>3
```

## 2 Real life scenario

### Overview

This section presents a step-by-step real-life example of how web monitoring can be used.

Let's use Zabbix web monitoring to monitor the web interface of Zabbix. We want to know if it is available, provides the right content and how quickly it works. To do that we also must log in with our user name and password.

### Scenario

#### Step 1

Add a new web scenario.

We will add a scenario to monitor the web interface of Zabbix. The scenario will execute a number of steps.

Go to Configuration → Hosts, pick a host and click on Web in the row of that host. Then click on Create web scenario.

Scenario **Steps** Authentication

\* Name

Application

New application

\* Update interval

\* Attempts

Agent

HTTP proxy

Variables

Name	Value	Rem
<input type="text" value="{password}"/>	⇒ <input type="text" value="zabbix"/>	<a href="#">Rem</a>
<input type="text" value="{user}"/>	⇒ <input type="text" value="Admin"/>	<a href="#">Rem</a>

[Add](#)

Headers

Name	Value	Rem
<input type="text" value="name"/>	⇒ <input type="text" value="value"/>	<a href="#">Rem</a>

[Add](#)

Enabled

All mandatory input fields are marked with a red asterisk.

In the new scenario form we will name the scenario as Zabbix frontend and create a new Zabbix frontend application for it.

Note that we will also create two variables: {user} and {password}.

#### Step 2

Define steps for the scenario.

Click on Add button in the Steps tab to add individual steps.

#### Web scenario step 1

We start by checking that the first page responds correctly, returns with HTTP response code 200 and contains text "Zabbix SIA".

### Step of web scenario ✕

**\* Name**

**\* URL**

**Query fields**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Post type**

**Post fields**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Variables**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Headers**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Follow redirects**

**Retrieve mode**

**\* Timeout**

**Required string**

**Required status codes**

When done configuring the step, click on Add.

Web scenario step 2

We continue by logging in to the Zabbix frontend, and we do so by reusing the macros (variables) we defined on the scenario level - {user} and {password}.

### Step of web scenario ✕

**\* Name**

**\* URL**

**Query fields**

Name	Value	
<input type="text" value="name"/>	⇒ <input type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>		

**Post type**

**Post fields**

Name	Value	
<input type="text" value="name"/>	⇒ <input style="border: 1px solid #ccc;" type="text" value="{user}"/>	<a href="#">Remove</a>
<input type="text" value="password"/>	⇒ <input style="border: 1px solid #ccc;" type="text" value="{password}"/>	<a href="#">Remove</a>
<input type="text" value="enter"/>	⇒ <input style="border: 1px solid #ccc;" type="text" value="Sign in"/>	<a href="#">Remove</a>
<a href="#">Add</a>		

**Variables**

Name	Value	
<input style="border: 1px solid #ccc;" type="text" value="{sid}"/>	⇒ <input content='\"([0-\"' csrf-token\"="" style="border: 1px solid #ccc;" type="text" value="regex:name=\"/>	<a href="#">Remove</a>
<a href="#">Add</a>		

**Headers**

Name	Value	
<input type="text" value="name"/>	⇒ <input type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>		

**Follow redirects**

**Retrieve mode**

**\* Timeout**

**Required string**

**Required status codes**

**Attention:** Note that Zabbix frontend uses JavaScript redirect when logging in, thus first we must log in, and only in further steps we may check for logged-in features. Additionally, the login step must use full URL to **index.php** file.

Take note also of how we are getting the content of the {sid} variable (session ID) using a variable syntax with regular expression: `regex:name="csrf-token" content="([0-9a-z]{16})"`. This variable will be required in step 4.

Web scenario step 3



Being logged in, we should now verify the fact. To do so, we check for a string that is only visible when logged in - for example, **Administration**.

### Step of web scenario ✕

\* Name

\* URL

Query fields

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Remove](#)

[Add](#)

Post type  Form data  Raw data

Post fields

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Remove](#)

[Add](#)

Variables

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Remove](#)

[Add](#)

Headers

Name	Value
<input type="text" value="name"/>	<input type="text" value="value"/>

[Remove](#)

[Add](#)

Follow redirects

Retrieve mode  Body  Headers  Body and headers

\* Timeout

Required string

Required status codes

#### Web scenario step 4

Now that we have verified that frontend is accessible and we can log in and retrieve logged-in content, we should also log out - otherwise Zabbix database will become polluted with lots and lots of open session records.

### Step of web scenario ✕

**\* Name**

**\* URL**

**Query fields**

Name	⇒	Value	
<input type="text" value="sid"/>	⇒	<input style="border: 1px solid #ccc; width: 100%;" type="text" value="{sid}"/>	<a href="#">Remove</a>
<input type="text" value="reconnect"/>	⇒	<input style="border: 1px solid #ccc; width: 100%;" type="text" value="1"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Post type**

**Post fields**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input style="border: 1px solid #ccc; width: 100%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Variables**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input style="border: 1px solid #ccc; width: 100%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Headers**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input style="border: 1px solid #ccc; width: 100%;" type="text" value="value"/>	<a href="#">Remove</a>
<a href="#">Add</a>			

**Follow redirects**

**Retrieve mode**

**\* Timeout**

**Required string**

**Required status codes**

Web scenario step 5

We can also check that we have logged out by looking for the **Username** string.

### Step of web scenario ✕

**\* Name**

**\* URL**

**Query fields**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Post type**  Form data  Raw data

**Post fields**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Variables**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Headers**

Name	⇒	Value	
<input type="text" value="name"/>	⇒	<input type="text" value="value"/>	<a href="#">Remove</a>

[Add](#)

**Follow redirects**

**Retrieve mode**  Body  Headers  Body and headers

**\* Timeout**

**Required string**

**Required status codes**

Complete configuration of steps

A complete configuration of web scenario steps should look like this:

Scenario **Steps 5** Authentication

• Steps

Name	Timeout	URL	Required	Status codes	Action
1: <a href="#">First page</a>	15s	http://localhost/zabbix/index.php	Zabbix SIA	200	<a href="#">Remove</a>
2: <a href="#">Log in</a>	15s	http://localhost/zabbix/index.php		200	<a href="#">Remove</a>
3: <a href="#">Login check</a>	15s	http://localhost/zabbix/index.php	Administration	200	<a href="#">Remove</a>
4: <a href="#">Log out</a>	15s	http://localhost/zabbix/index.php		200	<a href="#">Remove</a>
5: <a href="#">Logout check</a>	15s	http://localhost/zabbix/index.php	Username	200	<a href="#">Remove</a>
<a href="#">Add</a>					

### Step 3

Save the finished web monitoring scenario.

The scenario will be added to a host. To view web scenario information go to Monitoring → Hosts, locate the host in the list and click on the Web hyperlink in the last column.

Web monitoring Filter

Host groups

Hosts

Host	Name	Number of steps	Last check	Status
<a href="#">Zabbix server</a>	<a href="#">Zabbix frontend</a>	1	2020-08-28 10:13:23	OK

Displaying 1 of 1 found

Click on the scenario name to see more detailed statistics:

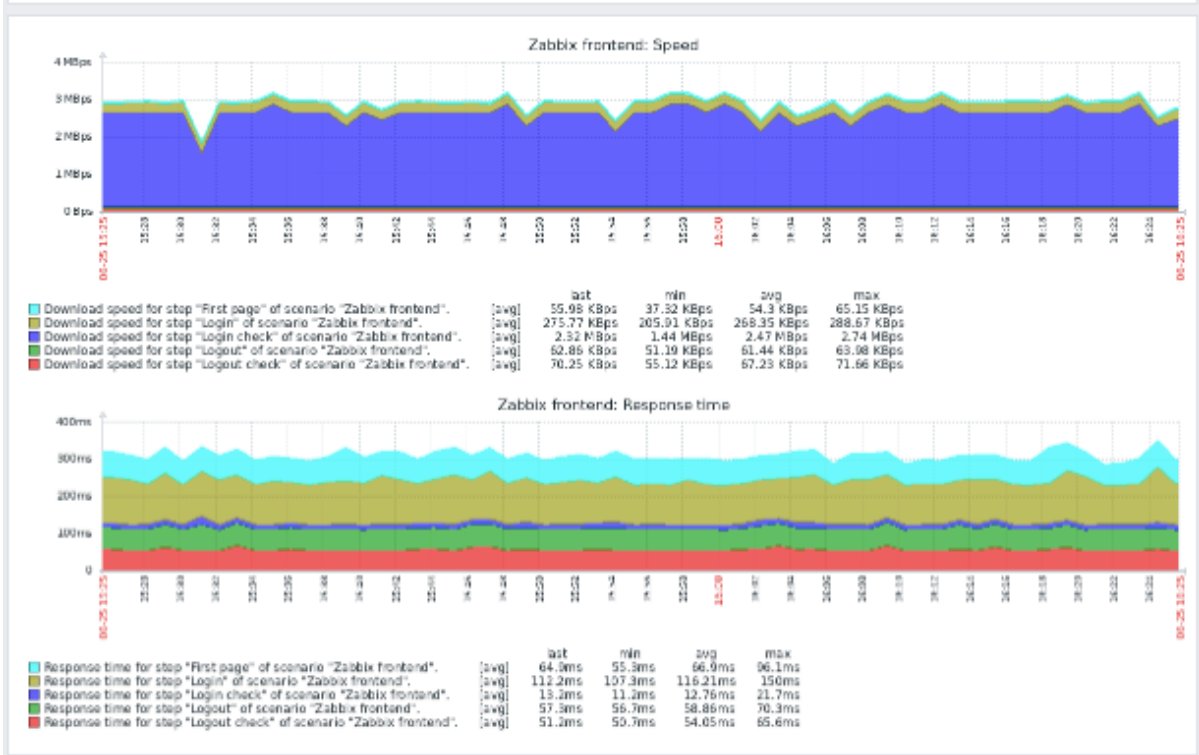


Step	Speed	Response time	Response code	Status
First page	55.98 KBps	64.9ms	200	OK
Login	275.77 KBps	112.2ms	200	OK
Login check	2.32 MBps	13.2ms	200	OK
Logout	62.86 KBps	57.3ms	200	OK
Logout check	70.25 KBps	51.2ms	200	OK
<b>TOTAL</b>		<b>298.8ms</b>		<b>OK</b>

From:  To:

Zoom out | Last 1 hour

- Last 2 days: Yesterday, Today, Last 5 minutes
- Last 7 days: Day before yesterday, Today so far, Last 15 minutes
- Last 30 days: This day last week, This week, Last 30 minutes
- Last 3 months: Previous week, This week so far, **Last 1 hour**
- Last 6 months: Previous month, This month, Last 3 hours
- Last 1 year: Previous year, This month so far, Last 6 hours
- Last 2 years: This year, Last 12 hours, This year so far, Last 1 day



## 10. Virtual machine monitoring

**Overview** Support of monitoring VMware environments is available in Zabbix starting with version 2.2.0.

Zabbix can use low-level discovery rules to automatically discover VMware hypervisors and virtual machines and create hosts to monitor them, based on pre-defined host prototypes.

The default dataset in Zabbix offers several ready-to-use templates for monitoring VMware vCenter or ESX hypervisor.

The minimum required VMware vCenter or vSphere version is 5.1.

**Details** The virtual machine monitoring is done in two steps. First, virtual machine data is gathered by vmware collector Zabbix processes. Those processes obtain necessary information from VMware web services over the SOAP protocol, pre-process it and store into Zabbix server shared memory. Then, this data is retrieved by pollers using Zabbix simple check **VMware keys**.

Starting with Zabbix version 2.4.4 the collected data is divided into 2 types: VMware configuration data and VMware performance counter data. Both types are collected independently by vmware collectors. Because of this it is recommended to enable more collectors than the monitored VMware services. Otherwise retrieval of VMware performance counter statistics might be delayed by the retrieval of VMware configuration data (which takes a while for large installations).

Currently only datastore, network interface and disk device statistics and custom performance counter items are based on the VMware performance counter information.

**Configuration** For virtual machine monitoring to work, Zabbix should be **compiled** with the `--with-libxml2` and `--with-libcurl` compilation options.

The following configuration file options can be used to tune the Virtual machine monitoring:

- **StartVMwareCollectors** - the number of pre-forked vmware collector instances.  
This value depends on the number of VMware services you are going to monitor. For the most cases this should be:  $\text{servicenum} < \text{StartVMwareCollectors} < (\text{servicenum} * 2)$  where `servicenum` is the number of VMware services. E. g. if you have 1 VMware service to monitor set `StartVMwareCollectors` to 2, if you have 3 VMware services, set it to 5. Note that in most cases this value should not be less than 2 and should not be 2 times greater than the number of VMware services that you monitor. Also keep in mind that this value also depends on your VMware environment size and `VMwareFrequency` and `VMwarePerfFrequency` configuration parameters (see below).
- **VMwareCacheSize**
- **VMwareFrequency**
- **VMwarePerfFrequency**
- **VMwareTimeout**

For more details, see the configuration file pages for Zabbix [server](#) and [proxy](#).

**Attention:**

To support datastore capacity metrics Zabbix requires VMware configuration `vpxd.stats.maxQueryMetrics` parameter to be at least 64. See also the VMware knowledge base [article](#).

**Discovery** Zabbix can use a low-level discovery rule to automatically discover VMware hypervisors and virtual machines.

Discovery rule   Preprocessing   LLD macros   Filters   Overrides

\* Name

Type

\* Key

User name

Password

\* Update interval

Custom intervals

Type	Interval	Period	
Flexible	Scheduling	50s	1-7,00:00-24:00

[Add](#)

\* Keep lost resources period

Description

Enabled

All mandatory input fields are marked with a red asterisk.

The discovery rule key in the above screenshot is `vmware.hv.discovery[{$URL}]`.

**Host prototypes** Host prototypes can be created with the low-level discovery rule. When virtual machines are discovered, these prototypes become real hosts. Prototypes, before becoming discovered, cannot have their own items and triggers, other than those from the linked templates. Discovered hosts will belong to an existing host.

## Discovery rules

All templates / VMware					Applications 1	Items 3	Triggers	Graphs	Dashboards	Discovery rules	
<input type="checkbox"/>	Host	Name ▲								Items	Triggers
<input type="checkbox"/>	VMware	Discover VMware clusters								Item prototypes 1	Trigger p
<input type="checkbox"/>	VMware	Discover VMware datastores								Item prototypes 4	Trigger p
<input type="checkbox"/>	VMware	Discover VMware hypervisors								Item prototypes	Trigger p
<input type="checkbox"/>	VMware	Discover VMware VMs								Item prototypes	Trigger p

In order for hosts created from a prototype to have unique host names, the Host name field must contain at least one **low-level discovery macro**.

Since Zabbix 5.2, discovered hosts may be configured with custom interfaces or inherit the IP of a host the discovery rule belongs to (default). To add one or more custom interface, switch the Interface selector from Inherit to Custom mode, then press [Add](#) and select the required interface type from the drop-down menu that appears. All supported types of interfaces can be defined for a host prototype: Zabbix agent, SNMP, JMX, IPMI. Interface fields support low-level discovery macros and **user macros**. If several custom interfaces are specified - use the Default column to specify the primary interface.

Notes:

- If Custom is selected, but no interfaces have been specified the hosts will be created without interfaces.
- If Inherit is selected for a host prototype that belongs to a template, discovered hosts will inherit the interface of a host to which the template is linked to.

**Warning:**

A host will not be created if the host interface contains incorrect data.

Type	IP address	DNS name	Connect to	Port	Default
Agent	198.51.100.0		IP DNS	10050	<input checked="" type="radio"/> Remove
Agent		{#LLDMACRO}	IP DNS	10051	<input type="radio"/> Remove

LLD macros can also be used for the visible name, host group prototype fields, tag values, or values of host prototype user macros.

Other options that can be specified for a host prototype are:

- Linkage to existing host groups
- Template linkage
- Encryption

If Create enabled is checked, the host will be added in an enabled state. If unchecked, the host will be added, but in a disabled state.

If Discover is checked (default), the host will be created. If unchecked, the host will not be created, unless this setting is overridden in the **discovery rule**. This functionality provides additional flexibility when creating discovery rules.

Discovered hosts are prefixed with the name of the discovery rule that created them, in the host list. Discovered hosts can be manually deleted. Discovered hosts will also be automatically deleted, based on the Keep lost resources period (in days) value of the discovery rule. Most of the configuration options are read-only, except for enabling/disabling the host and host inventory. Discovered hosts cannot have host prototypes of their own.

**Ready-to-use templates** The default dataset in Zabbix offers several ready-to-use templates for monitoring VMware vCenter or directly ESX hypervisor. These templates contain pre-configured LLD rules as well as a number of built-in checks for monitoring virtual installations.

Templates for VMware vCenter and ESX hypervisor monitoring:

- VMware - uses UUID data for corresponding macros;
- VMware FQDN - uses FQDN data for corresponding macros (available since Zabbix 5.2.2).



**Note:**

In order for the VMware FQDN template to work correctly each monitored VM should have a unique OS name compliant with FQDN rules and VMware Tools must be installed on every machine. If these conditions are met, it is recommended to use VMware FQDN template. The creation of VMware FQDN template became possible after introducing the ability to create hosts with custom interfaces in Zabbix 5.2.

A classic VMware template is still available and can be used if FQDN requirements cannot be met. Please keep in mind, that the VMware template has a known issue. Hosts for discovered virtual machines will be created with the names saved in the vCenter (for example, VM1, VM2, etc.). If Zabbix agent active is installed on these hosts later with autoregistration enabled, the autoregistration process will read host names as they have been registered upon launch (for example, vm1.example.com, vm2.example.com, etc.) and create new hosts since no name matches have been found. As a result there will be two duplicate hosts for each machine with different names.

Templates used by discovery (normally, these templates should not be manually linked to a host):

- VMware Hypervisor;
- VMware Guest.

## Templates

<input type="checkbox"/> Name ▲	Hosts	Applications	Items	Triggers
<input type="checkbox"/> VMware	Hosts	Applications 1	Items 3	Triggers
<input type="checkbox"/> VMware FQDN	Hosts	Applications 1	Items 3	Triggers
<input type="checkbox"/> VMware Guest	Hosts	Applications 1	Items 19	Triggers 1
<input type="checkbox"/> VMware Hypervisor	Hosts	Applications 1	Items 22	Triggers 6
<input type="checkbox"/> VMware macros	Hosts	Applications	Items	Triggers

**Host configuration** To use VMware simple checks the host must have the following user macros defined:

- **{ \$VMWARE.URL }** - VMware service (vCenter or ESX hypervisor) SDK URL (<https://servername/sdk>)
- **{ \$VMWARE.USERNAME }** - VMware service user name
- **{ \$VMWARE.PASSWORD }** - VMware service { \$VMWARE.USERNAME } user password

**Example** The following example demonstrates how to quickly setup VMware monitoring on Zabbix:

- compile zabbix server with required options (--with-libxml2 and --with-libcurl)
- set the StartVMwareCollectors option in Zabbix server configuration file to 1 or more
- create a new host
- set the host macros required for VMware authentication:

```
{{...:assets:en:manual:vm_monitoring:vm_host_macros.png|}}
```

\* Link the host to the VMware service template:

```
{{...:assets:en:manual:vm_monitoring:vm_host_templates.png|}}
```

\* Click on the //Add// button to save the host

**Extended logging** The data gathered by VMware collector can be logged for detailed debugging using debug level 5. This level can be set in **server** and **proxy** configuration files or using a runtime control option (-R log\_level\_increase="vmware collector,N", where N is a process number). The following examples demonstrate how extended logging can be started provided debug level 4 is already set:

Increase log level of all vmware collectors:

```
shell> zabbix_server -R log_level_increase="vmware collector"
```

Increase log level of second vmware collector:

```
shell> zabbix_server -R log_level_increase="vmware collector,2"
```

If extended logging of VMware collector data is not required it can be stopped using the `-R log_level_decrease` option.

### Troubleshooting

- In case of unavailable metrics, please make sure if they are not made unavailable or turned off by default in recent VMware vSphere versions or if some limits are not placed on performance-metric database queries. See [ZBX-12094](#) for additional details.
- In case of 'config.vpxd.stats.maxQueryMetrics' is invalid or exceeds the maximum number of characters permitted\*\* error, add a `config.vpxd.stats.maxQueryMetrics` parameter to the vCenter Server settings. The value of this parameter should be the same as the value of `maxQuerysize` in VMware's `web.xml`. See this VMware knowledge base [article](#) for details.

### 1 Virtual machine discovery key fields

The following table lists fields returned by virtual machine related discovery keys.

Item key	Description	Field	Retrieved content
vmware.cluster.discovery	Performs cluster discovery.	{#CLUSTER.ID}	Cluster identifier.
		{#CLUSTER.NAME}	Cluster name.
vmware.datastore.discovery	Performs datastore discovery.	{#DATASTORE.ID}	Datastore name.
		{#DATASTORE.PATH}	Path to the object with an array of {instance-Name:partitionId}. Supported since Zabbix 5.2.5.
vmware.dc.discovery	Performs datacenter discovery.	{#DATACENTER.ID}	Datacenter name.
		{#DATACENTER.ID}	Datacenter ID.
vmware.hv.discovery	Performs hypervisor discovery.	{#HV.UUID}	Unique hypervisor identifier.
		{#HV.ID}	Hypervisor identifier (Host-System managed object name).

---

**Item key**

---

{#HV.NAME} Hypervisor name.

{#HV.IP} Hypervisor IP address, might be empty. Supported since Zabbix 5.2.2.

{#DATACENTER.NAME} name.

{#CLUSTER.NAME} name, might be empty.

{#PARENT.NAME} name of container that stores the hypervisor. Supported since Zabbix 4.0.3.

{#PARENT.TYPE} type of container in which the hypervisor is stored. The values could be Datacenter, Folder, ClusterComputerResources, VMware, where 'VMware' stands for unknown container type. Supported since Zabbix 4.0.3.

vmware.hv.datastore.discovery

Performs hypervisor datastore discovery. Note that multiple hypervisors can use the same datastore. {#DATASTORE} Datastore name.

---

**Item key**

---

vmware.vm.discovery  
Performs virtual machine discovery.

{#MULTIPATH} ~~REGIONS~~  
number  
of data-  
store  
paths.  
Supported  
since  
Zabbix  
5.2.5.

{#MULTIPATH} ~~NUMPARTITION~~.COUNT}  
of  
available  
disk par-  
titions.  
Supported  
since  
Zabbix  
5.2.5.

{#VM.UUID} Unique  
virtual  
machine  
identi-  
fier.

{#VM.ID} Virtual  
machine  
identifier  
(Virtual-  
Machine  
man-  
aged  
object  
name).

{#VM.NAME} Virtual  
machine  
name.

{#HV.NAME} Hypervisor  
name.

{#DATACENTER} ~~DATA NAME~~  
name.

{#CLUSTER} ~~NAME~~  
name,  
might be  
empty.

{#VM.IP} Virtual  
machine  
IP  
address,  
might be  
empty.  
Supported  
since  
Zabbix  
5.2.2.

---

**Item key**

---

{#VM.DNS} Virtual machine DNS name, might be empty. Supported since Zabbix 5.2.2.

{#VM.GUESTFAMILY} virtual machine OS family, might be empty. Supported since Zabbix 5.2.2.

{#VM.GUESTFULLNAME} guest virtual machine OS name, might be empty. Supported since Zabbix 5.2.2.

{#VM.FOLDERS} chain of virtual machine parent folders, can be used as value for nested groups; folder names are combined with "/". Might be empty. Supported since Zabbix 5.2.7.

vmware.vm.net.if.discovery  
Performs virtual machine network interface discovery.

{#IFNAME} Network interface name.

vmware.vm.vfs.dev.discovery

---

**Item key**

Performs virtual machine disk device discovery.	{#DISKNAME} disk device name.
vmware.vm.vfs.fs.discovery Performs virtual machine file system discovery.	{#FSNAME} File system name.

---

## 11. Maintenance

**Overview** You can define maintenance periods for host groups, hosts and specific triggers/services in Zabbix.

There are two maintenance types - with data collection and with no data collection.

During a maintenance "with data collection" triggers are processed as usual and events are created when required. However, problem escalations are paused for hosts/triggers in maintenance, if the Pause operations for suppressed problems option is checked in action configuration. In this case, escalation steps that may include sending notifications or remote commands will be ignored for as long as the maintenance period lasts. Note that problem recovery and update operations are not suppressed during maintenance, only escalations.

For example, if escalation steps are scheduled at 0, 30 and 60 minutes after a problem start, and there is a half-hour long maintenance lasting from 10 minutes to 40 minutes after a real problem arises, steps two and three will be executed a half-hour later, or at 60 minutes and 90 minutes (providing the problem still exists). Similarly, if a problem arises during the maintenance, the escalation will start after the maintenance.

To receive problem notifications during the maintenance normally (without delay), you have to uncheck the Pause operations for suppressed problems option in action configuration.

**Note:**

If at least one host (used in the trigger expression) is not in maintenance mode, Zabbix will send a problem notification.

Zabbix server must be running during maintenance. Timer processes are responsible for switching host status to/from maintenance at 0 seconds of every minute. Note that when a host enters maintenance, Zabbix server timer processes will read all open problems to check if it is required to suppress those. This may have a performance impact if there are many open problems. Zabbix server will also read all open problems upon startup, even if there are no maintenances configured at the time.

A proxy will always collect data regardless of the maintenance type (including "no data" maintenance). The data is later ignored by the server if 'no data collection' is set.

When "no data" maintenance ends, triggers using nodata() function will not fire before the next check during the period they are checking.

If a log item is added while a host is in maintenance and the maintenance ends, only new logfile entries since the end of the maintenance will be gathered.

If a timestamped value is sent for a host that is in a "no data" maintenance type (e.g. using [Zabbix sender](#)) then this value will be dropped however it is possible to send a timestamped value in for an expired maintenance period and it will be accepted.

**Attention:**

To ensure predictable behavior of recurring maintenance periods (daily, weekly, monthly), it is required to use a common time zone for all parts of Zabbix.

If maintenance period, hosts, groups or tags are changed by the user, the changes will only take effect after configuration cache synchronization.

**Configuration** To configure a maintenance period:

- Go to: Configuration → Maintenance
- Click on Create maintenance period (or on the name of an existing maintenance period)

Fill out the **Maintenance periods** configuration form:

The screenshot shows the Zabbix Maintenance periods configuration form. It includes the following elements:

- Name:** A text input field containing "Zabbix server maintenance".
- Maintenance type:** Two radio buttons: "With data collection" (selected) and "No data collection".
- Active since:** A date-time picker showing "2020-06-18 11:15".
- Active till:** A date-time picker showing "2020-06-19 00:00".
- Periods:** A table with columns: Period type, Schedule, Period, and Action.
 

Period type	Schedule	Period	Action
One time only	2020-06-18 11:15	1h	<a href="#">Edit</a> <a href="#">Remove</a>
<a href="#">Add</a>			
- Host groups:** A search input field with "Zabbix servers" selected and a "Select" button.
- Hosts:** A search input field and a "Select" button.
- Validation:** A message: "\* At least one host group or host must be selected."
- Tags:** A section with "And/Or" and "Or" radio buttons, a "tag" input field, a "Contains" radio button, an "Equals" radio button, a "value" input field, and a "Remove" button. An "Add" button is also present.
- Description:** A text area containing "Planned server maintenance.".
- Buttons:** "Add" and "Cancel" buttons at the bottom.

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Name of the maintenance period.
Maintenance type	Two types of maintenance can be set: <b>With data collection</b> - data will be collected by the server during maintenance, triggers will be processed <b>No data collection</b> - data will not be collected by the server during maintenance
Active since	The date and time when executing maintenance periods becomes active. Note: Setting this time alone does not activate a maintenance period; for that go to the Periods tab.
Active till	The date and time when executing maintenance periods stops being active.
Periods	This block allows you to define the exact days and hours when the maintenance takes place. Clicking on <a href="#">Add</a> opens a popup window with a flexible Maintenance period form where you can define maintenance schedule. See <a href="#">Maintenance periods</a> for a detailed description.

Parameter	Description
Host groups	Select host groups that the maintenance will be activated for. The maintenance will be activated for all hosts from the specified host group(s). This field is auto-complete, so starting to type in it will display a dropdown of all available host groups. Specifying a parent host group implicitly selects all nested host groups. Thus the maintenance will also be activated on hosts from nested groups.
Hosts	Select hosts that the maintenance will be activated for. This field is auto-complete, so starting to type in it will display a dropdown of all available hosts.
Tags	If maintenance tags are specified, maintenance for the selected hosts will still be activated, but problems will only be suppressed (i.e. no actions will be taken) if their tags are a match. In case of multiple tags, they are calculated as follows: <b>And/Or</b> - all tags must correspond; however tags with the same tag name are calculated by the Or condition <b>Or</b> - enough if one tag corresponds There are two ways of matching the tag value: <b>Contains</b> - case-sensitive substring match (tag value contains the entered string) <b>Equals</b> - case-sensitive string match (tag value equals the entered string)
Description	Description of maintenance period.

#### Maintenance periods

The maintenance period window is for scheduling time for a recurring or a one-time maintenance. The form is dynamic with available fields changing based on the Period type selected.

Period type	Description
One time only	Define the date and time, and the length of the maintenance period.
Daily	Every day(s) - maintenance frequency: 1 (default) - every day, 2 - every two days, etc. At (hour:minute) - time of the day when maintenance starts Maintenance period length - for how long the maintenance will be active.



Period type	Description
Weekly	<p>Every week(s) - maintenance frequency: 1 (default) - every day, 2 - every two days, etc.</p> <p>Day of week - on which day the maintenance should take place.</p> <p>At (hour:minute) - time of the day when maintenance starts</p> <p>Maintenance period length - for how long the maintenance will be active.</p>
Monthly	<p>Month - select all months during which the regular maintenance is carried out.</p> <p>Date: <b>Day of month</b> - Select this option if the maintenance takes place on the same date each month (for example, every 1st day of the month). Then, select the required day in the new field that appears.</p> <p>Date: <b>Day of week</b> - Select this option if the maintenance takes place only on certain days (for example, every first Monday of the month). Then, in the drop-down select the required week of the month (first, second, third, fourth, or last) and mark the checkboxes for maintenance day(s).</p> <p>At (hour:minute) - time of the day when maintenance starts</p> <p>Maintenance period length - for how long the maintenance will be active.</p>

When done, press Add to add the maintenance period to the Periods block.

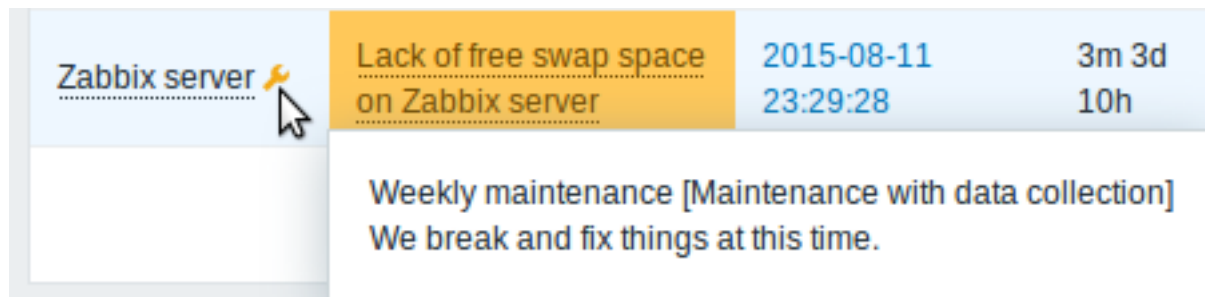
Notes:

- When Every day/Every week parameter is greater than 1, the starting day or week is the day/week that the Active since time falls on. For example:
  - with Active since set to January 1st at 12:00 and a one-hour maintenance set for every two days at 11pm will result in the first maintenance period starting on January 1st at 11pm, while the second maintenance period will start on January 3rd at 11pm;
  - with the same Active since time and a one-hour maintenance set for every two days at 1am, the first maintenance period will start on January 3rd at 1am, while the second maintenance period will start on January 5th at 1am.
- Daylight Saving Time (**DST**) changes do not affect how long the maintenance will be. Let's say we have a two-hour maintenance that usually starts at 1am and finishes at 3am:
  - If after one hour of maintenance (at 2am) a DST change happens and current time changes from 2:00 to 3:00, the maintenance will continue for one more hour till 4:00;
  - If after two hours of maintenance (at 3am) a DST change happens and current time changes from 3:00 to 2:00, the maintenance will stop because two hours have passed.

### Display Displaying hosts in maintenance

An orange wrench icon  next to the host name indicates that this host is in maintenance in:

- Monitoring → Dashboard
- Monitoring → Problems
- Inventory → Hosts → Host inventory details
- Configuration → Hosts (See 'Status' column)



Maintenance details are displayed when the mouse pointer is positioned over the icon.

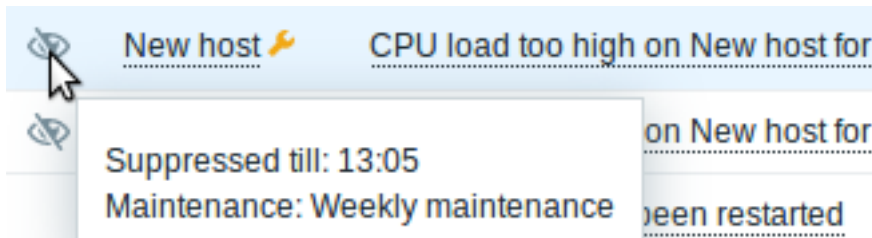
Additionally, hosts in maintenance get an orange background in Monitoring → Maps.

Displaying suppressed problems

Normally problems for hosts in maintenance are suppressed, i.e. not displayed in the frontend. However, it is also possible to configure that suppressed problems are shown, by selecting the Show suppressed problems option in these locations:

- Monitoring → Dashboard (in Problem hosts, Problems, Problems by severity, Trigger overview widget configuration)
- Monitoring → Problems (in the filter)
- Monitoring → Overview (in the filter; with 'Triggers' as Type)
- Monitoring → Maps (in map configuration)
- Global **notifications** (in user profile configuration)

When suppressed problems are displayed, the following icon is displayed: . Rolling a mouse over the icon displays more details:



## 12. Regular expressions

**Overview** [Perl Compatible Regular Expressions](#) (PCRE) are supported in Zabbix.

There are two ways of using regular expressions in Zabbix:

- manually entering a regular expression
- using a global regular expression created in Zabbix

**Regular expressions** You may manually enter a regular expression in supported places. Note that the expression may not start with @ because that symbol is used in Zabbix for referencing global regular expressions.

**Warning:**

It's possible to run out of stack when using regular expressions. See the [pcrestack man page](#) for more information.

Note that in multi-line matching, the ^ and \$ anchors match at the beginning/end of each line respectively, instead of the beginning/end of the entire string.

**Global regular expressions** There is an advanced editor for creating and testing complex regular expressions in Zabbix frontend.

Once a regular expression has been created this way, it can be used in several places in the frontend by referring to its name, prefixed with @, for example, @mycustomregexp.

To create a global regular expression:

- Go to: Administration → General
- Select Regular expressions from the dropdown
- Click on New regular expression

The **Expressions** tab allows to set the regular expression name and add subexpressions.

Expressions **Test**

\* Name

\* Expressions

Expression type	Expression	Delimiter	Case s
Result is FALSE	<input type="text" value="^Software Loopback Interface"/>		<input checked="" type="checkbox"/>
Result is FALSE	<input type="text" value="^(In)?[Ll]oop[Bb]ack[0-9._]*\$"/>		<input checked="" type="checkbox"/>
Result is FALSE	<input type="text" value="^NULL[0-9.]*\$"/>		<input checked="" type="checkbox"/>
Result is FALSE	<input type="text" value="^[Ll]o[0-9.]*\$"/>		<input checked="" type="checkbox"/>
Result is FALSE	<input type="text" value="^[Ss]ystem\$"/>		<input checked="" type="checkbox"/>
Result is FALSE	<input type="text" value="^Nu[0-9.]*\$"/>		<input checked="" type="checkbox"/>

[Add](#)

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Set the regular expression name. Any Unicode characters are allowed.
Expressions	Click on Add in the Expressions block to add a new subexpression. Expression type: <ul style="list-style-type: none"> <li><b>Character string included</b> - match the substring</li> <li><b>Any character string included</b> - match any substring from a delimited list. The delimited list includes a comma (,), a dot (.) or a forward slash (/).</li> <li><b>Character string not included</b> - match any string except the substring</li> <li><b>Result is TRUE</b> - match the regular expression</li> <li><b>Result is FALSE</b> - do not match the regular expression</li> </ul>
Delimiter	Enter substring/regular expression. A comma (,), a dot (.) or a forward slash (/) to separate text strings in a regular expression. This parameter is active only when "Any character string included" expression type is selected.
Case sensitive	A checkbox to specify whether a regular expression is sensitive to capitalization of letters.

A forward slash (/) in the expression is treated literally, rather than a delimiter. This way it is possible to save expressions containing a slash, without errors.

**Attention:**

A custom regular expression name in Zabbix may contain commas, spaces, etc. In those cases where that may lead to misinterpretation when referencing (for example, a comma in the parameter of an item key) the whole reference may be put in quotes like this: "@My custom regexp for purpose1, purpose2".  
 Regular expression names must not be quoted in other locations (for example, in LLD rule properties).

In the **Test** tab the regular expression and its subexpressions can be tested by providing a test string.

Test string

Test expressions

Result

Expression type	Expression	Result
Result is FALSE	^Software Loopback Interface	TRUE
Result is FALSE	^(In)?[Ll]oop[Bb]ack[0-9._]*\$	TRUE
Result is FALSE	^NULL[0-9.]*\$	TRUE
Result is FALSE	^[Ll]o[0-9.]*\$	FALSE
Result is FALSE	^[Ss]ystem\$	TRUE
Result is FALSE	^Nu[0-9.]*\$	TRUE
Combined result		FALSE

Results show the status of each subexpression and total custom expression status.

Total custom expression status is defined as Combined result. If several sub expressions are defined Zabbix uses AND logical operator to calculate Combined result. It means that if at least one Result is False Combined result has also False status.

**Default global regular expressions** Zabbix comes with several global regular expression in its default dataset.

Name	Expression	Matches
File systems for discovery	^(btrfs ext2 ext3 ext4 jfs reiser xfs ufs ufs2 vxfs zfs zfs2 zfs3 zfs4 zfs5 zfs6 zfs7 zfs8 zfs9 zfs10 zfs11 zfs12 zfs13 zfs14 zfs15 zfs16 zfs17 zfs18 zfs19 zfs20 zfs21 zfs22 zfs23 zfs24 zfs25 zfs26 zfs27 zfs28 zfs29 zfs30 zfs31 zfs32 zfs33 zfs34 zfs35 zfs36 zfs37 zfs38 zfs39 zfs40 zfs41 zfs42 zfs43 zfs44 zfs45 zfs46 zfs47 zfs48 zfs49 zfs50 zfs51 zfs52 zfs53 zfs54 zfs55 zfs56 zfs57 zfs58 zfs59 zfs60 zfs61 zfs62 zfs63 zfs64 zfs65 zfs66 zfs67 zfs68 zfs69 zfs70 zfs71 zfs72 zfs73 zfs74 zfs75 zfs76 zfs77 zfs78 zfs79 zfs80 zfs81 zfs82 zfs83 zfs84 zfs85 zfs86 zfs87 zfs88 zfs89 zfs90 zfs91 zfs92 zfs93 zfs94 zfs95 zfs96 zfs97 zfs98 zfs99 zfs100)\$	"btrfs" or "reiser" or "xfs" or "ufs" or "ufs2" or "vxfs" or "ufs" or "jfs" or "jfs2" or "vxfs" or "hfs" or "refs" or "apfs" or "ntfs" or "fat32" or "zfs"
Network interfaces for discovery	^Software Loopback Interface	Strings starting with "Software Loopback Interface".
	^lo\$	"lo"
	^(In)?[Ll]oop[Bb]ack[0-9._]*\$	Strings that optionally start with "In", then have "L" or "l", then "oop", then "B" or "b", then "ack", which can be optionally followed by any number of digits, dots or underscores.
	^NULL[0-9.]*\$	Strings starting with "NULL" optionally followed by any number of digits or dots.
	^[Ll]o[0-9.]*\$	Strings starting with "Lo" or "lo" and optionally followed by any number of digits or dots.
Storage devices for SNMP discovery	^[Ss]ystem\$	"System" or "system"
	^Nu[0-9.]*\$	Strings starting with "Nu" optionally followed by any number of digits or dots.
	^(Physical memory Virtual memory Memory buffers Cached memory Swap space)\$	"Physical memory" or "Virtual memory" or "Memory buffers" or "Cached memory" or "Swap space"

Name	Expression	Matches
Windows service names for discovery	^(MMCSS\ gupdate\SysmonLog\ clr_optimization_v4.0.30319\ MMCSS\50727_32\ clr_optimization_v2.0.50727_32\ clr_optimization_v4.0.30319_32\ )	"MMCSS\50727_32\ clr_optimization_v4.0.30319_32\ ", "SysmonLog" or strings like "clr_optimization_v2.0.50727_32" and "clr_optimization_v4.0.30319_32" where instead of dots you can put any character except newline.
Windows service startup states for discovery	^(automatic\ automatic delayed)\$	"automatic" or "automatic delayed"

**Examples** Example 1

Use of the following expression in low-level discovery to discover databases except a database with a specific name:

^TESTDATABASE\$

Test string

Test expressions

Result	Expression type	Expression	Result
	Result is FALSE	^TESTDATABASE	FALSE
	Combined result		FALSE

Chosen Expression type: "Result is FALSE". Doesn't match name, containing string "TESTDATABASE".

Example with an inline regex modifier

Use of the following regular expression including an inline modifier (?i) to match the characters "error":

(?i)error

Test string

Test expressions

Result	Expression type	Expression	Result
	Result is TRUE	(?i)error	TRUE
	Combined result		TRUE

Chosen Expression type: "Result is TRUE". Characters "error" are matched.

Another example with an inline regex modifier

Use of the following regular expression including multiple inline modifiers to match the characters after a specific line:

`(?<=match (?i)everything(?-i) after this line\n)(?sx).*#` we add s modifier to allow . match newline characters

```
Test string
Some text here for your consideration
1235kfd345
match eveRything after this line
Continuation
```

Test expressions

Result	Expression type	Expression	Result
Result is TRUE	(?<=match (?i)everything(?-i) after this line\n)(?sx).*#	we add s modifier to allow . match newline characters	TRUE
Combined result			TRUE

Chosen Expression type: "Result is TRUE". Characters after a specific line are matched.

**Attention:**  
**g** modifier can't be specified in line. The list of available modifiers can be found in [pcre syntax man page](#). For more information about PCRE syntax please refer to [PCRE HTML documentation](#).

### Regular expression support by location

Location	Regular expression	Global regular expression	Comments
<b>Agent items</b>			
	eventlog[]	Yes	regex, severity, source, eventid parameters
	log[]		regex parameter
	log.count[]		
	logrt[]	Yes/No	regex parameter supports both, file_regex parameter supports non-global expressions only
	logrt.count[]		
	proc.cpu.util[]	No	cmdline parameter
	proc.mem[]		
	proc.num[]		
	sensor[]		device and sensor parameters
	system.hw.macaddr[]		on Linux 2.4 interface parameter
	system.sw.packages[]		package parameter
	vfs.dir.count[]		regex_incl, regex_excl, regex_excl_dir parameters

Location	Regular expression	Global regular expression	Comments
	vfs.dir.size[]		regex_incl, regex_excl, regex_excl_dir parameters
	vfs.file.regexp[]		regexp parameter
	vfs.file.regmatch[] web.page.regexp[]		
<b>SNMP traps</b>	snmptrap[]	Yes	regexp parameter
<b>Item value preprocessing Trigger functions</b>	Yes	No	pattern parameter
	count[]	Yes	pattern parameter if operator parameter is regexp or iregexp pattern parameter
	logeventid()		
	logsource() iregexp() regexp()		
<b>Low-level discovery</b>	Filter[]	Yes	Regular expression field
	Over[]	No	In matches, does not match options for Operation conditions
<b>Action conditions</b>	Yes	No	In matches, does not match options for Host name and Host metadata au- toregistration conditions
<b>Web monitoring</b>	Yes	No	Variables with a <b>regex:</b> prefix Required string field
<b>User macro context</b>	Yes	No	In macro context with a <b>regex:</b> prefix
<b>Macro functions</b>	regsub()	No	pattern parameter
	iregsub()		
<b>Icon mapping</b>	Yes	Yes	Expression field

## 13. Problem acknowledgment

**Overview** Problem events in Zabbix can be acknowledged by users.

If a user gets notified about a problem event, they can go to Zabbix frontend, open the problem update popup window of that problem using one of the ways listed below and acknowledge the problem. When acknowledging, they can enter their comment for it, saying that they are working on it or whatever else they may feel like saying about it.

This way, if another system user spots the same problem, they immediately see if it has been acknowledged and the comments so far.

This way the workflow of resolving problems with more than one system user can take place in a coordinated way.

Acknowledgment status is also used when defining **action operations**. You can define, for example, that a notification is sent to a higher level manager only if an event is not acknowledged for some time.

To acknowledge events and comment on them, a user must have at least read permissions to the corresponding triggers. To change problem severity or close problem, a user must have read-write permissions to the corresponding triggers.

There are **several** ways to access the problem update popup window, which allows to acknowledge a problem.

- You may select problems in Monitoring → Problems and then click on Mass update below the list
- You can click in the Ack column showing the acknowledgment status of problems in:
  - Monitoring → Dashboard (Problems and Problems by severity widgets)
  - Monitoring → Problems
  - Monitoring → Problems → Event details
  - Monitoring → Screens (Host group issues, Host issues, Problems by severity elements)

The Ack column contains either a 'Yes' or a 'No' link, indicating an acknowledged or an unacknowledged problem respectively. Clicking on the links will take you to the problem update popup window.

- You can click on an unresolved problem cell in:
  - Monitoring → Dashboard (Trigger overview widget)
  - Monitoring → Overview
  - Monitoring → Screens (Trigger overview element)

The popup menu contains an Acknowledge option that will take you to the problem update window.

**Updating problems** The problem update popup allows to:

- comment on the problem
- view comments and actions so far
- change problem severity
- acknowledge/unacknowledge problem
- manually close problem



### Update problem ✕

Problem /: Disk space is critically low (>90% used)

Message

History	Time	User	User action	Message
	2020-05-07 11:27:50	Admin (Zabbix Administrator)	✕	
	2020-05-07 11:27:43	Admin (Zabbix Administrator)	✓ <span style="font-size: 0.8em;">⋮</span>	Ok

Scope

Only selected problem

Selected and all other problems of related triggers 1 event

Change severity  Not classified Information Warning Average High Disaster

Acknowledge

Close problem

\* At least one update operation or message must exist.

Update
Cancel

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Problem	If only one problem is selected, the problem name is displayed. If several problems are selected, N problems selected is displayed.
Message	Enter text to comment on the problem (maximum 2048 characters).
History	Previous activities and comments on the problem are listed, along with the time and user details. For the meaning of icons used to denote user actions see the <a href="#">event detail</a> page. Note that history is displayed if only one problem is selected for the update.
Scope	Define the scope of such actions as changing severity, acknowledging or manually closing problems: <b>Only selected problem</b> - will affect this event only <b>Selected and all other problems of related triggers</b> - in case of acknowledgment/closing problem, will affect this event and all other problems that are not acknowledged/closed so far. If the scope contains problems already acknowledged or closed, these problems will not be acknowledged/closed repeatedly. On the other hand, the number of message and severity change operations are not limited.
Change severity	Mark the checkbox and click on the severity button to update problem severity. The checkbox for changing severity is available if read-write permissions exist for at least one of the selected problems. Only those problems that are read-writable will be updated when clicking on Update. If read-write permissions exist for none of the selected triggers, the checkbox is disabled.

Parameter	Description
Acknowledge	Mark the checkbox to acknowledge the problem. This checkbox is available if there is at least one unacknowledged problem among the selected. It is not possible to add another acknowledgment for an already acknowledged problem (it is possible to add another comment though).
Unacknowledge	Mark the checkbox to unacknowledge the problem. This checkbox is available if there is at least one acknowledged problem among the selected.
Close problem	Mark the checkbox to manually close the selected problem(s). The checkbox for closing a problem is available if the Allow manual close option is checked in <b>trigger configuration</b> for at least one of the selected problems. Only those problems will be closed that are allowed to be closed when clicking on Update. If no problem is manually closeable, the checkbox is disabled. Already closed problems will not be closed repeatedly.

**Display** Based on acknowledgment information it is possible to configure how the problem count is displayed in the dashboard or maps. To do that, you have to make selections in the Problem display option, available in both **map configuration** and the Problems by severity **dashboard widget**. It is possible to display all problem count, unacknowledged problem count as separated from the total or unacknowledged problem count only.

Based on problem update information (acknowledgment, etc.) it is possible to configure update operations - send message or execute remote commands.

## 14. Configuration export/import

**Overview** Zabbix export/import functionality makes it possible to exchange various configuration entities between one Zabbix system and another.

Typical use cases for this functionality:

- share templates or network maps - Zabbix users may share their configuration parameters
- share web scenarios on share.zabbix.com - export a template with the web scenarios and upload to share.zabbix.com. Then others can download the template and import the file into Zabbix.
- integrate with third-party tools - universal YAML, XML and JSON formats make integration and data import/export possible with third party tools and applications

What can be exported/imported

Objects that can be exported/imported are:

- **host groups** (through Zabbix API only)
- **templates**
- **hosts**
- **network maps**
- **screens**
- **media types**
- **images**
- **value maps**

Export format

Data can be exported using the Zabbix web frontend or **Zabbix API**. Supported export formats are YAML, XML and JSON.

### Details about export

- All supported elements are exported in one file.
- Host and template entities (items, triggers, graphs, discovery rules) that are inherited from linked templates are not exported. Any changes made to those entities on a host level (such as changed item interval, modified regular expression or added prototypes to the low-level discovery rule) will be lost when exporting; when importing, all entities from linked templates are re-created as on the original linked template.

- Entities created by low-level discovery and any entities depending on them are not exported. For example, a trigger created for an LLD-rule generated item will not be exported.

### Details about import

- Import stops at the first error.
- When updating existing images during image import, "imagetype" field is ignored, i.e. it is impossible to change image type via import.
- When importing hosts/templates using the "Delete missing" option, host/template macros not present in the import file will be deleted too.
- Empty tags for items, triggers, graphs, host/template applications, discoveryRules, itemPrototypes, triggerPrototypes, graphPrototypes are meaningless i.e. it's the same as if it was missing. Other tags, for example, item applications, are meaningful i.e. empty tag means no applications for item, missing tag means don't update applications.
- Import supports YAML, XML and JSON, the import file must have a correct file extension: .yaml and .yml for YAML, .xml for XML and .json for JSON.
- See [compatibility information](#) about supported XML versions.

```
zabbix_export:
  version: '5.2'
  date: '2020-04-22T06:20:11Z'
```

### YAML base format

```
zabbix_export:
```

Root node for Zabbix YAML export.

```
version: '5.2'
```

Export version.

```
date: '2020-04-22T06:20:11Z'
```

Date when export was created in ISO 8601 long format.

Other nodes are dependent on exported objects.

```
<?xml version="1.0" encoding="UTF-8"?>
<zabbix_export>
  <version>5.0</version>
  <date>2020-04-22T06:20:11Z</date>
</zabbix_export>
```

### XML format

```
<?xml version="1.0" encoding="UTF-8"?>
```

Default header for XML documents.

```
<zabbix_export>
```

Root element for Zabbix XML export.

```
<version>5.0</version>
```

Export version.

```
<date>2020-04-22T06:20:11Z</date>
```

Date when export was created in ISO 8601 long format.

Other tags are dependent on exported objects.

```
{
  "zabbix_export": {
    "version": "5.2",
    "date": "2020-04-22T06:20:11Z"
  }
}
```

## JSON format

```
"zabbix_export":
```

Root node for Zabbix JSON export.

```
"version": "5.2"
```

Export version.

```
"date": "2020-04-22T06:20:11Z"
```

Date when export was created in ISO 8601 long format.

Other nodes are dependent on exported objects.

## 1 Host groups

In the frontend host groups can be **exported** only with host or template export. When a host or template is exported all groups it belongs to are exported with it automatically.

API allows to export host groups independently from hosts or templates.

Export format

```
groups:
-
  name: 'Zabbix servers'
```

groups/group

Parameter	Type	Description	Details
name	string	Group name.	

## 2 Templates

Overview

Templates are **exported** with many related objects and object relations.

Template export contains:

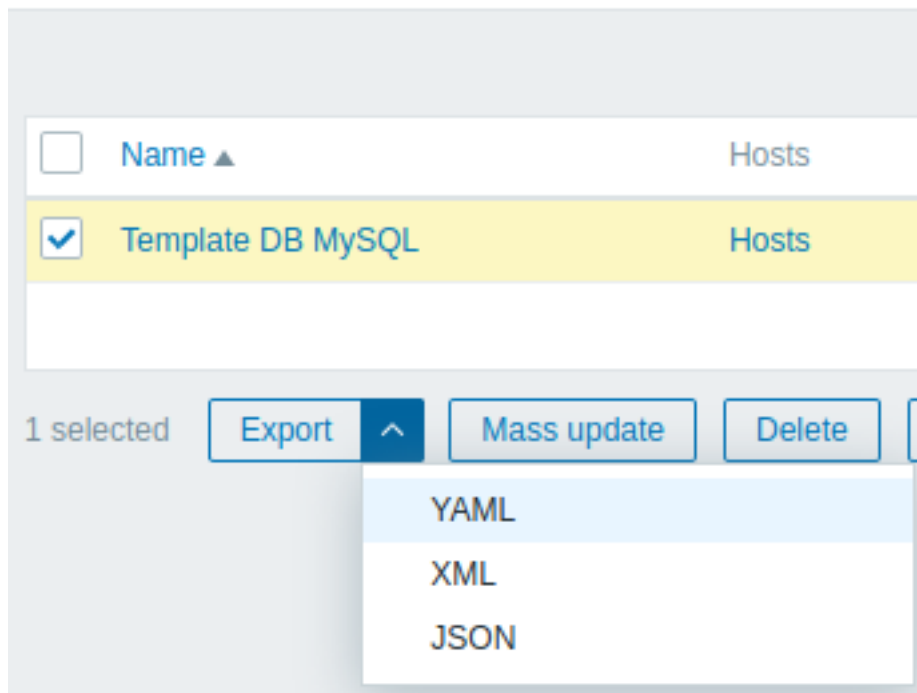
- linked host groups
- template data
- linkage to other templates
- linkage to host groups
- directly linked applications
- directly linked items
- directly linked triggers
- directly linked graphs
- directly linked screens
- directly linked discovery rules with all prototypes
- directly linked web scenarios
- value maps

Exporting

To export templates, do the following:

- Go to: Configuration → Templates
- Mark the checkboxes of the templates to export
- Click on Export below the list

## ≡ Templates



The screenshot shows the Zabbix Templates management interface. At the top, there is a header with a hamburger menu icon and the word "Templates". Below this is a table with two columns: "Name" and "Hosts". The first row has an unchecked checkbox, the name "Name", and the host "Hosts". The second row has a checked checkbox, the name "Template DB MySQL", and the host "Hosts". Below the table, it says "1 selected". To the right of this text are four buttons: "Export", "Mass update", "Delete", and a partially visible "Import" button. The "Export" button is active, and a dropdown menu is open below it, showing three options: "YAML", "XML", and "JSON".

Depending on the selected format, templates are exported to a local file with a default name:

- zabbix\_export\_templates.yaml - in YAML export (default option for export)
- zabbix\_export\_templates.xml - in XML export
- zabbix\_export\_templates.json - in JSON export

### Importing

To import templates, do the following:

- Go to: Configuration → Templates
- Click on Import to the right
- Select the import file
- Mark the required options in import rules
- Click on Import

\* Import file  zbx\_export\_templates.yaml

Rules	Update existing	Create new	Delete missing
Groups		<input checked="" type="checkbox"/>	
Hosts	<input type="checkbox"/>	<input type="checkbox"/>	
Templates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Template dashboards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Template linkage		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Applications		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Items	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Discovery rules	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Triggers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Graphs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Web scenarios	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Screens	<input type="checkbox"/>	<input type="checkbox"/>	
Maps	<input type="checkbox"/>	<input type="checkbox"/>	
Images	<input type="checkbox"/>	<input type="checkbox"/>	
Media types	<input type="checkbox"/>	<input type="checkbox"/>	
Value mappings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

All mandatory input fields are marked with a red asterisk.

A success or failure message of the import will be displayed in the frontend.

Import rules:

Rule	Description
Update existing	Existing elements will be updated with data taken from the import file. Otherwise they will not be updated.
Create new	The import will add new elements using data from the import file. Otherwise it will not add them.
Delete missing	The import will remove existing elements not present in the import file. Otherwise it will not remove them. If Delete missing is marked for template linkage, existing template linkage not present in the import file will be removed from the template along with all entities inherited from the potentially unlinked templates (items, triggers, etc).

Export format

Export format in YAML:

```
zabbix_export:
```

```

version: "5.2"
date: "2020-08-06T07:52:43Z"
groups:
- name: Templates/Modules
templates:
- template: Linux filesystems by Zabbix agent
  name: Linux filesystems by Zabbix agent
  description: 'Template tooling version used: 0.32'
  groups:
  - name: Templates/Modules
  applications:
  - name: Filesystems
  discovery_rules:
  - name: Mounted filesystem discovery
    key: vfs.fs.discovery
    delay: 1h
    filter:
      evaltype: AND
      conditions:
      - macro: '#{FSNAME}'
        value: '{$VFS.FS.FSNAME.MATCHES}'
        formulaid: A
      - macro: '#{FSNAME}'
        value: '{$VFS.FS.FSNAME.NOT_MATCHES}'
        operator: NOT_MATCHES_REGEX
        formulaid: B
      - macro: '#{FSTYPE}'
        value: '{$VFS.FS.FSTYPE.MATCHES}'
        formulaid: C
      - macro: '#{FSTYPE}'
        value: '{$VFS.FS.FSTYPE.NOT_MATCHES}'
        operator: NOT_MATCHES_REGEX
        formulaid: D
    description: Discovery of file systems of different types.
  item_prototypes:
  - name: '#{FSNAME}: Free inodes in %'
    key: vfs.fs.inode[#{FSNAME},pfree]
    history: 7d
    value_type: FLOAT
    units: '%'
    application_prototypes:
    - name: Filesystem {FSNAME}
    trigger_prototypes:
    - expression: '{min(5m)}<{$VFS.FS.INODE.PFREE.MIN.CRIT:"#{FSNAME}}"'
      name: '#{FSNAME}: Running out of free inodes (free < {$VFS.FS.INODE.PFREE.MIN.CRIT:"#{FSNAME}})%'
      opdata: 'Free inodes: {ITEM.LASTVALUE1}'
      priority: AVERAGE
      description: |-
        It may become impossible to write to disk if there are no index nodes left.
        As symptoms, 'No space left on device' or 'Disk is full' errors may be seen even though free s
    - expression: '{min(5m)}<{$VFS.FS.INODE.PFREE.MIN.WARN:"#{FSNAME}}"'
      name: '#{FSNAME}: Running out of free inodes (free < {$VFS.FS.INODE.PFREE.MIN.WARN:"#{FSNAME}})%'
      opdata: 'Free inodes: {ITEM.LASTVALUE1}'
      priority: WARNING
      description: |-
        It may become impossible to write to disk if there are no index nodes left.
        As symptoms, 'No space left on device' or 'Disk is full' errors may be seen even though free s
    dependencies:
    - name: '#{FSNAME}: Running out of free inodes (free < {$VFS.FS.INODE.PFREE.MIN.CRIT:"#{FSNAME}}"'
      expression: '{Linux filesystems by Zabbix agent:vfs.fs.inode[#{FSNAME},pfree].min(5m)}<{$VFS.FS.FSNAME.MATCHES}'
  - name: '#{FSNAME}: Space utilization'
    key: vfs.fs.size[#{FSNAME},pused]

```

```

history: 7d
value_type: FLOAT
units: '%'
description: Space utilization in % for {#FSNAME}
application_prototypes:
- name: Filesystem {#FSNAME}
- name: '{#FSNAME}: Total space'
key: vfs.fs.size[{#FSNAME},total]
history: 7d
units: B
description: Total space in Bytes
application_prototypes:
- name: Filesystem {#FSNAME}
- name: '{#FSNAME}: Used space'
key: vfs.fs.size[{#FSNAME},used]
history: 7d
units: B
description: Used storage in Bytes
application_prototypes:
- name: Filesystem {#FSNAME}
trigger_prototypes:
- expression: |-
    {Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},pused].last()}>{$VFS.FS.PUSED.MAX.CRIT:"}
    (({Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},total].last()}-{Linux filesystems by
name: '{#FSNAME}: Disk space is critically low (used > {$VFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"}%)'
opdata: 'Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1})'
priority: AVERAGE
description: |-
    Two conditions should match: First, space utilization should be above {$VFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"}%
    Second condition should be one of the following:
    - The disk free space is less than 5G.
    - The disk will be full in less than 24 hours.
manual_close: "YES"
- expression: |-
    {Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},pused].last()}>{$VFS.FS.PUSED.MAX.WARN:"}
    (({Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},total].last()}-{Linux filesystems by
name: '{#FSNAME}: Disk space is low (used > {$VFS.FS.PUSED.MAX.WARN:"{#FSNAME}"}%)'
opdata: 'Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1})'
priority: WARNING
description: |-
    Two conditions should match: First, space utilization should be above {$VFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"}%
    Second condition should be one of the following:
    - The disk free space is less than 10G.
    - The disk will be full in less than 24 hours.
manual_close: "YES"
dependencies:
- name: '{#FSNAME}: Disk space is critically low (used > {$VFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"}%)'
  expression: |-
    {Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},pused].last()}>{$VFS.FS.PUSED.MAX.CRIT:"}
    (({Linux filesystems by Zabbix agent:vfs.fs.size[{#FSNAME},total].last()}-{Linux filesystems by
graph_prototypes:
- name: '{#FSNAME}: Disk space usage'
width: "600"
height: "340"
type: PIE
show_3d: "YES"
graph_items:
- sortorder: "1"
  color: 199COD
  calc_fnc: LAST
  type: GRAPH_SUM
  item:

```



```

    host: Linux filesystems by Zabbix agent
    key: vfs.fs.size[#{FSNAME},total]
- sortorder: "2"
  color: F63100
  calc_fnc: LAST
  item:
    host: Linux filesystems by Zabbix agent
    key: vfs.fs.size[#{FSNAME},used]
macros:
- macro: '{$VFS.FS.FSNAME.MATCHES}'
  value: .+
  description: This macro is used in filesystems discovery. Can be overridden
    on the host or linked template level
- macro: '{$VFS.FS.FSNAME.NOT_MATCHES}'
  value: ^(/dev/sys/run/proc|./shm$)
  description: This macro is used in filesystems discovery. Can be overridden
    on the host or linked template level
- macro: '{$VFS.FS.FSTYPE.MATCHES}'
  value: ^(btrfs|ext2|ext3|ext4|reiser|xfs|ffs|ufs|jfs|jfs2|vxfs|hfs|apfs|refs|ntfs|fat32|zfs)$
  description: This macro is used in filesystems discovery. Can be overridden
    on the host or linked template level
- macro: '{$VFS.FS.FSTYPE.NOT_MATCHES}'
  value: ^\s$
  description: This macro is used in filesystems discovery. Can be overridden
    on the host or linked template level
- macro: '{$VFS.FS.INODE.PFREE.MIN.CRIT}'
  value: "10"
- macro: '{$VFS.FS.INODE.PFREE.MIN.WARN}'
  value: "20"
- macro: '{$VFS.FS.PUSED.MAX.CRIT}'
  value: "90"
- macro: '{$VFS.FS.PUSED.MAX.WARN}'
  value: "80"
...

```

## Element tags

Element tag values are explained in the table below.

## Template tags

Element	Element property	Required	Type	Range	Description
templates		-			Root element for templates.
	template	x	string		Unique template name.
	name	-	string		Visible template name.
groups	description	-	text		Template description.
		x			Root element for template host groups.
applications	name	x	string		Host group name.
		-			Root element for template applications.
macros	name	x	string		Application name.
		-			Root element for template user macros.
	macro	x	string		User macro name.
	type	-	string	0 - TEXT (default) 1 - SE-CRET_TEXT 2 - VAULT	Type of the macro.
	value	-	string		User macro value.

Element	Element property	Required	Type	Range	Description
	description	-	string		User macro description.
tags		-			Root element for template tags.
	tag	x	string		Tag name.
	value	-	string		Tag value.
templates		-			Root element for linked templates.
	name	x	string		Template name.

#### Template item tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
items		-			Root element for items.
	name	x	string		Item name.
	type	-	string	0 - ZABBIX_PASSIVE (default) 2 - TRAP 3 - SIMPLE 5 - INTERNAL 7 - ZABBIX_ACTIVE 8 - AGGREGATE 10 - EXTERNAL 11 - ODBC 12 - IPMI 13 - SSH 14 - TELNET 15 - CALCULATED 16 - JMX 17 - SNMP_TRAP 18 - DEPENDENT 19 - HTTP_AGENT 20 - SNMP_AGENT 21 - ITEM_TYPE_SCRIPT	Item type.
	snmp_oid	-	string		SNMP object ID.
	key	x	string		Required by SNMP items. Item key.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	delay	-	string	Default: 1m	Update interval of the item.  Accepts seconds or a time unit with suffix (30s, 1m, 2h, 1d). Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling. Multiple intervals are separated by a semicolon. User macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported. Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{\$FLEX_INTERVAL}/{\$FLEX_INTERVAL}</code> ).
	history	-	string	Default: 90d	A time unit of how long the history data should be stored. Time unit with suffix, user macro or LLD macro.
	trends	-	string	Default: 365d	A time unit of how long the trends data should be stored. Time unit with suffix, user macro or LLD macro.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Item status.
	value_type	-	string	0 - FLOAT 1 - CHAR 2 - LOG 3 - UNSIGNED (default) 4 - TEXT	Received value type.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	allowed_hosts	-	string		List of IP addresses (comma delimited) of hosts allowed sending data for the item.
	units	-	string		Used by trapper and HTTP agent items. Units of returned values (bps, B, etc).
	params	-	text		Additional parameters depending on the type of the item: - executed script for Script, SSH and Telnet items; - SQL query for database monitor items; - formula for calculated items.
	ipmi_sensor	-	string		IPMI sensor.
	authtype	-	string	Authentication type for SSH agent items: 0 - PASSWORD (default) 1 - PUBLIC_KEY  Authentication type for HTTP agent items: 0 - NONE (default) 1 - BASIC 2 - NTLM	Used only by IPMI items. Authentication type.  Used only by SSH and HTTP agent items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	username	-	string		<p>Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.</p> <p>Required by SSH and Telnet items. When used by JMX agent, password should also be specified together with the username or both properties should be left blank.</p>
	password	-	string		<p>Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.</p> <p>When used by JMX agent, username should also be specified together with the password or both properties should be left blank.</p>
	publickey	-	string		<p>Name of the public key file.</p> <p>Required for SSH agent items.</p>
	privatekey	-	string		<p>Name of the private key file.</p> <p>Required for SSH agent items.</p>
	port	-	string		<p>Custom port monitored by the item. Can contain user macros.</p>
	description	-	text		<p>Used only by SNMP items. Item description.</p>

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	inventory_link	-	string	0 - NONE Capitalized host inventory field name. For example: 4 - ALIAS 6 - OS_FULL 14 - HARDWARE etc.	Host inventory field that is populated by the item.  Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs.
	logtimefmt	-	string		Format of the time in log entries. Used only by log items.
	jmx_endpoint	-	string		JMX endpoint.  Used only by JMX agent items.
	url	-	string		URL string.
	allow_traps	-	string	0 - NO (default) 1 - YES	Required only for HTTP agent items. Allow to populate value as in a trapper item.
	follow_redirects	-	string	0 - NO 1 - YES (default)	Used only by HTTP agent items. Follow HTTP response redirects while pooling data.
headers		-			Used only by HTTP agent items. Root element for HTTP(S) request headers, where header name is used as key and header value as value.
	name	x	string		Used only by HTTP agent items. Header name.
	value	x	string		Header value.
	http_proxy	-	string		HTTP(S) proxy connection string.  Used only by HTTP agent items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	output_format	-	string	0 - RAW (default) 1 - JSON	How to process response.  Used only by HTTP agent items.
	post_type	-	string	0 - RAW (default) 2 - JSON 3 - XML	Type of post data body.  Used only by HTTP agent items.
	posts	-	string		HTTP(S) request body data.
query_fields		-			Used only by HTTP agent items. Root element for query parameters.
	name	x	string		Used only by HTTP agent items. Parameter name.
	value	-	string		Parameter value.
	request_method	-	string	0 - GET (default) 1 - POST 2 - PUT 3 - HEAD	Request method.  Used only by HTTP agent items.
	retrieve_mode	-	string	0 - BODY (default) 1 - HEADERS 2 - BOTH	What part of response should be stored.
	ssl_cert_file	-	string		Used only by HTTP agent items. Public SSL Key file path.
	ssl_key_file	-	string		Used only by HTTP agent items. Private SSL Key file path.
	ssl_key_password	-	string		Used only by HTTP agent items. Password for SSL Key file.
					Used only by HTTP agent items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	status_codes	-	string		<p>Ranges of required HTTP status codes separated by commas. Supports user macros. Example: 200,200-{\$M},{M},200-400</p> <p>Used only by HTTP agent items.</p>
	timeout	-	string		<p>Item data polling request timeout. Supports user macros.</p> <p>Used by HTTP agent and Script items.</p>
	verify_host	-	string	0 - NO (default) 1 - YES	<p>Validate if host name in URL is in Common Name field or a Subject Alternate Name field of host certificate.</p> <p>Used only by HTTP agent items.</p>
	verify_peer	-	string	0 - NO (default) 1 - YES	<p>Validate if host certificate is authentic.</p> <p>Used only by HTTP agent items.</p>
parameters		-			<p>Root element for user-defined parameters.</p> <p>Used only by Script items.</p>
	name	x	string		<p>Parameter name.</p> <p>Used only by Script items.</p>
	value	-	string		<p>Parameter value.</p> <p>Used only by Script items.</p>
value map		-			<p>Value map.</p>



Element	Element property	Required	Type	Range <sup>1</sup>	Description
	name	x	string		Name of the value map to use for the item.
applications		-			Root element for applications.
	name	x	string		Application name.
preprocessing		-			Root element for item value preprocessing.
step		-			Individual item value preprocessing step.
	type	x	string	1 - MULTIPLIER 2 - RTRIM 3 - LTRIM 4 - TRIM 5 - REGEX 6 - BOOL_TO_DECIMAL 7 - OCTAL_TO_DECIMAL 8 - HEX_TO_DECIMAL 9 - SIMPLE_CHANGE (calculated as (received value-previous value)) 10 - CHANGE_PER_SECOND (calculated as (received value-previous value)/(time now-time of last check)) 11 - XMLPATH 12 - JSONPATH 13 - IN_RANGE 14 - MATCHES_REGEX 15 - NOT_MATCHES_REGEX 16 - CHECK_JSON_ERROR 17 - CHECK_XML_ERROR 18 - CHECK_REGEX_ERROR 19 - DISCARD_UNCHANGED 20 - DISCARD_UNCHANGED_HEARTBEAT 21 - JAVASCRIPT 22 - PROMETHEUS_PATTERN 23 - PROMETHEUS_TO_JSON 24 - CSV_TO_JSON 25 - STR_REPLACE 26 - CHECK_NOT_SUPPORTED	Type of the item value preprocessing step.
	parameters	-			Root element for parameters of the item value preprocessing step.
	parameter	x	string		Individual parameter of the item value preprocessing step.
	error_handler	-	string	0 - ORIGINAL_ERROR (default) 1 - DISCARD_VALUE 2 - CUSTOM_VALUE 3 - CUSTOM_ERROR	Action type used in case of preprocessing step failure.
	error_handler_params	-	string		Error handler parameters used with 'error_handler'.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
master_item		-			Individual item master item.
	key	x	string		Required by dependent items. Dependent item master item key value.
triggers		-			Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed. Root element for simple triggers.
	For trigger element tag values, see template <a href="#">trigger tags</a> .				

#### Template low-level discovery rule tags

Element	Element property	Required	Type	Range	Description
discovery_rules		-			Root element for low-level discovery rules.
	For most of the element tag values, see element tag values for a regular item. Only the tags that are specific to low-level discovery rules, are described below.				
	type	-	string	0 - ZAB-BIX_PASSIVE (default) 2 - TRAP 3 - SIMPLE 5 - INTERNAL 7 - ZAB-BIX_ACTIVE 10 - EXTERNAL 11 - ODBC 12 - IPMI 13 - SSH 14 - TELNET 16 - JMX 18 - DEPENDENT 19 - HTTP_AGENT 20 - SNMP_AGENT	Item type.

Element	Element property	Required	Type	Range	Description
filter	lifetime	-	string	Default: 30d	Time period after which items that are no longer discovered will be deleted. Seconds, time unit with suffix or user macro. Individual filter.
	evaltype	-	string	0 - AND_OR (default) 1 - AND 2 - OR 3 - FORMULA	Logic to use for checking low-level discovery rule filter conditions.
	formula	-	string		Custom calculation formula for filter conditions.
conditions		-			Root element for filter conditions.
	macro	x	string		Low-level discovery macro name.
	value	-	string		Filter value: regular expression or global regular expression.
	operator	-	string	8 - MATCHES_REGEX (default) 9 - NOT_MATCHES_REGEX	Condition operator.
	formulaid	x	character		Arbitrary unique ID that is used to reference a condition from the custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
lld_macro_paths		-			Root element for LLD macro paths.
	lld_macro	x	string		Low-level discovery macro name.
	path	x	string		Selector for value which will be assigned to the corresponding macro.
preprocessing		-			LLD rule value preprocessing.
step		-			Individual LLD rule value preprocessing step.

For most of the element tag values, see element tag values for a template item value preprocessing. Only the tags that are specific to template low-level discovery value preprocessing, are described below.

Element	Element property	Required	Type	Range	Description
	type	x	string	5 - REGEX 11 - XMLPATH 12 - JSONPATH 15 - NOT_MATCHES_REGEX 16 - CHECK_JSON_ERROR 17 - CHECK_XML_ERROR 20 - DIS-CARD_UNCHANGED_HEARTBEAT 21 - JAVASCRIPT 23 - PROMETHEUS_TO_JSON 24 - CSV_TO_JSON 25 - STR_REPLACE	Type of the item value preprocessing step.
trigger_prototypes		-			Root element for trigger prototypes.  For trigger prototype element tag values, see regular <b>template trigger</b> tags.
graph_prototypes		-			Root element for graph prototypes.  For graph prototype element tag values, see regular <b>template graph</b> tags.
host_prototypes		-			Root element for host prototypes.  For host prototype element tag values, see regular <b>host</b> tags.
item_prototypes		-			Root element for item prototypes.  For item prototype element tag values, see regular <b>template item</b> tags.
application_prototypes		-			Root element for application prototypes.
	name	x	string		Application prototype name.
master_item		-			Individual item prototype master item/item prototype data.
	key	x	string		Dependent item prototype master item/item prototype key value.
					Required for a dependent item.

## Template trigger tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
triggers		-			Root element for triggers.
	expression	x	string		Trigger expression.
	recovery_mode	-	string	0 - EXPRESSION (default) 1 - RECOVERY_EXPRESSION 2 - NONE	Basis for generating OK events.
	recovery_expression	-	string		Trigger recovery expression.
	name	x	string		Trigger name.
	correlation_mode	-	string	0 - DISABLED (default) 1 - TAG_VALUE	Correlation mode (no event correlation or event correlation by tag).
	correlation_tag	-	string		The tag name to be used for event correlation.
	url	-	string		URL associated with the trigger.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Trigger status.
	priority	-	string	0 - NOT_CLASSIFIED (default) 1 - INFO 2 - WARNING 3 - AVERAGE 4 - HIGH 5 - DISASTER	Trigger severity.
	description	-	text		Trigger description.
	type	-	string	0 - SINGLE (default) 1 - MULTIPLE	Event generation type (single problem event or multiple problem events).
	manual_close	-	string	0 - NO (default) 1 - YES	Manual closing of problem events.
dependencies		-			Root element for dependencies.
	name	x	string		Dependency trigger name.
	expression	x	string		Dependency trigger expression.
	recovery_expression	-	string		Dependency trigger recovery expression.
tags		-			Root element for event tags.
	tag	x	string		Tag name.
	value	-	string		Tag value.

Template graph tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
graphs		-			Root element for graphs.
	name	x	string		Graph name.
	width	-	integer	20-65535 (default: 900)	Graph width, in pixels. Used for preview and for pie/exploded graphs.
	height	-	integer	20-65535 (default: 200)	Graph height, in pixels. Used for preview and for pie/exploded graphs.
	yaxismin	-	double	Default: 0	Value of Y axis minimum.
	yaxismax	-	double	Default: 0	Value of Y axis maximum.
	show_work_period	-	string	0 - NO 1 - YES (default)	Used if 'ymin_type_1' is FIXED. Highlight non-working hours.
	show_triggers	-	string	0 - NO 1 - YES (default)	Used by normal and stacked graphs. Display simple trigger values as a line.
	type	-	string	0 - NORMAL (default) 1 - STACKED 2 - PIE 3 - EXPLODED	Used by normal and stacked graphs. Graph type.
	show_legend	-	string	0 - NO 1 - YES (default)	Display graph legend.
	show_3d	-	string	0 - NO (default) 1 - YES	Enable 3D style.
	percent_left	-	double	Default:0	Used by pie and exploded pie graphs. Show the percentile line for left axis.
	percent_right	-	double	Default:0	Used only for normal graphs. Show the percentile line for right axis.
					Used only for normal graphs.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	ymin_type_1	-	string	0 - CALCULATED (default) 1 - FIXED 2 - ITEM	Minimum value of Y axis.  Used by normal and stacked graphs.
	ymax_type_1	-	string	0 - CALCULATED (default) 1 - FIXED 2 - ITEM	Maximum value of Y axis.  Used by normal and stacked graphs.
ymin_item_1		-			Individual item details.  Required if 'ymin_type_1' is ITEM.
	host	x	string		Item host.
	key	x	string		Item key.
ymax_item_1		-			Individual item details.  Required if 'ymax_type_1' is ITEM.
	host	x	string		Item host.
	key	x	string		Item key.
graph_items		x			Root element for graph items.
	sortorder	-	integer		Draw order. The smaller value is drawn first. Can be used to draw lines or regions behind (or in front of) another.
	drawtype	-	string	0 - SINGLE_LINE (default) 1 - FILLED_REGION 2 - BOLD_LINE 3 - DOTTED_LINE 4 - DASHED_LINE 5 - GRADIENT_LINE	Draw style of the graph item.  Used only by normal graphs.
	color	-	string		Element color (6 symbols, hex).
	yaxisside	-	string	0 - LEFT (default) 1 - RIGHT	Side of the graph where the graph item's Y scale will be drawn.
	calc_fnc	-	string	1 - MIN 2 - AVG (default) 4 - MAX 7 - ALL (minimum, average and maximum; used only by simple graphs) 9 - LAST (used only by pie and exploded pie graphs)	Used by normal and stacked graphs. Data to draw if more than one value exists for an item.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	type	-	string	0 - SIMPLE (default) 2 - GRAPH_SUM (value of the item represents the whole pie; used only by pie and exploded pie graphs)	Graph item type.
item		x			Individual item.
	host	x	string		Item host.
	key	x	string		Item key.

#### Template web scenario tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
httptests		-			Root element for web scenarios.
	name	x	string		Web scenario name.
	delay	-	string	Default: 1m	Frequency of executing the web scenario. Seconds, time unit with suffix or user macro.
	attempts	-	integer	1-10 (default: 1)	The number of attempts for executing web scenario steps.
	agent	-	string	Default: Zabbix	Client agent. Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.
	http_proxy	-	string		Specify an HTTP proxy to use, using the format: <code>http://[username[:password]@]host[:port]</code>
variables		-			Root element for scenario-level variables (macros) that may be used in scenario steps.
	name	x	text		Variable name.
	value	x	text		Variable value.
headers		-			Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.



Element	Element property	Required	Type	Range <sup>1</sup>	Description
	name	x	text		Header name.
	value	x	text		Header value.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Web scenario status.
	authentication	-	string	0 - NONE (default) 1 - BASIC 2 - NTLM	Authentication method.
	http_user	-	string		User name used for basic, HTTP or NTLM authentication.
	http_password	-	string		Password used for basic, HTTP or NTLM authentication.
	verify_peer	-	string	0 - NO (default) 1 - YES	Verify the SSL certificate of the web server.
	verify_host	-	string	0 - NO (default) 1 - YES	Verify that the Common Name field or the Subject Alternate Name field of the web server certificate matches.
	ssl_cert_file	-	string		Name of the SSL certificate file used for client authentication (must be in PEM format).
	ssl_key_file	-	string		Name of the SSL private key file used for client authentication (must be in PEM format).
	ssl_key_password	-	string		SSL private key file password.
steps		x			Root element for web scenario steps.
	name	x	string		Web scenario step name.
	url	x	string		URL for monitoring.
query_fields		-			Root element for query fields - an array of HTTP fields that will be added to the URL when performing a request.
	name	x	string		Query field name.
	value	-	string		Query field value.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
posts		-			HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).
	name	x	string		Post field name.
	value	x	string		Post field value.
variables		-			Root element of step-level variables (macros) that should be applied after this step.
					If the variable value has a 'regex:' prefix, then its value is extracted from the data returned by this step according to the regular expression pattern following the 'regex:' prefix
	name	x	string		Variable name.
	value	x	string		Variable value.
headers		-			Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.
	name	x	string		Header name.
	value	x	string		Header value.
	follow_redirects	-	string	0 - NO 1 - YES (default)	Follow HTTP redirects.
	retrieve_mode	-	string	0 - BODY (default) 1 - HEADERS 2 - BOTH	HTTP response retrieve mode.
	timeout	-	string	Default: 15s	Timeout of step execution. Seconds, time unit with suffix or user macro.
	required	-	string		Text that must be present in the response. Ignored if empty.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	status_codes	-	string		A comma delimited list of accepted HTTP status codes. Ignored if empty. For example: 200-201,210-299

#### Template dashboard tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
dashboards		-			Root element for template dashboards.
	name	x	string		Template dashboard name.
widgets		-			Root element for template dashboard widgets.
	type	x	string		Widget type.
	name	-	string		Widget name.
	x	-	integer	0-23	Horizontal position from the left side of the template dashboard.
	y	-	integer	0-62	Vertical position from the top of the template dashboard.
	width	-	integer	1-24	Widget width.
	height	-	integer	2-32	Widget height.
	hide_header	-	string	0 - no 1 - yes	Hide widget header.
fields		-			Root element for the template dashboard widget fields.
	type	x	string	0 - INTEGER 1 - STRING 3 - HOST 4 - ITEM 5 - ITEM_PROTOTYPE 6 - GRAPH 7 - GRAPH_PROTOTYPE	Widget field type.
	name	x	string		Widget field name.
	value	x	mixed		Widget field value, depending on the field type.

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "ZABBIX\_ACTIVE") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

### 3 Hosts

#### Overview

Hosts are **exported** with many related objects and object relations.

Host export contains:

- linked host groups
- host data
- template linkage
- host group linkage
- host interfaces
- directly linked applications
- directly linked items
- directly linked triggers
- directly linked graphs
- directly linked discovery rules with all prototypes
- directly linked web scenarios
- host macros
- host inventory data
- value maps

#### Exporting

To export hosts, do the following:

- Go to: Configuration → Hosts
- Mark the checkboxes of the hosts to export
- Click on Export below the list

## ☰ Hosts

The screenshot shows the Zabbix Hosts configuration page. At the top, there is a table with columns: Name, Applications, Items, Triggers, and Graphs. The first row is highlighted in yellow and contains a checked checkbox, the name 'Server 1', and the same column headers. Below the table, there is a control bar with the text '1 selected' and buttons for 'Enable', 'Disable', 'Export', 'Mass update', and 'Delete'. The 'Export' button is active, and a dropdown menu is open below it, showing three options: 'YAML', 'XML', and 'JSON'.

Depending on the selected format, hosts are exported to a local file with a default name:

- zabbix\_export\_hosts.yaml - in YAML export (default option for export)
- zabbix\_export\_hosts.xml - in XML export
- zabbix\_export\_hosts.json - in JSON export

#### Importing

To import hosts, do the following:

- Go to: Configuration → Hosts
- Click on Import to the right
- Select the import file
- Mark the required options in import rules
- Click on Import

\* Import file  No file selected.

Rules	Update existing	Create new	Delete missing
Groups		<input checked="" type="checkbox"/>	
Hosts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Templates	<input type="checkbox"/>	<input type="checkbox"/>	
Template screens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Template linkage		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Applications		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Items	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Discovery rules	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Triggers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Graphs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Web scenarios	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Screens	<input type="checkbox"/>	<input type="checkbox"/>	
Maps	<input type="checkbox"/>	<input type="checkbox"/>	
Images	<input type="checkbox"/>	<input type="checkbox"/>	
Media types	<input type="checkbox"/>	<input type="checkbox"/>	
Value mappings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

A success or failure message of the import will be displayed in the frontend.

Import rules:

Rule	Description
Update existing	Existing elements will be updated with data taken from the import file. Otherwise they will not be updated.
Create new	The import will add new elements using data from the import file. Otherwise it will not add them.
Delete missing	The import will remove existing elements not present in the import file. Otherwise it will not remove them. If Delete missing is marked for template linkage, existing template linkage not present in the import file will be removed from the host along with all entities inherited from the potentially unlinked templates (items, triggers, etc).

Export format

Export format in YAML:

```
zabbix_export:
  version: '5.2'
  date: '2021-09-28T10:57:04Z'
  groups:
    -
      name: 'Discovered hosts'
    -
      name: 'Zabbix servers'
  hosts:
    -
      host: 'Zabbix server 1'
      name: 'Main Zabbix server'
      tls_connect: TLS_PSK
      tls_accept:
        - NO_ENCRYPTION
        - TLS_PSK
      tls_psk_identity: z112
      tls_psk: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952
      templates:
        -
          name: 'Template App Zabbix Server'
        -
          name: 'Template OS Linux'
      groups:
        -
          name: 'Discovered hosts'
        -
          name: 'Zabbix servers'
      interfaces:
        -
          ip: 192.168.1.1
          interface_ref: if1
      items:
        -
          name: 'Zabbix trap'
          type: TRAP
          key: trap
          delay: '0'
          history: 1w
          applications:
            -
              name: 'Zabbix server'
          preprocessing:
            -
              type: MULTIPLIER
              parameters:
                - '8'
          triggers:
            -
              expression: '{last()}=0'
              name: 'Last value is zero'
              priority: WARNING
              tags:
                -
                  tag: Process
                  value: 'Internal test'
      tags:
        -
          tag: Process
          value: Zabbix
  macros:
```

```

-
macro: '{$HOST.MACRO}'
value: '123'
-
macro: '{$PASSWORD1}'
type: SECRET_TEXT
inventory:
type: 'Zabbix server'
name: yyyyyy-HP-Pro-3010-Small-Form-Factor-PC
os: 'Linux yyyyyy-HP-Pro-3010-Small-Form-Factor-PC 4.4.0-165-generic #193-Ubuntu SMP Tue Sep 17 17
inventory_mode: AUTOMATIC
graphs:
-
name: 'CPU utilization server'
show_work_period: 'NO'
show_triggers: 'NO'
graph_items:
-
drawtype: FILLED_REGION
color: FF5555
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,steal]'
-
sortorder: '1'
drawtype: FILLED_REGION
color: 55FF55
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,softirq]'
-
sortorder: '2'
drawtype: FILLED_REGION
color: '009999'
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,interrupt]'
-
sortorder: '3'
drawtype: FILLED_REGION
color: '990099'
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,nice]'
-
sortorder: '4'
drawtype: FILLED_REGION
color: '999900'
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,iowait]'
-
sortorder: '5'
drawtype: FILLED_REGION
color: '990000'
item:
host: 'Zabbix server 1'
key: 'system.cpu.util[,system]'
-
sortorder: '6'
drawtype: FILLED_REGION
color: '000099'
calc_fnc: MIN

```

```

item:
  host: 'Zabbix server 1'
  key: 'system.cpu.util[,user]'
-
sortorder: '7'
drawtype: FILLED_REGION
color: '009900'
item:
  host: 'Zabbix server 1'
  key: 'system.cpu.util[,idle]'

```

## Element tags

Element tag values are explained in the table below.

## Host tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
groups		x			Root element for host groups.
	name	x	string		Host group name.
hosts		-			Root element for hosts.
	host	x	string		Unique host name.
	name	-	string		Visible host name.
	description	-	text		Host description.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Host status.
	ipmi_authtype	-	string	-1 - DEFAULT (default) 0 - NONE 1 - MD2 2 - MD5 4 - STRAIGHT 5 - OEM 6 - RMCP_PLUS	IPMI session authentication type.
	ipmi_privilege	-	string	1 - CALLBACK 2 - USER (default) 3 - OPERATOR 4 - ADMIN 5 - OEM	IPMI session privilege level.
	ipmi_username	-	string		Username for IPMI checks.
	ipmi_password	-	string		Password for IPMI checks.
	tls_connect	-	string	1 - NO_ENCRYPTION (default) 2 - TLS_PSK 4 - TLS_CERTIFICATE	Type of outgoing connection.
tls_accept	-			Root element for incoming connection options.	



Element	Element property	Required	Type	Range <sup>1</sup>	Description
	option	-	string	1 - NO_ENCRYPTION (default) 2 - TLS_PSK 4 - TLS_CERTIFICATE	Type of incoming connection.  If both unencrypted and encrypted connection is allowed, the <option> property is used twice, one time with NO_ENCRYPTION and another with the encryption option (see example above).
	tls_issuer	-	string		Allowed agent/proxy certificate issuer.
	tls_subject	-	string		Allowed agent/proxy certificate subject.
	tls_psk_identity	-	string		PSK identity string.
	tls_psk	-	string		Required if either tls_connect or tls_accept has PSK enabled. The preshared key string, at least 32 hex digits.
proxy	name	-	string		Required if either tls_connect or tls_accept has PSK enabled. Proxy. Name of the proxy (if any) that monitors the host.
templates		-			Root element for linked templates.
interfaces	name	x	string		Template name.
		-			Root element for host interfaces.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	default	-	string	0 - NO 1 - YES (default)	Whether this is the primary host interface. There can be only one primary interface of one type on a host.
	type	-	string	1 - ZABBIX (default) 2 - SNMP 3 - IPMI 4 - JMX	Interface type.
	useip	-	string	0 - NO 1 - YES (default)	Whether to use IP as the interface for connecting to the host (if not, DNS will be used).
	ip	-	string		IP address, can be either IPv4 or IPv6.
	dns	-	string		Required if the connection is made via IP. DNS name.
	port	-	string		Required if the connection is made via DNS. Port number. Supports user macros.
	interface_ref	x	string	Format: if<N>	Interface reference name to be used in items.
details		-			Root element for interface details.
	version	-	string	1 - SNMPV1 2 - SNMP_V2C (default) 3 - SNMP_V3	Use this SNMP version.
	community	-	string		SNMP community.
	contextname	-	string		Required by SNMPv1 and SNMPv2 items. SNMPv3 context name.
	securityname	-	string		Used only by SNMPv3 items. SNMPv3 security name.
					Used only by SNMPv3 items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	securitylevel	-	string	0 - NOAUTHNOPRIV (default) 1 - AUTHNOPRIV 2 - AUTHPRIV	SNMPv3 security level.  Used only by SNMPv3 items.
	authprotocol	-	string	0 - MD5 (default) 1 - SHA	SNMPv3 authentication protocol.  Used only by SNMPv3 items.
	authpassphrase	-	string		SNMPv3 authentication passphrase.  Used only by SNMPv3 items.
	privprotocol	-	string	0 - DES (default) 1 - AES	SNMPv3 privacy protocol.  Used only by SNMPv3 items.
	privpassphrase	-	string		SNMPv3 privacy passphrase.  Used only by SNMPv3 items.
	bulk	-	string	0 - NO 1 - YES (default)	Use bulk requests for SNMP.  Used only by SNMPv3 items.
items		-			Root element for items.
	For item element tag values, see host <a href="#">item</a> tags.				
tags		-			Root element for host tags.
	tag	x	string		Tag name.
	value	-	string		Tag value.
macros		-			Root element for macros.
	macro	x			User macro name.
	type	-	string	0 - TEXT (default) 1 - SECRET_TEXT 2 - VAULT	Type of the macro.
	value	-	string		User macro value.
	description	-	string		User macro description.
inventory		-			Root element for host inventory.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	<inventory_property>	-			Individual inventory property.
					All available inventory properties are listed under the respective tags, e.g. <type>, <name>, <os> (see example above).
inventory_mode		-	string	-1 - DISABLED 0 - MANUAL (default) 1 - AUTOMATIC	Inventory mode.

#### Host item tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
items		-			Root element for items.
	name	x	string		Item name.
	type	-	string	0 - ZABBIX_PASSIVE (default) 2 - TRAP 3 - SIMPLE 5 - INTERNAL 7 - ZABBIX_ACTIVE 8 - AGGREGATE 10 - EXTERNAL 11 - ODBC 12 - IPMI 13 - SSH 14 - TELNET 15 - CALCULATED 16 - JMX 17 - SNMP_TRAP 18 - DEPENDENT 19 - HTTP_AGENT 20 - SNMP_AGENT 21 - ITEM_TYPE_SCRIPT	Item type.
	snmp_oid	-	string		SNMP object ID.
	key	x	string		Required by SNMP items. Item key.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	delay	-	string	Default: 1m	Update interval of the item.  Accepts seconds or a time unit with suffix (30s, 1m, 2h, 1d). Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling. Multiple intervals are separated by a semicolon. User macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported. Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{\$FLEX_INTERVAL}/{\$FLEX_INTERVAL}</code> ).
	history	-	string	Default: 90d	A time unit of how long the history data should be stored. Time unit with suffix, user macro or LLD macro.
	trends	-	string	Default: 365d	A time unit of how long the trends data should be stored. Time unit with suffix, user macro or LLD macro.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Item status.
	value_type	-	string	0 - FLOAT 1 - CHAR 2 - LOG 3 - UNSIGNED (default) 4 - TEXT	Received value type.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	allowed_hosts	-	string		List of IP addresses (comma delimited) of hosts allowed sending data for the item.
	units	-	string		Used by trapper and HTTP agent items. Units of returned values (bps, B, etc).
	params	-	text		Additional parameters depending on the type of the item: - executed script for Script, SSH and Telnet items; - SQL query for database monitor items; - formula for calculated items.
	ipmi_sensor	-	string		IPMI sensor.
	authtype	-	string	Authentication type for SSH agent items: 0 - PASSWORD (default) 1 - PUBLIC_KEY  Authentication type for HTTP agent items: 0 - NONE (default) 1 - BASIC 2 - NTLM	Used only by IPMI items. Authentication type.  Used only by SSH and HTTP agent items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	username	-	string		<p>Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.</p> <p>Required by SSH and Telnet items. When used by JMX agent, password should also be specified together with the username or both properties should be left blank.</p>
	password	-	string		<p>Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.</p> <p>When used by JMX agent, username should also be specified together with the password or both properties should be left blank.</p>
	publickey	-	string		<p>Name of the public key file.</p> <p>Required for SSH agent items.</p>
	privatekey	-	string		<p>Name of the private key file.</p> <p>Required for SSH agent items.</p>
	description	-	text		Item description.
	inventory_link	-	string	0 - NONE	<p>Host inventory field that is populated by the item.</p> <p>Capitalized host inventory field name. For example:  4 - ALIAS  6 - OS_FULL  14 - HARDWARE  etc.</p> <p>Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs.</p>

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	logtimefmt	-	string		Format of the time in log entries. Used only by log items.
	interface_ref	-	string	Format: if<N>	Reference to the host interface.
	jmx_endpoint	-	string		JMX endpoint.  Used only by JMX agent items.
	url	-	string		URL string.
	allow_traps	-	string	0 - NO (default) 1 - YES	Required only for HTTP agent items. Allow to populate value as in a trapper item.
	follow_redirects	-	string	0 - NO 1 - YES (default)	Used only by HTTP agent items. Follow HTTP response redirects while pooling data.
headers		-			Used only by HTTP agent items. Root element for HTTP(S) request headers, where header name is used as key and header value as value.
	name	x	string		Used only by HTTP agent items. Header name.
	value	x	string		Header value.
	http_proxy	-	string		HTTP(S) proxy connection string.
	output_format	-	string	0 - RAW (default) 1 - JSON	Used only by HTTP agent items. How to process response.
					Used only by HTTP agent items.



Element	Element property	Required	Type	Range <sup>1</sup>	Description
	post_type	-	string	0 - RAW (default) 2 - JSON 3 - XML	Type of post data body.  Used only by HTTP agent items.
	posts	-	string		HTTP(S) request body data.  Used only by HTTP agent items.
query_fields		-			Root element for query parameters.  Used only by HTTP agent items.
	name	x	string		Parameter name.
	value	-	string		Parameter value.
	request_method	-	string	0 - GET (default) 1 - POST 2 - PUT 3 - HEAD	Request method.  Used only by HTTP agent items.
	retrieve_mode	-	string	0 - BODY (default) 1 - HEADERS 2 - BOTH	What part of response should be stored.
	ssl_cert_file	-	string		Used only by HTTP agent items. Public SSL Key file path.
	ssl_key_file	-	string		Used only by HTTP agent items. Private SSL Key file path.
	ssl_key_password	-	string		Used only by HTTP agent items. Password for SSL Key file.
					Used only by HTTP agent items.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	status_codes	-	string		<p>Ranges of required HTTP status codes separated by commas. Supports user macros. Example: 200,200-{\$M},{ \$M},200-400</p> <p>Used only by HTTP agent items.</p>
	timeout	-	string		<p>Item data polling request timeout. Supports user macros.</p> <p>Used by HTTP agent and Script items.</p>
	verify_host	-	string	0 - NO (default) 1 - YES	<p>Validate if host name in URL is in Common Name field or a Subject Alternate Name field of host certificate.</p> <p>Used only by HTTP agent items.</p>
	verify_peer	-	string	0 - NO (default) 1 - YES	<p>Validate if host certificate is authentic.</p> <p>Used only by HTTP agent items.</p>
parameters		-			<p>Root element for user-defined parameters.</p> <p>Used only by Script items.</p>
	name	x	string		<p>Parameter name.</p> <p>Used only by Script items.</p>
	value	-	string		<p>Parameter value.</p> <p>Used only by Script items.</p>
value map		-			<p>Value map.</p>

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	name	x	string		Name of the value map to use for the item.
applications		-			Root element for applications.
	name	x	string		Application name.
preprocessing		-			Root element for item value preprocessing.
step		-			Individual item value preprocessing step.
	type	x	string	1 - MULTIPLIER 2 - RTRIM 3 - LTRIM 4 - TRIM 5 - REGEX 6 - BOOL_TO_DECIMAL 7 - OCTAL_TO_DECIMAL 8 - HEX_TO_DECIMAL 9 - SIMPLE_CHANGE (calculated as (received value-previous value)) 10 - CHANGE_PER_SECOND (calculated as (received value-previous value)/(time now-time of last check)) 11 - XMLPATH 12 - JSONPATH 13 - IN_RANGE 14 - MATCHES_REGEX 15 - NOT_MATCHES_REGEX 16 - CHECK_JSON_ERROR 17 - CHECK_XML_ERROR 18 - CHECK_REGEX_ERROR 19 - DISCARD_UNCHANGED 20 - DISCARD_UNCHANGED_HEARTBEAT 21 - JAVASCRIPT 22 - PROMETHEUS_PATTERN 23 - PROMETHEUS_TO_JSON 24 - CSV_TO_JSON 25 - STR_REPLACE 26 - CHECK_NOT_SUPPORTED	Type of the item value preprocessing step.
	parameters	-			Root element for parameters of the item value preprocessing step.
	parameter	x	string		Individual parameter of the item value preprocessing step.
	error_handler	-	string	0 - ORIGINAL_ERROR (default) 1 - DISCARD_VALUE 2 - CUSTOM_VALUE 3 - CUSTOM_ERROR	Action type used in case of preprocessing step failure.
	error_handler_params	-	string		Error handler parameters used with 'error_handler'.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
master_item		-			Individual item master item.
	key	x	string		Required by dependent items. Dependent item master item key value.
					Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed.
triggers		-			Root element for simple triggers.
	For trigger element tag values, see host <a href="#">trigger tags</a> .				

#### Host low-level discovery rule tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
discovery_rules		-			Root element for low-level discovery rules.
	For most of the element tag values, see element tag values for a regular item. Only the tags that are specific to low-level discovery rules, are described below.				
	type	-	string	0 - ZABBIX_PASSIVE (default) 2 - TRAP 3 - SIMPLE 5 - INTERNAL 7 - ZABBIX_ACTIVE 10 - EXTERNAL 11 - ODBC 12 - IPMI 13 - SSH 14 - TELNET 16 - JMX 18 - DEPENDENT 19 - HTTP_AGENT 20 - SNMP_AGENT	Item type.
	lifetime	-	string	Default: 30d	Time period after which items that are no longer discovered will be deleted. Seconds, time unit with suffix or user macro.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
filter	evaltype	-	string	0 - AND_OR (default) 1 - AND 2 - OR 3 - FORMULA	Individual filter. Logic to use for checking low-level discovery rule filter conditions.
	formula	-	string		Custom calculation formula for filter conditions.
conditions		-			Root element for filter conditions.
	macro	x	string		Low-level discovery macro name.
	value	-	string		Filter value: regular expression or global regular expression.
	operator	-	string	8 - MATCHES_REGEX (default) 9 - NOT_MATCHES_REGEX	Condition operator.
	formulaid	x	character		Arbitrary unique ID that is used to reference a condition from the custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
lld_macro_paths		-			Root element for LLD macro paths.
	lld_macro	x	string		Low-level discovery macro name.
	path	x	string		Selector for value which will be assigned to the corresponding macro.
preprocessing		-			LLD rule value preprocessing.
step		-			Individual LLD rule value preprocessing step.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	<p>For most of the element tag values, see element tag values for a host item value preprocessing. Only the tags that are specific to low-level discovery value preprocessing, are described below.</p> <p>type</p>	x	string	5 - REGEX 11 - XMLPATH 12 - JSONPATH 15 - NOT_MATCHES_REGEX 16 - CHECK_JSON_ERROR 17 - CHECK_XML_ERROR 20 - DISCARD_UNCHANGED_HEARTBEAT 21 - JAVASCRIPT 23 - PROMETHEUS_TO_JSON 24 - CSV_TO_JSON 25 - STR_REPLACE	Type of the item value preprocessing step.
trigger_prototypes	<p>For trigger prototype element tag values, see regular <b>host trigger</b> tags.</p>	-			Root element for trigger prototypes.
graph_prototypes	<p>For graph prototype element tag values, see regular <b>host graph</b> tags.</p>	-			Root element for graph prototypes.
host_prototypes	<p>For host prototype element tag values, see regular <b>host</b> tags.</p>	-			Root element for host prototypes.
item_prototypes	<p>For item prototype element tag values, see regular <b>host item</b> tags.</p>	-			Root element for item prototypes.
application_prototypes	<p>For application prototype element tag values, see regular <b>host application</b> tags.</p>	-			Root element for application prototypes.
	name	x	string		Application prototype name.
master_item		-			Individual item prototype master item/item prototype data.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	key	x	string		Dependent item prototype master item/item prototype key value.  Required for a dependent item.

#### Host trigger tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
triggers		-			Root element for triggers.
	expression	x	string		Trigger expression.
	recovery_mode	-	string	0 - EXPRESSION (default) 1 - RECOVERY_EXPRESSION 2 - NONE	Basis for generating OK events.
	recovery_expression	-	string		Trigger recovery expression.
	name	x	string		Trigger name.
	correlation_mode	-	string	0 - DISABLED (default) 1 - TAG_VALUE	Correlation mode (no event correlation or event correlation by tag).
	correlation_tag	-	string		The tag name to be used for event correlation.
	url	-	string		URL associated with the trigger.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Trigger status.
	priority	-	string	0 - NOT_CLASSIFIED (default) 1 - INFO 2 - WARNING 3 - AVERAGE 4 - HIGH 5 - DISASTER	Trigger severity.
	description	-	text		Trigger description.
	type	-	string	0 - SINGLE (default) 1 - MULTIPLE	Event generation type (single problem event or multiple problem events).
	manual_close	-	string	0 - NO (default) 1 - YES	Manual closing of problem events.
dependencies		-			Root element for dependencies.
	name	x	string		Dependency trigger name.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	expression	x	string		Dependency trigger expression.
	recovery_expression	-	string		Dependency trigger recovery expression.
tags		-			Root element for event tags.
	tag	x	string		Tag name.
	value	-	string		Tag value.

#### Host graph tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
graphs		-			Root element for graphs.
	name	x	string		Graph name.
	width	-	integer	20-65535 (default: 900)	Graph width, in pixels. Used for preview and for pie/exploded graphs.
	height	-	integer	20-65535 (default: 200)	Graph height, in pixels. Used for preview and for pie/exploded graphs.
	yaxismin	-	double	Default: 0	Value of Y axis minimum.
	yaxismax	-	double	Default: 0	Value of Y axis maximum.
	show_work_period	-	string	0 - NO 1 - YES (default)	Used if 'ymin_type_1' is FIXED. Highlight non-working hours.
	show_triggers	-	string	0 - NO 1 - YES (default)	Used by normal and stacked graphs. Display simple trigger values as a line.
	type	-	string	0 - NORMAL (default) 1 - STACKED 2 - PIE 3 - EXPLODED	Used by normal and stacked graphs. Graph type.
	show_legend	-	string	0 - NO 1 - YES (default)	Display graph legend.



Element	Element property	Required	Type	Range <sup>1</sup>	Description
	show_3d	-	string	0 - NO (default) 1 - YES	Enable 3D style.
	percent_left	-	double	Default:0	Used by pie and exploded pie graphs. Show the percentile line for left axis.
	percent_right	-	double	Default:0	Used only for normal graphs. Show the percentile line for right axis.
	ymin_type_1	-	string	0 - CALCULATED (default) 1 - FIXED 2 - ITEM	Used only for normal graphs. Minimum value of Y axis.
	ymax_type_1	-	string	0 - CALCULATED (default) 1 - FIXED 2 - ITEM	Used by normal and stacked graphs. Maximum value of Y axis.
ymin_item_1		-			Used by normal and stacked graphs. Individual item details.
	host	x	string		Required if 'ymin_type_1' is ITEM. Item host.
	key	x	string		Item key.
ymax_item_1		-			Individual item details.
	host	x	string		Required if 'ymax_type_1' is ITEM. Item host.
	key	x	string		Item key.
graph_items		x			Root element for graph items.
	sortorder	-	integer		Draw order. The smaller value is drawn first. Can be used to draw lines or regions behind (or in front of) another.
	drawtype	-	string	0 - SINGLE_LINE (default) 1 - FILLED_REGION 2 - BOLD_LINE 3 - DOTTED_LINE 4 - DASHED_LINE 5 - GRADIENT_LINE	Draw style of the graph item.
	color	-	string		Used only by normal graphs. Element color (6 symbols, hex).

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	yaxisside	-	string	0 - LEFT (default) 1 - RIGHT	Side of the graph where the graph item's Y scale will be drawn.
	calc_fnc	-	string	1 - MIN 2 - AVG (default) 4 - MAX 7 - ALL (minimum, average and maximum; used only by simple graphs) 9 - LAST (used only by pie and exploded pie graphs)	Used by normal and stacked graphs. Data to draw if more than one value exists for an item.
	type	-	string	0 - SIMPLE (default) 2 - GRAPH_SUM (value of the item represents the whole pie; used only by pie and exploded pie graphs)	Graph item type.
item		x			Individual item.
	host	x	string		Item host.
	key	x	string		Item key.

#### Host web scenario tags

Element	Element property	Required	Type	Range <sup>1</sup>	Description
httptests		-			Root element for web scenarios.
	name	x	string		Web scenario name.
	delay	-	string	Default: 1m	Frequency of executing the web scenario. Seconds, time unit with suffix or user macro.
	attempts	-	integer	1-10 (default: 1)	The number of attempts for executing web scenario steps.
	agent	-	string	Default: Zabbix	Client agent. Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.
	http_proxy	-	string		Specify an HTTP proxy to use, using the format: http://[username[:password

Element	Element property	Required	Type	Range <sup>1</sup>	Description
variables		-			Root element for scenario-level variables (macros) that may be used in scenario steps.
	name	x	text		Variable name.
	value	x	text		Variable value.
headers		-			Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.
	name	x	text		Header name.
	value	x	text		Header value.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Web scenario status.
	authentication	-	string	0 - NONE (default) 1 - BASIC 2 - NTLM	Authentication method.
	http_user	-	string		User name used for basic, HTTP or NTLM authentication.
	http_password	-	string		Password used for basic, HTTP or NTLM authentication.
	verify_peer	-	string	0 - NO (default) 1 - YES	Verify the SSL certificate of the web server.
	verify_host	-	string	0 - NO (default) 1 - YES	Verify that the Common Name field or the Subject Alternate Name field of the web server certificate matches.
	ssl_cert_file	-	string		Name of the SSL certificate file used for client authentication (must be in PEM format).
	ssl_key_file	-	string		Name of the SSL private key file used for client authentication (must be in PEM format).
	ssl_key_password	-	string		SSL private key file password.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
steps		x			Root element for web scenario steps.
	name	x	string		Web scenario step name.
	url	x	string		URL for monitoring.
query_fields		-			Root element for query fields - an array of HTTP fields that will be added to the URL when performing a request.
	name	x	string		Query field name.
	value	-	string		Query field value.
posts		-			HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).
	name	x	string		Post field name.
	value	x	string		Post field value.
variables		-			Root element of step-level variables (macros) that should be applied after this step.
					If the variable value has a 'regex:' prefix, then its value is extracted from the data returned by this step according to the regular expression pattern following the 'regex:' prefix
	name	x	string		Variable name.
	value	x	string		Variable value.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
headers		-			Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.
	name	x	string		Header name.
	value	x	string		Header value.
	follow_redirects	-	string	0 - NO 1 - YES (default)	Follow HTTP redirects.
	retrieve_mode	-	string	0 - BODY (default) 1 - HEADERS 2 - BOTH	HTTP response retrieve mode.
	timeout	-	string	Default: 15s	Timeout of step execution. Seconds, time unit with suffix or user macro.
	required	-	string		Text that must be present in the response. Ignored if empty.
	status_codes	-	string		A comma delimited list of accepted HTTP status codes. Ignored if empty. For example: 200-201,210-299

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "ZABBIX\_ACTIVE") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

## 4 Network maps

### Overview

Network map **export** contains:

- all related images
- map structure - all map settings, all contained elements with their settings, map links and map link status indicators

#### **Warning:**

Any host groups, hosts, triggers, other maps or other elements that may be related to the exported map are not exported. Thus, if at least one of the elements the map refers to is missing, importing it will fail.

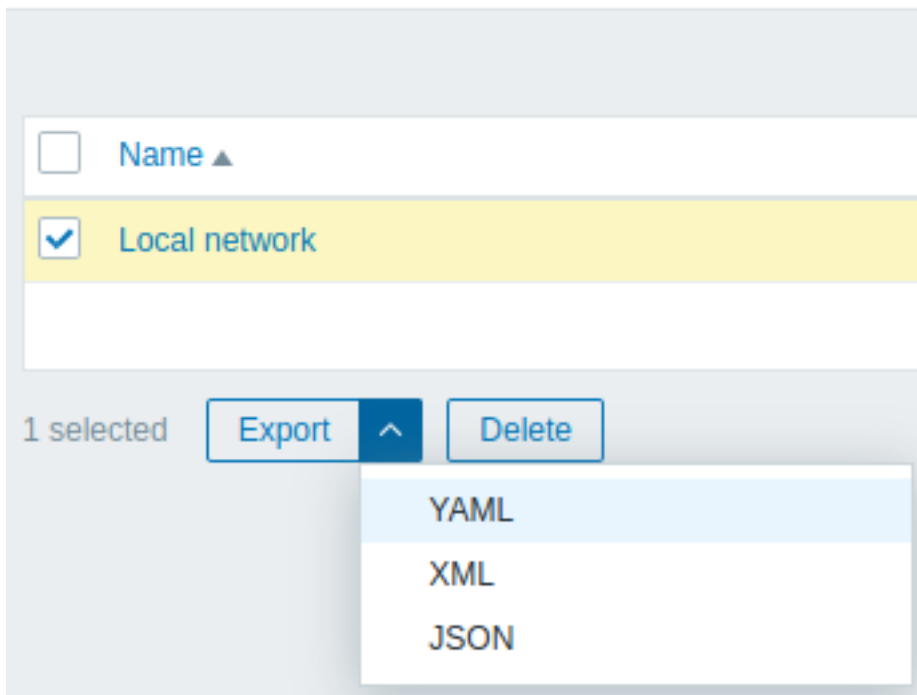
Network map export/import is supported since Zabbix 1.8.2.

### Exporting

To export network maps, do the following:

- Go to: Monitoring → Maps
- Mark the checkboxes of the network maps to export
- Click on Export below the list

## ☰ Maps



Depending on the selected format, maps are exported to a local file with a default name:

- zabbix\_export\_maps.yaml - in YAML export (default option for export)
- zabbix\_export\_maps.xml - in XML export
- zabbix\_export\_maps.json - in JSON export

### Importing

To import network maps, do the following:

- Go to: Monitoring → Maps
- Click on Import to the right
- Select the import file
- Mark the required options in import rules
- Click on Import

\* Import file  zbx\_export\_maps.xml

Rules	Update existing	Create new	Delete missing
Groups		<input type="checkbox"/>	
Hosts	<input type="checkbox"/>	<input type="checkbox"/>	
Templates	<input type="checkbox"/>	<input type="checkbox"/>	
Template screens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Template linkage		<input type="checkbox"/>	
Applications		<input type="checkbox"/>	<input type="checkbox"/>
Items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discovery rules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Triggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web scenarios			
Screens	<input type="checkbox"/>	<input type="checkbox"/>	
Maps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Images	<input type="checkbox"/>	<input type="checkbox"/>	
Value mappings	<input type="checkbox"/>	<input type="checkbox"/>	

All mandatory input fields are marked with a red asterisk.

A success or failure message of the import will be displayed in the frontend.

Import rules:

Rule	Description
Update existing	Existing maps will be updated with data taken from the import file. Otherwise they will not be updated.
Create new	The import will add new maps using data from the import file. Otherwise it will not add them.

If you uncheck both map options and check the respective options for images, images only will be imported. Image importing is only available to Super Admin users.

**Warning:**  
If replacing an existing image, it will affect all maps that are using this image.

Export format

Export to YAML:

```
---
zabbix_export:
```

```

version: "5.2"
date: "2020-08-06T08:20:27Z"
images:
- name: Zabbix_server_3D_(128)
  imagetype: "1"
  encodedImage: iVBOR...CYII=
maps:
- name: Local network
  width: "680"
  height: "200"
  label_type: "0"
  label_location: "0"
  highlight: "1"
  expandproblem: "1"
  markelements: "1"
  show_unack: "0"
  severity_min: "0"
  show_suppressed: "0"
  grid_size: "50"
  grid_show: "1"
  grid_align: "1"
  label_format: "0"
  label_type_host: "2"
  label_type_hostgroup: "2"
  label_type_trigger: "2"
  label_type_map: "2"
  label_type_image: "2"
  label_string_host: ""
  label_string_hostgroup: ""
  label_string_trigger: ""
  label_string_map: ""
  label_string_image: ""
  expand_macros: "1"
  background: []
  iconmap: []
  urls: []
  selements:
- elementtype: "0"
  elements:
- host: Zabbix server
  label: |-
    {HOST.NAME}
    {HOST.CONN}
  label_location: "0"
  x: "111"
  "y": "61"
  elementsubtype: "0"
  areatype: "0"
  width: "200"
  height: "200"
  viewtype: "0"
  use_iconmap: "0"
  selementid: "1"
  icon_off:
    name: Zabbix_server_3D_(128)
  icon_on: []
  icon_disabled: []
  icon_maintenance: []
  application: ""
  urls: []
  shapes:
- type: "0"

```



```

x: "0"
"y": "0"
width: "680"
height: "15"
text: '{MAP.NAME}'
font: "9"
font_size: "11"
font_color: "000000"
text_halign: "0"
text_valign: "0"
border_type: "0"
border_width: "0"
border_color: "000000"
background_color: ""
zindex: "0"
lines: []
links: []
...

```

## Element tags

Element tag values are explained in the table below.

Element	Element property	Type	Range	Description
images	name	string		Root element for images. Unique image name.
	imagetype	integer	1 - image 2 - background	Image type.
maps	encodedImage			Base64 encoded image. Root element for maps.
	name	string		Unique map name.
	width	integer		Map width, in pixels.
	height	integer		Map height, in pixels.
	label_type	integer	0 - label 1 - host IP address 2 - element name 3 - status only 4 - nothing	Map element label type.
	label_location	integer	0 - bottom 1 - left 2 - right 3 - top	Map element label location by default.
	highlight	integer	0 - no 1 - yes	Enable icon highlighting for active triggers and host statuses.
	expandproblem	integer	0 - no 1 - yes	Display problem trigger for elements with a single problem.
	markelements	integer	0 - no 1 - yes	Highlight map elements that have recently changed their status.

Element	Element property	Type	Range	Description
	show_unack	integer	0 - count of all problems 1 - count of unacknowledged problems 2 - count of acknowledged and unacknowledged problems separately	Problem display.
	severity_min	integer	0 - not classified 1 - information 2 - warning 3 - average 4 - high 5 - disaster	Minimum trigger severity to show on the map by default.
	show_suppressed	integer	0 - no 1 - yes	Display problems which would otherwise be suppressed (not shown) because of host maintenance.
	grid_size	integer	20, 40, 50, 75 or 100	Cell size of a map grid in pixels, if "grid_show=1"
	grid_show	integer	0 - yes 1 - no	Display a grid in map configuration.
	grid_align	integer	0 - yes 1 - no	Automatically align icons in map configuration.
	label_format	integer	0 - no 1 - yes	Use advanced label configuration.
	label_type_host	integer	0 - label 1 - host IP address 2 - element name 3 - status only 4 - nothing 5 - custom label	Display as host label, if "label_format=1"
	label_type_hostgroup	integer	0 - label 2 - element name 3 - status only 4 - nothing 5 - custom label	Display as host group label, if "label_format=1"
	label_type_trigger	integer	0 - label 2 - element name 3 - status only 4 - nothing 5 - custom label	Display as trigger label, if "label_format=1"

Element	Element property	Type	Range	Description
	label_type_map	integer	0 - label 2 - element name 3 - status only 4 - nothing 5 - custom label	Display as map label, if "label_format=1"
	label_type_image	integer	0 - label 2 - element name 4 - nothing 5 - custom label	Display as image label, if "label_format=1"
	label_string_host	string		Custom label for host elements, if "label_type_host=5"
	label_string_hostgroup	string		Custom label for host group elements, if "label_type_hostgroup=5"
	label_string_trigger	string		Custom label for trigger elements, if "label_type_trigger=5"
	label_string_map	string		Custom label for map elements, if "label_type_map=5"
	label_string_image	string		Custom label for image elements, if "label_type_image=5"
	expand_macros	integer	0 - no 1 - yes	Expand macros in labels in map configuration.
	background	id		ID of the background image (if any), if "imagetype=2"
	iconmap	id		ID of the icon mapping (if any).
urls				Used by maps or each map element.
	name	string		Link name.
	url	string		Link URL.
	elementtype	integer	0 - host 1 - map 2 - trigger 3 - host group 4 - image	Map item type the link belongs to.
selements				
	elementtype	integer	0 - host 1 - map 2 - trigger 3 - host group 4 - image	Map element type.
	label	string		Icon label.
	label_location	integer	-1 - use map default 0 - bottom 1 - left 2 - right 3 - top	
	x	integer		Location on the X axis.
	y	integer		Location on the Y axis.

Element	Element property	Type	Range	Description
	elementsubtype	integer	0 - single host group 1 - all host groups	Element subtype, if "elementtype=3"
	areatype	integer	0 - same as whole map 1 - custom size	Area size, if "elementsubtype=1"
	width	integer		Width of area, if "areatype=1"
	height	integer		Height of area, if "areatype=1"
	viewtype	integer	0 - place evenly in the area	Area placement algorithm, if "elementsubtype=1"
	use_iconmap	integer	0 - no 1 - yes	Use icon mapping for this element. Relevant only if iconmapping is activated on map level.
	selementid	id		Unique element record ID.
	application	string		Application name filter. If an application name is given, only problems of triggers that belong to the given application will be displayed on the map.
elements				Zabbix entities that are represented on the map (host, host group, map etc).
icon_off	host			Image to use when element is in 'OK' status.
icon_on				Image to use when element is in 'Problem' status.
icon_disabled				Image to use when element is disabled.
icon_maintenance				Image to use when element is in maintenance.
shapes	name	string		Unique image name.
	type	integer	0 - rectangle 1 - ellipse	Shape type.
	x	integer		X coordinates of the shape in pixels.
	y	integer		Y coordinates of the shape in pixels.
	width	integer		Shape width.
	height	integer		Shape height.
	border_type	integer	0 - none 1 - bold line 2 - dotted line 3 - dashed line	Type of the border for the shape.
	border_width	integer		Width of the border in pixels.
	border_color	string		Border color represented in hexadecimal code.
	text	string		Text inside of shape.

Element	Element property	Type	Range	Description
	font	integer	0 - Georgia, serif 1 - "Palatino Linotype", "Book Antiqua", Palatino, serif 2 - "Times New Roman", Times, serif 3 - Arial, Helvetica, sans-serif 4 - "Arial Black", Gadget, sans-serif 5 - "Comic Sans MS", cursive, sans-serif 6 - Impact, Charcoal, sans-serif 7 - "Lucida Sans Unicode", "Lucida Grande", sans-serif 8 - Tahoma, Geneva, sans-serif 9 - "Trebuchet MS", Helvetica, sans-serif 10 - Verdana, Geneva, sans-serif 11 - "Courier New", Courier, monospace 12 - "Lucida Console", Monaco, monospace	Text font style.
	font_size	integer		Font size in pixels.
	font_color	string		Font color represented in hexadecimal code.
	text_halign	integer	0 - center 1 - left 2 - right	Horizontal alignment of text.
	text_valign	integer	0 - middle 1 - top 2 - bottom	Vertical alignment of text.

Element	Element property	Type	Range	Description
lines	background_color	string		Background (fill) color represented in hexadecimal code.
	zindex	integer		Value used to order all shapes and lines (z-index).
	x1	integer		X coordinates of the line point 1 in pixels.
	y1	integer		Y coordinates of the line point 1 in pixels.
	x2	integer		X coordinates of the line point 2 in pixels.
	y2	integer		Y coordinates of the line point 2 in pixels.
	line_type	integer	0 - none 1 - bold line 2 - dotted line 3 - dashed line	Line type.
	line_width	integer		Line width in pixels.
	line_color	string		Line color represented in hexadecimal code.
	zindex	integer		Value used to order all shapes and lines (z-index).
links				Links between map elements.
	drawtype	integer	0 - line 2 - bold line 3 - dotted line 4 - dashed line	Link style.
	color	string		Link color (6 symbols, hex).
	label	string		Link label.
	selementid1	id		ID of one element to connect.
linktriggers	selementid2	id		ID of the other element to connect.
				Link status indicators.
	drawtype	integer	0 - line 2 - bold line 3 - dotted line 4 - dashed line	Link style when trigger is in the 'Problem' state.
trigger	color	string		Link color (6 symbols, hex) when trigger is in the 'Problem' state.
				Trigger used for indicating link status.
	description	string		Trigger name.
	expression	string		Trigger expression.
	recovery_expression	string		Trigger recovery expression.

## 5 Screens

Overview

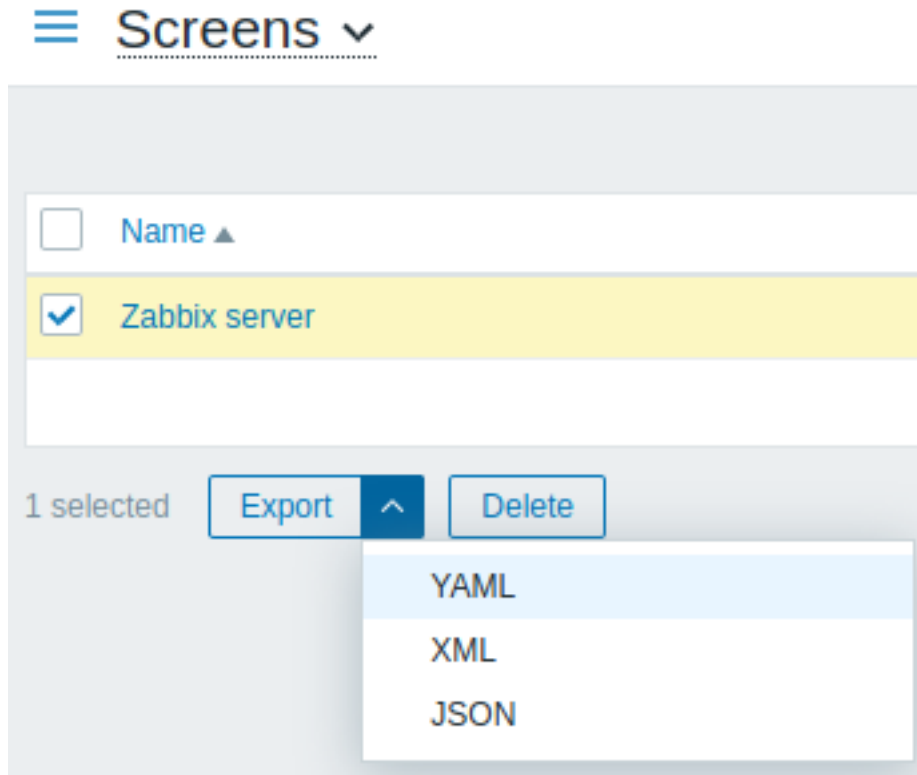
Screen **export** contains the screen structure - all screen settings and all screen elements along with their configuration.

Anything included in the screen itself (like a host, host group or any other data) is not exported. Thus, if at least one of the elements the screen refers to is missing, importing it will fail.

#### Exporting

To export screens, do the following:

- Go to: Monitoring → Screens
- Mark the checkboxes of the screens to export
- Click on Export below the list



Depending on the selected format, screens are exported to a local file with a default name:

- zabbix\_export\_screens.yaml - in YAML export (default option for export)
- zabbix\_export\_screens.xml - in XML export
- zabbix\_export\_screens.json - in JSON export

#### Importing

To import screens, do the following:

- Go to: Monitoring → Screens
- Click on Import to the right
- Select the import file
- Mark the required options in import rules
- Click on Import

\* Import file  zbx\_export\_screens.xml

Rules	Update existing	Create new	Delete missing
Groups		<input type="checkbox"/>	
Hosts	<input type="checkbox"/>	<input type="checkbox"/>	
Templates	<input type="checkbox"/>	<input type="checkbox"/>	
Template screens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Template linkage		<input type="checkbox"/>	
Applications		<input type="checkbox"/>	<input type="checkbox"/>
Items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discovery rules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Triggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web scenarios			
Screens	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Maps	<input type="checkbox"/>	<input type="checkbox"/>	
Images	<input type="checkbox"/>	<input type="checkbox"/>	
Value mappings	<input type="checkbox"/>	<input type="checkbox"/>	

All mandatory input fields are marked with a red asterisk.

A success or failure message of the import will be displayed in the frontend.

Import rules:

Rule Description

Update existing Existing screens will be updated with data taken from the import file. Otherwise they will not be updated.

Create new The import will add new screens using data from the import file. Otherwise it will not add them. |<| |<| |<| |<| hsize: "2" vsize: "1" screen\_items: - resourcetype: "0" width: "500" height: "100" x: "0" "y": "0" colspan: "1" rowspan: "1" elements: "0" valign: "0" valign: "0" halign: "0" style: "0" url: "" dynamic: "0" sort\_triggers: "0" resource: name: CPU jumps host: Zabbix server max\_columns: "3" application: "" - resourcetype: "0" width: "500" height: "100" x: "1" "y": "0" colspan: "1" rowspan: "1" elements: "0" valign: "0" halign: "0" style: "0" url: "" dynamic: "0" sort\_triggers: "0" resource: name: CPU utilization host: Zabbix server max\_columns: "3" application: "" ...

##### Element tags

Element tag values are explained in the table below.

Element	Element property	Type	Range	Description
screens	< < < <			
	< name `string` <			Unique screen name.



```

|<|hsize|`integer`|<|Horizontal size, number of columns.|
|<|vsize|`integer`|<|Vertical size, number of rows.|
|screen\_items|<|<|<|
|<|resourcetype|`integer`|0 - graph<br>1 - simple graph<br>2 - map<br>3 - plain text<br>4 - host info<br>5
|<|width|`integer`|<|Width of the screen item (in pixels) if 'resourcetype' is 0, 1, 7, 11, 19 or 20.|
|<|height|`integer`|<|Height of the screen item (in pixels) if 'resourcetype' is 0, 1, 7, 11, 19 or 20.|
|<|x|`integer`|<|X-coordinates of the screen item on the screen, from left to right.<br>'0' means start fr
|<|y|`integer`|<|Y-coordinates of the screen item on the screen, from top to bottom.<br>'0' means start fr
|<|colspan|`integer`|<|Number of columns the screen item will span across.|
|<|rowspan|`integer`|<|Number or rows the screen item will span across.|
|<|elements|`integer`|<|Number of lines to display on the screen item if 'resourcetype' is 3, 12, 13, 14 o
|<|valign|`integer`|0 - middle (default)<br>1 - top<br>2 - bottom|Vertical alignment.|
|<|halign|`integer`|0 - center (default)<br>1 - left<br>2 - right|Horizontal alignment.|
|<|style|`integer`|0 - plain text<br>1 - HTML|Option of displaying screen item if 'resourcetype' is 3.|
|^|^|`integer`|0 - local time<br>1 - server time<br>2 - host time|Option of displaying screen item if 'res
|^|^|`integer`|0 - horizontal<br>1 - vertical|Option of displaying screen item if 'resourcetype' is 4,5.
|^|^|`integer`|0 - left side<br>1 - top|Option of displaying screen item if 'resourcetype' is 9,10.
|<|url|`string`|<|Link URL if 'resourcetype' is 11.
|<|dynamic|`integer`|0 - no<br>1 - yes|Make screen item dynamic if 'resourcetype' is 0, 1, 3, 19 or 20.
|<|sort\_triggers|`integer`|0 - last change (descending)<br>1 - severity (descending)<br>2 - host (ascendi
|^|^|`integer`|3 - time (ascending)<br>4 - time (descending)<br>5 - type (ascending)<br>6 - type (descendi
|<|max\_columns|`integer`|<|In how many columns generated graphs should be displayed in the screen cell if
|<|application|`string`|<|Filter by application name if 'resourcetype' is 9 or 10.
|resource|<|<|<|<|
|<|name|`string`|<|Resource name.
|<|host|`string`|<|Resource host.

```

```

### 6 Media types {#manual-xml_export_import-media}

```

```

\

```

#### ##### Overview

Media types are [exported](/manual/xml\_export\_import) with all related objects and object relations.

#### ##### Exporting

To export media types, do the following:

- Go to: *\*Administration\** → *\*Media types\**
- Mark the checkboxes of the media types to export
- Click on *\*Export\** below the list

```



```

Depending on the selected format, media types are exported to a local file with a default name:

- *\*zabbix\\_export\\_mediatypes.yaml\** - in YAML export (default option for export)
- *\*zabbix\\_export\\_mediatypes.xml\** - in XML export
- *\*zabbix\\_export\\_mediatypes.json\** - in JSON export

#### ##### Importing

To import media types, do the following:

- Go to: *\*Administration\** → *\*Media types\**
- Click on *\*Import\** to the right
- Select the import file
- Mark the required options in import rules
- Click on *\*Import\**



A success or failure message of the import will be displayed in the frontend.

Import rules:

Rule	Description
*Update existing*	Existing elements will be updated with data taken from the import file. Otherwise th
*Create new*	The import will add new elements using data from the import file. Otherwise it will
*Delete missing*	The import will remove existing elements not present in the import file. Otherwise i

```

|<|
|<|
|<|
|<|

```

```

type: WEBHOOK
parameters:
  7:
    name: eventid
    value: '{EVENT.ID}'
  2:
    name: message
    value: '{ALERT.MESSAGE}'
  6:
    name: priority
    value: "0"
  3:
    name: title
    value: '{ALERT.SUBJECT}'
  0:
    name: token
    value: <PUSHOVER TOKEN HERE>
  8:
    name: triggerid
    value: '{TRIGGER.ID}'
  4:
    name: url
    value: '{$ZABBIX.URL}'
  5:
    name: url_title
    value: Zabbix
  1:
    name: user
    value: '{ALERT.SENDTO}'

```

```

max_sessions: "0"
script: "try {\n/>\tZabbix.Log(127, 'Pushover webhook script value='+value);\n\n\tparams
= JSON.parse(value),\n\treq = new CurlHttpRequest(),\n\tfields = {};\n\n\treq.AddHeader('Content-Typ
application/json');\n\n\tfields.token= params.token;\n\tfields.user = params.user;\n\n\n
 \ /*\n      If a device name is not specified for a user, or the specified
device name is no longer enabled/valid,\n      notifications will be sent to
all active devices for that user to avoid losing messages.\n      Messages
may be addressed to multiple specific devices by joining them with a comma (such
as device=iphone,nexus5).\n      fields.device = params.device;\n      */\n\tfields.title
= params.title;\n\tfields.message = params.message;\n      fields.url =
params.url+"\t/tr_events.php?triggerid="+params.triggerid+"\t&eventid="+params.eventid;\n
 \ fields.url_title = params.url_title;\n      fields.priority = params.priority;\n\tvar
resp = req.Post('https://api.pushover.net/1/messages.json',\n\t\tJSON.stringify(fields)\n\t);\n\n\ti
(req.Status() != 200) {\n\t\tthrow JSON.parse(resp).errors[0];\n\t}\n\n\tresp

```

```

= JSON.parse(resp);\n          return \"OK\";\n\n\n} catch (error) {\n\tZabbix.Log(127,\n'Pushover notification failed : '+error);\n          throw 'Pushover notification\nfailed : '+error;\n\n}

```

description: |-

Please refer to setup guide here: <https://git.zabbix.com/projects/ZBX/repos/zabbix/browse/templates/>

Set token parameter with to your Pushover application key.

When assigning Pushover media to the Zabbix user - add user key into send to field.

...

## Element tags

Element tag values are explained in the table below.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
media_types		-			Root element for media_types.
	name	x	string		Media type name.
	type	x	string	0 - EMAIL 1 - SMS 2 - SCRIPT 4 - WEBHOOK	Transport used by the media type.
	status	-	string	0 - ENABLED (default) 1 - DISABLED	Whether the media type is enabled.
	max_sessions	-	integer	Possible values for SMS: 1 - (default)  Possible values for other media types: 0-100, 0 - unlimited	The maximum number of alerts that can be processed in parallel.
	attempts	-	integer	1-10 (default: 3)	The maximum number of attempts to send an alert.
	attempt_interval	-	string	0-60s (default: 10s)	The interval between retry attempts.
	description	-	string		Accepts seconds and time unit with suffix. Media type description.
message_templates		-			Root element for media type message templates.
	event_source	x	string	0 - TRIGGERS 1 - DISCOVERY 2 - AUTOREGISTRATION 3 - INTERNAL	Event source.
	operation_mode	x	string	0 - PROBLEM 1 - RECOVERY 2 - UPDATE	Operation mode.
	subject	-	string		Message subject.
	message	-	string		Message body.
Used only by e-mail media type	smtp_server	x	string		SMTP server.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	smtp_port	-	integer	Default: 25	SMTP server port to connect to.
	smtp_helo	x	string		SMTP helo.
	smtp_email	x	string		Email address from which notifications will be sent.
	smtp_security	-	string	0 - NONE (default) 1 - STARTTLS 2 - SSL_OR_TLS	SMTP connection security level to use.
	smtp_verify_host	-	string	0 - NO (default) 1 - YES	SSL verify host for SMTP. Optional if smtp_security is STARTTLS or SSL_OR_TLS.
	smtp_verify_peer	-	string	0 - NO (default) 1 - YES	SSL verify peer for SMTP. Optional if smtp_security is STARTTLS or SSL_OR_TLS.
	smtp_authentication	-	string	0 - NONE (default) 1 - PASSWORD	SMTP authentication method to use.
	username	-	string		Username.
	password	-	string		Authentication password.
	content_type	-	string	0 - TEXT 1 - HTML (default)	Message format.
Used only by SMS media type	gsm_modem	x	string		Serial device name of the GSM modem.
Used only by script media type parameters	script name	x	string		Script name. Root element for script parameters.
Used only by webhook media type	script timeout	x	string	1-60s (default: 30s)	Script. Javascript script HTTP request timeout interval.
	process_tags	-	string	0 - NO (default) 1 - YES	Whether to process returned tags.

Element	Element property	Required	Type	Range <sup>1</sup>	Description
	show_event_menu	-	string	0 - NO (default) 1 - YES	If {EVENT.TAGS.*} were successfully resolved in event_menu_url and event_menu_name fields, this field indicates presence of entry in the event menu.
	event_menu_url	-	string		URL of the event menu entry. Supports {EVENT.TAGS.*} macro.
	event_menu_name	-	string		Name of the event menu entry. Supports {EVENT.TAGS.*} macro.
parameters		-			Root element for webhook media type parameters.
	name	x	string		Webhook parameter name.
	value	-	string		Webhook parameter value.

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "EMAIL") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

## 15. Discovery

Please use the sidebar to access content in the Discovery section.

### 1 Network discovery

#### Overview

Zabbix offers automatic network discovery functionality that is effective and very flexible.

With network discovery properly set up you can:

- speed up Zabbix deployment
- simplify administration
- use Zabbix in rapidly changing environments without excessive administration

Zabbix network discovery is based on the following information:

- IP ranges
- Availability of external services (FTP, SSH, WEB, POP3, IMAP, TCP, etc)

- Information received from Zabbix agent (only unencrypted mode is supported)
- Information received from SNMP agent

It does NOT provide:

- Discovery of network topology

Network discovery basically consists of two phases: discovery and actions.

#### Discovery

Zabbix periodically scans the IP ranges defined in **network discovery rules**. The frequency of the check is configurable for each rule individually.

Note that one discovery rule will always be processed by a single discoverer process. The IP range will not be split between multiple discoverer processes.

Each rule has a set of service checks defined to be performed for the IP range.

#### Note:

Discovery checks are processed independently from the other checks. If any checks do not find a service (or fail), other checks will still be processed.

Every check of a service and a host (IP) performed by the network discovery module generates a discovery event.

Event	Check of service result
Service Discovered	The service is 'up' after it was 'down' or when discovered for the first time.
Service Up	The service is 'up', after it was already 'up'.
Service Lost	The service is 'down' after it was 'up'.
Service Down	The service is 'down', after it was already 'down'.
Host Discovered	At least one service of a host is 'up' after all services of that host were 'down' or a service is discovered which belongs to a not registered host.
Host Up	At least one service of a host is 'up', after at least one service was already 'up'.
Host Lost	All services of a host are 'down' after at least one was 'up'.
Host Down	All services of a host are 'down', after they were already 'down'.

#### Actions

Discovery events can be the basis of relevant **actions**, such as:

- Sending notifications
- Adding/removing hosts
- Enabling/disabling hosts
- Adding hosts to a group
- Removing hosts from a group
- Linking hosts to/unlinking from a template
- Executing remote scripts

These actions can be configured with respect to the device type, IP, status, uptime/downtime, etc. For full details on configuring actions for network-discovery based events, see action **operation** and **conditions** pages.

#### Note:

Linking a discovered host to templates will fail collectively if any of the linkable templates has a unique entity (e.g. item key) that is the same as a unique entity (e.g. item key) already existing on the host or on another of the linkable templates.

#### Host creation

A host is added if the Add host operation is selected. A host is also added, even if the Add host operation is missing, if you select operations resulting in actions on a host. Such operations are:

- enable host
- disable host
- add host to a host group
- link template to a host

Created hosts are added to the Discovered hosts group (by default, configurable in Administration → General → **Other**). If you wish hosts to be added to another group, add a Remove from host groups operation (specifying "Discovered hosts") and also add an Add to host groups operation (specifying another host group), because a host must belong to a host group.

## Host naming

When adding hosts, a host name is the result of reverse DNS lookup or IP address if reverse lookup fails. Lookup is performed from the Zabbix server or Zabbix proxy, depending on which is doing the discovery. If lookup fails on the proxy, it is not retried on the server. If the host with such a name already exists, the next host would get **\_2** appended to the name, then **\_3** and so on.

It is also possible to override DNS/IP lookup and instead use an item value for host name, for example:

- You may discover multiple servers with Zabbix agent running using a Zabbix agent item for discovery and assign proper names to them automatically, based on the string value returned by this item
- You may discover multiple SNMP network devices using an SNMP agent item for discovery and assign proper names to them automatically, based on the string value returned by this item

If the host name has been set using an item value, it is not updated during the following discovery checks. If it is not possible to set host name using an item value, default value (DNS name) is used.

If a host already exists with the discovered IP address, a new host is not created. However, if the discovery action contains operations (link template, add to host group, etc), they are performed on the existing host.

## Host removal

Hosts discovered by a network discovery rule are removed automatically from Monitoring → Discovery if a discovered entity is not in the rule's IP range any more. Hosts are removed immediately.

## Interface creation when adding hosts

When hosts are added as a result of network discovery, they get interfaces created according to these rules:

- the services detected - for example, if an SNMP check succeeded, an SNMP interface will be created
- if a host responded both to Zabbix agent and SNMP requests, both types of interfaces will be created
- if uniqueness criteria are Zabbix agent or SNMP-returned data, the first interface found for a host will be created as the default one. Other IP addresses will be added as additional interfaces.
- if a host responded to agent checks only, it will be created with an agent interface only. If it would start responding to SNMP later, additional SNMP interfaces would be added.
- if 3 separate hosts were initially created, having been discovered by the "IP" uniqueness criteria, and then the discovery rule is modified so that hosts A, B and C have identical uniqueness criteria result, B and C are created as additional interfaces for A, the first host. The individual hosts B and C remain. In Monitoring → Discovery the added interfaces will be displayed in the "Discovered device" column, in black font and indented, but the "Monitored host" column will only display A, the first created host. "Uptime/Downtime" is not measured for IPs that are considered to be additional interfaces.

## Changing proxy setting

The hosts discovered by different proxies are always treated as different hosts. While this allows to perform discovery on matching IP ranges used by different subnets, changing proxy for an already monitored subnet is complicated because the proxy changes must be also applied to all discovered hosts.

For example the steps to replace proxy in a discovery rule:

1. disable discovery rule
2. sync proxy configuration
3. replace the proxy in the discovery rule
4. replace the proxy for all hosts discovered by this rule
5. enable discovery rule

## 1 Configuring a network discovery rule

### Overview

To configure a network discovery rule used by Zabbix to discover hosts and services:

- Go to Configuration → Discovery
- Click on Create rule (or on the rule name to edit an existing one)
- Edit the discovery rule attributes

### Rule attributes

\* Name

Discovery by proxy

\* IP range

\* Update interval

\* Checks

Type	Discovery check
HTTP	Check type <input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="SNMPv2 agent"/>
HTTPS	* Port range <input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="161"/>
SNMPv2 agent "iso.3.6.1.2.1.1.1.0"	* SNMP community <input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="public"/>
Zabbix agent "system.uptime"	* SNMP OID <input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="iso.3.6.1.2.1.1.1.0"/>
<a href="#">Add</a>	

Device uniqueness criteria

IP address

SNMPv2 agent "iso.3.6.1.2.1.1.1.0"

Zabbix agent "system.uptime"

Host name

DNS name

IP address

SNMPv2 agent "iso.3.6.1.2.1.1.1.0"

Zabbix agent "system.uptime"

Visible name

Host name

DNS name

IP address

SNMPv2 agent "iso.3.6.1.2.1.1.1.0"

Zabbix agent "system.uptime"

Enabled

All mandatory input fields are marked with a red asterisk.



Parameter	Description
Name	Unique name of the rule. For example, "Local network".
Discovery by proxy	What performs discovery: <b>no proxy</b> - Zabbix server is doing discovery <b>&lt;proxy name&gt;</b> - this proxy performs discovery
IP range	The range of IP addresses for discovery. It may have the following formats: Single IP: 192.168.1.33 Range of IP addresses: 192.168.1-10.1-255. The range is limited by the total number of covered addresses (less than 64K). IP mask: 192.168.4.0/24 supported IP masks: /16 - /30 for IPv4 addresses /112 - /128 for IPv6 addresses List: 192.168.1.1-255, 192.168.2.1-100, 192.168.2.200, 192.168.4.0/24 Since Zabbix 3.0.0 this field supports spaces, tabulation and multiple lines.
Update interval	This parameter defines how often Zabbix will execute the rule. The interval is measured after the execution of previous discovery instance ends so there is no overlap. <b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d, since Zabbix 3.4.0. <b>User macros</b> are supported, since Zabbix 3.4.0. Note that if a user macro is used and its value is changed (e.g. 1w → 1h), the next check will be executed according to the previous value (far in the future with the example values).
Checks	Zabbix will use this list of checks for discovery. Click on <a href="#">Add</a> to configure a new check in a popup window. Supported checks: SSH, LDAP, SMTP, FTP, HTTP, HTTPS, POP, NNTP, IMAP, TCP, Telnet, Zabbix agent, SNMPv1 agent, SNMPv2 agent, SNMPv3 agent, ICMP ping. A protocol-based discovery uses the <b>net.tcp.service[]</b> functionality to test each host, except for SNMP which queries an SNMP OID. Zabbix agent is tested by querying an item in unencrypted mode. Please see <b>agent items</b> for more details. The 'Ports' parameter may be one of following: Single port: 22 Range of ports: 22-45 List: 22-45,55,60-70
Device uniqueness criteria	Uniqueness criteria may be: <b>IP address</b> - no processing of multiple single-IP devices. If a device with the same IP already exists it will be considered already discovered and a new host will not be added. <b>&lt;discovery check&gt;</b> - either Zabbix agent or SNMP agent check.
Host name	Set the technical host name of a created host using: <b>DNS name</b> - DNS name (default) <b>IP address</b> - IP address <b>&lt;discovery check&gt;</b> - received string value of the discovery check (e.g. Zabbix agent, SNMP agent check) See also: <b>Host naming</b> .
Visible name	This option is supported since 4.2.0. Set the visible host name of a created host using: <b>Host name</b> - technical host name (default) <b>DNS name</b> - DNS name <b>IP address</b> - IP address <b>&lt;discovery check&gt;</b> - received string value of the discovery check (e.g. Zabbix agent, SNMP agent check) See also: <b>Host naming</b> . This option is supported since 4.2.0.

---

Parameter	Description
Enabled	With the check-box marked the rule is active and will be executed by Zabbix server. If unmarked, the rule is not active. It won't be executed.

---

#### A real life scenario

In this example, we would like to set up network discovery for the local network having an IP range of 192.168.1.1-192.168.1.254.

In our scenario we want to:

- discover those hosts that have Zabbix agent running
- run discovery every 10 minutes
- add a host to monitoring if the host uptime is more than 1 hour
- remove hosts if the host downtime is more than 24 hours
- add Linux hosts to the "Linux servers" group
- add Windows hosts to the "Windows servers" group
- use the template Linux for Linux hosts
- use the template Windows for Windows hosts

#### Step 1

Defining a network discovery rule for our IP range.

* Name	Local network							
Discovery by proxy	No proxy <span>▼</span>							
* IP range	192.168.1.1-254							
* Update interval	10m							
* Checks	<table border="1"> <thead> <tr> <th>Type</th> <th>Actions</th> </tr> </thead> <tbody> <tr> <td>Zabbix agent "system.uname"</td> <td><a href="#">Edit</a> <a href="#">Remove</a></td> </tr> <tr> <td><a href="#">Add</a></td> <td></td> </tr> </tbody> </table>	Type	Actions	Zabbix agent "system.uname"	<a href="#">Edit</a> <a href="#">Remove</a>	<a href="#">Add</a>		
Type	Actions							
Zabbix agent "system.uname"	<a href="#">Edit</a> <a href="#">Remove</a>							
<a href="#">Add</a>								
Device uniqueness criteria	<input checked="" type="radio"/> IP address <input type="radio"/> Zabbix agent "system.uname"							
Host name	<input type="radio"/> DNS name <input type="radio"/> IP address <input checked="" type="radio"/> Zabbix agent "system.uname"							
Visible name	<input checked="" type="radio"/> Host name <input type="radio"/> DNS name <input type="radio"/> IP address <input type="radio"/> Zabbix agent "system.uname"							
Enabled	<input checked="" type="checkbox"/>							

Zabbix will try to discover hosts in the IP range of 192.168.1.1-192.168.1.254 by connecting to Zabbix agents and getting the value from the **system.uname** key. The value received from the agent can be used to name the hosts and also to apply different actions for different operating systems. For example, link Windows servers to the template Windows, Linux servers to the template Linux.

The rule will be executed every 10 minutes.

When this rule is added, Zabbix will automatically start the discovery and generation of the discovery-based events for further processing.

#### Step 2

Defining an **action** for adding the discovered Linux servers to the respective group/template.

**Action** Operations

\* Name

Type of calculation  A and B and C and D

Conditions

Label	Name
A	Received value contains <i>Linux</i>
B	Discovery status equals <i>Up</i>
C	Service type equals <i>Zabbix agent</i>
D	Uptime/Downtime is greater than or equals <i>3600</i>

[Add](#)

The action will be activated if:

- the "Zabbix agent" service is "up"
- the value of system.uname (the Zabbix agent key we used in rule definition) contains "Linux"
- Uptime is 1 hour (3600 seconds) or more

**Action** Operations

Default subject

Default message

Operations

[Details](#)

**Add to host groups:** Linux servers

**Link to templates:** Linux

[Add](#)

The action will execute the following operations:

- add the discovered host to the "Linux servers" group (and also add host if it wasn't added previously)
- link host to the Linux template. Zabbix will automatically start monitoring the host using items and triggers from the "Linux" template.

Step 3

Defining an action for adding the discovered Windows servers to the respective group/template.

Action Operations

---

\* Name

Type of calculation  A and B and C and D

Conditions

Label	Name
A	Received value contains <i>Windows</i>
B	Discovery status equals <i>Up</i>
C	Service type equals <i>Zabbix agent</i>
D	Uptime/Downtime is greater than or equals <i>3600</i>

[Add](#)

Action Operations

---

Default subject

Default message

Operations

Details

**Add to host groups:** Windows servers

**Link to templates:** Windows

[Add](#)

Step 4

Defining an action for removing lost servers.

Action **Operations**

\* Name

Type of calculation  A and B and C

Conditions

Label	Name
A	Uptime/Downtime is greater than or equals 86400
B	Discovery status equals Down
C	Service type equals Zabbix agent

[Add](#)

Action **Operations**

Default subject

Default message   
 Device IP: {DISCOVERY.DEVICE.IPADDRESS}  
 Device DNS: {DISCOVERY.DEVICE.DNS}  
 Device status: {DISCOVERY.DEVICE.STATUS}  
 Device uptime: {DISCOVERY.DEVICE.UPTIME}  
 Device service name: {DISCOVERY.SERVICE.NAME}"/>

Operations

Details	Action
<b>Remove host</b>	<a href="#">Edit</a> <a href="#">Remove</a>

[Add](#)

A server will be removed if "Zabbix agent" service is 'down' for more than 24 hours (86400 seconds).

## 2 Active agent autoregistration

### Overview

It is possible to allow active Zabbix agent autoregistration, after which the server can start monitoring them. This way new hosts can be added for monitoring without configuring them manually on the server.

Autoregistration can happen when a previously unknown active agent asks for checks.

The feature might be very handy for automatic monitoring of new Cloud nodes. As soon as you have a new node in the Cloud Zabbix will automatically start the collection of performance and availability data of the host.

Active agent autoregistration also supports the monitoring of added hosts with passive checks. When the active agent asks for checks, providing it has the 'ListenIP' or 'ListenPort' configuration parameters defined in the configuration file, these are sent along to the server. (If multiple IP addresses are specified, the first one is sent to the server.)

Server, when adding the new autoregistered host, uses the received IP address and port to configure the agent. If no IP address value is received, the one used for the incoming connection is used. If no port value is received, 10050 is used.

It is possible to specify that the host should be autoregistered with a **DNS name** as the default agent interface.

Autoregistration is rerun:

- if host **metadata** information changes:
  - due to HostMetadata changed and agent restarted
  - due to value returned by HostMetadataItem changed
- for manually created hosts with metadata missing
- if a host is manually changed to be monitored by another Zabbix proxy
- if autoregistration for the same host comes from a new Zabbix proxy

Configuration

Specify server

Make sure you have the Zabbix server identified in the agent **configuration file** - zabbix\_agentd.conf

```
ServerActive=10.0.0.1
```

Unless you specifically define a Hostname in zabbix\_agentd.conf, the system hostname of agent location will be used by server for naming the host. The system hostname in Linux can be obtained by running the 'hostname' command.

If Hostname is defined in Zabbix agent configuration as a comma-delimited list of hosts, hosts will be created for all listed host-names.

Restart the agent after making any changes to the configuration file.

Action for active agent autoregistration

When server receives an autoregistration request from an agent it calls an **action**. An action of event source "Autoregistration" must be configured for agent autoregistration.

**Note:**

Setting up **network discovery** is not required to have active agents autoregister.

In the Zabbix frontend, go to Configuration → Actions, select Autoregistration as the event source and click on Create action:

- In the Action tab, give your action a name
- Optionally specify **conditions**. You can do a substring match or regular expression match in the conditions for host name/host metadata. If you are going to use the "Host metadata" condition, see the next section.
- In the Operations tab, add relevant operations, such as - 'Add host', 'Add to host group' (for example, Discovered hosts), 'Link to templates', etc.

**Note:**

If the hosts that will be autoregistering are likely to be supported for active monitoring only (such as hosts that are firewalled from your Zabbix server) then you might want to create a specific template like Template\_Linux-active to link to.

Created hosts are added to the Discovered hosts group (by default, configurable in Administration → General → **Other**). If you wish hosts to be added to another group, add a Remove from host group operation (specifying "Discovered hosts") and also add an Add to host group operation (specifying another host group), because a host must belong to a host group.

Secure autoregistration

A secure way of autoregistration is possible by configuring PSK-based authentication with encrypted connections.

The level of encryption is configured globally in Administration → **General**, in the Autoregistration section accessible through the dropdown to the right. It is possible to select no encryption, TLS encryption with PSK authentication or both (so that some hosts may register without encryption while others through encryption).

Authentication by PSK is verified by Zabbix server before adding a host. If successful, the host is added and **Connections from/to host** are set to 'PSK' only with identity/pre-shared key the same as in the global autoregistration setting.

**Attention:**

To ensure security of autoregistration on installations using proxies, encryption between Zabbix server and proxy should be enabled.

Using DNS as default interface

HostInterface and HostInterfaceItem **configuration parameters** allow to specify a custom value for the host interface during autoregistration.

More specifically, they are useful if the host should be autoregistered with a DNS name as the default agent interface rather than its IP address. In that case the DNS name should be specified or returned as the value of either HostInterface or HostInterfaceItem

parameters. Note that if the value of one of the two parameters changes, the autoregistered host interface is updated. So it is possible to update the default interface to another DNS name or update it to an IP address. For the changes to take effect though, the agent has to be restarted.

#### Using host metadata

When agent is sending an autoregistration request to the server it sends its hostname. In some cases (for example, Amazon cloud nodes) a hostname is not enough for Zabbix server to differentiate discovered hosts. Host metadata can be optionally used to send other information from an agent to the server.

Host metadata is configured in the agent **configuration file** - `zabbix_agentd.conf`. There are 2 ways of specifying host metadata in the configuration file:

```
HostMetadata
HostMetadataItem
```

See the description of the options in the link above.

<note:important>An autoregistration attempt happens every time an active agent sends a request to refresh active checks to the server. The delay between requests is specified in the **RefreshActiveChecks** parameter of the agent. The first request is sent immediately after the agent is restarted.

#### Example 1

Using host metadata to distinguish between Linux and Windows hosts.

Say you would like the hosts to be autoregistered by the Zabbix server. You have active Zabbix agents (see "Configuration" section above) on your network. There are Windows hosts and Linux hosts on your network and you have "Linux by Zabbix agent" and "Windows by Zabbix agent" templates available in your Zabbix frontend. So at host registration, you would like the appropriate Linux/Windows template to be applied to the host being registered. By default, only the hostname is sent to the server at autoregistration, which might not be enough. In order to make sure the proper template is applied to the host you should use host metadata.

#### Frontend configuration

The first thing to do is to configure the frontend. Create 2 actions. The first action:

- Name: Linux host autoregistration
- Conditions: Host metadata contains Linux
- Operations: Link to templates: Linux

#### Note:

You can skip an "Add host" operation in this case. Linking to a template requires adding a host first so the server will do that automatically.

The second action:

- Name: Windows host autoregistration
- Conditions: Host metadata contains Windows
- Operations: Link to templates: Windows

#### Agent configuration

Now you need to configure the agents. Add the next line to the agent configuration files:

```
HostMetadataItem=system.uname
```

This way you make sure host metadata will contain "Linux" or "Windows" depending on the host an agent is running on. An example of host metadata in this case:

```
Linux: Linux server3 3.2.0-4-686-pae #1 SMP Debian 3.2.41-2 i686 GNU/Linux
Windows: Windows WIN-OPXGGSTYNHO 6.0.6001 Windows Server 2008 Service Pack 1 Intel IA-32
```

Do not forget to restart the agent after making any changes to the configuration file.

#### Example 2

##### Step 1

Using host metadata to allow some basic protection against unwanted hosts registering.

#### Frontend configuration

Create an action in the frontend, using some hard-to-guess secret code to disallow unwanted hosts:



- Name: Autoregistration action Linux
- Conditions:
  - \* Type of calculation: AND
  - \* Condition (A): Host metadata contains //Linux//
  - \* Condition (B): Host metadata contains //21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
- \* Operations:
  - \* Send message to users: Admin via all media
  - \* Add to host groups: Linux servers
  - \* Link to templates: Linux

Please note that this method alone does not provide strong protection because data is transmitted in plain text. Configuration cache reload is required for changes to have an immediate effect.

#### Agent configuration

Add the next line to the agent configuration file:

```
HostMetadata=Linux 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
```

where "Linux" is a platform, and the rest of the string is the hard-to-guess secret text.

Do not forget to restart the agent after making any changes to the configuration file.

#### Step 2

It is possible to add additional monitoring for an already registered host.

#### Frontend configuration

Update the action in the frontend:

- Name: Autoregistration action Linux
- Conditions:
  - \* Type of calculation: AND
  - \* Condition (A): Host metadata contains Linux
  - \* Condition (B): Host metadata contains 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
- \* Operations:
  - \* Send message to users: Admin via all media
  - \* Add to host groups: Linux servers
  - \* Link to templates: Linux
  - \* Link to templates: MySQL by Zabbix Agent

#### Agent configuration

Update the next line in the agent configuration file:

```
HostMetadata=MySQL on Linux 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
```

Do not forget to restart the agent after making any changes to the configuration file.

### 3 Low-level discovery

**Overview** Low-level discovery provides a way to automatically create items, triggers, and graphs for different entities on a computer. For instance, Zabbix can automatically start monitoring file systems or network interfaces on your machine, without the need to create items for each file system or network interface manually. Additionally, it is possible to configure Zabbix to remove unneeded entities automatically based on actual results of periodically performed discovery.

A user can define their own types of discovery, provided they follow a particular JSON protocol.

The general architecture of the discovery process is as follows.

First, a user creates a discovery rule in "Configuration" → "Templates" → "Discovery" column. A discovery rule consists of (1) an item that discovers the necessary entities (for instance, file systems or network interfaces) and (2) prototypes of items, triggers, and graphs that should be created based on the value of that item.

An item that discovers the necessary entities is like a regular item seen elsewhere: the server asks a Zabbix agent (or whatever the type of the item is set to) for a value of that item, the agent responds with a textual value. The difference is that the value the agent responds with should contain a list of discovered entities in a JSON format. While the details of this format are only

important for implementers of custom discovery checks, it is necessary to know that the returned value contains a list of macro → value pairs. For instance, item "net.if.discovery" might return two pairs: "{#IFNAME}" → "lo" and "{#IFNAME}" → "eth0".

These macros are used in names, keys and other prototype fields where they are then substituted with the received values for creating real items, triggers, graphs or even hosts for each discovered entity. See the full list of [options](#) for using LLD macros.

When the server receives a value for a discovery item, it looks at the macro → value pairs and for each pair generates real items, triggers, and graphs, based on their prototypes. In the example with "net.if.discovery" above, the server would generate one set of items, triggers, and graphs for the loopback interface "lo", and another set for interface "eth0".

Note that since **Zabbix 4.2**, the format of the JSON returned by low-level discovery rules has been changed. It is no longer expected that the JSON will contain the "data" object. Low-level discovery will now accept a normal JSON containing an array, in order to support new features such as the item value preprocessing and custom paths to low-level discovery macro values in a JSON document.

Built-in discovery keys have been updated to return an array of LLD rows at the root of JSON document. Zabbix will automatically extract a macro and value if an array field uses the {#MACRO} syntax as a key. Any new native discovery checks will use the new syntax without the "data" elements. When processing a low-level discovery value first the root is located (array at \$. or \$.data).

While the "data" element has been removed from all native items related to discovery, for backward compatibility Zabbix will still accept the JSON notation with a "data" element, though its use is discouraged. If the JSON contains an object with only one "data" array element, then it will automatically extract the content of the element using JSONPath \$.data. Low-level discovery now accepts optional user-defined LLD macros with a custom path specified in JSONPath syntax.

**Warning:**

As a result of the changes above, newer agents no longer will be able to work with an older Zabbix server.

See also: [Discovered entities](#)

**Configuring low-level discovery** We will illustrate low-level discovery based on an example of file system discovery.

To configure the discovery, do the following:

- Go to: Configuration → Templates or Hosts
- Click on Discovery in the row of an appropriate template/host

## ☰ Templates

<input type="checkbox"/>	Name ▲	Hosts	Applications	Items	Triggers	Graphs	Dashboards	Discovery
<input type="checkbox"/>	Linux OS agent	Hosts 1	Applications 11	Items 42	Triggers 14	Graphs 8	Dashboards 1	Discovery 3

- Click on Create discovery rule in the upper right corner of the screen
- Fill in the discovery rule form with the required details

Discovery rule

The discovery rule form contains five tabs, representing, from left to right, the data flow during discovery:

- Discovery rule - specifies, most importantly, the built-in item or custom script to retrieve discovery data
- Preprocessing - applies some preprocessing to the discovered data
- LLD macros - allows to extract some macro values to use in discovered items, triggers, etc
- Filters - allows to filter the discovered values
- Overrides - allows to modify items, triggers, graphs or host prototypes when applying to specific discovered objects

The **Discovery rule** tab contains the item key to use for discovery (as well as some general discovery rule attributes):

Discovery rule   Preprocessing   LLD macros   Filters 4   Overrides

\* Name

Type

\* Key

\* Update interval

Custom intervals

Type	Interval	Period
Flexible Scheduling	50s	1-7,00:00-24:00

[Add](#)

\* Keep lost resources period

Description

Enabled

All mandatory input fields are marked with a red asterisk.

Parameter	Description
Name	Name of discovery rule.
Type	The type of check to perform discovery. In this example we are using a Zabbix agent item key. The discovery rule can also be a <b>dependent item</b> , depending on a regular item. It cannot depend on another discovery rule. For a dependent item, select the respective type (Dependent item) and specify the master item in the 'Master item' field. The master item must exist.
Key	Enter the discovery item key (up to 2048 characters). For example, you may use the built-in "vfs.fs.discovery" item key to return a JSON with the list of file systems present on the computer and their types. Note that another option for filesystem discovery is using discovery results by the "vfs.fs.get" agent key, supported since Zabbix 4.4.5 (see <b>example</b> ).

Parameter	Description
Update interval	<p>This field specifies how often Zabbix performs discovery. In the beginning, when you are just setting up file system discovery, you might wish to set it to a small interval, but once you know it works you can set it to 30 minutes or more, because file systems usually do not change very often.</p> <p><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d, since Zabbix 3.4.0.</p> <p><b>User macros</b> are supported, since Zabbix 3.4.0.</p> <p>Note: The update interval can only be set to '0' if custom intervals exist with a non-zero value. If set to '0', and a custom interval (flexible or scheduled) exists with a non-zero value, the item will be polled during the custom interval duration.</p> <p>Note that for an existing discovery rule the discovery can be performed immediately by pushing the Check now <b>button</b>.</p>
Custom intervals	<p>You can create custom rules for checking the item:</p> <p><b>Flexible</b> - create an exception to the Update interval (interval with different frequency)</p> <p><b>Scheduling</b> - create a custom polling schedule.</p> <p>For detailed information see <b>Custom intervals</b>. Scheduling is supported since Zabbix 3.0.0.</p>
Keep lost resources period	<p>This field allows you to specify the duration for how long the discovered entity will be retained (won't be deleted) once its discovery status becomes "Not discovered anymore" (between 1 hour to 25 years; or "0").</p> <p><b>Time suffixes</b> are supported, e.g. 2h, 1d, since Zabbix 3.4.0.</p> <p><b>User macros</b> are supported, since Zabbix 3.4.0.</p> <p>Note: If set to "0", entities will be deleted immediately. Using "0" is not recommended, since just wrongly editing the filter may end up in the entity being deleted with all the historical data.</p>
Description	Enter a description.
Enabled	If checked, the rule will be processed.

**Note:**

Discovery rule history is not preserved.

Preprocessing

The **Preprocessing** tab allows to define transformation rules to apply to the result of discovery. One or several transformations are possible in this step. Transformations are executed in the order in which they are defined. All preprocessing is done by Zabbix server.

See also:

- [Preprocessing details](#)
- [Preprocessing testing](#)

The screenshot shows the Zabbix web interface for configuring a discovery rule. The 'Preprocessing' tab is selected, showing a list of preprocessing steps. Step 1 is 'Regular expression' with the parameter 'pattern'. Step 2 is 'JSONPath' with the parameter '\$.pool'. An 'Add' button is visible below the list.

Type	Transformation	Description
Text	Regular expression	<p>Match the received value to the &lt;pattern&gt; regular expression and replace value with the extracted &lt;output&gt;. The regular expression supports extraction of maximum 10 captured groups with the \N sequence.</p> <p>Parameters:</p> <p><b>pattern</b> - regular expression</p> <p><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text. If you mark the Custom on fail checkbox, it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>
	Replace	<p>Find the search string and replace it with another (or nothing). All occurrences of the search string will be replaced.</p> <p>Parameters:</p> <p><b>search string</b> - the string to find and replace, case-sensitive (required)</p> <p><b>replacement</b> - the string to replace the search string with. The replacement string may also be empty effectively allowing to delete the search string when found.</p> <p>It is possible to use escape sequences to search for or replace line breaks, carriage return, tabs and spaces "\n \r \t \s"; backslash can be escaped as "\\" and escape sequences can be escaped as "\\n". Escaping of line breaks, carriage return, tabs is automatically done during low-level discovery.</p> <p>Supported since 5.0.0.</p>
Structured data	JSONPath	<p>Extract value or fragment from JSON data using <a href="#">JSONPath functionality</a>.</p> <p>If you mark the Custom on fail checkbox, the item will not become unsupported in case of failed preprocessing step and it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>

Type	Transformation	Description
	XML XPath	<p>Extract value or fragment from XML data using XPath functionality.</p> <p>For this option to work, Zabbix server must be compiled with libxml support.</p> <p>Examples:</p> <p><code>number(/document/item/value)</code> will extract 10 from</p> <pre>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/do</pre> <p><code>number(/document/item/@attribute)</code> will extract 10 from <code>&lt;document&gt;&lt;item attribute="10"&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>/document/item</code> will extract</p> <pre>&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;</pre> <p>from <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/do</code></p> <p>Note that namespaces are not supported.</p> <p>Supported since 4.4.0.</p> <p>If you mark the Custom on fail checkbox, it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>
	CSV to JSON	<p>Convert CSV file data into JSON format.</p> <p>For more information, see: <a href="#">CSV to JSON preprocessing</a>.</p> <p>Supported since 4.4.0.</p>
Custom scripts	JavaScript	<p>Enter JavaScript code in the block that appears when clicking in the parameter field or on Open.</p> <p>Note that available JavaScript length depends on the <a href="#">database used</a>.</p> <p>For more information, see: <a href="#">Javascript preprocessing</a></p>
Validation	Does not match regular expression	<p>Specify a regular expression that a value must not match.</p> <p>E.g. <code>Error: (.*)\.</code></p> <p>If you mark the Custom on fail checkbox, it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>
	Check for error in JSON	<p>Check for an application-level error message located at JSONpath. Stop processing if succeeded and message is not empty; otherwise continue processing with the value that was before this preprocessing step.</p> <p>Note that these external service errors are reported to user as is, without adding preprocessing step information.</p> <p>E.g. <code>\$.errors</code>. If a JSON like <code>{"errors": "e1"}</code> is received, the next preprocessing step will not be executed.</p> <p>If you mark the Custom on fail checkbox, it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>

Type	Transformation	Description
	Check for error in XML	<p>Check for an application-level error message located at xpath. Stop processing if succeeded and message is not empty; otherwise continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to user as is, without adding preprocessing step information. No error will be reported in case of failing to parse invalid XML. Supported since 4.4.0. If you mark the Custom on fail checkbox, it is possible to specify custom error handling options: either to discard the value, set a specified value or set a specified error message.</p>
Throttling	Discard unchanged with heartbeat	<p>Discard a value if it has not changed within the defined time period (in seconds). Positive integer values are supported to specify the seconds (minimum - 1 second). Time suffixes can be used in this field (e.g. 30s, 1m, 2h, 1d). User macros and low-level discovery macros can be used in this field. Only one throttling option can be specified for a discovery item. E.g. 1m. If identical text is passed into this rule twice within 60 seconds, it will be discarded. Note: Changing item prototypes does not reset throttling. Throttling is reset only when preprocessing steps are changed.</p>
Prometheus	Prometheus to JSON	<p>Convert required Prometheus metrics to JSON. See <a href="#">Prometheus checks</a> for more details.</p>

Note that if the discovery rule has been applied to the host via template then the content of this tab is read-only.

#### Custom macros

The **LLD macros** tab allows to specify custom low-level discovery macros.

Custom macros are useful in cases when the returned JSON does not have the required macros already defined. So, for example:

- The native `vfs.fs.discovery` key for filesystem discovery returns a JSON with some pre-defined LLD macros such as `{#FSNAME}`, `{#FSTYPE}`. These macros can be used in item, trigger prototypes (see subsequent sections of the page) directly; defining custom macros is not needed;
- The `vfs.fs.get` agent item also returns a JSON with filesystem data, but without any pre-defined LLD macros. In this case you may define the macros yourself, and map them to the values in the JSON using JSONPath:

The screenshot shows the 'LLD macros' configuration tab. It features a table with the following content:

LLD macro	JSONPath
{#FSNAME}	\$.fsname
{#FSTYPE}	\$.fstype

Below the table, there is an 'Add' button with a dotted line underneath it.

The extracted values can be used in discovered items, triggers, etc. Note that values will be extracted from the result of discovery and any preprocessing steps so far.

Parameter	Description
LLD macro	Name of the low-level discovery macro, using the following syntax: {#MACRO}.
JSONPath	Path that is used to extract LLD macro value from a LLD row, using JSONPath syntax. For example, \$.foo will extract "bar" and "baz" from this JSON: [{"foo": "bar"}, {"foo": "baz"}] The values extracted from the returned JSON are used to replace the LLD macros in item, trigger, etc. prototype fields. JSONPath can be specified using the dot notation or the bracket notation. Bracket notation should be used in case of any special characters and Unicode, like \$('unicode + special chars #1')['unicode + special chars #2'].

### Filter

The **Filters** tab contains discovery rule filter definitions allowing to filter discovery values:

Parameter	Description
Type of calculation	The following options for calculating filters are available: <b>And</b> - all filters must be passed; <b>Or</b> - enough if one filter is passed; <b>And/Or</b> - uses And with different macro names and Or with the same macro name; <b>Custom expression</b> - offers the possibility to define a custom calculation of filters. The formula must include all filters in the list. Limited to 255 symbols.



Parameter	Description
Filters	<p>A filter can be used to generate real items, triggers, and graphs only for certain file systems. It expects a <a href="#">Perl Compatible Regular Expression</a> (PCRE). For instance, if you are only interested in C:, D:, and E: file systems, you could put {#FSNAME} into "Macro" and "^C ^D ^E" regular expression into "Regular expression" text fields. Filtering is also possible by file system types using {#FSTYPE} macro (e.g. "^ext ^reiserfs") and by drive types (supported only by Windows agent) using {#FSDRIVETYPE} macro (e.g., "fixed").</p> <p>You can enter a regular expression or reference a global <a href="#">regular expression</a> in "Regular expression" field.</p> <p>In order to test a regular expression you can use "grep -E", for example:</p> <pre>for f in ext2 nfs reiserfs smbfs; do echo \$f \   grep -E '^ext ^ext'</pre> <p>macro on Windows is supported since Zabbix <b>3.0.0</b>.</p> <p>Defining several filters is supported since Zabbix <b>2.4.0</b>.</p> <p>Note that if some macro from the filter is missing in the response, the found entity will be ignored.</p> <p>Filter drop-down offers two values to specify whether a macro matches a regular expression or does not match.</p>

**Warning:**

A mistake or typo in the regular expression used in LLD rule may cause deleting thousands of configuration elements, historical values and events for many hosts. For example, an incorrect "File systems for discovery" regular expression may cause deleting thousands of items, triggers, historical values and events.

**Attention:**

Zabbix database in MySQL must be created as case-sensitive if file system names that differ only by case are to be discovered correctly.

Override

The **Override** tab allows to set rules to modify the list of item, trigger, graph and host prototypes or their attributes for discovered objects that meet given criteria.

Discovery rule	Preprocessing	LLD macros	Filters	Overrides 1						
Overrides										
				<table border="1"> <thead> <tr> <th>Name</th> <th>Stop processing</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>1: Set trigger with threshold of 50%</td> <td>Yes</td> <td>Remove</td> </tr> </tbody> </table>	Name	Stop processing	Action	1: Set trigger with threshold of 50%	Yes	Remove
Name	Stop processing	Action								
1: Set trigger with threshold of 50%	Yes	Remove								
				Add						

Overrides (if any) are displayed in a reorderable drag-and-drop list and executed in the order in which they are defined. To configure details of a new override, click on [Add](#) in the Overrides block. To edit an existing override, click on the override name. A popup window will open allowing to edit the override rule details.

### Override

\* Name

If filter matches

Filters

	Label Macro		Regular expression
A	<input type="text" value="{#FSNAME}"/>	matches	<input type="text" value="^Vtmp\$"/>
<a href="#">Add</a>			

Operations

Condition

Trigger prototype does not equal *Disk space is low (used > 50%)*

[Add](#)

All mandatory parameters are marked with red asterisks.

Parameter	Description
Name	A unique (per LLD rule) override name.
If filter matches	Defines whether next overrides should be processed when filter conditions are met: <b>Continue overrides</b> - subsequent overrides will be processed. <b>Stop processing</b> - operations from preceding (if any) and this override will be executed, subsequent overrides will be ignored for matched LLD rows.
Filters	Determines to which discovered entities the override should be applied. Override filters are processed after discovery rule <b>filters</b> and have the same functionality.
Operations	Override operations are displayed with these details: <b>Condition</b> - an object type (item prototype/trigger prototype/graph prototype/host prototype) and a condition to be met (equals/does not equal/contains/does not contain/matches/does not match) <b>Action</b> - links for editing and removing an operation are displayed.

### Configuring an operation

To configure details of a new operation, click on [Add](#) in the Operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window where you can edit the operation details will open.

## New operation

Object

Condition

Create enabled  Original

Discover

Severity  Original

Tags  Original

Add







Parameter	Description
Object	Four types of objects are available: Item prototype Trigger prototype Graph prototype Host prototype
Condition	Allows to filter entities to which the operation should be applied.
Operator	Supported operators: <b>equals</b> - apply to this prototype <b>does not equal</b> - apply to all prototypes, except this <b>contains</b> - apply, if prototype name contains this string <b>does not contain</b> - apply, if prototype name does not contain this string <b>matches</b> - apply, if prototype name matches regular expression <b>does not match</b> - apply, if prototype name does not match regular expression
Pattern	A <b>regular expression</b> or a string to search for.
Object: Item pro- to- type Create en- abled	When the checkbox is marked, the buttons will appear, allowing to override original item prototype settings: Yes - the item will be added in an enabled state. No - the item will be added to a discovered entity, but in a disabled state.
Discover	When the checkbox is marked, the buttons will appear, allowing to override original item prototype settings: Yes - the item will be added. No - the item will not be added.

Parameter	Description
Update inter-val	<p>When the checkbox is marked, two options will appear, allowing to set different interval for the item: Delay - Item update interval. <b>User macros</b> and <b>time suffixes</b> (e.g. 30s, 1m, 2h, 1d) are supported. Should be set to 0 if Custom interval is used.</p> <p>//Custom interval // - click <a href="#">Add</a> to specify flexible/scheduling intervals. For detailed information see <b>Custom intervals</b>.</p>
History stor-age pe-riod	<p>When the checkbox is marked, the buttons will appear, allowing to set different history storage period for the item:</p> <p>Do not keep history - if selected, the history will not be stored.</p> <p>Storage period - if selected, an input field for specifying storage period will appear to the right. <b>User macros</b> and <b>LLD macros</b> are supported.</p>
Trend stor-age pe-riod	<p>When the checkbox is marked, the buttons will appear, allowing to set different trend storage period for the item:</p> <p>Do not keep trends - if selected, the trends will not be stored.</p> <p>Storage period - if selected, an input field for specifying storage period will appear to the right. <b>User macros</b> and <b>LLD macros</b> are supported.</p>
Object: Trig-ger pro-to-type Create en-abled	<p>When the checkbox is marked, the buttons will appear, allowing to override original trigger prototype settings:</p> <p>Yes - the trigger will be added in an enabled state. No - the trigger will be added to a discovered entity, but in a disabled state.</p>
Discover	<p>When the checkbox is marked, the buttons will appear, allowing to override original trigger prototype settings:</p> <p>Yes - the trigger will be added. No - the trigger will not be added.</p>
Severity	<p>When the checkbox is marked, trigger severity buttons will appear, allowing to modify trigger severity.</p>
Tags	<p>When the checkbox is marked, a new block will appear, allowing to specify tag-value pairs. These tags will be appended to the tags specified in the trigger prototype, even if the tag names match.</p>
Object: Graph pro-to-type Discover	<p>When the checkbox is marked, the buttons will appear, allowing to override original graph prototype settings:</p> <p>Yes - the graph will be added. No - the graph will not be added.</p>

Parameter	Description
Object: Host pro- to- type Create en- abled	When the checkbox is marked, the buttons will appear, allowing to override original host prototype settings: Yes - the host will be created in an enabled state. No - the host will be created in a disabled state.
Discover	When the checkbox is marked, the buttons will appear, allowing to override original host prototype settings: Yes - the host will be discovered. No - the host will not be discovered.
Link tem- plates	When the checkbox is marked, an input field for specifying templates will appear. Start typing the template name or click on Select next to the field and select templates from the list in a popup window. All templates linked to a host prototype will be replaced by templates from this override.
Tags	When the checkbox is marked, a new block will appear, allowing to specify tag-value pairs. These tags will be appended to the tags specified in the host prototype, even if the tag names match.
Host in- ven- tory	When the checkbox is marked, the buttons will appear, allowing to select different inventory <b>mode</b> for the host prototype: Disabled - do not populate host inventory Manual - provide details manually Automated - auto-fill host inventory data based on collected metrics.

#### Form buttons

Buttons at the bottom of the form allow to perform several operations.

	Add a discovery rule. This button is only available for new discovery rules.
	Update the properties of a discovery rule. This button is only available for existing discovery rules.
	Create another discovery rule based on the properties of the current discovery rule.
	Perform discovery based on the discovery rule immediately. The discovery rule must already exist. See <a href="#">more details</a> . Note that when performing discovery immediately, configuration cache is not updated, thus the result will not reflect very recent changes to discovery rule configuration.
	Delete the discovery rule.
	Cancel the editing of discovery rule properties.

**Discovered entities** The screenshots below illustrate how discovered items, triggers, and graphs look like in the host's configuration. Discovered entities are prefixed with an orange link to a discovery rule they come from.

# Items


All hosts / Remote proxy: New host Enabled ZBX SNMP JMX IPMI Applications 11 Items 41

<input type="checkbox"/>	Wizard	Name	Triggers	Key
<input type="checkbox"/>	...	<b>Mounted filesystem discovery: Free disk space on / (percentage)</b>	Triggers 1	vfs.fs.size[/,pfr
<input type="checkbox"/>	...	<b>Mounted filesystem discovery: Used disk space on /</b>		vfs.fs.size[/,use
<input type="checkbox"/>	...	<b>Mounted filesystem discovery: Free disk space on /</b>		vfs.fs.size[/,fre
<input type="checkbox"/>	...	<b>Mounted filesystem discovery: Free inodes on / (percentage)</b>	Triggers 1	vfs.fs.inode[/,p

Note that discovered entities will not be created in case there are already existing entities with the same uniqueness criteria, for example, an item with the same key or graph with the same name. An error message is displayed in this case in the frontend that the low-level discovery rule could not create certain entities. The discovery rule itself, however, will not turn unsupported because some entity could not be created and had to be skipped. The discovery rule will go on creating/updating other entities.

Items (similarly, triggers and graphs) created by a low-level discovery rule will be deleted automatically if a discovered entity (file system, interface, etc) stops being discovered (or does not pass the filter anymore). In this case the items, triggers and graphs will be deleted after the days defined in the Keep lost resources period field pass.

When discovered entities become 'Not discovered anymore', a lifetime indicator is displayed in the item list. Move your mouse pointer over it and a message will be displayed indicating how many days are left until the item is deleted.

1m 7d 1y Zabbix agent Enabled 

The item is not discovered anymore and will be deleted in 29d 23h 44m (on 2015-08-31 at 23:27).

If entities were marked for deletion, but were not deleted at the expected time (disabled discovery rule or item host), they will be deleted the next time the discovery rule is processed.

Entities containing other entities, which are marked for deletion, will not update if changed on the discovery rule level. For example, LLD-based triggers will not update if they contain items that are marked for deletion.

# Triggers

Group all

All hosts / Remote proxy: New host Enabled ZBX SNMP JMX IPMI Applications 11 Items 41

<input type="checkbox"/>	Severity	Name ▲
<input type="checkbox"/>	Warning	<b>Mounted filesystem discovery: Free disk space is less than 20% on volume /</b>
<input type="checkbox"/>	Warning	<b>Mounted filesystem discovery: Free inodes is less than 20% on volume /</b>

# Graphs

Group

All hosts / Remote proxy: New host Enabled **ZBX** SNMP JMX IPMI Applications 11 Items 41 T

- Name ▲
- [Template OS Linux: CPU jumps](#)
- [Template OS Linux: CPU load](#)
- [Template OS Linux: CPU utilization](#)
- [Mounted filesystem discovery: Disk space usage /](#)

**Other types of discovery** More detail and how-tos on other types of out-of-the-box discovery is available in the following sections:

- discovery of [network interfaces](#);
- discovery of [CPUs and CPU cores](#);
- discovery of [SNMP OIDs](#);
- discovery of [JMX objects](#);
- discovery using [ODBC SQL queries](#);
- discovery of [Windows services](#);
- discovery of [host interfaces](#) in Zabbix.

For more detail on the JSON format for discovery items and an example of how to implement your own file system discoverer as a Perl script, see [creating custom LLD rules](#).

**Creating custom LLD rules** It is also possible to create a completely custom LLD rule, discovering any type of entities - for example, databases on a database server.

To do so, a custom item should be created that returns JSON, specifying found objects and optionally - some properties of them. The amount of macros per entity is not limited - while the built-in discovery rules return either one or two macros (for example, two for filesystem discovery), it is possible to return more.

The required JSON format is best illustrated with an example. Suppose we are running an old Zabbix 1.8 agent (one that does not support "vfs.fs.discovery"), but we still need to discover file systems. Here is a simple Perl script for Linux that discovers mounted file systems and outputs JSON, which includes both file system name and type. One way to use it would be as a UserParameter with key "vfs.fs.discovery\_perl":

```
#!/usr/bin/perl

$first = 1;

print "[\n";

for (`cat /proc/mounts`)
{
    ($fsname, $fstype) = m/\S+ (\S+) (\S+)/;

    print "\t,\n" if not $first;
    $first = 0;

    print "\t{\n";
    print "\t\t\t\"{#FSNAME}\" : \"$fsname\", \n";
    print "\t\t\t\"{#FSTYPE}\" : \"$fstype\" \n";
    print "\t}\n";
}

print "]\n";
```

**Attention:**

Allowed symbols for LLD macro names are **0-9** , **A-Z** , **\_** , **.**

Lowercase letters are not supported in the names.

An example of its output (reformatted for clarity) is shown below. JSON for custom discovery checks has to follow the same format.

```
[
  { "#FSNAME": "/", "FSTYPE": "rootfs" },
  { "#FSNAME": "/sys", "FSTYPE": "sysfs" },
  { "#FSNAME": "/proc", "FSTYPE": "proc" },
  { "#FSNAME": "/dev", "FSTYPE": "devtmpfs" },
  { "#FSNAME": "/dev/pts", "FSTYPE": "devpts" },
  { "#FSNAME": "/lib/init/rw", "FSTYPE": "tmpfs" },
  { "#FSNAME": "/dev/shm", "FSTYPE": "tmpfs" },
  { "#FSNAME": "/home", "FSTYPE": "ext3" },
  { "#FSNAME": "/tmp", "FSTYPE": "ext3" },
  { "#FSNAME": "/usr", "FSTYPE": "ext3" },
  { "#FSNAME": "/var", "FSTYPE": "ext3" },
  { "#FSNAME": "/sys/fs/fuse/connections", "FSTYPE": "fusectl" }
]
```

In previous example it is required that the keys match the LLD macro names used in prototypes, the alternative is to extract LLD macro values using JSONPath `{#FSNAME} → $.fsname` and `{#FSTYPE} → $.fstype`, thus making such script possible:

```
#!/usr/bin/perl

$first = 1;

print "[\n";

for (`cat /proc/mounts`)
{
    ($fsname, $fstype) = m/\S+ (\S+) (\S+)/;

    print "\t,\n" if not $first;
    $first = 0;

    print "\t{\n";
    print "\t\t\"fsname\": \"$fsname\", \n";
    print "\t\t\"fstype\": \"$fstype\" \n";
    print "\t}\n";
}

print "]\n";
```

An example of its output (reformatted for clarity) is shown below. JSON for custom discovery checks has to follow the same format.

```
[
  { "fsname": "/", "fstype": "rootfs" },
  { "fsname": "/sys", "fstype": "sysfs" },
  { "fsname": "/proc", "fstype": "proc" },
  { "fsname": "/dev", "fstype": "devtmpfs" },
  { "fsname": "/dev/pts", "fstype": "devpts" },
  { "fsname": "/lib/init/rw", "fstype": "tmpfs" },
  { "fsname": "/dev/shm", "fstype": "tmpfs" },
  { "fsname": "/home", "fstype": "ext3" },
  { "fsname": "/tmp", "fstype": "ext3" },
  { "fsname": "/usr", "fstype": "ext3" },
  { "fsname": "/var", "fstype": "ext3" },
  { "fsname": "/sys/fs/fuse/connections", "fstype": "fusectl" }
]
```

Then, in the discovery rule's "Filter" field, we could specify `"{#FSTYPE}"` as a macro and `"rootfs|ext3"` as a regular expression.



**Note:**

You don't have to use macro names FSNAME/FSTYPE with custom LLD rules, you are free to use whatever names you like. In case JSONPath is used then LLD row will be an array element that can be an object, but it can be also another array or a value.

Note that, if using a user parameter, the return value is limited to 512 KB. For more details, see [data limits for LLD return values](#).

**1 Item prototypes**

Once a rule is created, go to the items for that rule and press "Create prototype" to create an item prototype. Note how macro {#FSNAME} is used where a file system name is required. When the discovery rule is processed, this macro will be substituted with the discovered file system.

\* Name Free disk space on {#FSNAME} (percentage)

Type Zabbix agent

\* Key vfs.fs.size[{#FSNAME},pfree]

Type of information Numeric (float)

Units %

\* Update interval 1m

Custom intervals

Type	Interval	Period
<input checked="" type="checkbox"/> Flexible <input type="checkbox"/> Scheduling	50s	1-7,00:00

[Add](#)

\* History storage period  Do not keep history  Storage period 7d

\* Trend storage period  Do not keep trends  Storage period 365d

Show value As is

New application

Applications

- None-
- CPU
- Filesystems
- General
- Memory
- Network interfaces
- OS
- Performance
- Processes
- Security

New application prototype

Application\_{#FSNAME}

Application prototypes

- None-

Description

Create enabled

Discover

Low-level discovery **macros** and user **macros** may be used in item prototype configuration and item value preprocessing **parameters**. Note that when used in update intervals, a single macro has to fill the whole field. Multiple macros in one field or macros mixed with text are not supported.

**Note:**

Context-specific escaping of low-level discovery macros is performed for safe use in regular expression and XPath preprocessing parameters.

Attributes that are specific for item prototypes:

Parameter	Description
New application prototype	You may define a new application prototype. In application prototypes you can use low-level discovery macros that, after discovery, will be substituted with real values to create applications that are specific for the discovered entity. See also <b>application discovery notes</b> for more specific information.
Application prototypes	Select from the existing application prototypes.
Create enabled	If checked the item will be added in an enabled state. If unchecked, the item will be added to a discovered entity, but in a disabled state.
Discover	If checked (default) the item will be added to a discovered entity. If unchecked, the item will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule.

We can create several item prototypes for each file system metric we are interested in:

## ☰ Item prototypes

All templates / Template Module Linux filesystems...    Discovery list / Mounted filesystem discovery    **Item**

<input type="checkbox"/>	Wizard	Name ▲	Key	Inten
<input type="checkbox"/>	...	{#FSNAME}: Free inodes in %	vfs.fs.inode[{#FSNAME},pfree]	1m
<input type="checkbox"/>	...	{#FSNAME}: Space utilization	vfs.fs.size[{#FSNAME},pused]	1m
<input type="checkbox"/>	...	{#FSNAME}: Total space	vfs.fs.size[{#FSNAME},total]	1m
<input type="checkbox"/>	...	{#FSNAME}: Used space	vfs.fs.size[{#FSNAME},used]	1m

**Mass update** option is available if you want to update properties of several item prototypes at once.

### 2 Trigger prototypes

We create trigger prototypes in a similar way as item prototypes:

Trigger prototype [Dependencies](#)

\* Name

Severity  Not classified  Information  Warning  Average  High  Critical

\* Expression

[Expression constructor](#)

OK event generation  Expression  Recovery expression  None

PROBLEM event generation mode  Single  Multiple

OK event closes  All problems  All problems if tag values match

Tags

tag	value
<input type="text" value="tag"/>	<input type="text" value="value"/>

[Add](#)

Allow manual close

URL

Description

Create enabled

Discover

Attributes that are specific for trigger prototypes:

Parameter	Description
Create enabled	If checked the trigger will be added in an enabled state. If unchecked, the trigger will be added to a discovered entity, but in a disabled state.

Parameter	Description
Discover	If checked (default) the trigger will be added to a discovered entity. If unchecked, the trigger will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule.

When real triggers are created from the prototypes, there may be a need to be flexible as to what constant ('20' in our example) is used for comparison in the expression. See how [user macros with context](#) can be useful to accomplish such flexibility.

You can define [dependencies](#) between trigger prototypes as well (supported since Zabbix 3.0). To do that, go to the Dependencies tab. A trigger prototype may depend on another trigger prototype from the same low-level discovery (LLD) rule or on a regular trigger. A trigger prototype may not depend on a trigger prototype from a different LLD rule or on a trigger created from trigger prototype. Host trigger prototype cannot depend on a trigger from a template.

## Trigger prototypes

[All templates](#) / [Template OS Linux](#) [Discovery list](#) / [Mounted filesystem discovery](#) [Item prototypes](#) 5

<input type="checkbox"/>	SEVERITY	NAME ▲	EXPRESSION
<input type="checkbox"/>	Warning	Free disk space is less than 20% on volume {#FSNAME}	{Template OS
<input type="checkbox"/>	Warning	Free inodes is less than 20% on volume {#FSNAME}	{Template OS

### 3 Graph prototypes

We can create graph prototypes, too:

Graph prototype
Preview

\* Name

\* Width

\* Height

Graph type

Show legend

3D view

\* Items

	Name	Type
⋮	1: Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Total space	Graph
⋮	2: Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Used space	Simple

[Add](#) [Add prototype](#)

Discover

Attributes that are specific for graph prototypes:

Parameter	Description
Discover	If checked (default) the graph will be added to a discovered entity. If unchecked, the graph will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule.

## Graph prototypes

[All templates / Template OS Linux](#)
[Discovery list / Mounted filesystem discovery](#)
Item prototypes 5

	NAME ▲	WIDTH
<input type="checkbox"/>	Disk space usage {#FSNAME}	600

Finally, we have created a discovery rule that looks as shown below. It has five item prototypes, two trigger prototypes, and one graph prototype.

# Discovery rules

All templates / [Template OS Linux](#) [Applications 10](#) [Items 32](#) [Triggers 15](#) [Graphs 5](#) [Screens 1](#)

<input type="checkbox"/>	NAME ▲	ITEMS	TRIGGERS	GRAPHS	H
<input type="checkbox"/>	<a href="#">Mounted filesystem discovery</a>	<a href="#">Item prototypes 5</a>	<a href="#">Trigger prototypes 2</a>	<a href="#">Graph prototypes 1</a>	H

Note: For configuring host prototypes, see the section about [host prototype](#) configuration in virtual machine monitoring.

## 4 Notes on low-level discovery

Application discovery

Application prototypes support LLD macros.

One application prototype can be used by several item prototypes of the same discovery rule.

If created application prototype is not used by any item prototype it gets removed from 'Application prototypes' list automatically.

Like other discovered entities applications follow the lifetime defined in discovery rule ('keep lost resources period' setting) - they are removed after not being discovered for the specified number of days.

If an application is not discovered anymore, the application itself may not be removed because of the 'lost resources period' setting, however:

- items that are still discovered are automatically removed from it;
- items that are no longer discovered are not removed from it.

Application prototypes defined by one discovery rule can't discover the same application. In this situation only the first prototype discovery will succeed, the rest will report appropriate LLD error. Only application prototypes defined in different discovery rules can result in discovering the same application.

Using LLD macros in user macro contexts

LLD macros may be used inside user macro context, for example, [in trigger prototypes](#).

Multiple LLD rules for the same item

Since Zabbix agent version 3.2 it is possible to define several low-level discovery rules with the same discovery item.

To do that you need to define the Alias agent [parameter](#), allowing to use altered discovery item keys in different discovery rules, for example `vfs.fs.discovery[foo]`, `vfs.fs.discovery[bar]`, etc.

Data limits for return values

There is no limit for low-level discovery rule JSON data if it is received directly by Zabbix server, because return values are processed without being stored in a database. There's also no limit for custom low-level discovery rules, however, if it is intended to acquire custom LLD data using a user parameter, then the user parameter return value limit applies (512 KB).

If data has to go through Zabbix proxy it has to store this data in database so [database limits](#) apply.

## 5 Discovery rules

Please use the sidebar to see discovery rule configuration examples for various cases.

### 1 Discovery of mounted filesystems

Overview

It is possible to discover mounted filesystems and their properties (mountpoint name, mountpoint type, filesystem size and inode statistics).

To do that, you may use a combination of:

- the `vfs.fs.get` agent item as the master item

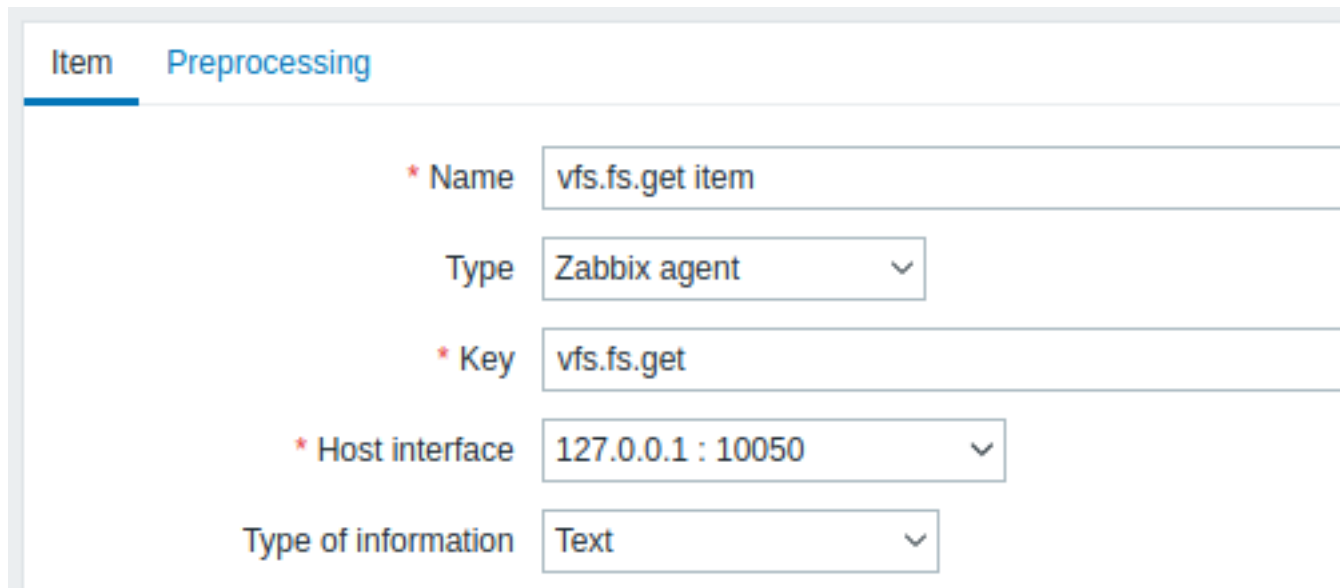
- dependent low-level discovery rule and item prototypes

Configuration

Master item

Create a Zabbix agent item using the following key:

`vfs.fs.get`



The screenshot shows the Zabbix configuration interface for an item. The 'Item' tab is selected, and the 'Preprocessing' section is visible. The configuration fields are as follows:

- Name:** `vfs.fs.get item`
- Type:** `Zabbix agent` (selected from a dropdown menu)
- Key:** `vfs.fs.get`
- Host interface:** `127.0.0.1 : 10050` (selected from a dropdown menu)
- Type of information:** `Text` (selected from a dropdown menu)

Set the type of information to "Text" for possibly big JSON data.

The data returned by this item will contain something like the following for a mounted filesystem:

```
{
  "fsname": "/",
  "fstype": "rootfs",
  "bytes": {
    "total": 1000,
    "free": 500,
    "used": 500,
    "pfree": 50.00,
    "pused": 50.00
  },
  "inodes": {
    "total": 1000,
    "free": 500,
    "used": 500,
    "pfree": 50.00,
    "pused": 50.00
  }
}
```

Dependent LLD rule

Create a low-level discovery rule as "Dependent item" type:



Discovery rule Preprocessing LLD macros Filters Overrides

\* Name

Type

\* Key

\* Master item

\* Keep lost resources period

As master item select the `vfs.fs.get` item we created.

In the "LLD macros" tab define custom macros with the corresponding JSONPath:

Discovery rule Preprocessing LLD macros 2 Filters Overrides

LLD macros

LLD macro	JSONPath
<input type="text" value="{#FSNAME}"/>	<input type="text" value="\$fsname"/>
<input type="text" value="{#FSTYPE}"/>	<input type="text" value="\$fstype"/>

[Add](#)

Dependent item prototype

Create an item prototype with "Dependent item" type in this LLD rule. As master item for this prototype select the `vfs.fs.get` item we created.

Item prototype Preprocessing

\* Name

Type

\* Key

\* Master item

Type of information

Note the use of custom macros in the item prototype name and key:

- Name: Free disk space on {#FSNAME}, type: {#FSTYPE}

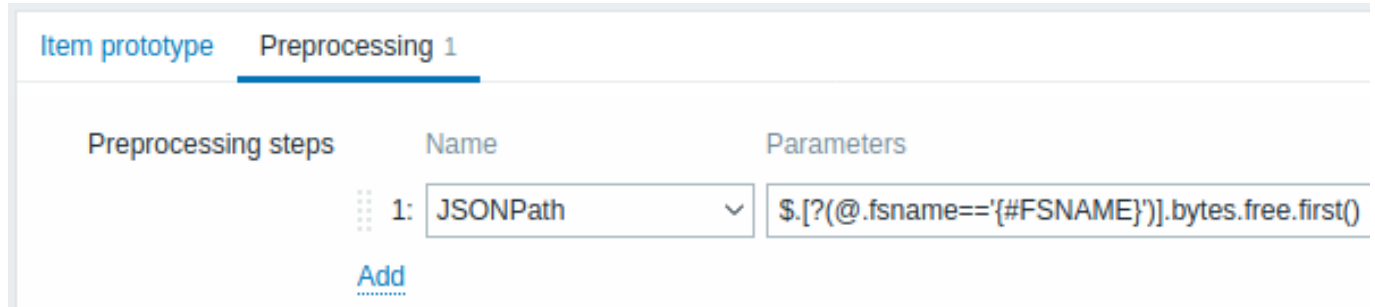
- Key: Free[`{#FSNAME}`]

As type of information, use:

- Numeric (unsigned) for metrics like 'free', 'total', 'used'
- Numeric (float) for metrics like 'pfree', 'pused' (percentage)

In the item prototype "Preprocessing" tab select JSONPath and use the following JSONPath expression as parameter:

```
$.[?(@.fsname=='{#FSNAME}')].bytes.free.first()
```



When discovery starts, one item per each mountpoint will be created. This item will return the number of free bytes for the given mountpoint.

## 2 Discovery of network interfaces

In a similar way as **file systems** are discovered, it is possible to also discover network interfaces.

Item key

The item key to use in the **discovery rule** is

```
net.if.discovery
```

This item is supported since Zabbix agent 2.0.

Supported macros

You may use the `{#IFNAME}` macro in the discovery rule **filter** and prototypes of items, triggers and graphs.

Examples of item prototypes that you might wish to create based on "net.if.discovery":

- "net.if.in[`{#IFNAME}`,bytes]"
- "net.if.out[`{#IFNAME}`,bytes]"

## 3 Discovery of CPUs and CPU cores

In a similar way as **file systems** are discovered, it is possible to also discover CPUs and CPU cores.

Item key

The item key to use in the **discovery rule** is

```
system.cpu.discovery
```

This item is supported since Zabbix agent 2.4.

Supported macros

This discovery key returns two macros - `{#CPU.NUMBER}` and `{#CPU.STATUS}` identifying the CPU order number and status respectively. Note that a clear distinction cannot be made between actual, physical processors, cores and hyperthreads. `{#CPU.STATUS}` on Linux, UNIX and BSD systems returns the status of the processor, which can be either "online" or "offline". On Windows systems, this same macro may represent a third value - "unknown" - which indicates that a processor has been detected, but no information has been collected for it yet.

CPU discovery relies on the agent's collector process to remain consistent with the data provided by the collector and save resources on obtaining the data. This has the effect of this item key not working with the test (-t) command line flag of the agent binary, which will return a NOT\_SUPPORTED status and an accompanying message indicating that the collector process has not been started.

Item prototypes that can be created based on CPU discovery include, for example:

- `system.cpu.util[{#CPU.NUMBER},<type>,<mode>]`

- `system.hw.cpu[#{CPU.NUMBER},<info>]`

#### 4 Discovery of SNMP OIDs

##### Overview

In this section we will perform an SNMP **discovery** on a switch.

##### Item key

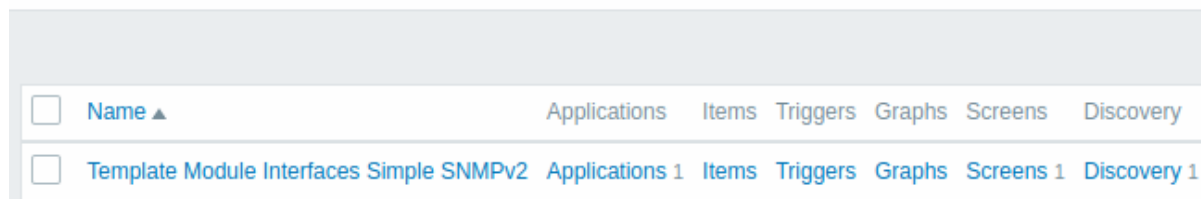
Unlike with file system and network interface discovery, the item does not necessarily has to have an "snmp.discovery" key - item type of SNMP agent is sufficient.

Discovery of SNMP OIDs is supported since Zabbix server/proxy 2.0.

To configure the discovery rule, do the following:

- Go to: Configuration → Templates
- Click on Discovery in the row of an appropriate template

### ≡ Templates



<input type="checkbox"/>	Name ▲	Applications	Items	Triggers	Graphs	Screens	Discovery
<input type="checkbox"/>	Template Module Interfaces Simple SNMPv2	Applications 1	Items	Triggers	Graphs	Screens 1	Discovery 1

- Click on Create discovery rule in the upper right corner of the screen
- Fill in the discovery rule form with the required details as in the screenshot below

Discovery rule Preprocessing LLD macros Filters Overrides

\* Name Network interfaces

Type SNMP agent

\* Key net.if.discovery

\* SNMP OID discovery[{-#IFDESCR},1.3.6.1.2.1.2.2.1.2,{-#IFTYPE},1.3.6.1.2.1.2.2.1.3]

\* Update interval 1h

Custom intervals

Type	Interval	Period
Flexible Scheduling	50s	1-7,00:00-24

Add

\* Keep lost resources period 30d

Description Discovering interfaces from IF-MIB.

Enabled

Add Test Cancel

All mandatory input fields are marked with a red asterisk.

The OIDs to discover are defined in SNMP OID field in the following format: `discovery[{-#MACRO1}, oid1, {#MACRO2}, oid2, ...,]`

where {#MACRO1}, {#MACRO2} ... are valid lld macro names and oid1, oid2... are OIDs capable of generating meaningful values for these macros. A built-in macro {#SNMPINDEX} containing index of the discovered OID is applied to discovered entities. The discovered entities are grouped by {#SNMPINDEX} macro value.

To understand what we mean, let us perform few snmpwalks on our switch:

```
$ snmpwalk -v 2c -c public 192.168.1.1 IF-MIB::ifDescr
IF-MIB::ifDescr.1 = STRING: WAN
IF-MIB::ifDescr.2 = STRING: LAN1
IF-MIB::ifDescr.3 = STRING: LAN2
```

```
$ snmpwalk -v 2c -c public 192.168.1.1 IF-MIB::ifPhysAddress
IF-MIB::ifPhysAddress.1 = STRING: 8:0:27:90:7a:75
IF-MIB::ifPhysAddress.2 = STRING: 8:0:27:90:7a:76
IF-MIB::ifPhysAddress.3 = STRING: 8:0:27:2b:af:9e
```

And set SNMP OID to: `discovery[{-#IFDESCR}, ifDescr, {#IFPHYSADDRESS}, ifPhysAddress]`

Now this rule will discover entities with {#IFDESCR} macros set to **WAN**, **LAN1** and **LAN2**, {#IFPHYSADDRESS} macros set to **8:0:27:90:7a:75**, **8:0:27:90:7a:76**, and **8:0:27:2b:af:9e**, {#SNMPINDEX} macros set to the discovered OIDs indexes **1**, **2** and **3**:

```
[
  {
    "{#SNMPINDEX}": "1",
```

```

    "{#IFDESCR}": "WAN",
    "{#IFPHYSADDRESS}": "8:0:27:90:7a:75"
  },
  {
    "{#SNMPINDEX}": "2",
    "{#IFDESCR}": "LAN1",
    "{#IFPHYSADDRESS}": "8:0:27:90:7a:76"
  },
  {
    "{#SNMPINDEX}": "3",
    "{#IFDESCR}": "LAN2",
    "{#IFPHYSADDRESS}": "8:0:27:2b:af:9e"
  }
]

```

If an entity does not have the specified OID, then the corresponding macro will be omitted for this entity. For example if we have the following data:

```

ifDescr.1 "Interface #1"
ifDescr.2 "Interface #2"
ifDescr.4 "Interface #4"

```

```

ifAlias.1 "eth0"
ifAlias.2 "eth1"
ifAlias.3 "eth2"
ifAlias.5 "eth4"

```

Then in this case SNMP discovery `discovery[#{#IFDESCR}, ifDescr, #{#IFALIAS}, ifAlias]` will return the following structure:

```

[
  {
    "{#SNMPINDEX}": 1,
    "{#IFDESCR}": "Interface #1",
    "{#IFALIAS}": "eth0"
  },
  {
    "{#SNMPINDEX}": 2,
    "{#IFDESCR}": "Interface #2",
    "{#IFALIAS}": "eth1"
  },
  {
    "{#SNMPINDEX}": 3,
    "{#IFALIAS}": "eth2"
  },
  {
    "{#SNMPINDEX}": 4,
    "{#IFDESCR}": "Interface #4"
  },
  {
    "{#SNMPINDEX}": 5,
    "{#IFALIAS}": "eth4"
  }
]

```

#### Item prototypes

The following screenshot illustrates how we can use these macros in item prototypes:

Item prototype Preprocessing

\* Name Incoming traffic on interface {#IFDESCR}

Type SNMP agent

\* Key ifInOctets[{#IFDESCR}]

\* SNMP OID IF-MIB::ifInOctets.{#SNMPINDEX}

\* SNMP community {\$SNMP\_COMMUNITY}

Port

Type of information Numeric (unsigned)

Units bps

\* Update interval 1m

Custom intervals		Type	Interval	Period
<input checked="" type="checkbox"/>	Flexible	Scheduling	50s	1-7,00:00-2
<a href="#">Add</a>				

\* History storage period 1w

\* Trend storage period 365d

Show value As is

New application

Again, creating as many item prototypes as needed:

# Item prototypes

[All templates / Template SNMP Interfaces](#)

[Discovery list / Network interfaces](#)

[Item prototypes 8](#)

<input type="checkbox"/> NAME ▲	KEY	INTERVAL	HI
<input type="checkbox"/> Admin status of interface {#IFDESCR}	ifAdminStatus[{#IFDESCR}]	1m	7d
<input type="checkbox"/> Alias of interface {#IFDESCR}	ifAlias[{#IFDESCR}]	1h	7d
<input type="checkbox"/> Description of interface {#IFDESCR}	ifDescr[{#IFDESCR}]	1h	7d
<input type="checkbox"/> Inbound errors on interface {#IFDESCR}	ifInErrors[{#IFDESCR}]	1m	7d
<input type="checkbox"/> Incoming traffic on interface {#IFDESCR}	ifInOctets[{#IFDESCR}]	1m	7d
<input type="checkbox"/> Operational status of interface {#IFDESCR}	ifOperStatus[{#IFDESCR}]	1m	7d
<input type="checkbox"/> Outbound errors on interface {#IFDESCR}	ifOutErrors[{#IFDESCR}]	1m	7d
<input type="checkbox"/> Outgoing traffic on interface {#IFDESCR}	ifOutOctets[{#IFDESCR}]	1m	7d

## Trigger prototypes

The following screenshot illustrates how we can use these macros in trigger prototypes:

\* Name

Event name

Operational data

Severity  Not classified  Information  Warning  Average  High  Disaster

\* Problem expression 

```
{$IFCONTROL:"{#IFNAME}"}=1 and ({Template Module Interfaces Simple SNMPv1:net.if.status[ifOperStatus. {#SNMPINDEX}].last()}=2 and {Template Module Interfaces Simple SNMPv1:net.if.status[ifOperStatus. {#SNMPINDEX}].diff()}=1)
```

[Expression constructor](#)

OK event generation  Expression  Recovery expression  None

\* Recovery expression 

```
{Template Module Interfaces Simple SNMPv1:net.if.status[ifOperStatus.{#SNMPINDEX}].last()}<=2
```

[Expression constructor](#)

PROBLEM event generation mode  Single  Multiple

OK event closes  All problems  All problems if tag values match

Allow manual close

URL

Description 

```
This trigger expression works as follows:
1. Can be triggered if operations status is down.
2. {$IFCONTROL:"{#IFNAME}"}=1 - user can redefine Context macro to value - 0. That marks this interface as not important. No new trigger will be fired if this interface is down.
3. {TEMPLATE_NAME:METRIC.diff()}=1) - trigger fires only if operational status was up(1) sometime before. (So, do not fire 'eternal off' interfaces.)

WARNING: if closed manually - won't fire again on next poll, because of .diff.
```

Create enabled

Discover



# Trigger prototypes

[All templates / Template SNMP Interfaces](#) [Discovery list / Network interfaces](#) [Item prototypes 8](#)

<input type="checkbox"/>	SEVERITY	NAME ▲	EXPR
<input type="checkbox"/>	Information	Operational status was changed on {HOST.NAME} interface {#IFDESCR}	{Temp

## Graph prototypes

The following screenshot illustrates how we can use these macros in graph prototypes:

**Graph prototype** [Preview](#)

\* Name

\* Width

\* Height

Graph type  ▼

Show legend

Show working time

Show triggers

Percentile line (left)

Percentile line (right)

Y axis MIN value  ▼

Y axis MAX value  ▼

\* Items

Name	Function	Draw st
1: Template SNMP Interfaces: Incoming traffic on interface {#IFDESCR}	<input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="avg"/> ▼	<input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="Gradie"/>
2: Template SNMP Interfaces: Outgoing traffic on interface {#IFDESCR}	<input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="avg"/> ▼	<input style="border: none; border-bottom: 1px solid #ccc;" type="text" value="Gradie"/>

[Add](#) [Add prototype](#)

# Graph prototypes

[All templates](#) / [Template SNMP Interfaces](#) [Discovery list](#) / [Network interfaces](#) [Item prototypes 8](#) [T](#)

<input type="checkbox"/> NAME ▲	WIDTH
<input type="checkbox"/> <a href="#">Traffic on interface {#SNMPVALUE}</a>	900

A summary of our discovery rule:

# Discovery rules

[All templates](#) / [Template SNMP Interfaces](#) [Applications 1](#) [Items 1](#) [Triggers](#) [Graphs](#) [Screens](#)

<input type="checkbox"/> NAME ▲	ITEMS	TRIGGERS	GRAPHS	HO
<input type="checkbox"/> <a href="#">Network interfaces</a>	<a href="#">Item prototypes 8</a>	<a href="#">Trigger prototypes 1</a>	<a href="#">Graph prototypes 1</a>	Ho

Discovered entities

When server runs, it will create real items, triggers and graphs based on the values the SNMP discovery rule returns. In the host configuration they are prefixed with an orange link to a discovery rule they come from.

## ☰ Items

[All hosts](#) / [Switch1](#) [Enabled](#) [ZBX](#) [SNMP](#) [JMX](#) [IPMI](#) : [Applications 19](#) [Items 133](#) [Triggers 63](#) [Gr](#)

<input type="checkbox"/> Wizard	Name	Triggers	Key ▲
<input type="checkbox"/>	<a href="#">Network interfaces</a> : <a href="#">Admin status of interface 1</a>		ifAdminStatus[1]
<input type="checkbox"/>	<a href="#">Network interfaces</a> : <a href="#">Admin status of interface 2</a>		ifAdminStatus[2]
<input type="checkbox"/>	<a href="#">Network interfaces</a> : <a href="#">Admin status of interface 3</a>		ifAdminStatus[3]
<input type="checkbox"/>	<a href="#">Network interfaces</a> : <a href="#">Admin status of interface 4</a>		ifAdminStatus[4]

# Triggers

All hosts / Switch1 Enabled ZBX **SNMP** JMX IPMI Applications 19 Items 133 Triggers 63

<input type="checkbox"/>	Severity	Name ▲	Exp
<input type="checkbox"/>	Information	Network interfaces: Operational status was changed on {HOST.NAME} interface 1	{pr
<input type="checkbox"/>	Information	Network interfaces: Operational status was changed on {HOST.NAME} interface 2	{pr
<input type="checkbox"/>	Information	Network interfaces: Operational status was changed on {HOST.NAME} interface 3	{pr
<input type="checkbox"/>	Information	Network interfaces: Operational status was changed on {HOST.NAME} interface 4	{pr

# Graphs

All hosts / Switch1 Enabled ZBX **SNMP** JMX IPMI Applications 19 Items 133 Triggers 63

<input type="checkbox"/>	Name ▲
<input type="checkbox"/>	Network interfaces: Traffic on interface 1
<input type="checkbox"/>	Network interfaces: Traffic on interface 2
<input type="checkbox"/>	Network interfaces: Traffic on interface 3
<input type="checkbox"/>	Network interfaces: Traffic on interface 4

## 5 Discovery of JMX objects

### Overview

It is possible to **discover** all JMX MBeans or MBean attributes or to specify a pattern for the discovery of these objects.

It is mandatory to understand the difference between an Mbean and Mbean attributes for discovery rule configuration. An MBean is an object which can represent a device, an application, or any resource that needs to be managed.

For example, there is an Mbean which represents a web server. Its attributes are connection count, thread count, request timeout, http file cache, memory usage, etc. Expressing this thought in human comprehensive language we can define a coffee machine as an Mbean which has the following attributes to be monitored: water amount per cup, average consumption of water for a certain period of time, number of coffee beans required per cup, coffee beans and water refill time, etc.

### Item key

In **discovery rule** configuration, select **JMX agent** in the Type field.

Two item keys are supported for JMX object discovery - `jmx.discovery[ ]` and `jmx.get[ ]`:

#### Item key

Item key	Return value	Parameters	Comment
<code>jmx.discovery[&lt;discovery mode&gt;,&lt;object name&gt;]</code>			

This item returns a JSON array with LLD macros describing MBean objects or their attributes.

**discovery mode** -> Examples: jmx.discovery - retrieve all JMX MBean attributes (retrieve JMX MBeans) - retrieve all JMX MBeans or beans (retrieve JMX MBeans)

**object name pattern** -> (see [documentation](#)) identifying the MBean names to be retrieved (empty by default, retrieving all registered beans)

There are some **limitations** to what MBean properties this item can return based on limited characters that are supported in macro name generation (supported characters can de-

---

**Item key**

---

**jmx.get**[<discovery mode>,<object name>]

This item returns a JSON array with MBean objects or their attributes. Compared to `jmx.discovery` it does not define LLD macros.

**discovery mode** - using this item, it is needed to define custom low-level discovery macros, pointing to values extracted from the returned JSON-Path. (see [documentation](#))

Supported since Zabbix Java gateway 4.4.

MBean names to be retrieved (empty by default, retrieving all registered beans)

---

**Attention:**

If no parameters are passed, all MBean attributes from JMX are requested. Not specifying parameters for JMX discovery or trying to receive all attributes for a wide range like `*:type=*,name=*` may lead to potential performance problems.

Using `jmx.discovery`

This item returns a JSON object with low-level discovery macros describing MBean objects or attributes. For example, in the discovery of MBean attributes (reformatted for clarity):

```
[
  {
    "#{JMXVALUE}": "0",
    "#{JMXTYPE}": "java.lang.Long",
```

```

    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,CollectionCount",
    "{#JMXATTR}": "CollectionCount"
  },
  {
    "{#JMXVALUE}": "0",
    "{#JMXTYPE}": "java.lang.Long",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,CollectionTime",
    "{#JMXATTR}": "CollectionTime"
  },
  {
    "{#JMXVALUE}": "true",
    "{#JMXTYPE}": "java.lang.Boolean",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,Valid",
    "{#JMXATTR}": "Valid"
  },
  {
    "{#JMXVALUE}": "PS Scavenge",
    "{#JMXTYPE}": "java.lang.String",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,Name",
    "{#JMXATTR}": "Name"
  },
  {
    "{#JMXVALUE}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXTYPE}": "javax.management.ObjectName",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,ObjectName",
    "{#JMXATTR}": "ObjectName"
  }
]

```

In the discovery of MBeans (reformatted for clarity):

```

[
  {
    "{#JMXDOMAIN}": "java.lang",
    "{#JMXTYPE}": "GarbageCollector",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXNAME}": "PS Scavenge"
  }
]

```

Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

Macro	Description
Discovery of MBean attributes	
{#JMXVALUE}	Attribute value.
{#JMXTYPE}	Attribute type.
{#JMXOBJ}	Object name.
{#JMXDESC}	Object name including attribute name.
{#JMXATTR}	Attribute name.
Discovery of MBeans	
{#JMXDOMAIN}	MBean domain. (Zabbix reserved name)
{#JMXOBJ}	Object name. (Zabbix reserved name)
{#JMX<key property>}	MBean properties (like {#JMXTYPE}, {#JMXNAME}) (see <a href="#">Limitations</a> below).

Limitations

There are some limitations associated with the algorithm of creating LLD macro names from MBean property names:

- attribute names are changed to uppercase
- attribute names are ignored (no LLD macros are generated) if they consist of unsupported characters for LLD macro names. Supported characters can be described by the following regular expression: A-Z0-9\_\.
- if an attribute is called "obj" or "domain" they will be ignored because of the overlap with the values of the reserved Zabbix properties {#JMXOBJ} and {#JMXDOMAIN} (supported since Zabbix 3.4.3.)

Please consider this jmx.discovery (with "beans" mode) example. MBean has the following properties defined:

```
name=test
  =Type
attributes []=1,2,3
Name=NameOfTheTest
domAin=some
```

As a result of JMX discovery, the following LLD macros will be generated:

- {#JMXDOMAIN} - Zabbix internal, describing the domain of MBean
- {#JMXOBJ} - Zabbix internal, describing MBean object
- {#JMXNAME} - created from "name" property

Ignored properties are:

- тип : its name contains unsupported characters (non-ASCII)
- attributes[] : its name contains unsupported characters (square brackets are not supported)
- Name : it's already defined (name=test)
- domAin : it's a Zabbix reserved name

### Examples

Let's review two more practical examples of a LLD rule creation with the use of Mbean. To understand the difference between a LLD rule collecting Mbeans and a LLD rule collecting Mbean attributes better please take a look at following table:

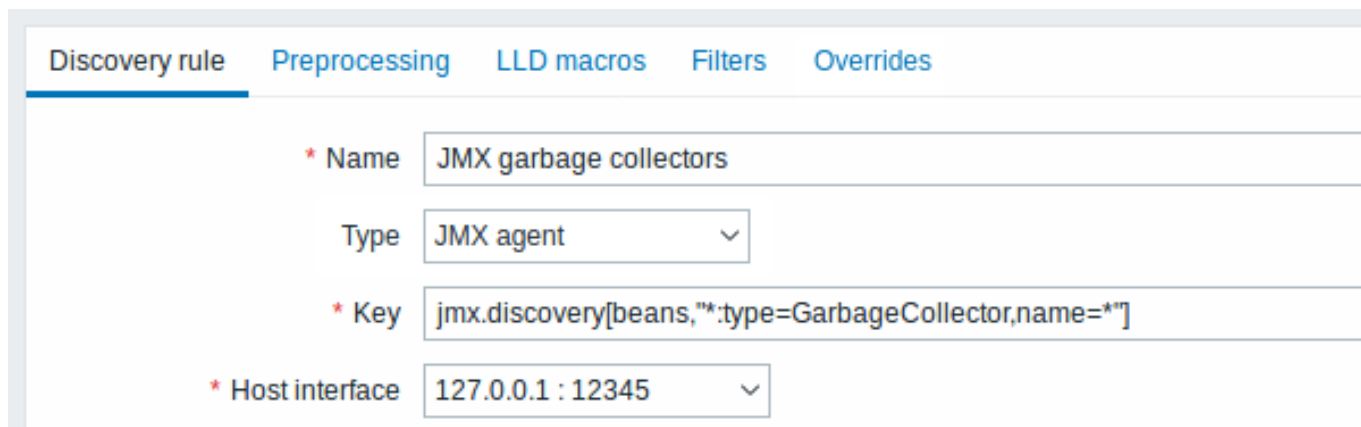
MBean1	MBean2	MBean3
MBean1Attribute1	MBean2Attribute1	MBean3Attribute1
MBean1Attribute2	MBean2Attribute2	MBean3Attribute2
MBean1Attribute3	MBean2Attribute3	MBean3Attribute3

### Example 1: Discovering Mbeans

This rule will return 3 objects: the top row of the column: MBean1, MBean2, MBean3.

For more information about objects please refer to [supported macros](#) table, Discovery of MBeans section.

Discovery rule configuration collecting Mbeans (without the attributes) looks like the following:



The key used here:

```
jmx.discovery[beans,":type=GarbageCollector,name=*"]
```

All the garbage collectors without attributes will be discovered. As Garbage collectors have the same attribute set, we can use desired attributes in item prototypes the following way:

## Item prototypes

All hosts / JMX Enabled ZBX SNMP JMX IPMI Discovery list / JMX garbage collectors Item prototypes 3 Trigger prot

<input type="checkbox"/> Name ▲	Key
<input type="checkbox"/> GC {#JMXNAME} CollectionCount	jmx[{#JMXOBJ},CollectionCount]
<input type="checkbox"/> GC {#JMXNAME} CollectionTime	jmx[{#JMXOBJ},CollectionTime]
<input type="checkbox"/> GC {#JMXNAME} Valid	jmx[{#JMXOBJ},Valid]

Keys used:

```
jmx[{#JMXOBJ},CollectionCount]
```

```
jmx[{#JMXOBJ},CollectionTime]
```

```
jmx[{#JMXOBJ},Valid]
```

LLD discovery rule will result in something close to this (items are discovered for two Garbage collectors):

<input type="checkbox"/> Wizard	Name ▲	Triggers	Key
<input type="checkbox"/>	JMX garbage collectors: GC PS MarkSweep CollectionCount		jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",CollectionCount]
<input type="checkbox"/>	JMX garbage collectors: GC PS MarkSweep CollectionTime		jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",CollectionTime]
<input type="checkbox"/>	... JMX garbage collectors: GC PS MarkSweep Valid		jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",Valid]
<input type="checkbox"/>	JMX garbage collectors: GC PS Scavenge CollectionCount		jmx["java.lang:type=GarbageCollector,name=PS Scavenge",CollectionCount]
<input type="checkbox"/>	JMX garbage collectors: GC PS Scavenge CollectionTime		jmx["java.lang:type=GarbageCollector,name=PS Scavenge",CollectionTime]
<input type="checkbox"/>	... JMX garbage collectors: GC PS Scavenge Valid		jmx["java.lang:type=GarbageCollector,name=PS Scavenge",Valid]

Example 2: Discovering Mbean attributes

This rule will return 9 objects with the following fields: MBean1Attribute1, MBean2Attribute1, Mbean3Attribute1,MBean1Attribute2,MBean2Attr Mbean3Attribute2, MBean1Attribute3, MBean2Attribute3, Mbean3Attribute3.

For more information about objects please refer to [supported macros](#) table, Discovery of MBean attributes section.

Discovery rule configuration collecting Mbean attributes looks like the following:

Discovery rule Preprocessing LLD macros Filters Overrides

---

\* Name

Type

\* Key

\* Host interface

The key used here:

```
jmx.discovery[attributes,"*:type=GarbageCollector,name=*"]
```

All the garbage collectors with a single item attribute will be discovered.



## Item prototypes

All hosts / JMX Enabled ZBX SNMP JMX IPMI Discovery list / JMX garbage collectors Item prototypes 1

<input type="checkbox"/>	Name ▲	Key
<input type="checkbox"/>	{#JMXOBJ} {#JMXATTR}	jmx[{#JMXOBJ},{#JMXATTR}]

In this particular case an item will be created from prototype for every MBean attribute. The main drawback of this configuration is that trigger creation from trigger prototypes is impossible as there is only one item prototype for all attributes. So this setup can be used for data collection, but is not recommended for automatic monitoring.

Using `jmx.get`

`jmx.get []` is similar to the `jmx.discovery []` item, but it does not turn Java object properties into low-level discovery macro names and therefore can return values without **limitations** that are associated with LLD macro name generation such as hyphens or non-ASCII characters.

When using `jmx.get []` for discovery, low-level discovery macros can be defined separately in the custom **LLD macro** tab of the discovery rule configuration, using JSONPath to point to the required values.

Discovering MBeans

Discovery item: `jmx.get [beans, "com.example:type=*,*"]`

Response:

```
[
  {
    "object": "com.example:type=Hello,data-src=data-base, = ",
    "domain": "com.example",
    "properties": {
      "data-src": "data-base",
      " ": " ",
      "type": "Hello"
    }
  },
  {
    "object": "com.example:type=Atomic",
    "domain": "com.example",
    "properties": {
      "type": "Atomic"
    }
  }
]
```

Discovering MBean attributes

Discovery item: `jmx.get [attributes, "com.example:type=*,*"]`

Response:

```
[
  {
    "object": "com.example:type=*",
    "domain": "com.example",
    "properties": {
      "type": "Simple"
    }
  },
  {
    "object": "com.zabbix:type=yes,domain=zabbix.com,data-source=/dev/rand, = ,obj=true",
    "domain": "com.zabbix",
    "properties": {
      "type": "Hello",
      "domain": "com.example",
    }
  }
]
```

```
    "data-source": "/dev/rand",
    " ": " ",
    "obj": true
  }
}
```

## 6 Discovery of IPMI sensors

### Overview

It is possible to automatically discover IPMI sensors.

To do that, you may use a combination of:

- the `ipmi.get` IPMI item (supported since Zabbix **5.0.0**) as the master item
- dependent low-level discovery rule and item prototypes

### Configuration

#### Master item

Create an IPMI item using the following key:

```
ipmi.get
```

The screenshot shows the Zabbix configuration interface for an item. The 'Item' tab is selected. The configuration fields are as follows:

* Name	IPMI get item
Type	IPMI agent
* Key	ipmi.get
* Host interface	127.0.0.1 : 623
IPMI sensor	
Type of information	Text

Set the type of information to "Text" for possibly big JSON data.

#### Dependent LLD rule

Create a low-level discovery rule as "Dependent item" type:

Discovery rule Preprocessing **LLD macros** Filters Overrides

\* Name

Type

\* Key

\* Master item

As master item select the `ipmi.get` item we created.

In the "LLD macros" tab define a custom macro with the corresponding JSONPath:

Discovery rule Preprocessing **LLD macros 1** Filters Overrides

LLD macros	LLD macro	JSONPath
	<input type="text" value="{#SENSOR_ID}"/>	<input type="text" value="\$..id"/>

[Add](#)

Dependent item prototype

Create an item prototype with "Dependent item" type in this LLD rule. As master item for this prototype select the `ipmi.get` item we created.

Item prototype Preprocessing

\* Name

Type

\* Key

\* Master item

Type of information

Note the use of the `{#SENSOR_ID}` macro in the item prototype name and key:

- Name: IPMI value for sensor `{#SENSOR_ID}`
- Key: `ipmi_sensor[{#SENSOR_ID}]`

As type of information, Numeric (unsigned).

In the item prototype "Preprocessing" tab select JSONPath and use the following JSONPath expression as parameter:

```
$. [?(@.id=='{#SENSOR_ID}')].value.first()
```

## Item prototype Preprocessing 1

### Preprocessing steps

### Name

### Parameters



1:

JSONPath



\$.[?(@.id=='{#SENSOR\_ID})].value.first()

Add

When discovery starts, one item per each IPMI sensor will be created. This item will return the integer value of the given sensor.

## 7 Discovery of systemd services

### Overview

It is possible to **discover** systemd units (services, by default) with Zabbix.

### Item key

The item to use in the **discovery rule** is the

systemd.unit.discovery

#### Attention:

This **item** key is only supported in Zabbix agent 2.

This item returns a JSON with information about systemd units, for example:

```
[{
  "{#UNIT.NAME}": "mysqld.service",
  "{#UNIT.DESCRPTION}": "MySQL Server",
  "{#UNIT.LOADSTATE}": "loaded",
  "{#UNIT.ACTIVESTATE}": "active",
  "{#UNIT.SUBSTATE}": "running",
  "{#UNIT.FOLLOWED}": "",
  "{#UNIT.PATH}": "/org/freedesktop/systemd1/unit/mysqld_2eservice",
  "{#UNIT.JOBID}": 0,
  "{#UNIT.JOBTYP}": "",
  "{#UNIT.JOBPATH}": "/",
  "{#UNIT.UNITFILESTATE}": "enabled"
}, {
  "{#UNIT.NAME}": "systemd-journald.socket",
  "{#UNIT.DESCRPTION}": "Journal Socket",
  "{#UNIT.LOADSTATE}": "loaded",
  "{#UNIT.ACTIVESTATE}": "active",
  "{#UNIT.SUBSTATE}": "running",
  "{#UNIT.FOLLOWED}": "",
  "{#UNIT.PATH}": "/org/freedesktop/systemd1/unit/systemd_2djournald_2esocket",
  "{#UNIT.JOBID}": 0,
  "{#UNIT.JOBTYP}": "",
  "{#UNIT.JOBPATH}": "/"
  "{#UNIT.UNITFILESTATE}": "enabled"
}]
```

### Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

Macro	Description
{#UNIT.NAME}	Primary unit name.
{#UNIT.DESCRPTION}	Human readable description.
{#UNIT.LOADSTATE}	Load state (i.e. whether the unit file has been loaded successfully)
{#UNIT.ACTIVESTATE}	Active state (i.e. whether the unit is currently started or not)

Macro	Description
{#UNIT.SUBSTATE}	Sub state (a more fine-grained version of the active state that is specific to the unit type, which the active state is not)
{#UNIT.FOLLOWED}	Unit that is being followed in its state by this unit, if there is any; otherwise an empty string.
{#UNIT.PATH}	Unit object path.
{#UNIT.JOBID}	Numeric job ID if there is a job queued for the job unit; 0 otherwise.
{#UNIT.JOBTYPE}	Job type.
{#UNIT.JOBPATH}	Job object path.
{#UNIT.UNITFILESTATE}	The install state of the unit file (supported since 5.2.2).

#### Item prototypes

Item prototypes that can be created based on systemd service discovery include, for example:

- Item name: {#UNIT.DESCRPTION}; item key: `systemd.unit.info["{#UNIT.NAME}"]`
- Item name: {#UNIT.DESCRPTION}; item key: `systemd.unit.info["{#UNIT.NAME}", LoadState]`

`systemd.unit.info` **agent items** are supported since Zabbix 4.4.

## 8 Discovery of Windows services

### Overview

In a similar way as **file systems** are discovered, it is possible to also discover Windows services.

### Item key

The item to use in the **discovery rule** is

`service.discovery`

This item is supported since Zabbix Windows agent 3.0.

### Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

Macro	Description
{#SERVICE.NAME}	Service name.
{#SERVICE.DISPLAYNAME}	Displayed service name.
{#SERVICE.DESCRPTION}	Service description.
{#SERVICE.STATE}	Numerical value of the service state: 0 - Running 1 - Paused 2 - Start pending 3 - Pause pending 4 - Continue pending 5 - Stop pending 6 - Stopped 7 - Unknown
{#SERVICE.STATENAME}	Name of the service state (Running, Paused, Start pending, Pause pending, Continue pending, Stop pending, Stopped or Unknown).
{#SERVICE.PATH}	Service path.
{#SERVICE.USER}	Service user.
{#SERVICE.STARTUP}	Numerical value of the service startup type: 0 - Automatic 1 - Automatic delayed 2 - Manual 3 - Disabled 4 - Unknown
{#SERVICE.STARTUPNAME}	Name of the service startup type (Automatic, Automatic delayed, Manual, Disabled, Unknown).

Macro	Description
{#SERVICE.STARTUPTRIGGER}	Numerical value to indicate if the service startup type has: 0 - no startup triggers 1 - has startup triggers This macro is supported since Zabbix 3.4.4. It is useful to discover such service startup types as Automatic (trigger start), Automatic delayed (trigger start) and Manual (trigger start).

Based on Windows service discovery you may create an **item** prototype like

```
service.info[{#SERVICE.NAME},<param>]
```

where **param** accepts the following values: state, displayname, path, user, startup or description.

For example, to acquire the display name of a service you may use a "service.info[{#SERVICE.NAME},displayname]" item. If **param** value is not specified ("service.info[{#SERVICE.NAME}]"), the default state parameter is used.

## 9 Discovery of Windows performance counter instances

### Overview

It is possible to **discover** object instances of Windows performance counters. This is useful for multi-instance performance counters.

### Item key

The item to use in the **discovery rule** is

```
perf_instance.discovery[object]
```

or, to be able to provide the object name in English only, independently of OS localization:

```
perf_instance_en.discovery[object]
```

For example:

```
perf_instance.discovery[Processador]
perf_instance_en.discovery[Processor]
```

These items are supported since Zabbix Windows agent 5.0.1.

### Supported macros

The discovery will return all instances of the specified object in the {#INSTANCE} macro, which may be used in the prototypes of **perf\_count** and **perf\_count\_en** items.

```
[
  {"{#INSTANCE}": "0"},
  {"{#INSTANCE}": "1"},
  {"{#INSTANCE}": "_Total"}
]
```

For example, if the item key used in the discovery rule is:

```
perf_instance.discovery[Processor]
```

you may create an item prototype:

```
perf_counter["\Processor({#INSTANCE})\% Processor Time"]
```

### Notes:

- If the specified object is not found or does not support variable instances then the discovery item will become NOTSUPPORTED.
- If the specified object supports variable instances, but currently does not have any instances, then an empty JSON array will be returned.
- In case of duplicate instances they will be skipped.

## 10 Discovery using WMI queries

### Overview

[WMI](#) is a powerful interface in Windows that can be used for retrieving various information about Windows components, services, state and software installed.

It can be used for physical disk discovery and their performance data collection, network interface discovery, Hyper-V guest discovery, monitoring Windows services and many other things in Windows OS.

This type of low-level [discovery](#) is done using WQL queries whose results get automatically transformed into a JSON object suitable for low-level discovery.

### Item key

The item to use in the [discovery rule](#) is

```
wmi.getall[<namespace>,<query>]
```

This [item](#) transforms the query result into a JSON array. For example:

```
select * from Win32_DiskDrive where Name like '%PHYSICALDRIVE%'
```

may return something like this:

```
[
  {
    "DeviceID" : "\\.\PHYSICALDRIVE0",
    "BytesPerSector" : 512,
    "Capabilities" : [
      3,
      4
    ],
    "CapabilityDescriptions" : [
      "Random Access",
      "Supports Writing"
    ],
    "Caption" : "VBOX HARDDISK ATA Device",
    "ConfigManagerErrorCode" : "0",
    "ConfigManagerUserConfig" : "false",
    "CreationClassName" : "Win32_DiskDrive",
    "Description" : "Disk drive",
    "FirmwareRevision" : "1.0",
    "Index" : 0,
    "InterfaceType" : "IDE"
  },
  {
    "DeviceID" : "\\.\PHYSICALDRIVE1",
    "BytesPerSector" : 512,
    "Capabilities" : [
      3,
      4
    ],
    "CapabilityDescriptions" : [
      "Random Access",
      "Supports Writing"
    ],
    "Caption" : "VBOX HARDDISK ATA Device",
    "ConfigManagerErrorCode" : "0",
    "ConfigManagerUserConfig" : "false",
    "CreationClassName" : "Win32_DiskDrive",
    "Description" : "Disk drive",
    "FirmwareRevision" : "1.0",
    "Index" : 1,
    "InterfaceType" : "IDE"
  }
]
```

This item is supported since Zabbix Windows agent 4.4.

Low-level discovery macros

Even though no low-level discovery macros are created in the returned JSON, these macros can be defined by the user as an additional step, using the [custom LLD macro](#) functionality with JSONPath pointing to the discovered values in the returned JSON.

The macros then can be used to create item, trigger, etc prototypes.

## 11 Discovery using ODBC SQL queries

Overview

This type of low-level [discovery](#) is done using SQL queries, whose results get automatically transformed into a JSON object suitable for low-level discovery.

Item key

SQL queries are performed using a "Database monitor" item type. Therefore, most of the instructions on [ODBC monitoring](#) page apply in order to get a working "Database monitor" discovery rule.

Two item keys may be used in "Database monitor" discovery rules:

- **db.odbc.discovery**[<unique short description>,<dsn>,<connection string>] - this item transforms the SQL query result into a JSON array, turning the column names from the query result into low-level discovery macro names paired with the discovered field values. These macros can be used in creating item, trigger, etc prototypes. See also: [Using db.odbc.discovery](#).
- **db.odbc.get**[<unique short description>,<dsn>,<connection string>] - this item transforms the SQL query result into a JSON array, keeping the original column names from the query result as a field name in JSON paired with the discovered values. Compared to `db.odbc.discovery []`, this item does not create low-level discovery macros in the returned JSON, therefore there is no need to check if the column names can be valid macro names. The low-level discovery macros can be defined as an additional step as required, using the [custom LLD macro](#) functionality with JSONPath pointing to the discovered values in the returned JSON. See also: [Using db.odbc.get](#).

Using db.odbc.discovery

As a practical example to illustrate how the SQL query is transformed into JSON, let us consider low-level discovery of Zabbix proxies by performing an ODBC query on Zabbix database. This is useful for automatic creation of "zabbix[proxy,<name>,lastaccess]" [internal items](#) to monitor which proxies are alive.

Let us start with discovery rule configuration:



Discovery rule Preprocessing LLD macros Filters Overrides

\* Name Proxy discovery

Type Database monitor

\* Key db.odbc.discovery[proxies,{SDSN}]

User name

Password

\* SQL query  
 SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy\_hostid WHERE h1.status IN (5, 6) GROUP BY h1.host;

\* Update interval 30s

All mandatory input fields are marked with a red asterisk.

Here, the following direct query on Zabbix database is used to select all Zabbix proxies, together with the number of hosts they are monitoring. The number of hosts can be used, for instance, to filter out empty proxies:

```
mysql> SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy_hostid
+-----+-----+
| host    | count |
+-----+-----+
| Japan 1 |     5 |
| Japan 2 |    12 |
| Latvia  |     3 |
+-----+-----+
3 rows in set (0.01 sec)
```

By the internal workings of "db.odbc.discovery[,{\$DSN}]" item, the result of this query gets automatically transformed into the following JSON:

```
[
  {
    "#HOST": "Japan 1",
    "#COUNT": "5"
  },
  {
    "#HOST": "Japan 2",
    "#COUNT": "12"
  },
  {
    "#HOST": "Latvia",
    "#COUNT": "3"
  }
]
```

It can be seen that column names become macro names and selected rows become the values of these macros.

**Note:**

If it is not obvious how a column name would be transformed into a macro name, it is suggested to use column aliases like "COUNT(h2.host) AS count" in the example above.

In case a column name cannot be converted into a valid macro name, the discovery rule becomes not supported, with the error message detailing the offending column number. If additional help is desired, the obtained column names are provided under DebugLevel=4 in Zabbix server log file:

```
$ grep db.odbc.discovery /tmp/zabbix_server.log
...
23876:20150114:153410.856 In db_odbc_discovery() query:'SELECT h1.host, COUNT(h2.host) FROM hosts h1 I
23876:20150114:153410.860 db_odbc_discovery() column[1]:'host'
23876:20150114:153410.860 db_odbc_discovery() column[2]:'COUNT(h2.host) '
23876:20150114:153410.860 End of db_odbc_discovery():NOTSUPPORTED
23876:20150114:153410.860 Item [Zabbix server:db.odbc.discovery[proxies,{$DSN}]] error: Cannot convert
```

Now that we understand how a SQL query is transformed into a JSON object, we can use {#HOST} macro in item prototypes:

The screenshot shows the 'Item prototype' configuration page in Zabbix. The 'Preprocessing' tab is active. The configuration includes: Name: Last access time of proxy {#HOST}; Type: Zabbix internal; Key: zabbix[proxy,{#HOST},lastaccess]; Type of information: Numeric (unsigned); Units: unixtime; Update interval: 60s.

Once discovery is performed, an item will be created for each proxy:

<input type="checkbox"/>	Wizard	Name	Triggers	Key ▲
<input type="checkbox"/>		Proxy discovery: Last access time of proxy Japan1		zabbix[proxy,Japan1,lastacce
<input type="checkbox"/>		Proxy discovery: Last access time of proxy Japan2		zabbix[proxy,Japan2,lastacce
<input type="checkbox"/>		Proxy discovery: Last access time of proxy Latvia		zabbix[proxy,Latvia,lastaccess

Using db.odbc.get

Using db.odbc.get[,{\$DSN}] and the following SQL example:

```
mysql> SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy_ho
+-----+-----+
| host      | count |
+-----+-----+
| Japan 1  |     5 |
| Japan 2  |    12 |
| Latvia   |     3 |
+-----+-----+
3 rows in set (0.01 sec)
```

this JSON will be returned:

```
[
  {
    "host": "Japan 1",
```

```

    "count": "5"
  },
  {
    "host": "Japan 2",
    "count": "12"
  },
  {
    "host": "Latvia",
    "count": "3"
  }
]

```

As you can see, there are no low-level discovery macros there. However, custom low-level discovery macros can be created in the **LLD macros** tab of a discovery rule using JSONPath, for example:

```
{#HOST} → $.host
```

Now this {#HOST} macro may be used in item prototypes:

The screenshot shows the 'Item prototype' configuration window in Zabbix. The 'Preprocessing' tab is active. The configuration is as follows:

- Name:** Last access time of proxy {#HOST}
- Type:** Zabbix internal
- Key:** zabbix[proxy,{#HOST},lastaccess]
- Type of information:** Numeric (unsigned)
- Units:** unixtime
- Update interval:** 60s

## 12 Discovery using Prometheus data

### Overview

Data provided in Prometheus line format can be used for low-level discovery.

See **Prometheus checks** for details how Prometheus data querying is implemented in Zabbix.

### Configuration

The low-level discovery rule should be created as a **dependent item** to the HTTP master item that collects Prometheus data.

### Prometheus to JSON

In the discovery rule, go to the Preprocessing tab and select the Prometheus to JSON preprocessing option. Data in JSON format are needed for discovery and the Prometheus to JSON preprocessing option will return exactly that, with the following attributes:

- metric name
- metric value
- help (if present)
- type (if present)
- labels (if present)
- raw line

For example, querying `wmi_logical_disk_free_bytes`:

Discovery rule   Preprocessing 1   LLD macros   Filters   Overrides

Preprocessing steps	Name	Parameters
1:	Prometheus to JSON	wmi_logical_disk_free_bytes{volume=~".*"} <a href="#">Add</a>

from these Prometheus lines:

```
# HELP wmi_logical_disk_free_bytes Free space in bytes (LogicalDisk.PercentFreeSpace)
# TYPE wmi_logical_disk_free_bytes gauge
wmi_logical_disk_free_bytes{volume="C:"} 3.5180249088e+11
wmi_logical_disk_free_bytes{volume="D:"} 2.627731456e+09
wmi_logical_disk_free_bytes{volume="HarddiskVolume4"} 4.59276288e+08
```

will return:

```
[
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "C:"
    },
    "value": "3.5180249088e+11",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"C:\"} 3.5180249088e+11"
  },
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "D:"
    },
    "value": "2.627731456e+09",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"D:\"} 2.627731456e+09"
  },
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "HarddiskVolume4"
    },
    "value": "4.59276288e+08",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"HarddiskVolume4\"} 4.59276288e+08"
  }
]
```

### Mapping LLD macros

Next you have to go to the LLD macros tab and make the following mappings:

```
{#VOLUME}=${.labels['volume']}
{#METRIC}=${['name']}
{#HELP}=${['help']}
```

Item prototype

You may want to create an item prototype like this:

\* Name

Type

\* Key

\* Master item

Type of information

Units

\* History storage period

\* Trend storage period

Show value

New application

- Applications
- None-
  - CPU
  - Filesystems
  - General
  - Memory
  - Network interfaces
  - OS
  - Performance
  - Processes
  - Security

New application prototype

- Application prototypes
- None-

Description

Create enabled

with preprocessing options:

Preprocessing steps	Name	Parameters
1:	Prometheus pattern	{#METRIC}{volume="{#VOLUME}"}

[Add](#)

### 13 Discovery of block devices

In a similar way as **file systems** are discovered, it is possible to also discover block devices and their type.

Item key

The item key to use in the **discovery rule** is

`vfs.dev.discovery`

This item is supported on Linux platforms only, since Zabbix agent 4.4.

You may create discovery rules using this discovery item and:

- filter: **{#DEVNAME} matches** `sd[\D]$` - to discover devices named "sd0", "sd1", "sd2", ...
- filter: **{#DEVTYPE} matches** `disk` **AND** **{#DEVNAME} does not match** `^loop.*` - to discover disk type devices whose name does not start with "loop"

Supported macros

This discovery key returns two macros - `{#DEVNAME}` and `{#DEVTYPE}` identifying the block device name and type respectively, e.g.:

```
[
  {
    "{#DEVNAME}": "loop1",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "dm-0",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "sda",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "sda1",
    "{#DEVTYPE}": "partition"
  }
]
```

Block device discovery allows to use `vfs.dev.read[]` and `vfs.dev.write[]` items to create item prototypes using the `{#DEVNAME}` macro, for example:

- `"vfs.dev.read[{#DEVNAME},sps]"`
- `"vfs.dev.write[{#DEVNAME},sps]"`

`{#DEVTYPE}` is intended for device filtering.

### 14 Discovery of host interfaces in Zabbix

Overview

It is possible to **discover** all interfaces configured in Zabbix frontend for a host.

Item key

The item to use in the **discovery rule** is the

```
zabbix[host,discovery,interfaces]
```

internal item. This item is supported since Zabbix server 3.4.

This item returns a JSON with the description of interfaces, including:

- IP address/DNS hostname (depending on the “Connect to” host setting)
- Port number
- Interface type (Zabbix agent, SNMP, JMX, IPMI)
- If it is the default interface or not
- If the bulk request feature is enabled - for SNMP interfaces only.

For example:

```
[{"#IF.CONN":"192.168.3.1","#IF.IP":"192.168.3.1","#IF.DNS":"","#IF.PORT":"10050","#IF.TYPE":"AG
```

With multiple interfaces their records in JSON are ordered by:

- Interface type,
- Default - the default interface is put before non-default interfaces,
- Interface ID (in ascending order).

Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

Macro	Description
{#IF.CONN}	Interface IP address or DNS host name.
{#IF.IP}	Interface IP address.
{#IF.DNS}	Interface DNS host name.
{#IF.PORT}	Interface port number.
{#IF.TYPE}	Interface type (“AGENT”, “SNMP”, “JMX”, or “IPMI”).
{#IF.DEFAULT}	Default status for the interface: 0 - not default interface 1 - default interface
{#IF.SNMP.BULK}	SNMP bulk processing status for the interface: 0 - disabled 1 - enabled This macro is returned only if interface type is “SNMP”.

## 16. Distributed monitoring

**Overview** Zabbix provides an effective and reliable way of monitoring a distributed IT infrastructure using Zabbix **proxies**.

Proxies can be used to collect data locally on behalf of a centralized Zabbix server and then report the data to the server.

Proxy features

When making a choice of using/not using a proxy, several considerations must be taken into account.

	Proxy
Lightweight	<b>Yes</b>
GUI	No
Works independently	<b>Yes</b>
Easy maintenance	<b>Yes</b>
Automatic DB creation <sup>1</sup>	<b>Yes</b>
Local administration	No
Ready for embedded hardware	<b>Yes</b>
One way TCP connections	<b>Yes</b>
Centralized configuration	<b>Yes</b>
Generates notifications	No

**Note:**

[1] Automatic DB creation feature only works with SQLite. Other databases require a **manual setup**.

## 1 Proxies

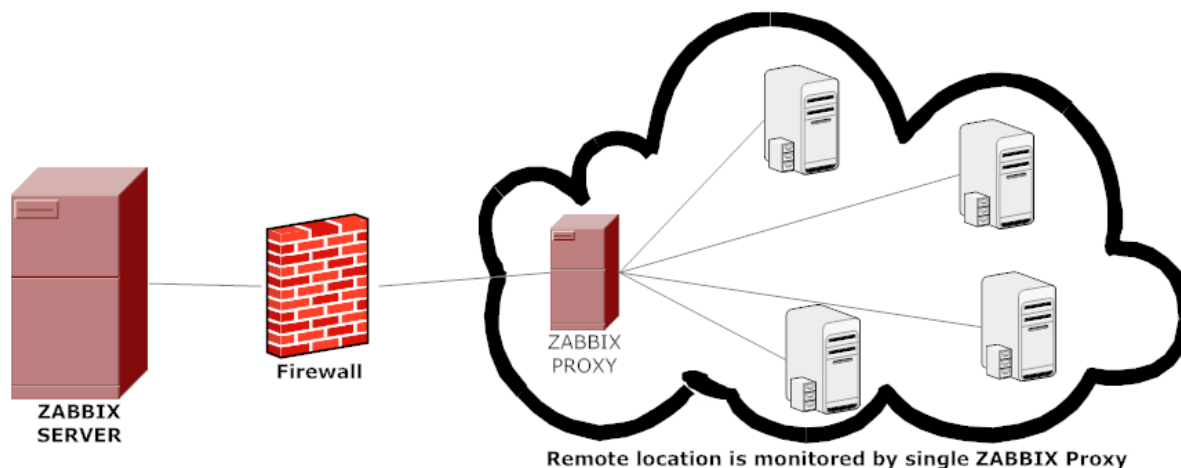
### Overview

A Zabbix proxy can collect performance and availability data on behalf of the Zabbix server. This way, a proxy can take on itself some of the load of collecting data and offload the Zabbix server.

Also, using a proxy is the easiest way of implementing centralized and distributed monitoring, when all agents and proxies report to one Zabbix server and all data is collected centrally.

A Zabbix proxy can be used to:

- Monitor remote locations
- Monitor locations having unreliable communications
- Offload the Zabbix server when monitoring thousands of devices
- Simplify the maintenance of distributed monitoring



The proxy requires only one TCP connection to the Zabbix server. This way it is easier to get around a firewall as you only need to configure one firewall rule.

**Attention:**

Zabbix proxy must use a separate database. Pointing it to the Zabbix server database will break the configuration.

All data collected by the proxy is stored locally before transmitting it over to the server. This way no data is lost due to any temporary communication problems with the server. The ProxyLocalBuffer and ProxyOfflineBuffer parameters in the **proxy configuration file** control for how long the data are kept locally.

**Attention:**

It may happen that a proxy, which receives the latest configuration changes directly from Zabbix server database, has a more up-to-date configuration than Zabbix server whose configuration may not be updated as fast due to the value of **CacheUpdateFrequency**. As a result, proxy may start gathering data and send them to Zabbix server that ignores these data.

Zabbix proxy is a data collector. It does not calculate triggers, process events or send alerts. For an overview of what proxy functionality is, review the following table:

Function	Supported by proxy
Items	
Zabbix agent checks	<b>Yes</b>
Zabbix agent checks (active)	<b>Yes</b> <sup>1</sup>
Simple checks	<b>Yes</b>
Trapper items	<b>Yes</b>



Function	Supported by proxy
SNMP checks	<b>Yes</b>
SNMP traps	<b>Yes</b>
IPMI checks	<b>Yes</b>
JMX checks	<b>Yes</b>
Log file monitoring	<b>Yes</b>
Internal checks	<b>Yes</b>
SSH checks	<b>Yes</b>
Telnet checks	<b>Yes</b>
External checks	<b>Yes</b>
Dependent items	<b>Yes</b>
Script items	<b>Yes</b>
Built-in web monitoring	<b>Yes</b>
Item value preprocessing	<b>Yes</b>
Network discovery	<b>Yes</b>
Active agent autoregistration	<b>Yes</b>
Low-level discovery	<b>Yes</b>
Remote commands	<b>Yes</b>
Calculating triggers	No
Processing events	No
Event correlation	No
Sending alerts	No

**Note:**

[1] To make sure that an agent asks the proxy (and not the server) for active checks, the proxy must be listed in the **ServerActive** parameter in the agent configuration file.

Configuration

Once you have **installed** and **configured** a proxy, it is time to configure it in the Zabbix frontend.

Adding proxies

To configure a proxy in Zabbix frontend:

- Go to: Administration → Proxies
- Click on Create proxy

Proxy
Encryption

\* Proxy name

Proxy mode Active Passive

Proxy address

Description

Add
Cancel

Parameter	Description
Proxy name	Enter the proxy name. It must be the same name as in the Hostname parameter in the proxy configuration file.

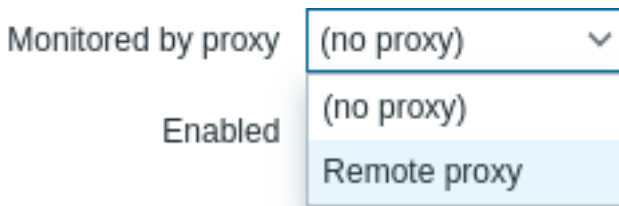
Parameter	Description
Proxy mode	Select the proxy mode. <b>Active</b> - the proxy will connect to the Zabbix server and request configuration data <b>Passive</b> - Zabbix server connects to the proxy Note that without encrypted communications (sensitive) proxy configuration data may become available to parties having access to the Zabbix server trapper port when using an active proxy. This is possible because anyone may pretend to be an active proxy and request configuration data if authentication does not take place or proxy addresses are not limited in the Proxy address field.
Proxy address	If specified then active proxy requests are only accepted from this list of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of active Zabbix proxy. This field is only available if an active proxy is selected in the Proxy mode field. Macros are not supported. This option is supported since Zabbix 4.0.0.
Interface	Enter interface details for the passive proxy. This field is only available if a passive proxy is selected in the Proxy mode field. IP address IP address of the passive proxy (optional). DNS name DNS name of the passive proxy (optional). Connect to Clicking the respective button will tell Zabbix server what to use to retrieve data from proxy: <b>IP</b> - Connect to the proxy IP address (recommended) <b>DNS</b> - Connect to the proxy DNS name
Description	Port TCP/UDP port number of the passive proxy (10051 by default). Enter the proxy description.

The **Encryption** tab allows you to require encrypted connections with the proxy.

Parameter	Description
Connections to proxy	How the server connects to the passive proxy: no encryption (default), using PSK (pre-shared key) or certificate.
Connections from proxy	Select what type of connections are allowed from the active proxy. Several connection types can be selected at the same time (useful for testing and switching to other connection type). Default is "No encryption".
Issuer	Allowed issuer of certificate. Certificate is first validated with CA (certificate authority). If it is valid, signed by the CA, then the Issuer field can be used to further restrict allowed CA. This field is optional, intended to use if your Zabbix installation uses certificates from multiple CAs.
Subject	Allowed subject of certificate. Certificate is first validated with CA. If it is valid, signed by the CA, then the Subject field can be used to allow only one value of Subject string. If this field is empty then any valid certificate signed by the configured CA is accepted.
PSK identity	Pre-shared key identity string. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.
PSK	Pre-shared key (hex-string). Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library. Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952

## Host configuration

You can specify that an individual host should be monitored by a proxy in the **host configuration** form, using the Monitored by proxy field.



Monitored by proxy (no proxy) ✓  
Enabled (no proxy)  
Remote proxy

Host **mass update** is another way of specifying that hosts should be monitored by a proxy.

## 17. Encryption

**Overview** Zabbix supports encrypted communications between Zabbix components using Transport Layer Security (TLS) protocol v.1.2 and 1.3 (depending on the crypto library). Certificate-based and pre-shared key-based encryption is supported.

Encryption can be configured for connections:

- Between Zabbix server, Zabbix proxy, Zabbix agent, zabbix\_sender and zabbix\_get utilities
- To Zabbix database **from Zabbix frontend and server/proxy**

Encryption is optional and configurable for individual components:

- Some proxies and agents can be configured to use certificate-based encryption with the server, while others can use pre-shared key-based encryption, and yet others continue with unencrypted communications (as before)
- Server (proxy) can use different encryption configurations for different hosts

Zabbix daemon programs use one listening port for encrypted and unencrypted incoming connections. Adding an encryption does not require opening new ports on firewalls.

### Limitations

- Private keys are stored in plain text in files readable by Zabbix components during startup
- Pre-shared keys are entered in Zabbix frontend and stored in Zabbix database in plain text
- Built-in encryption does not protect communications:
  - \* Between the web server running Zabbix frontend and user web browser
  - \* Between Zabbix frontend and Zabbix server
- \* Currently each encrypted connection opens with a full TLS handshake, no session caching and tickets are not used
- \* Adding encryption increases the time for item checks and actions, depending on network latency:
  - \* For example, if packet delay is 100ms then opening a TCP connection and sending unencrypted request takes 100ms
  - \* Timeouts may need to be increased, otherwise some items and actions running remote scripts on agents may fail
- \* Encryption is not supported by `[/manual/discovery/network_discovery|network discovery]`. Zabbix agent cannot connect to the server.

**Compiling Zabbix with encryption support** To support encryption Zabbix must be compiled and linked with one of the supported crypto libraries:

- GnuTLS - from version 3.1.18
- OpenSSL - versions 1.0.1, 1.0.2, 1.1.0, 1.1.1
- LibreSSL - tested with versions 2.7.4, 2.8.2:
  - LibreSSL 2.6.x is not supported
  - LibreSSL is supported as a compatible replacement of OpenSSL; the new `tls_*`() LibreSSL-specific API functions are not used. Zabbix components compiled with LibreSSL will not be able to use PSK, only certificates can be used.

The library is selected by specifying the respective option to "configure" script:

- `--with-gnutls [=DIR]`
- `--with-openssl [=DIR]` (also used for LibreSSL)

For example, to configure the sources for server and agent with OpenSSL you may use something like:

```
./configure --enable-server --enable-agent --with-mysql --enable-ipv6 --with-net-snmp --with-libcurl --with-
```

Different Zabbix components may be compiled with different crypto libraries (e.g. a server with OpenSSL, an agent with GnuTLS).

**Attention:**  
 If you plan to use pre-shared keys (PSK), consider using GnuTLS or OpenSSL 1.1.0 (or newer) libraries in Zabbix components using PSKs. GnuTLS and OpenSSL 1.1.0 libraries support PSK ciphersuites with [Perfect Forward Secrecy](#). Older versions of the OpenSSL library (1.0.1, 1.0.2c) also support PSKs, but available PSK ciphersuites do not provide Perfect Forward Secrecy.

**Connection encryption management** Connections in Zabbix can use:

- no encryption (default)
- **RSA certificate-based encryption**
- **PSK-based encryption**

There are two important parameters used to specify encryption between Zabbix components:

- TLSConnect - specifies what encryption to use for outgoing connections (unencrypted, PSK or certificate)
- TLSAccept - specifies what types of connections are allowed for incoming connections (unencrypted, PSK or certificate). One or more values can be specified.

TLSConnect is used in the configuration files for Zabbix proxy (in active mode, specifies only connections to server) and Zabbix agent (for active checks). In Zabbix frontend the TLSConnect equivalent is the Connections to host field in Configuration → Hosts → <some host> → Encryption tab and the Connections to proxy field in Administration → Proxies → <some proxy> → Encryption tab. If the configured encryption type for connection fails, no other encryption types will be tried.

TLSAccept is used in the configuration files for Zabbix proxy (in passive mode, specifies only connections from server) and Zabbix agent (for passive checks). In Zabbix frontend the TLSAccept equivalent is the Connections from host field in Configuration → Hosts → <some host> → Encryption tab and the Connections from proxy field in Administration → Proxies → <some proxy> → Encryption tab.

Normally you configure only one type of encryption for incoming encryptions. But you may want to switch the encryption type, e.g. from unencrypted to certificate-based with minimum downtime and rollback possibility. To achieve this:

- Set TLSAccept=unencrypted, cert in the agent configuration file and restart Zabbix agent
- Test connection with zabbix\_get to the agent using certificate. If it works, you can reconfigure encryption for that agent in Zabbix frontend in the Configuration → Hosts → <some host> → Encryption tab by setting Connections to host to "Certificate".
- When server configuration cache gets updated (and proxy configuration is updated if the host is monitored by proxy) then connections to that agent will be encrypted
- If everything works as expected you can set TLSAccept=cert in the agent configuration file and restart Zabbix agent. Now the agent will be accepting only encrypted certificate-based connections. Unencrypted and PSK-based connections will be rejected.

In a similar way it works on server and proxy. If in Zabbix frontend in host configuration Connections from host is set to "Certificate" then only certificate-based encrypted connections will be accepted from the agent (active checks) and zabbix\_sender (trapper items).

Most likely you will configure incoming and outgoing connections to use the same encryption type or no encryption at all. But technically it is possible to configure it asymmetrically, e.g. certificate-based encryption for incoming and PSK-based for outgoing connections.

Encryption configuration for each host is displayed in the Zabbix frontend, in Configuration → Hosts in the Agent encryption column. For example:

Example	Connections to host	Allowed connections from host	Rejected connections from host
	Unencrypted	Unencrypted	Encrypted, certificate and PSK-based encrypted
	Encrypted, certificate-based	Encrypted, certificate-based	Unencrypted and PSK-based encrypted
	Encrypted, PSK-based	Encrypted, PSK-based	Unencrypted and certificate-based encrypted
	Encrypted, PSK-based	Unencrypted and PSK-based encrypted	Certificate-based encrypted
	Encrypted, certificate-based	Unencrypted, PSK or certificate-based encrypted	-

**Attention:**

Connections are unencrypted by default. Encryption must be configured for each host and proxy individually.

**zabbix\_get and zabbix\_sender with encryption** See [zabbix\\_get](#) and [zabbix\\_sender](#) manpages for using them with encryption.

**Ciphersuites** Ciphersuites by default are configured internally during Zabbix startup and, before Zabbix 4.0.19, 4.4.7, are not user-configurable.

Since Zabbix 4.0.19, 4.4.7 also user-configured ciphersuites are supported for GnuTLS and OpenSSL. Users may **configure** ciphersuites according to their security policies. Using this feature is optional (built-in default ciphersuites still work).

For crypto libraries compiled with default settings Zabbix built-in rules typically result in the following ciphersuites (in order from higher to lower priority):

Library	Certificate ciphersuites	PSK ciphersuites
GnuTLS 3.1.18	TLS_ECDHE_RSA_AES_128_GCM_SHA256	TLS_ECDHE_PSK_AES_128_CBC_SHA256
	TLS_ECDHE_RSA_AES_128_CBC_SHA256	TLS_ECDHE_PSK_AES_128_CBC_SHA1
	TLS_ECDHE_RSA_AES_128_CBC_SHA1	TLS_PSK_AES_128_GCM_SHA256
	TLS_RSA_AES_128_GCM_SHA256	TLS_PSK_AES_128_CBC_SHA256
	TLS_RSA_AES_128_CBC_SHA256	TLS_PSK_AES_128_CBC_SHA1
	TLS_RSA_AES_128_CBC_SHA1	
OpenSSL 1.0.2c	ECDHE-RSA-AES128-GCM-SHA256	PSK-AES128-CBC-SHA
	ECDHE-RSA-AES128-SHA256	
	ECDHE-RSA-AES128-SHA	
	AES128-GCM-SHA256	
	AES128-SHA256	
OpenSSL 1.1.0	AES128-SHA	
	ECDHE-RSA-AES128-GCM-SHA256	ECDHE-PSK-AES128-CBC-SHA256
	ECDHE-RSA-AES128-SHA256	ECDHE-PSK-AES128-CBC-SHA
	ECDHE-RSA-AES128-SHA	PSK-AES128-GCM-SHA256
	AES128-GCM-SHA256	PSK-AES128-CCM8
	AES128-CCM8	PSK-AES128-CCM
	AES128-CCM	PSK-AES128-CBC-SHA256
AES128-SHA256	PSK-AES128-CBC-SHA	
OpenSSL 1.1.1d	AES128-SHA	
	TLS_AES_256_GCM_SHA384	TLS_CHACHA20_POLY1305_SHA256
	TLS_CHACHA20_POLY1305_SHA256	TLS_AES_128_GCM_SHA256
	TLS_AES_128_GCM_SHA256	ECDHE-PSK-AES128-CBC-SHA256
	ECDHE-RSA-AES128-GCM-SHA256	ECDHE-PSK-AES128-CBC-SHA
	ECDHE-RSA-AES128-SHA256	PSK-AES128-GCM-SHA256
	ECDHE-RSA-AES128-SHA	PSK-AES128-CCM8
	AES128-GCM-SHA256	PSK-AES128-CCM
	AES128-CCM8	PSK-AES128-CBC-SHA256
	AES128-CCM	PSK-AES128-CBC-SHA

**User-configured ciphersuites** The built-in ciphersuite selection criteria can be overridden with user-configured ciphersuites.

**Attention:**

User-configured ciphersuites is a feature intended for advanced users who understand TLS ciphersuites, their security and consequences of mistakes, and who are comfortable with TLS troubleshooting.

The built-in ciphersuite selection criteria can be overridden using the following parameters:

Override scope	Parameter	Value	Description
Ciphersuite selection for certificates	TLSCipherCert13	Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).	Certificate-based ciphersuite selection criteria for TLS 1.3 Only OpenSSL 1.1.1 or newer.
	TLSCipherCert	Valid OpenSSL <a href="#">cipher strings</a> for TLS 1.2 or valid GnuTLS <a href="#">priority strings</a> . Their values are passed to the <code>SSL_CTX_set_cipher_list()</code> or <code>gnutls_priority_init()</code> functions, respectively.	Certificate-based ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL)
Ciphersuite selection for PSK	TLSCipherPSK13	Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).	PSK-based ciphersuite selection criteria for TLS 1.3 Only OpenSSL 1.1.1 or newer.
	TLSCipherPSK	Valid OpenSSL <a href="#">cipher strings</a> for TLS 1.2 or valid GnuTLS <a href="#">priority strings</a> . Their values are passed to the <code>SSL_CTX_set_cipher_list()</code> or <code>gnutls_priority_init()</code> functions, respectively.	PSK-based ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL)
Combined ciphersuite list for certificate and PSK	TLSCipherAll13	Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).	Ciphersuite selection criteria for TLS 1.3 Only OpenSSL 1.1.1 or newer.

Override scope	Parameter	Value	Description
	TLSCipherAll	Valid OpenSSL cipher strings for TLS 1.2 or valid GnuTLS priority strings. Their values are passed to the SSL_CTX_set_cipher_list() or gnutls_priority_init() functions, respectively.	Ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL)

To override the ciphersuite selection in `zabbix_get` and `zabbix_sender` utilities - use the command-line parameters:

- `--tls-cipher13`
- `--tls-cipher`

The new parameters are optional. If a parameter is not specified, the internal default value is used. If a parameter is defined it cannot be empty.

If the setting of a TLSCipher\* value in the crypto library fails then the server, proxy or agent will not start and an error is logged.

It is important to understand when each parameter is applicable.

#### Outgoing connections

The simplest case is outgoing connections:

- For outgoing connections with certificate - use TLSCipherCert13 or TLSCipherCert
- For outgoing connections with PSK - use TLSCipherPSK13 and TLSCipherPSK
- In case of `zabbix_get` and `zabbix_sender` utilities the command-line parameters `--tls-cipher13` and `--tls-cipher` can be used (encryption is unambiguously specified with a `--tls-connect` parameter)

#### Incoming connections

It is a bit more complicated with incoming connections because rules are specific for components and configuration.

For Zabbix **agent**:

Agent connection setup	Cipher configuration
TLSCipherCert	TLSCipherCert, TLSCipherCert13
TLSCipherPSK	TLSCipherPSK, TLSCipherPSK13
TLSCipherCert, TLSCipherPSK	TLSCipherCert, TLSCipherCert13, TLSCipherPSK, TLSCipherPSK13
TLSCipherAll	TLSCipherAll, TLSCipherAll13

For Zabbix **server** and **proxy**:

Connection setup	Cipher configuration
Outgoing connections using PSK	TLSCipherPSK, TLSCipherPSK13
Incoming connections using certificates	TLSCipherAll, TLSCipherAll13
Incoming connections using PSK if server has no certificate	TLSCipherPSK, TLSCipherPSK13
Incoming connections using PSK if server has certificate	TLSCipherAll, TLSCipherAll13

Some pattern can be seen in the two tables above:

- TLSCipherAll and TLSCipherAll13 can be specified only if a combined list of certificate- **and** PSK-based ciphersuites is used. There are two cases when it takes place: server (proxy) with a configured certificate (PSK ciphersuites are always configured on server, proxy if crypto library supports PSK), agent configured to accept both certificate- and PSK-based incoming connections
- in other cases TLSCipherCert\* and/or TLSCipherPSK\* are sufficient

The following tables show the TLSCipher\* built-in default values. They could be a good starting point for your own custom values.

Parameter	GnuTLS 3.6.12
TLSCipherCert	NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509
TLSCipherPSK	NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL
TLSCipherAll	NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509

Parameter	OpenSSL 1.1.1d <sup>1</sup>
TLSCipherCert13	
TLSCipherCert	EECDH+aRSA+AES128:RSA+aRSA+AES128
TLSCipherPSK13	TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256
TLSCipherPSK	kECDHEPSK+AES128:kPSK+AES128
TLSCipherAll13	
TLSCipherAll	EECDH+aRSA+AES128:RSA+aRSA+AES128:kECDHEPSK+AES128:kPSK+AES128

<sup>1</sup> Default values are different for older OpenSSL versions (1.0.1, 1.0.2, 1.1.0), for LibreSSL and if OpenSSL is compiled without PSK support.

\*\* Examples of user-configured ciphersuites \*\*

See below the following examples of user-configured ciphersuites:

- [Testing cipher strings and allowing only PFS ciphersuites](#)
- [Switching from AES128 to AES256](#)

Testing cipher strings and allowing only PFS ciphersuites

To see which ciphersuites have been selected you need to set 'DebugLevel=4' in the configuration file, or use the -vv option for zabbix\_sender.

Some experimenting with TLSCipher\* parameters might be necessary before you get the desired ciphersuites. It is inconvenient to restart Zabbix server, proxy or agent multiple times just to tweak TLSCipher\* parameters. More convenient options are using zabbix\_sender or the openssl command. Let's show both.

### 1. Using zabbix\_sender.

Let's make a test configuration file, for example /home/zabbix/test.conf, with the syntax of a zabbix\_agentd.conf file:

```

Hostname=nonexisting
ServerActive=nonexisting

TLSCipherCert13=cert
TLSCipherCert=/home/zabbix/ca.crt
TLSCipherCertFile=/home/zabbix/agent.crt
TLSCipherKeyFile=/home/zabbix/agent.key
TLSCipherPSKIdentity=nonexisting
TLSCipherPSKFile=/home/zabbix/agent.psk

```

You need valid CA and agent certificates and PSK for this example. Adjust certificate and PSK file paths and names for your environment.

If you are not using certificates, but only PSK, you can make a simpler test file:

```

Hostname=nonexisting
ServerActive=nonexisting

```



```

TLSCipher=psk
TLSPSKIdentity=nonexisting
TLSPSKFile=/home/zabbix/agentd.psk

```

The selected ciphersuites can be seen by running `zabbix_sender` (example compiled with OpenSSL 1.1.d):

```

$ zabbix_sender -vv -c /home/zabbix/test.conf -k nonexisting_item -o 1 2>&1 | grep ciphersuites
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() certificate ciphersuites: TLS_AES_256_GCM_SHA384 TLS_
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() PSK ciphersuites: TLS_CHACHA20_POLY1305_SHA256 TLS_AE
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() certificate and PSK ciphersuites: TLS_AES_256_GCM_SHA

```

Here you see the ciphersuites selected by default. These default values are chosen to ensure interoperability with Zabbix agents running on systems with older OpenSSL versions (from 1.0.1).

With newer systems you can choose to tighten security by allowing only a few ciphersuites, e.g. only ciphersuites with PFS (Perfect Forward Secrecy). Let's try to allow only ciphersuites with PFS using `TLSCipher*` parameters.

**Attention:**

The result will not be interoperable with systems using OpenSSL 1.0.1 and 1.0.2, if PSK is used. Certificate-based encryption should work.

Add two lines to the `test.conf` configuration file:

```

TLSCipherCert=EECDH+aRSA+AES128
TLSCipherPSK=kECDHEPSK+AES128

```

and test again:

```

$ zabbix_sender -vv -c /home/zabbix/test.conf -k nonexisting_item -o 1 2>&1 | grep ciphersuites
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() certificate ciphersuites: TLS_AES_256_GCM_SHA384 TLS_
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() PSK ciphersuites: TLS_CHACHA20_POLY1305_SHA256 TLS_AE
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() certificate and PSK ciphersuites: TLS_AES_256_GCM_SHA

```

The "certificate ciphersuites" and "PSK ciphersuites" lists have changed - they are shorter than before, only containing TLS 1.3 ciphersuites and TLS 1.2 ECDHE-\* ciphersuites as expected.

2. `TLSCipherAll` and `TLSCipherAll13` cannot be tested with `zabbix_sender`; they do not affect "certificate and PSK ciphersuites" value shown in the example above. To tweak `TLSCipherAll` and `TLSCipherAll13` you need to experiment with the agent, proxy or server.

So, to allow only PFS ciphersuites you may need to add up to three parameters

```

TLSCipherCert=EECDH+aRSA+AES128
TLSCipherPSK=kECDHEPSK+AES128
TLSCipherAll=EECDH+aRSA+AES128:kECDHEPSK+AES128

```

to `zabbix_agentd.conf`, `zabbix_proxy.conf` and `zabbix_server_conf` if each of them has a configured certificate and agent has also PSK.

If your Zabbix environment uses only PSK-based encryption and no certificates, then only one:

```

TLSCipherPSK=kECDHEPSK+AES128

```

Now that you understand how it works you can test the ciphersuite selection even outside of Zabbix, with the `openssl` command. Let's test all three `TLSCipher*` parameter values:

```

$ openssl ciphers EECDH+aRSA+AES128 | sed 's/:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-RSA-AES128-GCM-SHA256 E
$ openssl ciphers kECDHEPSK+AES128 | sed 's/:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-PSK-AES128-CBC-SHA256 E
$ openssl ciphers EECDH+aRSA+AES128:kECDHEPSK+AES128 | sed 's/:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-RSA-AES128-GCM-SHA256 E

```

You may prefer `openssl ciphers` with option `-V` for a more verbose output:

```

$ openssl ciphers -V EECDH+aRSA+AES128:kECDHEPSK+AES128
0x13,0x02 - TLS_AES_256_GCM_SHA384 TLSv1.3 Kx=any Au=any Enc=AESGCM(256) Mac=AEAD
0x13,0x03 - TLS_CHACHA20_POLY1305_SHA256 TLSv1.3 Kx=any Au=any Enc=CHACHA20/POLY1305(256) Mac=AEAD
0x13,0x01 - TLS_AES_128_GCM_SHA256 TLSv1.3 Kx=any Au=any Enc=AESGCM(128) Mac=AEAD
0xC0,0x2F - ECDHE-RSA-AES128-GCM-SHA256 TLSv1.2 Kx=ECDH Au=RSA Enc=AESGCM(128) Mac=AEAD

```

```

0xC0,0x27 - ECDHE-RSA-AES128-SHA256 TLSv1.2 Kx=ECDH Au=RSA Enc=AES(128) Mac=SHA256
0xC0,0x13 - ECDHE-RSA-AES128-SHA TLSv1 Kx=ECDH Au=RSA Enc=AES(128) Mac=SHA1
0xC0,0x37 - ECDHE-PSK-AES128-CBC-SHA256 TLSv1 Kx=ECDHEPSK Au=PSK Enc=AES(128) Mac=SHA256
0xC0,0x35 - ECDHE-PSK-AES128-CBC-SHA TLSv1 Kx=ECDHEPSK Au=PSK Enc=AES(128) Mac=SHA1

```

Similarly, you can test the priority strings for GnuTLS:

```

$ gnutls-cli -l --priority=NONE:+VERS-TLS1.2:+ECDHE-RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+CURVE-ALL:+COMP-ALL
Cipher suites for NONE:+VERS-TLS1.2:+ECDHE-RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+CURVE-ALL:+COMP-ALL
TLS_ECDHE_RSA_AES_128_GCM_SHA256          0xc0, 0x2f      TLS1.2
TLS_ECDHE_RSA_AES_128_CBC_SHA256         0xc0, 0x27      TLS1.2

Protocols: VERS-TLS1.2
Ciphers: AES-128-GCM, AES-128-CBC
MACs: AEAD, SHA256
Key Exchange Algorithms: ECDHE-RSA
Groups: GROUP-SECP256R1, GROUP-SECP384R1, GROUP-SECP521R1, GROUP-X25519, GROUP-X448, GROUP-FFDHE2048, GROUP-FFDHE3072
PK-signatures: SIGN-RSA-SHA256, SIGN-RSA-PSS-SHA256, SIGN-RSA-PSS-RSAE-SHA256, SIGN-ECDSA-SHA256, SIGN-ECDSA-SHA384, SIGN-ECDSA-SHA512

```

Switching from AES128 to AES256

Zabbix uses AES128 as the built-in default for data. Let's assume you are using certificates and want to switch to AES256, on OpenSSL 1.1.1.

This can be achieved by adding the respective parameters in `zabbix_server.conf`:

```

TLSCAFile=/home/zabbix/ca.crt
TLSCertFile=/home/zabbix/server.crt
TLSKeyFile=/home/zabbix/server.key
TLSCipherCert13=TLS_AES_256_GCM_SHA384
TLSCipherCert=EECDH+aRSA+AES256:-SHA1:-SHA384
TLSCipherPSK13=TLS_CHACHA20_POLY1305_SHA256
TLSCipherPSK=kECDHEPSK+AES256:-SHA1
TLSCipherAll13=TLS_AES_256_GCM_SHA384
TLSCipherAll=EECDH+aRSA+AES256:-SHA1:-SHA384

```

#### Attention:

Although only certificate-related ciphersuites will be used, `TLSCipherPSK*` parameters are defined as well to avoid their default values which include less secure ciphers for wider interoperability. PSK ciphersuites cannot be completely disabled on server/proxy.

And in `zabbix_agentd.conf`:

```

TLSConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/ca.crt
TLSCertFile=/home/zabbix/agent.crt
TLSKeyFile=/home/zabbix/agent.key
TLSCipherCert13=TLS_AES_256_GCM_SHA384
TLSCipherCert=EECDH+aRSA+AES256:-SHA1:-SHA384

```

## 1 Using certificates

### Overview

Zabbix can use RSA certificates in PEM format, signed by a public or in-house certificate authority (CA). Certificate verification is done against a pre-configured CA certificate. Optionally certificate revocation lists (CRL) can be used. Each Zabbix component can have only one certificate configured.

For more information how to set up and operate internal CA, how to generate certificate requests and sign them, how to revoke certificates you can find numerous online how-tos, for example, [OpenSSL PKI Tutorial v1.1](#).

Carefully consider and test your certificate extensions - see [Limitations on using X.509 v3 certificate extensions](#).

Certificate configuration parameters

Parameter	Mandatory	Description
TLSCAFile	*	Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification. In case of certificate chain with several members they must be ordered: lower level CA certificates first followed by certificates of higher level CA(s). Certificates from multiple CA(s) can be included in a single file.
TLSCRLFile		Full pathname of a file containing Certificate Revocation Lists. See notes in <a href="#">Certificate Revocation Lists (CRL)</a> .
TLSCertFile	*	Full pathname of a file containing certificate (certificate chain). In case of certificate chain with several members they must be ordered: server, proxy, or agent certificate first, followed by lower level CA certificates then certificates of higher level CA(s).
TLSKeyFile	*	Full pathname of a file containing private key. Set access rights to this file - it must be readable only by Zabbix user.
TLSServerCertIssuer		Allowed server certificate issuer.
TLSServerCertSubject		Allowed server certificate subject.

#### Configuring certificate on Zabbix server

1. In order to verify peer certificates, Zabbix server must have access to file with their top-level self-signed root CA certificates. For example, if we expect certificates from two independent root CAs, we can put their certificates into file `/home/zabbix/zabbix_ca_file` like this:

Certificate:

Data:

Version: 3 (0x2)

Serial Number: 1 (0x1)

Signature Algorithm: sha1WithRSAEncryption

Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA

...

Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA

Subject Public Key Info:

Public Key Algorithm: rsaEncryption

Public-Key: (2048 bit)

...

X509v3 extensions:

X509v3 Key Usage: critical

Certificate Sign, CRL Sign

X509v3 Basic Constraints: critical

CA:TRUE

...

-----BEGIN CERTIFICATE-----

MIID2jCCAsKgAwIBAgIBATANBgkqhkiG9w0BAQUFADB+MRMwEQYKZCImiZPyLGQB

....

9wEzdN8uTrqoyU78gi12npLj08LegRKjb5hFTVm0

-----END CERTIFICATE-----

Certificate:

Data:

Version: 3 (0x2)

Serial Number: 1 (0x1)

Signature Algorithm: sha1WithRSAEncryption

Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root2 CA

...

Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root2 CA

```
Subject Public Key Info:
  Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    ....
X509v3 extensions:
  X509v3 Key Usage: critical
    Certificate Sign, CRL Sign
  X509v3 Basic Constraints: critical
    CA:TRUE
    ....
```

```
-----BEGIN CERTIFICATE-----
MIID3DCCAsSgAwIBAgIBATANBgkqhkiG9w0BAQUFADB/MRMwEQYKCZImiZPyLQGQ
...
vdGNYoSfVvu41GQAR5Vj5FnRJRzv5XQOZ3B6894GY1zY=
-----END CERTIFICATE-----
```

2. Put Zabbix server certificate chain into file, for example, /home/zabbix/zabbix\_server.crt:

Certificate:

```
Data:
  Version: 3 (0x2)
  Serial Number: 1 (0x1)
Signature Algorithm: sha1WithRSAEncryption
  Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
  ...
  Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Zabbix server
Subject Public Key Info:
  Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    ...
X509v3 extensions:
  X509v3 Key Usage: critical
    Digital Signature, Key Encipherment
  X509v3 Basic Constraints:
    CA:FALSE
    ...
```

```
-----BEGIN CERTIFICATE-----
MIIECDCCAvCgAwIBAgIBATANBgkqhkiG9w0BAQUFADCBGTETMBEGCgmSJomT8ixk
...
h02u1GHiy46GI+xfr3LsPwFKlkTaaLaL/6aaoQ==
-----END CERTIFICATE-----
```

Certificate:

```
Data:
  Version: 3 (0x2)
  Serial Number: 2 (0x2)
Signature Algorithm: sha1WithRSAEncryption
  Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA
  ...
  Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
Subject Public Key Info:
  Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    ...
X509v3 extensions:
  X509v3 Key Usage: critical
    Certificate Sign, CRL Sign
  X509v3 Basic Constraints: critical
    CA:TRUE, pathlen:0
    ...
```

```
-----BEGIN CERTIFICATE-----
MIID4TCCAsmgAwIBAgIBAJANBgkqhkiG9w0BAQUFADB+MRMwEQYKCZImiZPyLQGQ
...
dyCeWnvL7u5sd6ffo8iRny0QzbhKmqT/wUtvIvWXdMIFJMOHw==
-----END CERTIFICATE-----
```

Here the first is Zabbix server certificate, followed by intermediate CA certificate.

3. Put Zabbix server private key into file, for example, /home/zabbix/zabbix\_server.key:

```
-----BEGIN PRIVATE KEY-----
MIIEWAIBADANBgkqhkiG9w0BAQEFAASCCKowggSmAgEAAoIBAQC9tIXIJoVnNXDl
...
IJLkhbybBYEf47MLhffWa7XvZTY=
-----END PRIVATE KEY-----
```

4. Edit TLS parameters in Zabbix server configuration file like this:

```
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSCertFile=/home/zabbix/zabbix_server.crt
TLSKeyFile=/home/zabbix/zabbix_server.key
```

Configuring certificate-based encryption for Zabbix proxy

1. Prepare files with top-level CA certificates, proxy certificate (chain) and private key as described in [Configuring certificate on Zabbix server](#). Edit parameters TLSCAFile, TLSCertFile, TLSKeyFile in proxy configuration accordingly.

2. For active proxy edit TLSConnect parameter:

```
TLSConnect=cert
```

For passive proxy edit TLSAccept parameter:

```
TLSAccept=cert
```

3. Now you have a minimal certificate-based proxy configuration. You may prefer to improve proxy security by setting TLSServerCertIssuer and TLSServerCertSubject parameters (see [Restricting allowed certificate Issuer and Subject](#)).

4. In final proxy configuration file TLS parameters may look like:

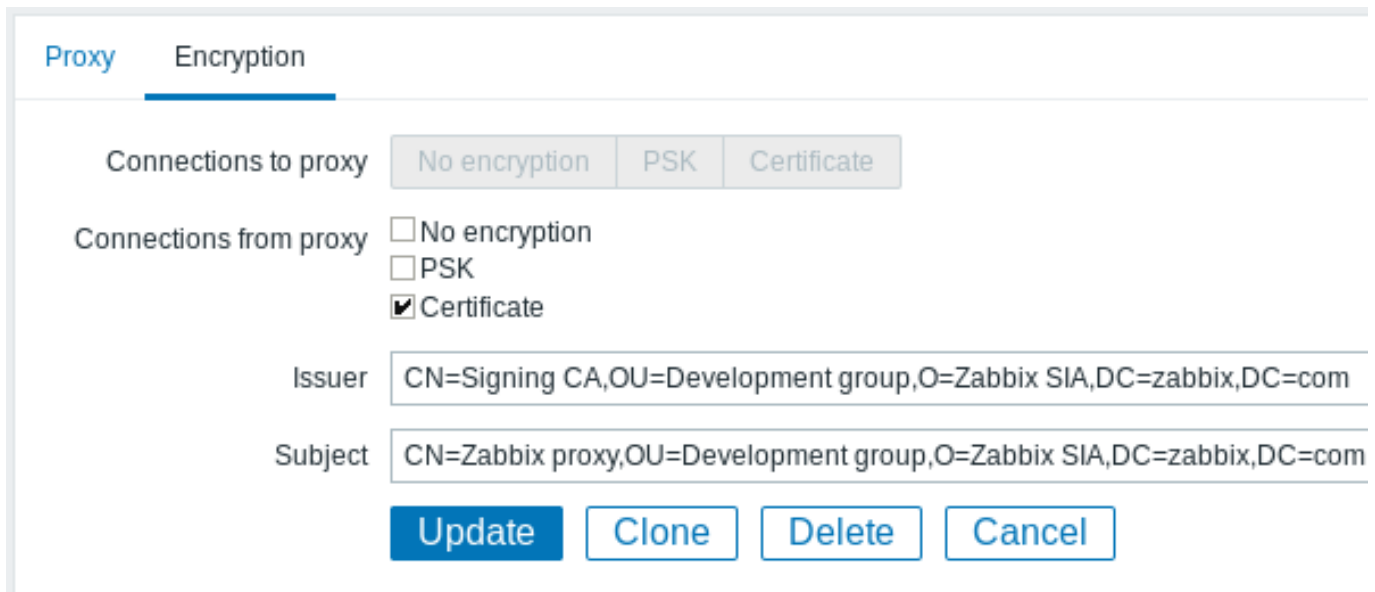
```
TLSConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix server,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSCertFile=/home/zabbix/zabbix_proxy.crt
TLSKeyFile=/home/zabbix/zabbix_proxy.key
```

5. Configure encryption for this proxy in Zabbix frontend:

- Go to: Administration → Proxies
- Select proxy and click on **Encryption** tab

In examples below Issuer and Subject fields are filled in - see [Restricting allowed certificate Issuer and Subject](#) why and how to use these fields.

For active proxy



For passive proxy

Proxy Encryption

Connections to proxy: No encryption | PSK | **Certificate**

Connections from proxy:  No encryption  
 PSK  
 Certificate

Issuer: CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Subject: CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

**Update** Clone Delete Cancel

Configuring certificate-based encryption for Zabbix agent

1. Prepare files with top-level CA certificates, agent certificate (chain) and private key as described in [Configuring certificate on Zabbix server](#). Edit parameters `TLSCAFile`, `TLSCertFile`, `TLSKeyFile` in agent configuration accordingly.

2. For active checks edit `TLSConnect` parameter:

```
TLSCConnect=cert
```

For passive checks edit `TLSAccept` parameter:

```
TLSAccept=cert
```

3. Now you have a minimal certificate-based agent configuration. You may prefer to improve agent security by setting `TLSServerCertIssuer` and `TLSServerCertSubject` parameters. (see [Restricting allowed certificate Issuer and Subject](#)).

4. In final agent configuration file TLS parameters may look like:

```
TLSCConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSCertFile=/home/zabbix/zabbix_agentd.crt
TLSKeyFile=/home/zabbix/zabbix_agentd.key
```

(Example assumes that host is monitored via proxy, hence proxy certificate Subject.)

5. Configure encryption for this agent in Zabbix frontend:

- Go to: Configuration → Hosts
- Select host and click on **Encryption** tab

In example below Issuer and Subject fields are filled in - see [Restricting allowed certificate Issuer and Subject](#) why and how to use these fields.

Host   Templates   IPMI   Macros   Host inventory   **Encryption**

Connections to host   No encryption   PSK   **Certificate**

Connections from host    No encryption  
 PSK  
 Certificate

Issuer   CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Subject   CN=www01,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

**Update**   Clone   Full clone   Delete   Cancel

### Restricting allowed certificate Issuer and Subject

When two Zabbix components (e.g. server and agent) establish a TLS connection they both check each others certificates. If a peer certificate is signed by a trusted CA (with pre-configured top-level certificate in `TLSCAFile`), is valid, has not expired and passes some other checks then communication can proceed. Certificate issuer and subject are not checked in this simplest case.

Here is a risk - anybody with a valid certificate can impersonate anybody else (e.g. a host certificate can be used to impersonate server). This may be acceptable in small environments where certificates are signed by a dedicated in-house CA and risk of impersonating is low.

If your top-level CA is used for issuing other certificates which should not be accepted by Zabbix or you want to reduce risk of impersonating you can restrict allowed certificates by specifying their Issuer and Subject strings.

For example, you can write in Zabbix proxy configuration file:

```
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix server,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
```

With these settings, an active proxy will not talk to Zabbix server with different Issuer or Subject string in certificate, a passive proxy will not accept requests from such server.

A few notes about Issuer or Subject string matching:

1. Issuer and Subject strings are checked independently. Both are optional.
2. UTF-8 characters are allowed.
3. Unspecified string means any string is accepted.
4. Strings are compared "as-is", they must be exactly the same to match.
5. Wildcards and regexp's are not supported in matching.
6. Only some requirements from [RFC 4514 Lightweight Directory Access Protocol \(LDAP\): String Representation of Distinguished Names](http://tools.ietf.org/html/rfc4514) are implemented:
  - escape characters `'\"'` (U+0022), `'+' U+002B`, `'\,' U+002C`, `';' U+003B`, `'<' U+003C`, `'>' U+003E`, `'\ ' U+0020`
  - escape characters space (`' ' U+0020`) or number sign (`'#' U+0023`) at the beginning of string.
  - escape character space (`' ' U+0020`) at the end of string.
- Match fails if a null character (U+0000) is encountered ([\[\[http://tools.ietf.org/html/rfc4514|RFC 4514\]\]](http://tools.ietf.org/html/rfc4514))
- Requirements of [\[\[http://tools.ietf.org/html/rfc4517| RFC 4517 Lightweight Directory Access Protocol \(LD](http://tools.ietf.org/html/rfc4517)

Order of fields in Issuer and Subject strings and formatting are important! Zabbix follows [RFC 4514](http://tools.ietf.org/html/rfc4514) recommendation and uses "reverse" order of fields.

The reverse order can be illustrated by example:

```
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
```

Note that it starts with low level (CN), proceeds to mid-level (OU, O) and ends with top-level (DC) fields.

OpenSSL by default shows certificate Issuer and Subject fields in "normal" order, depending on additional options used:

```
$ openssl x509 -noout -in /home/zabbix/zabbix_proxy.crt -issuer -subject
issuer= /DC=com/DC=zabbix/O=Zabbix SIA/OU=Development group/CN=Signing CA
```

```
subject= /DC=com/DC=zabbix/O=Zabbix SIA/OU=Development group/CN=Zabbix proxy
```

```
$ openssl x509 -noout -text -in /home/zabbix/zabbix_proxy.crt
```

Certificate:

```
...
    Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
...
    Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Zabbix proxy
```

Here Issuer and Subject strings start with top-level (DC) and end with low-level (CN) field, spaces and field separators depend on options used. None of these values will match in Zabbix Issuer and Subject fields!

**Attention:**

To get proper Issuer and Subject strings usable in Zabbix invoke OpenSSL with special options  
-nameopt esc\_2253,esc\_ctrl,utf8,dump\_nostr,dump\_unknown,dump\_der,sep\_comma\_plus,dn\_rev,sname:

```
$ openssl x509 -noout -issuer -subject \  
-nameopt esc_2253,esc_ctrl,utf8,dump_nostr,dump_unknown,dump_der,sep_comma_plus,dn_rev,sname \  
-in /home/zabbix/zabbix_proxy.crt  
issuer= CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com  
subject= CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
```

Now string fields are in reverse order, fields are comma-separated, can be used in Zabbix configuration files and frontend.

Limitations on using X.509 v3 certificate extensions

- **Subject Alternative Name (subjectAltName)** extension.  
Alternative subject names from subjectAltName extension (like IP address, e-mail address) are not supported by Zabbix. Only value of "Subject" field can be checked in Zabbix (see **Restricting allowed certificate Issuer and Subject**).  
If certificate uses the subjectAltName extension then result depends on particular combination of crypto toolkits Zabbix components are compiled with (it may or may not work, Zabbix may refuse to accept such certificates from peers).
- **Extended Key Usage** extension.  
If used then generally both clientAuth (TLS WWW client authentication) and serverAuth (TLS WWW server authentication) are necessary.  
For example, in passive checks Zabbix agent acts in a TLS server role, so serverAuth must be set in agent certificate. For active checks agent certificate needs clientAuth to be set.  
GnuTLS issues a warning in case of key usage violation but allows communication to proceed.
- **Name Constraints** extension.  
Not all crypto toolkits support it. This extension may prevent Zabbix from loading CA certificates where this section is marked as critical (depends on particular crypto toolkit).

Certificate Revocation Lists (CRL)

If a certificate is compromised CA can revoke it by including in CRL. CRLs can be configured in server, proxy and agent configuration file using parameter TLSCRLFile. For example:

```
TLSCRLFile=/home/zabbix/zabbix_crl_file
```

where zabbix\_crl\_file may contain CRLs from several CAs and look like:

```
-----BEGIN X509 CRL-----  
MIIB/DCB5QIBATANBgkqhkiG9w0BAQUFADCBgTETMBEGCgmSJomT8ixkARkWA2Nv  
...  
treZeUPjb7LSmZ3K2hpbZN7So0ZcAoHQ3GWd9npuctg=  
-----END X509 CRL-----  
-----BEGIN X509 CRL-----  
MIIB+TCB4gIBATANBgkqhkiG9w0BAQUFADB/MRMwEQYKCZImiZPyLGGQBG9YDY29t  
...  
CAEebS2CND3ShBedZ8YSi15906JvaDP611R51Ns=  
-----END X509 CRL-----
```

CRL file is loaded only on Zabbix start. CRL update requires restart.

**Attention:**

If Zabbix component is compiled with OpenSSL and CRLs are used then each top and intermediate level CA in certificate chains must have a corresponding CRL (it can be empty) in TLSCRLFile.



## 2 Using pre-shared keys

### Overview

Each pre-shared key (PSK) in Zabbix actually is a pair of:

- non-secret PSK identity string,
- secret PSK string value.

PSK identity string is a non-empty UTF-8 string. For example, "PSK ID 001 Zabbix agentd". It is a unique name by which this specific PSK is referred to by Zabbix components. Do not put sensitive information in PSK identity string - it is transmitted over the network unencrypted.

PSK value is a hard to guess string of hexadecimal digits, for example, "e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327b".

### Size limits

There are size limits for PSK identity and value in Zabbix, in some cases a crypto library can have lower limit:

Component	PSK identity max size	PSK value min size	PSK value max size
Zabbix	128 UTF-8 characters	128-bit (16-byte PSK, entered as 32 hexadecimal digits)	2048-bit (256-byte PSK, entered as 512 hexadecimal digits)
GnuTLS	128 bytes (may include UTF-8 characters)	-	2048-bit (256-byte PSK, entered as 512 hexadecimal digits)
OpenSSL 1.0.x, 1.1.0	127 bytes (may include UTF-8 characters)	-	2048-bit (256-byte PSK, entered as 512 hexadecimal digits)
OpenSSL 1.1.1	127 bytes (may include UTF-8 characters)	-	512-bit (64-byte PSK, entered as 128 hexadecimal digits)
OpenSSL 1.1.1a and later	127 bytes (may include UTF-8 characters)	-	2048-bit (256-byte PSK, entered as 512 hexadecimal digits)

#### Attention:

Zabbix frontend allows configuring up to 128-character long PSK identity string and 2048-bit long PSK regardless of crypto libraries used.

If some Zabbix components support lower limits, it is the user's responsibility to configure PSK identity and value with allowed length for these components.

Exceeding length limits results in communication failures between Zabbix components.

Before Zabbix server connects to agent using PSK, the server looks up the PSK identity and PSK value configured for that agent in database (actually in configuration cache). Upon receiving a connection the agent uses PSK identity and PSK value from its configuration file. If both parties have the same PSK identity string and PSK value the connection may succeed.

#### Attention:

Each PSK identity must be paired with only one value. It is the user's responsibility to ensure that there are no two PSKs with the same identity string but different values. Failing to do so may lead to unpredictable disruptions of communication between Zabbix components using PSKs with this PSK identity string.

### Generating PSK

For example, a 256-bit (32 bytes) PSK can be generated using the following commands:

- with OpenSSL:

```
$ openssl rand -hex 32
af8ced32dfe8714e548694e2d29e1a14ba6fa13f216cb35c19d0feb1084b0429
```

- with GnuTLS:

```
$ psktool -u psk_identity -p database.psk -s 32
Generating a random key for user 'psk_identity'
```

Key stored to database.psk

```
$ cat database.psk  
psk_identity:9b8eafedfaae00cece62e85d5f4792c7d9c9bcc851b23216a1d300311cc4f7cb
```

Note that "psktool" above generates a database file with a PSK identity and its associated PSK. Zabbix expects just a PSK in the PSK file, so the identity string and colon (':') should be removed from the file.

Configuring PSK for server-agent communication (example)

On the agent host, write the PSK value into a file, for example, /home/zabbix/zabbix\_agentd.psk. The file must contain PSK in the first text string, for example:

```
1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952
```

Set access rights to PSK file - it must be readable only by Zabbix user.

Edit TLS parameters in agent configuration file zabbix\_agentd.conf, for example, set:

```
TLSConnect=psk  
TLSAccept=psk  
TLSPSKFile=/home/zabbix/zabbix_agentd.psk  
TLSPSKIdentity=PSK 001
```

The agent will connect to server (active checks) and accept from server and zabbix\_get only connections using PSK. PSK identity will be "PSK 001".

Restart the agent. Now you can test the connection using zabbix\_get, for example:

```
$ zabbix_get -s 127.0.0.1 -k "system.cpu.load[all,avg1]" --tls-connect=psk \  
--tls-psk-identity="PSK 001" --tls-psk-file=/home/zabbix/zabbix_agentd.psk
```

(To minimize downtime see how to change connection type in [Connection encryption management](#)).

Configure PSK encryption for this agent in Zabbix frontend:

- Go to: Configuration → Hosts
- Select host and click on **Encryption** tab

Example:

The screenshot shows the 'Encryption' tab in the Zabbix frontend. It features a navigation bar with tabs for 'Host', 'Templates', 'IPMI', 'Macros', 'Host inventory', and 'Encryption'. Below the navigation bar, there are three radio buttons for 'Connections to host': 'No encryption', 'PSK' (which is selected), and 'Certificate'. Underneath, there are three checkboxes for 'Connections from host': 'No encryption', 'PSK' (which is checked), and 'Certificate'. There are two mandatory input fields, each marked with a red asterisk: '\* PSK identity' with the value 'PSK 001' and '\* PSK' with the value '1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952'. At the bottom, there are five buttons: 'Update', 'Clone', 'Full clone', 'Delete', and 'Cancel'.

All mandatory input fields are marked with a red asterisk.

When configuration cache is synchronized with database the new connections will use PSK. Check server and agent logfiles for error messages.

Configuring PSK for server - active proxy communication (example)

On the proxy, write the PSK value into a file, for example, /home/zabbix/zabbix\_proxy.psk. The file must contain PSK in the first text string, for example:

```
e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327ba434e9
```

Set access rights to PSK file - it must be readable only by Zabbix user.

Edit TLS parameters in proxy configuration file `zabbix_proxy.conf`, for example, set:

```
TLSCConnect=psk
TLSPSKFile=/home/zabbix/zabbix_proxy.psk
TLSPSKIdentity=PSK 002
```

The proxy will connect to server using PSK. PSK identity will be "PSK 002".

(To minimize downtime see how to change connection type in [Connection encryption management](#)).

Configure PSK for this proxy in Zabbix frontend. Go to Administration→Proxies, select the proxy, go to "Encryption" tab. In "Connections from proxy" mark PSK. Paste into "PSK identity" field "PSK 002" and "e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d083" into "PSK" field. Click "Update".

Restart proxy. It will start using PSK-based encrypted connections to server. Check server and proxy logfiles for error messages.

For a passive proxy the procedure is very similar. The only difference - set `TLSAccept=psk` in proxy configuration file and set "Connections to proxy" in Zabbix frontend to PSK.

### 3 Troubleshooting

#### General recommendations

- Start with understanding which component acts as a TLS client and which one acts as a TLS server in problem case. Zabbix server, proxies and agents, depending on interaction between them, all can work as TLS servers and clients. For example, Zabbix server connecting to agent for a passive check, acts as a TLS client. The agent is in role of TLS server. Zabbix agent, requesting a list of active checks from proxy, acts as a TLS client. The proxy is in role of TLS server. `zabbix_get` and `zabbix_sender` utilities always act as TLS clients.
- Zabbix uses mutual authentication. Each side verifies its peer and may refuse connection. For example, Zabbix server connecting to agent can close connection immediately if agent's certificate is invalid. And vice versa - Zabbix agent accepting a connection from server can close connection if server is not trusted by agent.
- Examine logfiles in both sides - in TLS client and TLS server. The side which refuses connection may log a precise reason why it was refused. Other side often reports rather general error (e.g. "Connection closed by peer", "connection was non-properly terminated").
- Sometimes misconfigured encryption results in confusing error messages in no way pointing to real cause. In subsections below we try to provide a (far from exhaustive) collection of messages and possible causes which could help in troubleshooting. Please note that different crypto toolkits (OpenSSL, GnuTLS) often produce different error messages in same problem situations. Sometimes error messages depend even on particular combination of crypto toolkits on both sides.

#### 1 Connection type or permission problems

Server is configured to connect with PSK to agent but agent accepts only unencrypted connections

In server or proxy log (with GnuTLS 3.3.16)

```
Get value from agent failed: zbx_tls_connect(): gnutls_handshake() failed: \
-110 The TLS connection was non-properly terminated.
```

In server or proxy log (with OpenSSL 1.0.2c)

```
Get value from agent failed: TCP connection successful, cannot establish TLS to [[127.0.0.1]:10050]: \
Connection closed by peer. Check allowed connection types and access rights
```

One side connects with certificate but other side accepts only PSK or vice versa

In any log (with GnuTLS):

```
failed to accept an incoming connection: from 127.0.0.1: zbx_tls_accept(): gnutls_handshake() failed:\
-21 Could not negotiate a supported cipher suite.
```

In any log (with OpenSSL 1.0.2c):

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake returned error code 1:\
  file .\ssl\s3_srvr.c line 1411: error:1408A0C1:SSL routines:ssl3_get_client_hello:no shared cipher:\
  TLS write fatal alert "handshake failure"
```

Attempting to use Zabbix sender compiled with TLS support to send data to Zabbix server/proxy compiled without TLS

In connecting-side log:

Linux:

```
...In zbx_tls_init_child()
...OpenSSL library (version OpenSSL 1.1.1 11 Sep 2018) initialized
...
...In zbx_tls_connect(): psk_identity:"PSK test sender"
...End of zbx_tls_connect():FAIL error:'connection closed by peer'
...send value error: TCP successful, cannot establish TLS to [[localhost]:10051]: connection closed by peer
```

Windows:

```
...OpenSSL library (version OpenSSL 1.1.1a 20 Nov 2018) initialized
...
...In zbx_tls_connect(): psk_identity:"PSK test sender"
...zbx_psk_client_cb() requested PSK identity "PSK test sender"
...End of zbx_tls_connect():FAIL error:'SSL_connect() I/O error: [0x00000000] The operation completed successfully'
...send value error: TCP successful, cannot establish TLS to [[192.168.1.2]:10051]: SSL_connect() I/O error: [0] Success
```

In accepting-side log:

```
...failed to accept an incoming connection: from 127.0.0.1: support for TLS was not compiled in
One side connects with PSK but other side uses LibreSSL or has been compiled without encryption support
LibreSSL does not support PSK.
```

In connecting-side log:

```
...TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect() I/O error: [0] Success
```

In accepting-side log:

```
...failed to accept an incoming connection: from 192.168.1.2: support for PSK was not compiled in
```

In Zabbix frontend:

```
Get value from agent failed: TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect()
One side connects with PSK but other side uses OpenSSL with PSK support disabled
```

In connecting-side log:

```
...TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect() set result code to SSL_ERROR_SSL
```

In accepting-side log:

```
...failed to accept an incoming connection: from 192.168.1.2: TLS handshake set result code to 1: file ssl
```

## 2 Certificate problems

OpenSSL used with CRLs and for some CA in the certificate chain its CRL is not included in TLSCRLFile

In TLS server log in case of OpenSSL peer:

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake with 127.0.0.1 returned error code
  file s3_srvr.c line 3251: error:14089086: SSL routines:ssl3_get_client_certificate:certificate verify
  TLS write fatal alert "unknown CA"
```

In TLS server log in case of GnuTLS peer:

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake with 127.0.0.1 returned error code
  file rsa_pk1.c line 103: error:0407006A: rsa routines:RSA_padding_check_PKCS1_type_1:\
  block type is not 01 file rsa_eay.c line 705: error:04067072: rsa routines:RSA_EAY_PUBLIC_DECRYPT:padding
```

CRL expired or expires during server operation

OpenSSL, in server log:

- before expiration:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004
SSL_connect() returned SSL_ERROR_SSL: file s3_clnt.c line 1253: error:14090086:\
SSL routines:ssl3_get_server_certificate:certificate verify failed:\
TLS write fatal alert "certificate revoked"
```

- after expiration:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004
SSL_connect() returned SSL_ERROR_SSL: file s3_clnt.c line 1253: error:14090086:\
SSL routines:ssl3_get_server_certificate:certificate verify failed:\
TLS write fatal alert "certificate expired"
```

The point here is that with valid CRL a revoked certificate is reported as "certificate revoked". When CRL expires the error message changes to "certificate expired" which is quite misleading.

GnuTLS, in server log:

- before and after expiration the same:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004
invalid peer certificate: The certificate is NOT trusted. The certificate chain is revoked.
```

Self-signed certificate, unknown CA

OpenSSL, in log:

```
error:'self signed certificate: SSL_connect() set result code to SSL_ERROR_SSL: file ../ssl/statem/statem_
line 1924: error:1416F086:SSL routines:tls_process_server_certificate:certificate verify failed:\
TLS write fatal alert "unknown CA"'
```

This was observed when server certificate by mistake had the same Issuer and Subject string, although it was signed by CA. Issuer and Subject are equal in top-level CA certificate, but they cannot be equal in server certificate. (The same applies to proxy and agent certificates.)

### 3 PSK problems

PSK contains an odd number of hex-digits

Proxy or agent does not start, message in the proxy or agent log:

```
invalid PSK in file "/home/zabbix/zabbix_proxy.psk"
```

PSK identity string longer than 128 bytes is passed to GnuTLS

In TLS client side log:

```
gnutls_handshake() failed: -110 The TLS connection was non-properly terminated.
```

In TLS server side log.

```
gnutls_handshake() failed: -90 The SRP username supplied is illegal.
```

Too long PSK value used with OpenSSL 1.1.1

In connecting-side log:

```
...OpenSSL library (version OpenSSL 1.1.1 11 Sep 2018) initialized
...
...In zbx_tls_connect(): psk_identity:"PSK 1"
...zbx_psk_client_cb() requested PSK identity "PSK 1"
...End of zbx_tls_connect():FAIL error:'SSL_connect() set result code to SSL_ERROR_SSL: file ssl\statem\ex
```

In accepting-side log:

```
...Message from 123.123.123.123 is missing header. Message ignored.
```

This problem typically arises when upgrading OpenSSL from 1.0.x or 1.1.0 to 1.1.1 and if the PSK value is longer than 512-bit (64-byte PSK, entered as 128 hexadecimal digits).

See also: [Value size limits](#)

## 18. Web interface

**Overview** For an easy access to Zabbix from anywhere and from any platform, the web-based interface is provided.

**Note:**

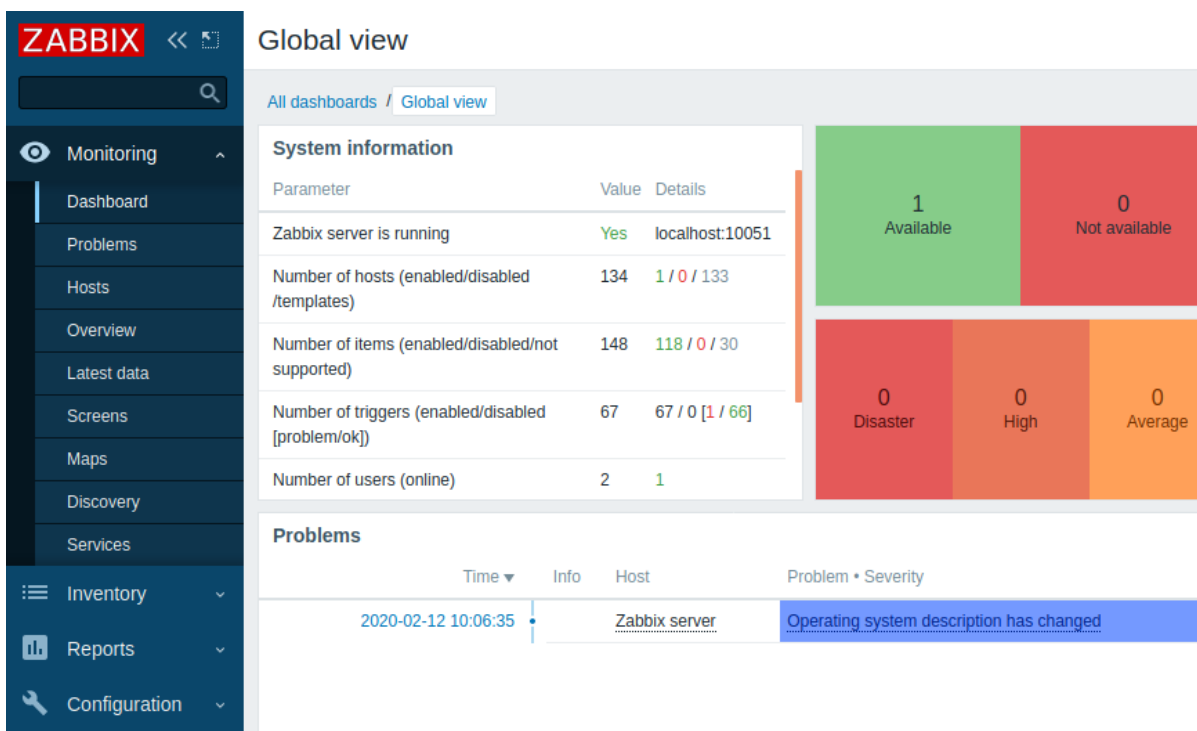
If using more than one frontend instance make sure that the locales and libraries (LDAP, SAML etc.) are installed and configured identically for all frontends.

### 1 Menu

Overview

A vertical menu in a sidebar provides access to various Zabbix frontend sections.

The menu is dark blue in the default theme.

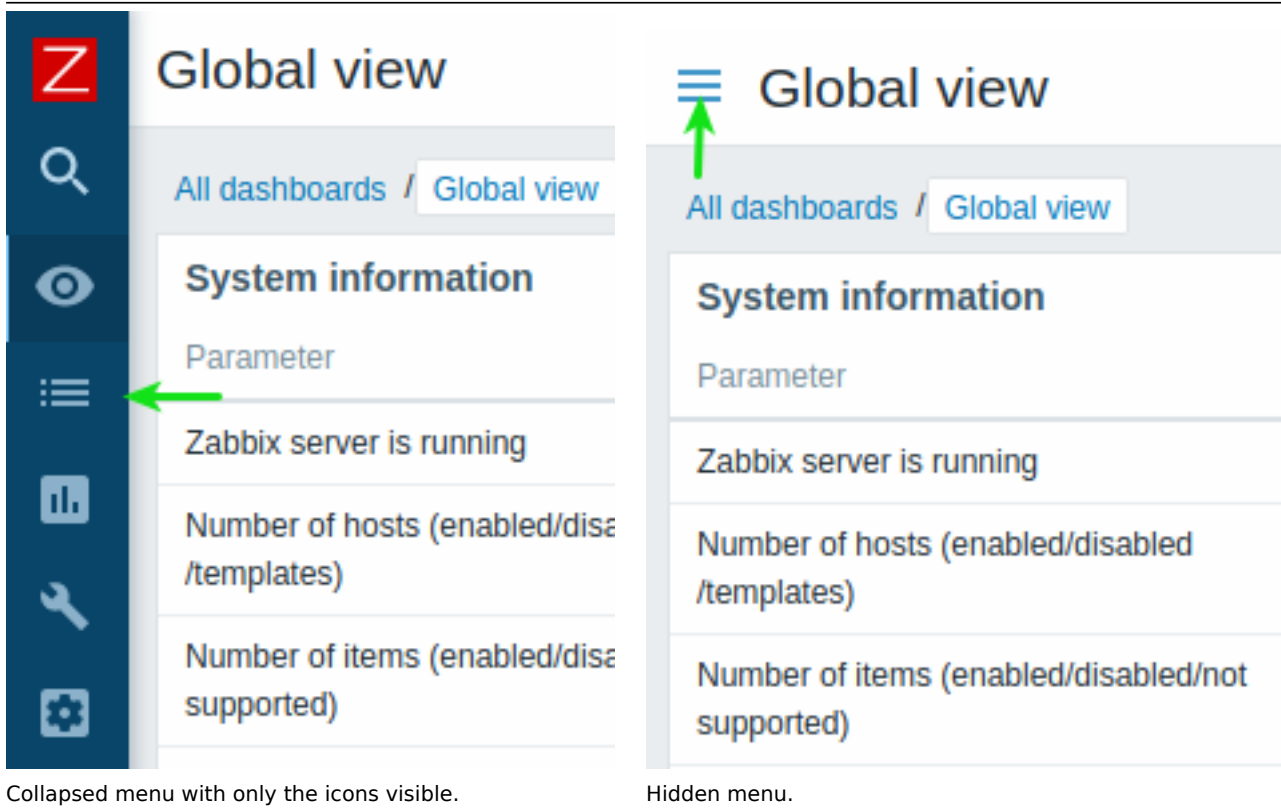


Working with the menu

A **global search** box is located below the Zabbix logo.

The menu can be collapsed or hidden completely:

- To collapse, click on  next to Zabbix logo
- To hide, click on  next to Zabbix logo



### Collapsed menu

When the menu is collapsed to icons only, a full menu reappears as soon as the mouse cursor is placed upon it. Note that it reappears over page content; to move page content to the right you have to click on the expand button. If the mouse cursor again is placed outside the full menu, the menu will collapse again after two seconds.

You can also make a collapsed menu reappear fully by hitting the Tab key. Hitting the Tab key repeatedly will allow to focus on the next menu element.

### Hidden menu

Even when the menu is hidden completely, a full menu is just one mouse click away, by clicking on the burger icon. Note that it reappears over page content; to move page content to the right you have to unhide the menu by clicking on the show sidebar button.

## 2 Frontend sections

### 1 Monitoring

#### Overview

The Monitoring menu is all about displaying data. Whatever information Zabbix is configured to gather, visualize and act upon, it will be displayed in the various sections of the Monitoring menu.

#### View mode buttons

The following buttons located in the top right corner are common for every section:



Display page in kiosk mode. In this mode only page content is displayed.



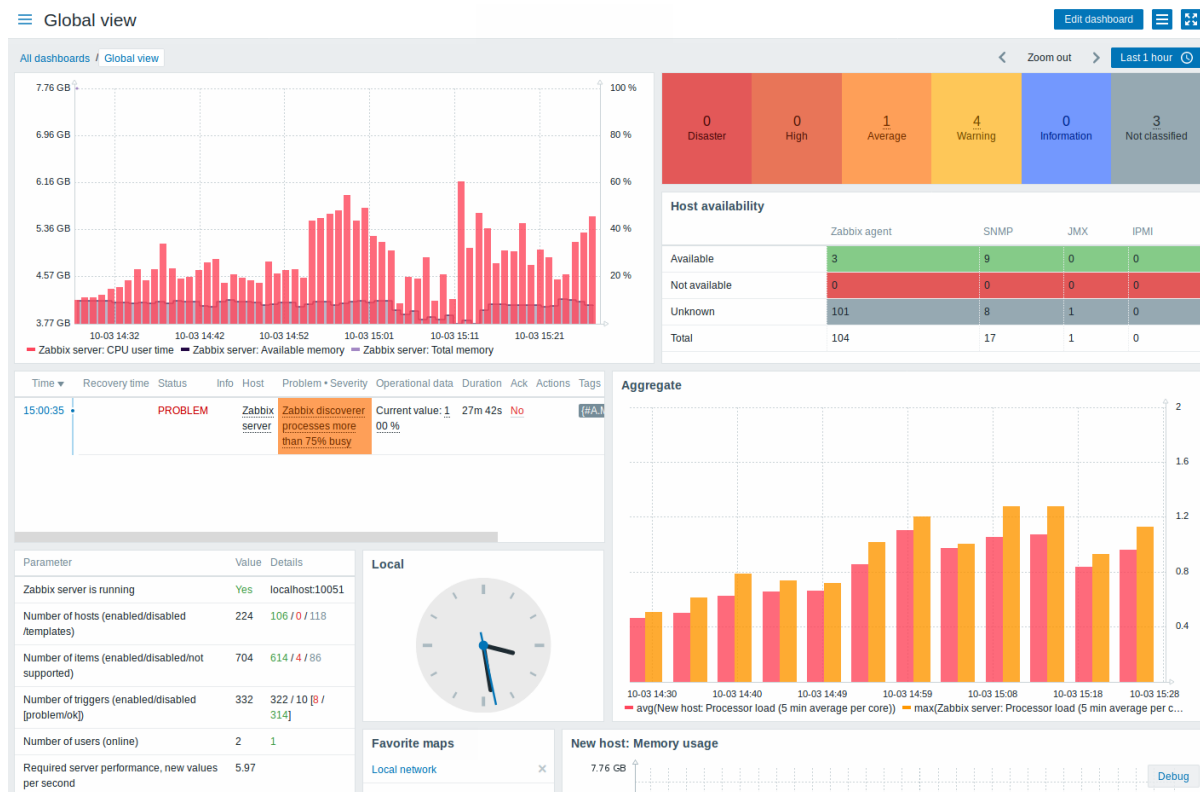
To exit kiosk mode, move the mouse cursor until the exit button appears and click on it. Note that you will be taken back to normal mode (not fullscreen mode).

## 1 Dashboard

### Overview

The Monitoring → Dashboard section is designed to display summaries of all the important information.

A dashboard consists of widgets and each widget is designed to display information of a certain kind and source, which can be a summary, a map, a graph, the clock, etc.



Widgets are added and edited in the dashboard editing mode. Widgets are viewed in the dashboard viewing mode.

While in a single dashboard you can group widgets from various sources for a quick overview, it is also possible to create several dashboards containing different sets of overviews and switch between them.

The time period that is displayed in graph widgets is controlled by the **time period selector** located above the widgets. The time period selector label, located to the right, displays the currently selected time period. Clicking the tab label allows to expand and collapse the time period selector.

Note that when the dashboard is displayed in kiosk mode and widgets only are displayed, it is possible to zoom out the graph period by double clicking in the graph.

### Viewing dashboards

To access all configured dashboards, click on the All dashboards link just below the section title.

## Global view

All dashboards / Global view



<input type="checkbox"/> Name ▲	
<input type="checkbox"/> Apache Info	My Shared
<input type="checkbox"/> Global view	
<input type="checkbox"/> HyperV (John's custom)	My
<input type="checkbox"/> Problems (quick view)	My
<input type="checkbox"/> Server	
<input type="checkbox"/> Zabbix server health	My Shared

A tag My at the right indicates that this dashboard was created by the current user. If a dashboard is public or is privately shared with any user or user group - a tag "Shared" next to the dashboard name will indicate that.

To see only your dashboards, in the filter located above the dashboard list, select Created by me mode:

To display a full list of dashboards again, select All in the filter.

To find specific dashboard(s) in the list, enter a name or part of the name into the Name filter field and press Apply.

To view a single dashboard, click on its name in the list of all dashboards.

To delete one or several dashboards, mark the checkboxes of the respective dashboards and click on Delete below the list.

### Creating a dashboard

When viewing all dashboards, you can click on the Create dashboard button to create a new dashboard:

Initially the dashboard is empty. To populate the dashboard, you can add widgets.

Click on the Save changes button to save the dashboard. If you click on Cancel, the dashboard will not be created.

### Adding widgets

To add a widget to a dashboard:

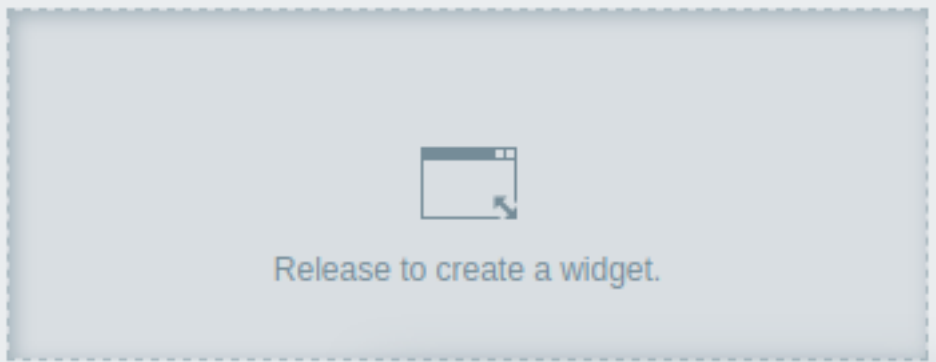
- Click on the Add widget button in dashboard editing mode. The widget will be created in its default size and placed after the existing widgets (if any);

Or

- Move your mouse to the desired empty spot for the new widget. Notice how a placeholder appears, on mouseover, on any empty slot on the dashboard. Then click to open the widget configuration form. After filling the form the widget will be created in its default size or take up all the available space if its default size is bigger. Alternatively you may click and drag the placeholder to the desired widget size, then release. (When releasing you may need to click on Add widget if the Paste widget from a copied widget option is also available.)



Click and drag  
to desired size.



Release to create a widget.

Add widget

Paste widget

Then, in the widget configuration form:

- Select the Type of widget
- Enter widget parameters
- Click on Add



### Add widget

Type	Graph
Name	Action log
Refresh interval	Clock
	Data overview
	Discovery status
	Favorite graphs
	Favorite maps
	Favorite screens
	Graph
	Graph (classic)
	Graph prototype
	Host availability
	Map

The following widgets can be added to a dashboard:

- Action log
- Clock
- Data overview
- Discovery status
- Favorite graphs
- Favorite maps
- Favorite screens
- Graph
- Graph (classic)
- Graph prototype
- Host availability
- Problem hosts
- Map
- Map navigation tree
- Plain text
- Problems
- System information
- Problems by severity
- Trigger overview
- URL
- Web monitoring

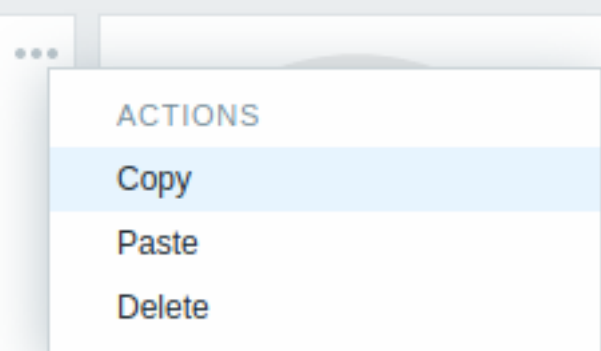
In dashboard editing mode widgets can be resized and moved around the dashboard by clicking on the widget title bar and dragging it to a new location. Also, you can click on the following buttons in the top-right corner of the widget to:

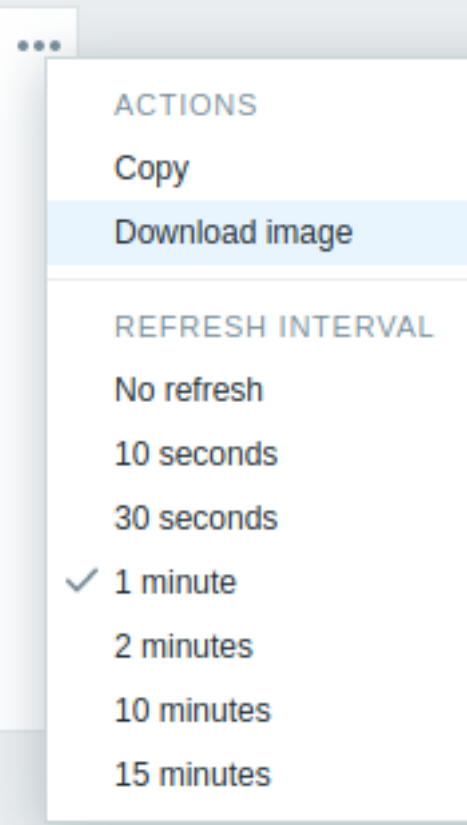
-  - edit a widget;
-  - access the **widget menu**

Click on Save changes for the dashboard to make any changes to the widgets permanent.

#### Widget menu

The widget menu contains different options based on whether the dashboard is in the edit or view mode:

Widget menu	Options
<p>In dashboard edit mode:</p> 	<p>Copy - copy the widget            Paste - paste a copied widget over this widget            This option is grayed out if no widget has been copied.            Delete - delete the widget</p>

Widget menu	Options
<p>In dashboard view mode:</p> 	<p>Copy - copy the widget</p> <p>Download image - download the widget as a PNG image (only available for <b>graph/classic graph</b> widgets)</p> <p>Refresh interval - select the frequency of refreshing the widget contents</p>

#### Copying/pasting widgets

Dashboard widgets can be copied and pasted. They can be copy-pasted within the same dashboard, or between dashboards opened in different tabs.

A widget can be copied using the **widget menu**. Then the copied widget can be used to create a new widget with the same properties:

- using the Paste widget button when editing the dashboard
- using the Paste widget option when adding a new widget by selecting some area in the dashboard (a widget must be copied first for the paste option to become available)

A copied widget can be used to paste over an existing widget using the Paste option in the widget menu.

#### Dynamic widgets

When **configuring** some of the widgets:

- Graphs (simple and custom)
- Plain text
- URL

there is an extra option called Dynamic item. You can check this box to make the widget dynamic - i.e. capable of displaying different content based on the selected host.

Now, when saving the dashboard, you will notice that a new host selection field has appeared atop the dashboard for selecting the host (while the Select button allows to select the host group in a popup):



Thus you have a widget, which can display content that is based on the data from the host that is selected. The benefit of this is that you do not need to create extra widgets just because, for example, you want to see the same graphs containing data from various hosts.

#### Viewing and editing a dashboard

When viewing a single dashboard, the following options are available:

## Edit dashboard



Sharing

Switch to the dashboard editing mode.

Open the action menu (see description of the available actions below).

Edit sharing preferences for the dashboard. Dashboards can be made public or private.

Public dashboards are visible to all users.

Private dashboards are visible only to their owner. Private dashboards can be shared by the owner to other users and user groups.

For details on configuring sharing, see the map [configuration](#) section.

Create new

Create a new dashboard.

First you are prompted to enter general properties of the new dashboard - owner and name. Then, the new dashboard opens in editing mode and you can add widgets.

Clone

Create a new dashboard by copying properties of the existing one.

First you are prompted to enter general properties of the new dashboard - owner and name. Then, the new dashboard opens in editing mode with all the widgets of the original dashboard.

Delete

Delete the dashboard.



Display only page content ([kiosk mode](#)).


Kiosk mode can also be accessed with the following URL parameters:

```
/zabbix.php?action=dashboard.view&kiosk=
```

To exit to normal mode:

```
/zabbix.php?action=dashboard.view&kiosk=
```

Editing mode is opened:

- when a new dashboard is being created
- when you click on the  edit button of a widget
- when you click the Edit dashboard button for an existing dashboard

In the dashboard editing mode the following options are available:



Edit general dashboard properties - name and owner.

+ Add widget

Add a new widget.

Paste widget

Paste a copied widget.

This button is grayed out if no widget has been copied.

Save changes

Save dashboard changes.

Cancel

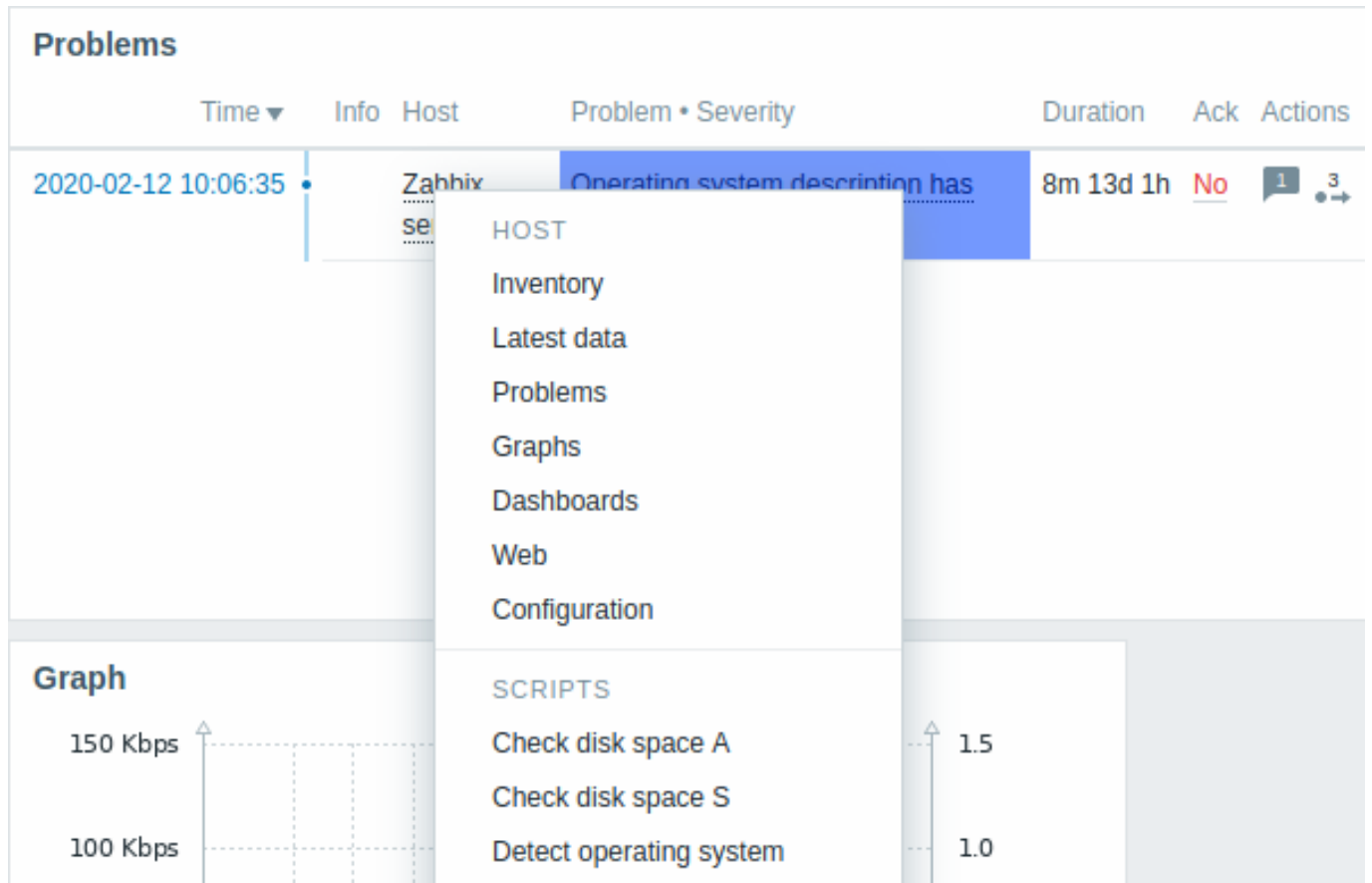
Cancel dashboard changes.

Permissions to dashboards for regular users and users of 'Admin' type are limited in the following way:

- They can see and clone a dashboard if they have at least READ rights to it;
- They can edit and delete dashboard only if they have READ/WRITE rights to it;
- They cannot change the dashboard owner.

#### Host menu

Clicking on a host in the Problems widget brings up the host menu. It includes links to host inventory, latest data, problems, graphs, dashboards, web scenarios, configuration and custom scripts. Note that host configuration is available for Admin and Superadmin users only.

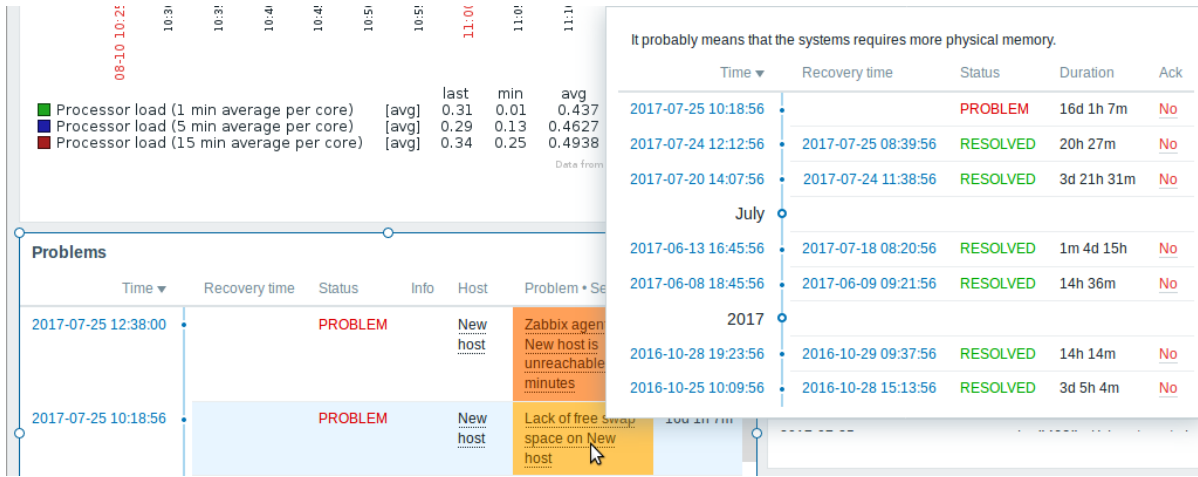


The host menu is accessible by clicking on a host in several other frontend sections:

- Monitoring → [Problems](#)
- Monitoring → [Problems](#) → Event details
- Monitoring → [Hosts](#)
- Monitoring → Hosts → [Web Monitoring](#)
- Monitoring → [Overview](#) (on Hosts: left)
- Monitoring → [Latest data](#)
- Monitoring → [Screens](#) (in Host issues and Host group issues widgets)
- Monitoring → [Maps](#)
- Reports → [Triggers top 100](#)

#### Problem event popup

The problem event popup includes the list of problem events for this trigger and, if defined, the trigger description and a clickable URL.



To bring up the problem event popup:

- roll a mouse over the problem name in the Problem-Severity column of the Problems widget. The popup disappears once you remove the mouse from the problem name.
- click on the problem name in the Problem-Severity column of the Problems widget. The popup disappears only if you click on the problem name again.

**Attention:** Resolved values of `{ITEM.VALUE}` and `{ITEM.LASTVALUE}` macros in trigger descriptions are truncated to 20 characters. To see the entire values you may use **macro functions** with these macros, e.g. `{{ITEM.VALUE}.regsub("(.*")", \1)}`, `{{ITEM.LASTVALUE}.regsub("(.*")", \1)}` as a workaround.

## 1 Dashboard widgets


### Overview

This section lists available **dashboard** widgets and provides details for widget configuration.

The following parameters are common for every single widget:

Name	Enter a widget name.
Refresh interval	Configure default refresh interval. Default refresh intervals for widgets range from No refresh to 15 minutes depending on the type of widget. For <b>example://</b> No refresh// for URL widget, 1 minute for action log widget, 15 minutes for clock widget.
Show header	Mark the checkbox to show the header permanently. When unchecked the header is hidden to save space and only slides up and becomes visible again when the mouse is positioned over the widget, both in view and edit modes. It is also semi-visible when dragging a widget to a new place.

Refresh intervals for a widget can be set to a default value for all the corresponding users and also each user can set his own refresh interval value:

- To set a default value for all the corresponding users switch to editing mode (click the Edit dashboard button, find the right widget, click the Edit button opening the editing form of a widget) and choose the required refresh interval from the dropdown list.
- Setting a unique refresh interval for each user separately is possible in view mode by clicking the  button for a certain widget.

Unique refresh interval set by a user has priority over the widget setting and once it's set it's always preserved when the widget's setting is modified.

### Action log

In the action log widget you can display details of action operations (notifications, remote commands). It replicates information from Administration → Audit.

To configure, select Action log as type:

The screenshot shows a dialog box titled "Add widget" with a close button (X) in the top right corner. It contains the following configuration options:

- Type: Action log (dropdown menu)
- Show header:
- Name: Action log (text input field)
- Refresh interval: Default (1 minute) (dropdown menu)
- Sort entries by: Time (descending) (dropdown menu)
- \* Show lines: 25 (text input field)

At the bottom right, there are two buttons: "Add" (highlighted in blue) and "Cancel".

You may set the following specific options:

---

Sort entries by	Sort entries by: <b>Time</b> (descending or ascending) <b>Type</b> (descending or ascending) <b>Status</b> (descending or ascending) <b>Recipient</b> (descending or ascending).
Show lines	Set how many action log lines will be displayed in the widget.

---

Clock

In the clock widget you may display local, server or specified host time.

To configure, select Clock as type:

The screenshot shows a dialog box titled "Add widget" with a close button (X) in the top right corner. It contains the following configuration options:

- Type: Clock (dropdown menu)
- Show header:
- Name: Local time (text input field)
- Refresh interval: Default (15 minutes) (dropdown menu)
- Time type: Local time (dropdown menu)

At the bottom right, there are two buttons: "Add" (highlighted in blue) and "Cancel".

You may set the following specific options:

---

Time type	Select local, server or specified host time. Server time will be identical to the time zone set globally or for the Zabbix user.
Item	Select the item for displaying time. To display host time, use the <code>system.localtime[local]</code> item. This item must exist on the host. This field is available only when Host time is selected.

---

Data overview



In the data overview widget you can display the latest data for a group of hosts. It replicates information from Monitoring → Overview (when viewing Data overview).

Note that there is a hard-coded limit of 50 records displayed. There is no pagination. If more records exist, a message is displayed at the bottom of the table, asking to provide more specific filtering criteria.

To configure, select Data overview as type:

**Add widget** ✕

Type  Show header

Name

Refresh interval

Host groups

Hosts

Application

Show suppressed problems

Hosts location  Left  Top

You may set the following specific options:

Host groups	Select host groups. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected.
Hosts	Select hosts. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.
Application	Enter application name.
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.
Hosts location	Select host location - left or top.

Discovery status

This widget displays a status summary of the active network discovery rules.

### Add widget ✕


Type  Show header

Name

Refresh interval

#### Favorite graphs

This widget contains shortcuts to the most needed graphs, sorted alphabetically.

The list of shortcuts is populated when you **view** a graph and then click on its  Add to favorites button.


#### Favorite maps

This widget contains shortcuts to the most needed maps, sorted alphabetically.

The list of shortcuts is populated when you **view** a map and then click on its  Add to favorites button.

#### Favorite screens

This widget contains shortcuts to the most needed screens and slide shows, sorted alphabetically.

The list of shortcuts is populated when you **view** a screen/slide show and then click on its  Add to favorites button.

#### Graph

The graph widget provides a modern and versatile way of visualizing data collected by Zabbix using a vector image drawing technique. This graph widget is supported since Zabbix 4.0. Note that the graph widget supported before Zabbix 4.0 can still be used as **Graph (classic)**.

To configure, select Graph as type:

**Add widget**

Type:  Show header

Name:

Refresh interval:

■ last(Zabbix server: CPU user time)
 ■ last(Zabbix server: Available memory)
 ■ last(Zabbix server: Total memory)

**Data set 2** | Displaying options | Time period | Axes | Legend | Problems | Overrides

Data set: ■ Zabbix\* [X] host pattern [Select] ■ CPU user time [X] item pattern [Select] [X]

Base color: ■ FF465C

Draw:  Line  Points  Staircase  Bar

Width:  1

Point size:  3

Transparency:  2

Fill:  3

Missing data:  None  Connected  Treat as 0

Y-axis:  Left  Right

Time shift:

Aggregation function:

Aggregation interval:

Aggregate:  Each item  Data set

■ Zabbix\* [X] [Select] ■ \*memory [X] [Select] [X]

The **Data set** tab allows to add data sets and define their visual representation:

---

Data set

Select hosts and items to display on the graph. Alternatively you may enter host and item patterns. Wildcard patterns may be used (for example, \* will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press Enter. While you are typing, note how all matching hosts are displayed in the dropdown. Up to 50 items may be displayed in the graph.

Host pattern and item pattern fields are mandatory.

Note that item names containing deprecated positional macros (\$1-\$9) are not resolved in this field. Therefore it will not be possible to add any of the items named like CPU \$2 time individually to the graph using its resolved name (like CPU user time); while using its unresolved name CPU \$2 time will add all corresponding items to the graph (e.g. CPU user time, CPU system time, CPU idle time, etc.).

The wildcard symbol is always interpreted, therefore it is not possible to add, for example, an item named "item\*" individually, if there are other matching items (e.g. item2, item3).

Base color

Adjust base color, either from the color picker or manually. Base color is used to calculate different colors for each item of the data set. Base color input field is mandatory.

Draw

Choose the draw type of the metric. Possible draw types are Line (set by default), Points, Staircase and Bar. Note that if there's only one data point in line/staircase graph it is drawn as point regardless of draw type. The point size is calculated from line width, but it cannot be smaller than 3 pixels, even if line width is less.

Width

Set the line width. This option is available when Line or Staircase draw type is selected.

Point size




Set the point size. This option is available when Points draw type is selected.

Transparency  
Fill

Set the transparency level.  
Set the fill level. This option is available when Line or Staircase draw type is selected.

Missing data	Select the option for displaying missing data: <b>None</b> - the gap is left empty <b>Connected</b> - two border values are connected <b>Treat as 0</b> - the missing data is displayed as 0 values Not applicable for the Points and Bar draw type.
Y-axis	Select the side of the graph where Y-axis will be displayed.
Time shift	Specify time shift if required. You may use <b>time suffixes</b> in this field. Negative values are allowed.
Aggregation function	Specify which aggregation function to use: <b>min</b> - display the smallest value <b>max</b> - display the largest value <b>avg</b> - display the average value <b>sum</b> - display the sum of values <b>count</b> - display the count of values <b>first</b> - display the first value <b>last</b> - display the last value <b>none</b> - display all values (no aggregation) Aggregation allows to display an aggregated value for the chosen interval (5 minutes, an hour, a day), instead of all values. See also: <a href="#">Aggregation in graphs</a> . This option is supported since Zabbix 4.4.
Aggregation interval	Specify the interval for aggregating values. You may use <b>time suffixes</b> in this field. A numeric value without a suffix will be regarded as seconds. This option is supported since Zabbix 4.4.
Aggregate	Specify whether to aggregate: <b>Each item</b> - each item in the dataset will be aggregated and displayed separately. <b>Data set</b> - all dataset items will be aggregated and displayed as one value. This option is supported since Zabbix 4.4.

Existing data sets are displayed in a list. You may:

-  - click on this button to add a new data set
-  - click on the color icon to expand/collapse data set details
-  - click on the move icon and drag a data set to a new place in the list

The **Displaying options** tab allows to define history data selection:

[Data set 2](#)
[Displaying options](#)
[Time period](#)
[Axes](#)
[Legend ●](#)
[Problems](#)
[Overrides](#)

History data selection

History data selection

Set the source of graph data:

**Auto** - data are sourced according to the classic graph algorithm (default)


**History** - data from history


**Trends** - data from trends

The **Time period** tab allows to set a custom time period:

[Data set 2](#)
[Displaying options](#)
[Time period ●](#)
[Axes](#)
[Legend ●](#)
[Problems](#)
[Overrides](#)

Set custom time period

From  

To  

Set custom time period

Mark this checkbox to set custom time period for the graph (unmarked by default).

From

Set the start time of the custom time period for the graph.

To

Set the end time of the custom time period for the graph.

The **Axes** tab allows to customize how axes are displayed:

[Data set 2](#)
[Displaying options](#)
[Time period](#)
[Axes ●](#)
[Legend ●](#)
[Problems](#)
[Overrides](#)

Left Y  Show
   
 Right Y  Show
   
 X-Axis  Show

Min 
   
 Min

Max 
   
 Max

Units  
   
 Units

Left Y

Mark this checkbox to make left Y axis visible. The checkbox may be disabled if unselected either in Data set or in Overrides tab.

Right Y

Mark this checkbox to make right Y axis visible. The checkbox may be disabled if unselected either in Data set or in Overrides tab.

X-Axis

Unmark this checkbox to hide X axis (marked by default).

Min

Set the minimum value of the corresponding axis. Visible range minimum value of Y axis is specified.

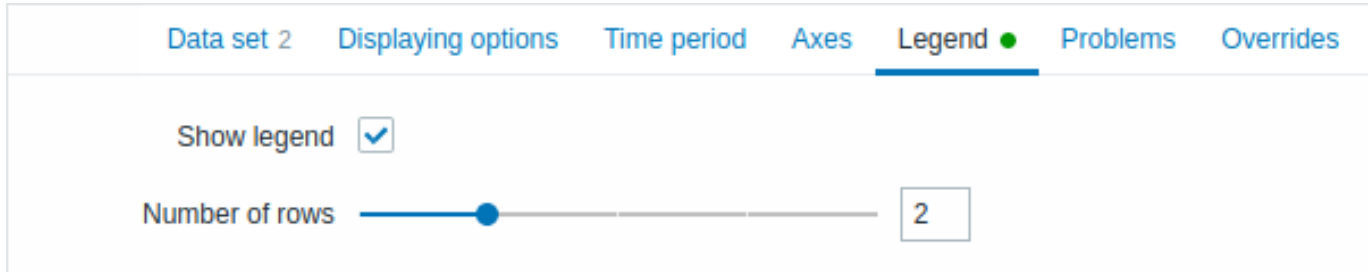
Max

Set the maximum value of the corresponding axis. Visible range maximum value of Y axis is specified.

Units

Choose the unit for the graph axis values from the dropdown. If Auto option is chosen axis values are displayed using units of the first item of corresponding axis. Static option allows you to assign corresponding axis' custom name. If Static option is chosen and value input field left blank the corresponding axis' name will only consist of a numeric value.

The **Legend** tab allows to customize the graph legend:



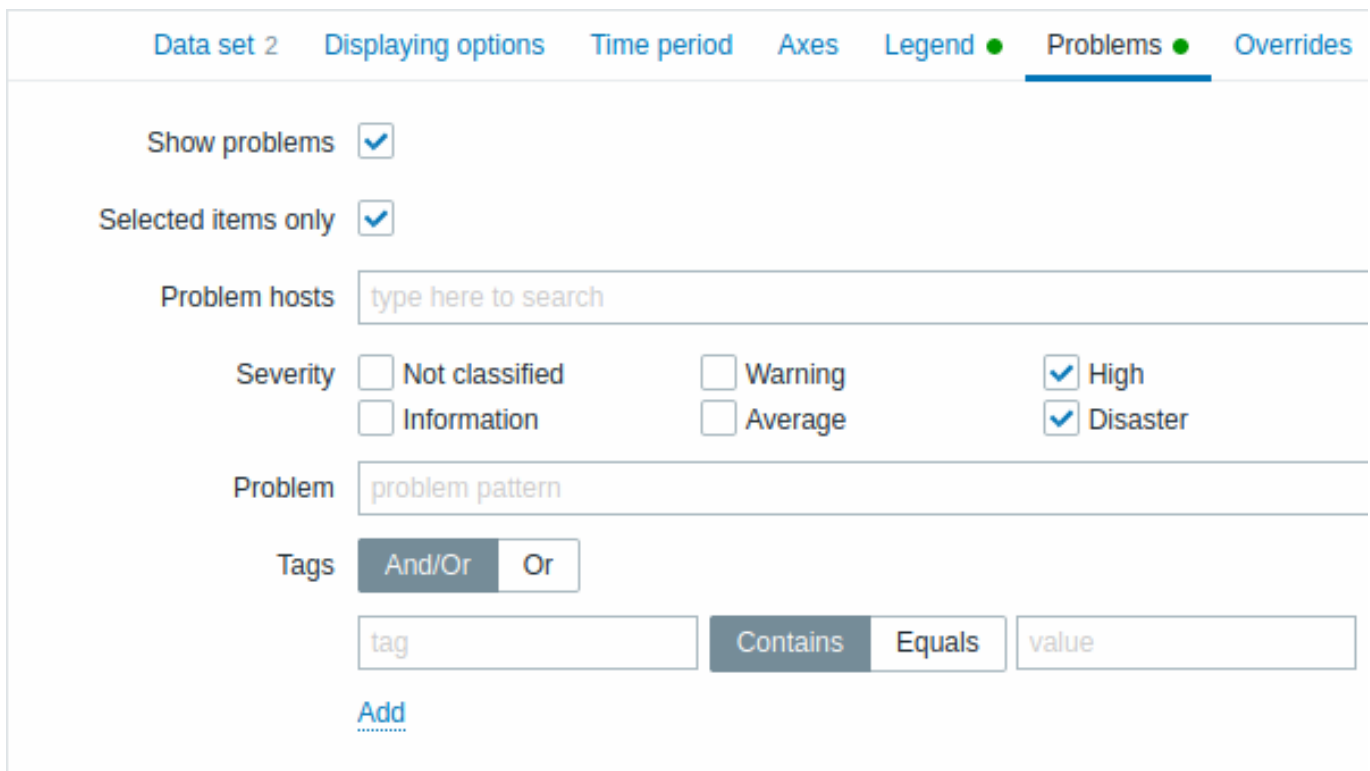
Show legend

Unmark this checkbox to hide the legend on the graph (marked by default).

Number of rows

Set the number of rows to be displayed on the graph.

The **Problems** tab allows to customize the problem display:



Show problems

Mark this checkbox to enable problem displaying on the graph (unmarked, i.e. disabled by default).

Selected items only

Mark this checkbox to include problems for the selected items only to be displayed on the graph.

Problem hosts

Select the problem hosts to be displayed on the graph. Wildcard patterns may be used (for example, \* will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press Enter. While you are typing, note how all matching hosts are displayed in the dropdown.

Severity  
Problem  
Tags

Mark the problem severities to be displayed on the graph.  
Specify the problem's name to be displayed on the graph.  
Specify tag name and value to limit the number of problems displayed on the graph. To add more tag names and values, click on Add.

There are two calculation types for several conditions:

**And/Or** - all conditions must be met, conditions having same tag name will be grouped by Or condition

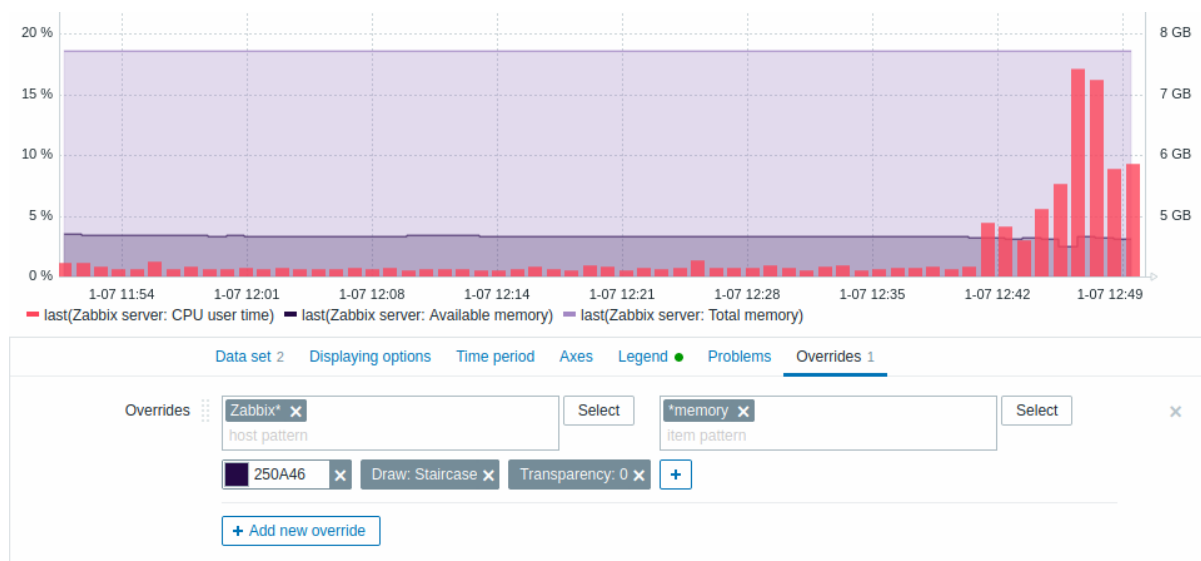
**Or** - enough if one condition is met

There are two ways of matching the tag value:

**Contains** - case-sensitive substring match (tag value contains the entered string)

**Equals** - case-sensitive string match (tag value equals the entered string).

The **Overrides** tab allows to add custom overrides for data sets:



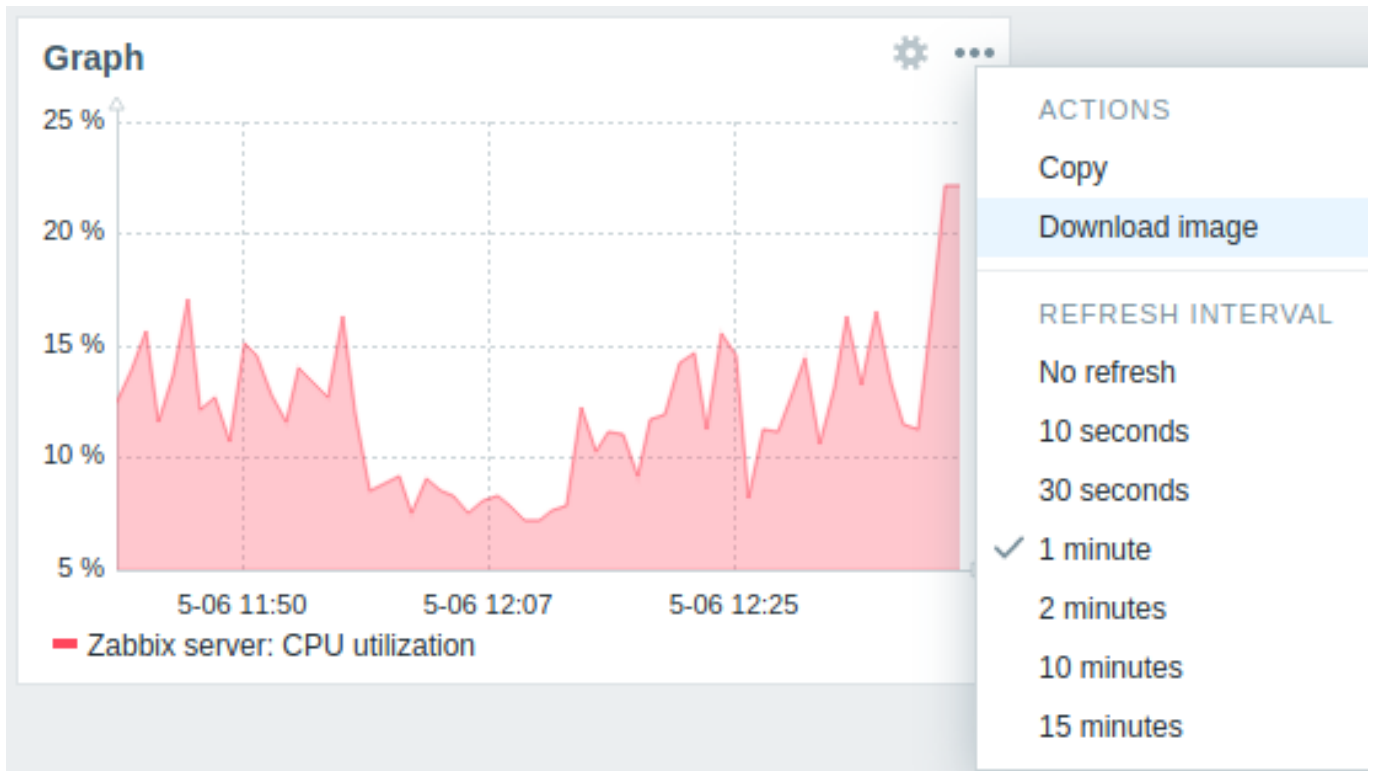
Overrides are useful when several items are selected for a data set using the \* wildcard and you want to change how the items are displayed by default (e.g. default base color or any other property).

Existing overrides (if any) are displayed in a list. To add a new override:

- Click on the **+ Add new override** button
- Select hosts and items for the override. Alternatively you may enter host and item patterns. Wildcard patterns may be used (for example, \* will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press Enter. While you are typing, note how all matching hosts are displayed in the dropdown. The wildcard symbol is always interpreted, therefore it is not possible to add, for example, an item named "item\*" individually, if there are other matching items (e.g. item2, item3). Host pattern and item pattern fields are mandatory.
- Click on **+**, to select override parameters. At least one override parameter should be selected. For parameter descriptions, see the Data set tab above.

Information displayed by the graph widget can be downloaded as a .png image using the **widget menu**:





A screenshot of the widget will be saved to the Downloads folder.

Graph (classic)

In the classic graph widget you can display a single custom graph or simple graph.

To configure, select Graph (classic) as type:

### Add widget ✕

Type Graph (classic) ▾ Show header

Name System load

Refresh interval Default (1 minute) ▾

Source Graph Simple graph

\* Graph Zabbix server: System load ✕ Select

Show legend

Dynamic item

Add
Cancel

You may set the following specific options:

Source

Select graph type:

**Graph** - custom graph

**Simple graph** - simple graph

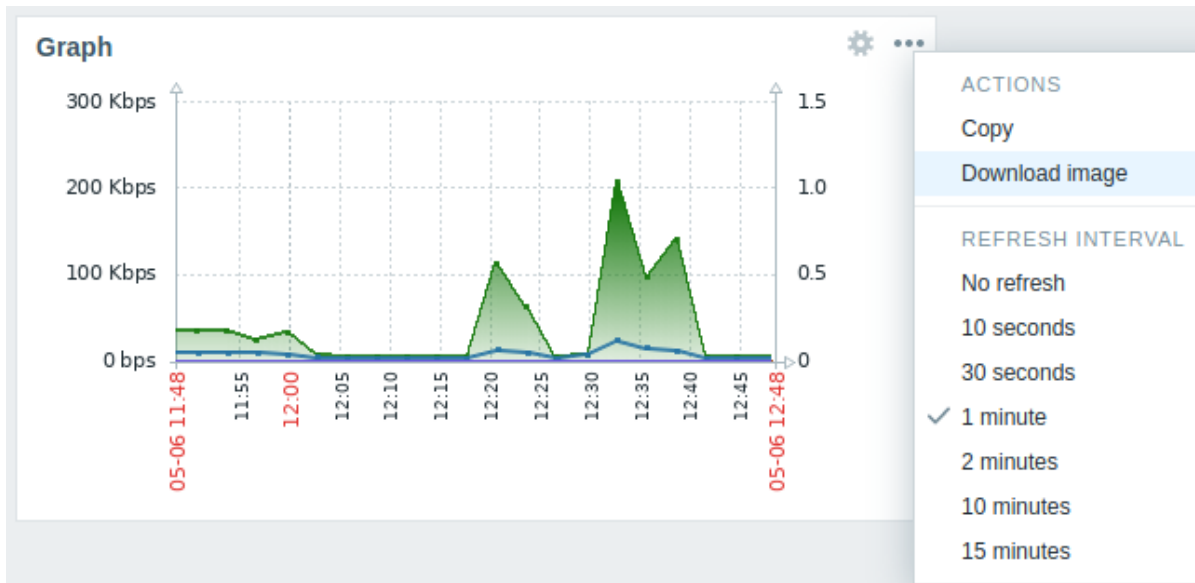
Graph

Select the custom graph to display.

This option is available if 'Graph' is selected as Source.

Item	Select the item to display in a simple graph. This option is available if 'Simple graph' is selected as Source.
Show legend	Unmark this checkbox to hide the legend on the graph (marked by default).
Dynamic item	Set graph to display different data depending on the selected host.

Information displayed by the classic graph widget can be downloaded as .png image using the **widget menu**:



A screenshot of the widget will be saved to the Downloads folder.

#### Graph prototype

In the graph prototype widget you can display a grid of graphs created from either a graph prototype or an item prototype by low-level discovery.

To configure, select Graph prototype as widget type:

### Add widget ✕

Type Graph prototype Show header

Name Graph prototype

Refresh interval Default (1 minute)

Source Graph prototype Simple graph prototype

\* Graph prototype Zabbix server: Interface {#IFNAME}: Network traffic Select

Show legend

Dynamic item

\* Columns 2

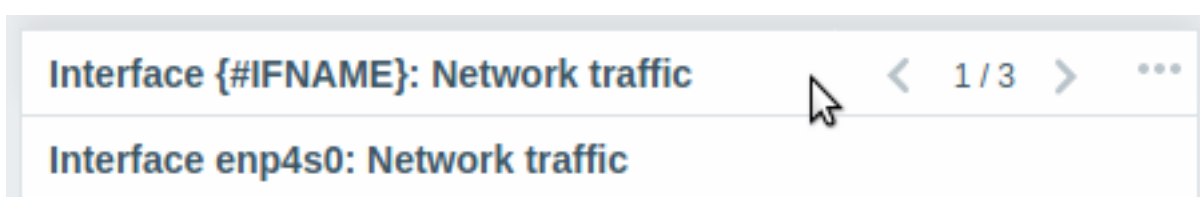
\* Rows 1

Add
Cancel

You may set the following specific options:

Source	Select source: either a <b>Graph prototype</b> or a <b>Simple graph prototype</b> .
Graph prototype	Select a graph prototype to display discovered graphs of the graph prototype. This option is available if 'Graph prototype' is selected as Source.
Item prototype	Select an item prototype to display simple graphs based on discovered items of an item prototype. This option is available if 'Simple graph prototype' is selected as Source.
Show legend	Mark this checkbox to show the legend on the graphs (marked by default).
Dynamic item	Set graphs to display different data depending on the selected host.
Columns	Enter number of columns of graphs to display within a graph prototype widget.
Rows	Enter number of rows of graphs to display within a graph prototype widget.

While the Columns and Rows settings allow to fit more than one graph in the widget, there still may be more discovered graphs than there are columns/rows in the widget. In this case paging becomes available in the widget and a slideup header allows to switch between pages using the left and right arrows.



#### Host availability

In the host availability widget you can display high-level statistics about host availability.

To configure, select Host availability as type:

### Add widget ✕

Type  Show header

Name

Refresh interval

Host groups    
type here to search

Interface type  Zabbix agent  
 SNMP  
 JMX  
 IPMI

Layout

Show hosts in maintenance

You may set the following specific options:

Host groups	Select host group(s). This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected.
Interface type	Select which host interfaces you want to see availability data for. Availability of all interfaces is displayed by default, if nothing is selected.
Layout	Select vertical or horizontal display.
Show hosts in maintenance	Include hosts that are in maintenance in the statistics.

### Map

In the map widget you can display either:

- a single configured network map
- one of the configured network maps in the map navigation tree (when clicking on the map name in the tree).

To configure, select Map as type:

### Add widget ✕

Type Map Show header

Name Local network

Refresh interval Default (15 minutes)

Source type Map Map navigation tree

\* Map Local network Select

Add
Cancel

You may set the following specific options:

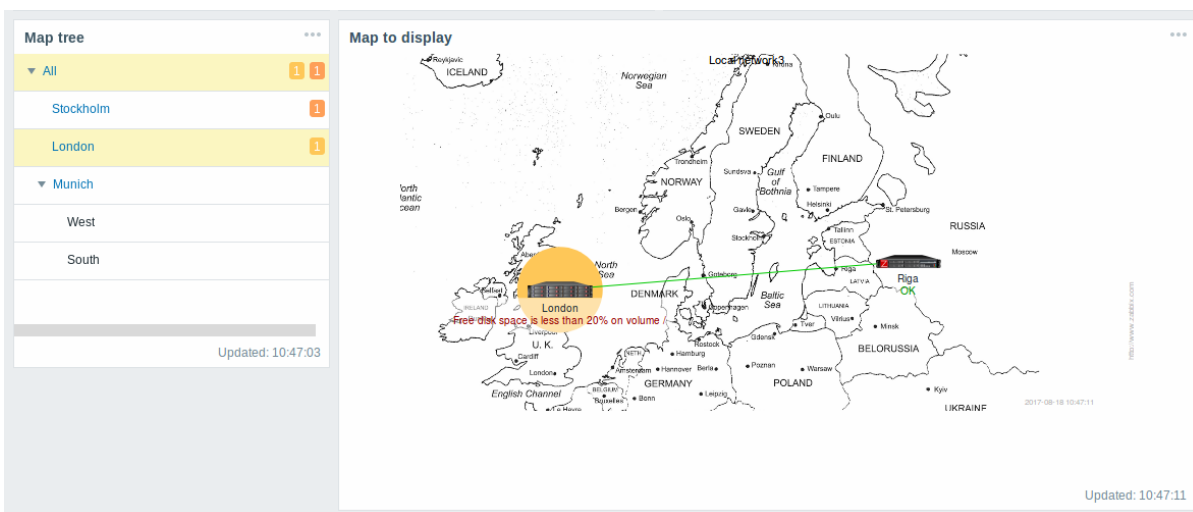
Source type	Select to display: <b>Map</b> - network map <b>Map navigation tree</b> - one of the maps in the selected map navigation tree
Map	Select the map to display.
Filter	This option is available if 'Map' is selected as Source type. Select the map navigation tree to display the maps of. This option is available if 'Map navigation tree' is selected as Source type.

See also: [known issue with IE11](#)

#### Map navigation tree

This widget allows to build a hierarchy of existing maps while also displaying problem statistics with each included map and map group.

It becomes even more powerful if you link the Map widget to the navigation tree. In this case, clicking on a map name in the navigation tree displays the map in full in the Map widget.



Statistics with the top level map in the hierarchy display a sum of problems of all submaps and its own problems.

To configure the navigation tree widget, select Map navigation tree as type:

### Add widget ✕

Type Map navigation tree Show header

Name Map tree

Refresh interval Default (15 minutes)

Show unavailable maps

Add
Cancel

You may set the following specific options:

Show unavailable maps

Mark this checkbox to display maps that the user does not have read permission to. Unavailable maps in the navigation tree will be displayed with a grayed out icon. Note that if this checkbox is marked, available submaps are displayed even if the parent level map is unavailbale. If unmarked, available submaps to an unavailable parent map will not be displayed at all. Problem count is calculated based on available maps and available map elements.

Plain text

In the plain text widget you can display latest item data in plain text.

To configure, select Plain text as type:

### Add widget ✕

Type Plain text Show header

Name Available memory

Refresh interval Default (1 minute)

\* Items Zabbix server: Available memory ✕ Select  
type here to search

Items location Left Top

\* Show lines 25

Show text as HTML

Dynamic items

Add
Cancel

You may set the following specific options:

Items	Select the items.
Items location	Choose the location of selected items to be displayed in the widget.
Show lines	Set how many latest data lines will be displayed in the widget.
Show text as HTML	Set to display text as HTML.
Dynamic item	Set to display different data depending on the selected host.

### Problem hosts

In the host information widget you can display high-level information about host availability.

To configure, select Problem hosts as type:

### Add widget ✕

Type  Show header

Name

Refresh interval

Host groups    
type here to search

Exclude host groups

Hosts

Problem

Severity  Not classified  Warning  High  
 Information  Average  Disaster

Tags

[Add](#)

Show suppressed problems

Hide groups without problems

You may set the following specific options:

Parameter	Description
Host groups	<p>Enter host groups to display in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.</p> <p>Specifying a parent host group implicitly selects all nested host groups.</p> <p>Host data from these host groups will be displayed in the widget. If no host groups are entered, all host groups will be displayed.</p>
Exclude host groups	<p>Enter host groups to hide from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.</p> <p>Specifying a parent host group implicitly selects all nested host groups.</p> <p>Host data from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to show Group A and exclude Group B at the same time, only data from host 001 will be displayed in the Dashboard.</p>
Hosts	<p>Enter hosts to display in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.</p> <p>If no hosts are entered, all hosts will be displayed.</p>
Problem	<p>You can limit the number of problem hosts displayed by the problem name. If you enter a string here, only those hosts with problems whose name contains the entered string will be displayed. Macros are not expanded.</p>
Severity	<p>Mark the problem severities to be displayed in the widget.</p>
Tags	<p>Specify tag name and value to limit the number of problems displayed on the graph. To add more tag names and values, click on Add.</p> <p>There are two calculation types for several conditions:  <b>And/Or</b> - all conditions must be met, conditions having same tag name will be grouped by Or condition  <b>Or</b> - enough if one condition is met</p> <p>There are two ways of matching the tag value:  <b>Contains</b> - case-sensitive substring match (tag value contains the entered string)  <b>Equals</b> - case-sensitive string match (tag value equals the entered string).</p>
Show suppressed problems	<p>Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.</p>
Hide groups without problems	<p>Mark the Hide groups without problems option to hide data from host groups without problems in the widget.</p>
Problem display	<p>Display problem count as:  <b>All</b> - full problem count will be displayed  <b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count  <b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed.</p>

## Problems

In this widget you can display current problems. The information in this widget is similar to Monitoring → Problems.

To configure, select Problems as type:



### Add widget ✕

Type  Show header

Name

Refresh interval

Show Recent problems Problems History

Host groups  Select

Exclude host groups  Select

Hosts  Select

Problem

Severity  Not classified  Warning  High  
 Information  Average  Disaster

Tags And/Or Or

Contains Equals

[Add](#)

Show tags None 1 2 3

Add Cancel

You can limit how many problems are displayed in the widget in various ways - by problem status, problem name, severity, host group, host, event tag, acknowledgment status, etc.

Parameter	Description
Show	Filter by problem status: <b>Recent problems</b> - unresolved and recently resolved problems are displayed (default) <b>Problems</b> - unresolved problems are displayed <b>History</b> - history of all events is displayed
Host groups	Enter host groups to display problems of in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Specifying a parent host group implicitly selects all nested host groups. Problems from these host groups will be displayed in the widget. If no host groups are entered, problems from all host groups will be displayed.

Parameter	Description
Exclude host groups	<p>Enter host groups to hide problems of from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.</p> <p>Specifying a parent host group implicitly selects all nested host groups.</p> <p>Problems from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to show Group A and exclude Group B at the same time, only problems from host 001 will be displayed in the widget.</p>
Hosts	<p>Enter hosts to display problems of in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.</p> <p>If no hosts are entered, problems of all hosts will be displayed.</p>
Problem	<p>You can limit the number of problems displayed by their name. If you enter a string here, only those problems whose name contains the entered string will be displayed. Macros are not expanded.</p>
Severity	<p>Mark the problem severities to be displayed in the widget.</p>
Tags	<p>Specify event tag name and value to limit the number of problems displayed. To add more event tag names and values, click on Add. There are two calculation types for several conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having same tag name will be grouped by Or condition</p> <p><b>Or</b> - enough if one condition is met</p> <p>There are two ways of matching the tag value:</p> <p><b>Contains</b> - case-sensitive substring match (tag value contains the entered string)</p> <p><b>Equals</b> - case-sensitive string match (tag value equals the entered string)</p> <p>When filtered, the tags specified here will be displayed first with the problem, unless overridden by the Tag display priority (see below) list.</p>
Show tags	<p>Select the number of displayed tags:</p> <p><b>None</b> - no Tags column in Monitoring → Problems</p> <p><b>1</b> - Tags column contains one tag</p> <p><b>2</b> - Tags column contains two tags</p> <p><b>3</b> - Tags column contains three tags</p> <p>To see all tags for the problem roll your mouse over the three dots icon.</p>
Tag name	<p>Select tag name display mode:</p> <p><b>Full</b> - tag names and values are displayed in full</p> <p><b>Shortened</b> - tag names are shortened to 3 symbols; tag values are displayed in full</p>
Tag display priority	<p><b>None</b> - only tag values are displayed; no names</p> <p>Enter tag display priority for a problem, as a comma-separated list of tags (for example: Services, Applications, Application). Tag names only should be used, no values. The tags of this list will always be displayed first, overriding the natural ordering by alphabet.</p>
Show operational data	<p>Select the mode for displaying <b>operational data</b>:</p> <p><b>None</b> - no operational data is displayed</p> <p><b>Separately</b> - operational data is displayed in a separate column</p> <p><b>With problem name</b> - append operational data to the problem name, using parentheses for the operational data</p>
Show suppressed problems	<p>Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.</p>
Show unacknowledged only	<p>Mark the checkbox to display unacknowledged problems only.</p>
Sort entries by	<p>Sort entries by:</p> <p><b>Time</b> (descending or ascending)</p> <p><b>Severity</b> (descending or ascending)</p> <p><b>Problem name</b> (descending or ascending)</p> <p><b>Host</b> (descending or ascending).</p>

Parameter	Description
Show timeline	Mark the checkbox to display a visual timeline.
Show lines	Specify the number of problem lines to display.

### Problems by severity

In this widget you can display problems by severity. You can limit what hosts and triggers are displayed in the widget and define how the problem count is displayed.

To configure, select Problems by severity as type:

#### Add widget ✕

Type Problems by severity Show header

Name Problems by severity

Refresh interval Default (1 minute)

Host groups type here to search Select

Exclude host groups type here to search Select

Hosts type here to search Select

Problem  

Severity  Not classified     Warning     High  
 Information     Average     Disaster

Tags And/Or Or

tag Contains Equals value

[Add](#)

Show Host groups Totals

Layout Horizontal Vertical

Show optional data None Counts With problem name

Add
Cancel

You may set the following specific options:

Parameter	Description
Host groups	Enter host groups to display in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Specifying a parent host group implicitly selects all nested host groups. Host data from these host groups will be displayed in the widget. If no host groups are entered, all host groups will be displayed.

Parameter	Description
Exclude host groups	Enter host groups to hide from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Specifying a parent host group implicitly selects all nested host groups. Host data from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to show Group A and exclude Group B at the same time, only data from host 001 will be displayed in the Dashboard.
Hosts	Enter hosts to display in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. If no hosts are entered, all hosts will be displayed.
Problem	You can limit the number of problem hosts displayed by the problem name. If you enter a string here, only those hosts with problems whose name contains the entered string will be displayed. Macros are not expanded.
Severity	Mark the problem severities to be displayed in the widget.
Tags	Specify tag name and value to limit the number of problems displayed on the graph. To add more tag names and values, click on Add. There are two calculation types for several conditions: <b>And/Or</b> - all conditions must be met, conditions having same tag name will be grouped by Or condition <b>Or</b> - enough if one condition is met There are two ways of matching the tag value: <b>Contains</b> - case-sensitive substring match (tag value contains the entered string) <b>Equals</b> - case-sensitive string match (tag value equals the entered string).
Show	Select the show option: <b>Host groups</b> - display problems per host group <b>Totals</b> - display a problem total for all selected host groups in coloured blocks corresponding to the problem severity.
Layout	Select the layout option: <b>Horizontal</b> - coloured blocks of totals will be displayed horizontally <b>Vertical</b> - coloured blocks of totals will be displayed vertically This field is available for editing if 'Totals' is selected as the Show option.
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.
Hide groups without problems	Mark the Hide groups without problems option to hide data from host groups without problems in the widget.
Show operational data	Mark the checkbox to display operational data (see description of <b>Operational data</b> in Monitoring → Problems).
Problem display	Display problem count as: <b>All</b> - full problem count will be displayed <b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count <b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed.
Show timeline	Mark the checkbox to display a visual timeline.

## System information

In the System information widget you can display high-level Zabbix and Zabbix server information.

To configure, select System information as type:

### Add widget ✕

Type System information Show header

Name System information

Refresh interval Default (15 minutes)

Add
Cancel

#### Trigger overview

In the trigger overview widget you can display the trigger states for a group of hosts. It replicates information from Monitoring → Overview (when viewing Trigger overview).

Note that there is a hard-coded limit of 50 records displayed. There is no pagination. If more records exist, a message is displayed at the bottom of the table, asking to provide more specific filtering criteria.

To configure, select Trigger overview as type:

### Add widget ✕

Type Trigger overview Show header

Name Trigger overview

Refresh interval Default (1 minute)

Show Recent problems Problems Any

Host groups type here to search Select

Hosts type here to search Select

Application  Select

Show suppressed problems

Hosts location Left Top

Add
Cancel

You may set the following specific options:

Show

Filter by problem status:

**Recent problems** - unresolved and recently resolved problems are displayed (default)

**Problems** - unresolved problems are displayed

**Any** - history of all events is displayed

Host groups

Select the host group(s). This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.

Hosts	Select hosts. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.
Application	Enter the application name.
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.
Hosts location	Select host location - left or top.

## URL

This widget displays the content retrieved from the specified URL.

To configure, select URL as type:

**Add widget** ✕

Type  Show header

Name

Refresh interval

\* URL

Dynamic item

You may set the following specific options:

URL	Enter the URL to display. Relative paths are allowed since Zabbix 4.4.8. {HOST.*} macros are supported.
Dynamic item	Set to display different URL content depending on the selected host. This can work if {HOST.*} macros are used in the URL.

**Attention:**

Browsers might not load an HTTP page included in the widget, if Zabbix frontend is accessed over HTTPS.

## Web monitoring

This widget displays a status summary of the active web monitoring scenarios.

### Add widget ✕

Type  Show header

Name

Refresh interval

Host groups

Exclude host groups

Hosts

Show hosts in maintenance

**Note:**  
 In cases when a user does not have permission to access certain widget elements, that element's name will appear as Inaccessible during the widget's configuration. This results in Inaccessible Item, Inaccessible Host, Inaccessible Group, Inaccessible Map and Inaccessible Graph appearing instead of the "real" name of the element.

## 2 Problems

### Overview

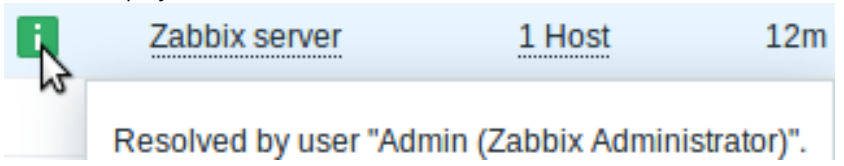
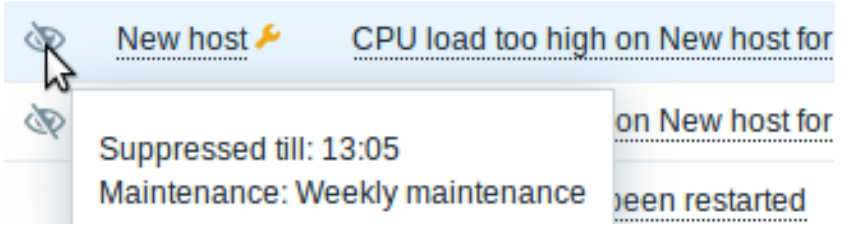

In Monitoring → Problems you can see what problems you currently have. Problems are those triggers that are in the "Problem" state.

☰ Problems








Time	Severity	Recovery time	Status	Info	Host	Problem	Operational data	Duration	Ack	Actions	Tags
14:14:12	Average		PROBLEM		Zabbix server	↑ Interface ppp0: Link down	Current state: down (2)	1m 50s	No		
2020-02-12 10:06:35	Information		PROBLEM		Zabbix server	↑ ↓ Operating system description has changed	Linux version 5.3.0-...	2m 10d 3h	Yes		

0 selected  Displaying 2 of 2 found

Column	Description
Time	Problem start time is displayed.
Severity	Problem severity is displayed. Problem severity is originally based on the severity of the underlying problem trigger, however, after the event has happened it can be updated using the Update problem <b>screen</b> . Color of the problem severity is used as cell background during problem time.
Recovery time	Problem resolution time is displayed.
Status	Problem status is displayed: <b>Problem</b> - unresolved problem <b>Resolved</b> - recently resolved problem. You can hide recently resolved problems using the filter. New and recently resolved problems blink for 2 minutes. Resolved problems are displayed for 5 minutes in total. Both of these values are configurable in Administration → General → <b>Trigger displaying options</b> .

Column	Description
Info	<p>A green information icon is displayed if a problem is closed by global correlation or manually when updating the problem. Rolling a mouse over the icon will display more details:</p>  <p>The following icon is displayed if a suppressed problem is being shown (see Show suppressed problems option in the filter). Rolling a mouse over the icon will display more details:</p> 
Host	Problem host is displayed.
Problem	<p>Problem name is displayed.</p> <p>Problem name is based on the name of the underlying problem trigger.</p> <p>Macros in the trigger name are resolved at the time of the problem happening and the resolved values do not update any more.</p> <p>Note that it is possible to append the problem name with <b>operational data</b> showing some latest item values.</p> <p>Clicking on the problem name brings up the <b>event menu</b>.</p> <p>Hovering on the  icon after the problem name will bring up the trigger description (for those problems that have it).</p> <p>(Note that resolved values of {ITEM.VALUE} and {ITEM.LASTVALUE} macros in trigger descriptions and URLs are truncated to 20 characters. To see the entire values you may use <b>macro functions</b> with these macros, e.g. <code>{{ITEM.VALUE}.regsub("(.*)", \1)}</code>, <code>{{ITEM.LASTVALUE}.regsub("(.*)", \1)}</code> as a workaround.)</p>
Operational data	<p><b>Operational data</b> are displayed containing latest item values.</p> <p>Operational data can be a combination of text and item value macros, if configured on a trigger level. If no operational data is configured on a trigger level, latest values of all items from the expression are displayed.</p> <p>This column is only displayed if Separately is selected for Show operational data in the filter.</p>
Duration	<p>Problem duration is displayed.</p> <p>See also: <b>Negative problem duration</b></p>
Ack	<p>The acknowledgment status of the problem is displayed:</p> <p><b>Yes</b> - green text indicating that the problem is acknowledged. A problem is considered to be acknowledged if all events for it are acknowledged.</p> <p><b>No</b> - a red link indicating unacknowledged events.</p> <p>If you click on the link you will be taken to the <b>problem update</b> screen where various actions can be taken on the problem, including commenting and acknowledging the problem.</p>



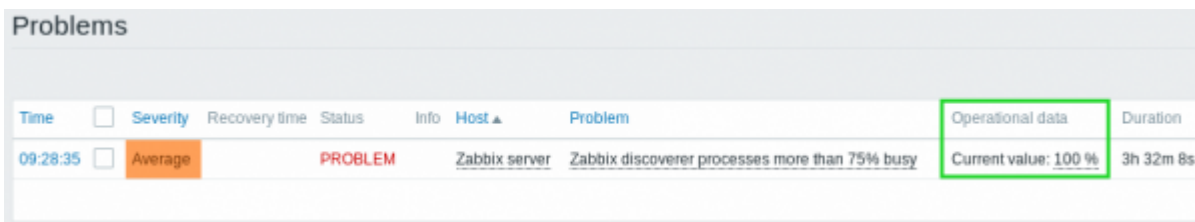
Column	Description
Actions	<p>History of activities about the problem is displayed using symbolic icons:</p> <ul style="list-style-type: none"> <li> - comments have been made. The number of comments is also displayed.</li> <li> - problem severity has been increased (e.g. Information → Warning)</li> <li> - problem severity has been decreased (e.g. Warning → Information)</li> <li> - problem severity has been changed, but returned to the original level (e.g. Warning → Information → Warning)</li> <li> - actions have been taken. The number of actions is also displayed.</li> <li> - actions have been taken, at least one is in progress. The number of actions is also displayed.</li> <li> - actions have been taken, at least one has failed. The number of actions is also displayed.</li> </ul> <p>When rolling the mouse over the icons, popups with details about the activity are displayed. See <a href="#">viewing details</a> for the explanation on icons used in the popup for actions taken.</p>
Tags	<p><b>Event tags</b> are displayed (if any).</p> <p>In addition, tags from an external ticketing system may also be displayed (see the Process tags option when configuring <a href="#">webhooks</a>).</p>

### Operational data of problems

It is possible to display operational data for current problems, i.e. the latest item values as opposed to the item values at the time of the problem.

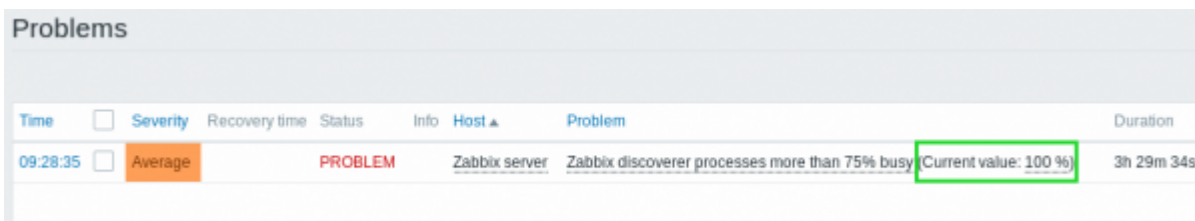
Operational data display can be configured in the filter of Monitoring → Problems or in the configuration of the respective **dashboard widget**, by selecting one of the three options:

- None - no operational data is displayed
- Separately - operational data is displayed in a separate column



The screenshot shows a table with columns: Time, Severity, Recovery time, Status, Info, Host, Problem, Operational data, and Duration. A row is displayed with the following values: 09:28:35, Average, PROBLEM, Zabbix server, Zabbix discoverer processes more than 75% busy, Current value: 100 %, and 3h 32m 8s. The 'Operational data' column is highlighted with a green box.

- With problem name - operational data is appended to the problem name and in parentheses. Operational data are appended to the problem name only if the Operational data field is non-empty in the trigger configuration.



The screenshot shows a table with columns: Time, Severity, Recovery time, Status, Info, Host, Problem, and Duration. A row is displayed with the following values: 09:28:35, Average, PROBLEM, Zabbix server, Zabbix discoverer processes more than 75% busy (Current value: 100 %), and 3h 29m 34s. The operational data is appended to the problem name in parentheses, and the entire 'Problem' column is highlighted with a green box.

The content of operational data can be configured with each **trigger**, in the Operational data field. This field accepts an arbitrary string with macros, most importantly, the `{ITEM.LASTVALUE<1-9>}` macro.

`{ITEM.LASTVALUE<1-9>}` in this field will always resolve to the latest values of items in the trigger expression. `{ITEM.VALUE<1-9>}` in this field will resolve to the item values at the moment of trigger status change (i.e. change into problem, change into OK, being closed manually by user or being closed by correlation).

### Negative problem duration

It is actually possible in some common situations to have negative problem duration i.e. when the problem resolution time is earlier than problem creation time, e. g.:

- If some host is monitored by proxy and a network error happens, leading to no data received from the proxy for a while, the item.nodata() trigger will be fired by the server. When the connection is restored, the server will receive item data from the proxy having a time from the past. Then, the item.nodata() problem will be resolved and it will have a negative problem duration;
- When item data that resolve the problem event are sent by Zabbix sender and contain a timestamp earlier than the problem creation time, a negative problem duration will also be displayed.

**Note:**

Negative problem duration is not affecting **SLA calculation** or **Availability report** of a particular trigger in any way; it neither reduces nor expands problem time.

Mass editing options

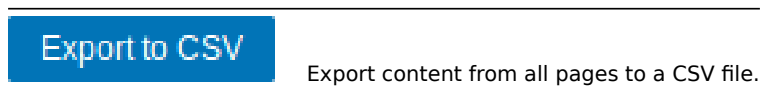
Buttons below the list offer some mass-editing options:

- Mass update - update the selected problems by navigating to the **problem update** screen

To use this option, mark the checkboxes before the respective problems, then click on the Mass update button.

Buttons

Button to the right offers the following option:

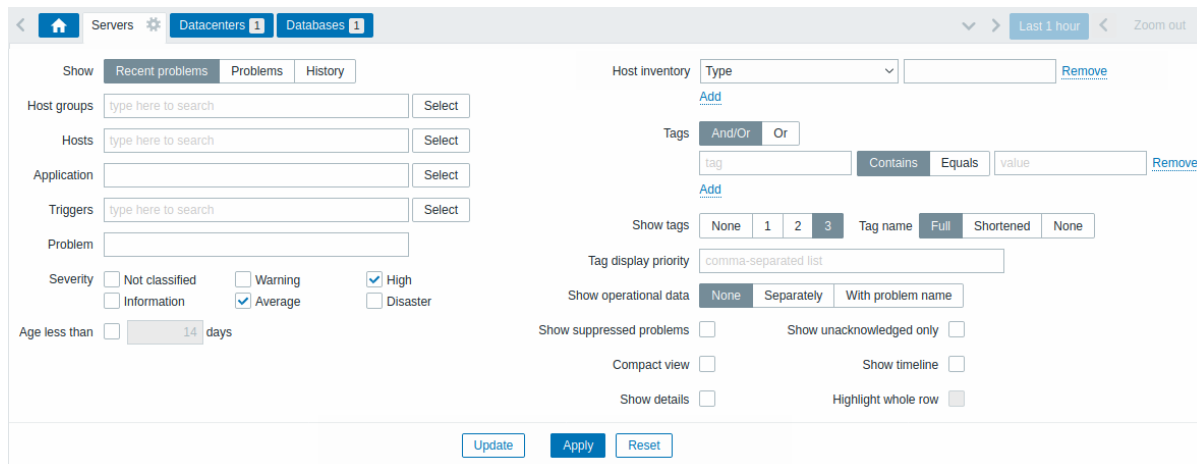


View mode buttons being common for all sections are described on the **Monitoring** page.

Using filter

You can use the filter to display only the problems you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table. Favorite filter settings can be saved as tabs and then quickly accessed by clicking on the **tabs above the filter**.



Parameter	Description
Show	Filter by problem status: <b>Recent problems</b> - unresolved and recently resolved problems are displayed (default) <b>Problems</b> - unresolved problems are displayed <b>History</b> - history of all events is displayed
Host groups	Filter by one or more host groups. Specifying a parent host group implicitly selects all nested host groups.
Hosts	Filter by one or more hosts.
Application	Filter by application name.

Parameter	Description
Triggers	Filter by one or more triggers.
Problem	Filter by problem name.
Severity	Filter by trigger (problem) severity.
Age less than	Filter by how old the problem is.
Host inventory	Filter by inventory type and value.
Tags	Filter by event tag name and value. Several conditions can be set. There are two calculation types for conditions: <b>And/Or</b> - all conditions must be met, conditions having same tag name will be grouped by Or condition <b>Or</b> - enough if one condition is met There are two ways of matching the tag value: <b>Contains</b> - case-sensitive substring match (tag value contains the entered string) <b>Equals</b> - case-sensitive string match (tag value equals the entered string)
Show tags	When filtered, the tags specified here will be displayed first with the problem, unless overridden by the Tag display priority (see below) list. Select the number of displayed tags: <b>None</b> - no Tags column in Monitoring → Problems <b>1</b> - Tags column contains one tag <b>2</b> - Tags column contains two tags <b>3</b> - Tags column contains three tags To see all tags for the problem roll your mouse over the three dots icon.
Tag name	Select tag name display mode: <b>Full</b> - tag names and values are displayed in full <b>Shortened</b> - tag names are shortened to 3 symbols; tag values are displayed in full <b>None</b> - only tag values are displayed; no names
Tag display priority	Enter tag display priority for a problem, as a comma-separated list of tags (for example: <code>Services,Applications,Application</code> ). Tag names only should be used, no values. The tags of this list will always be displayed first, overriding the natural ordering by alphabet.
Show operational data	Select the mode for displaying <b>operational data</b> : <b>None</b> - no operational data is displayed <b>Separately</b> - operational data is displayed in a separate column <b>With problem name</b> - append operational data to the problem name, using parentheses for the operational data
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.
Compact view	Mark the checkbox to enable compact view.
Show details	Mark the checkbox to display underlying trigger expressions of the problems. Disabled if Compact view checkbox is marked.
Show unacknowledged only	Mark the checkbox to display unacknowledged problems only.
Show timeline	Mark the checkbox to display the visual timeline and grouping. Disabled if Compact view checkbox is marked.
Highlight whole row	Mark the checkbox to highlight the full line for unresolved problems. The problem severity color is used for the highlighting. Enabled only if the Compact view checkbox is marked in the standard blue and dark themes. Highlight whole row is not available in the high-contrast themes.

#### Tabs for favorite filters

Frequently used sets of filter parameters can be saved in tabs.

To save a new set of filter parameters, open the Home tab and configure the filter settings, then press the Save as button. In a new popup window, define Filter properties.

### Filter properties ✕

\* Name

Show number of records

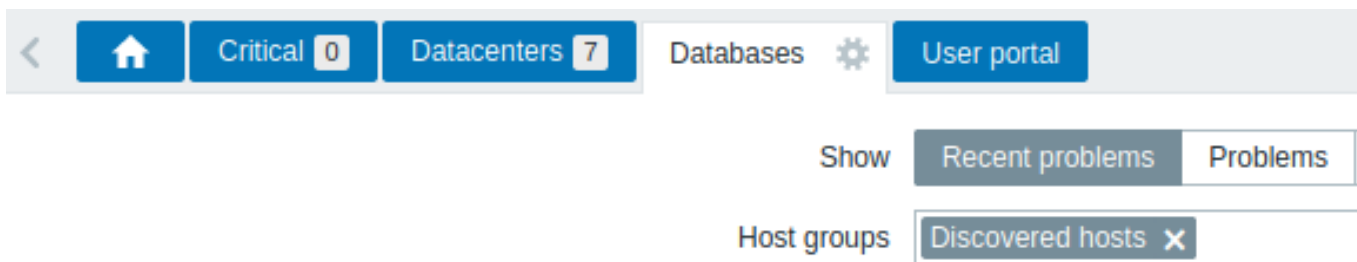
Set custom time period

From

To

Parameter	Description
Name	The name of the filter to display in the tab list.
Show number of records	Check, if you want the number of problems to be displayed next to the tab name.
Set custom time period	Check to set specific default time period for this filter set. If set, you will only be able to change the time period for this tab by updating filter settings. For tabs without a custom time period, the time range can be changed by pressing the time selector button in the top right corner (button name depends on selected time interval: This week, Last 30 minutes, Yesterday, etc.).
From/To	This option is available only for filters in Monitoring→Problems. <b>Time period</b> start and end in absolute (Y-m-d H:i:s) or relative time syntax (now-1d). Available, if Set custom time period is checked.

To edit Filter properties of an existing filter, press the gear symbol next to the active tab name.



Notes:

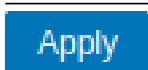
- To hide a filter, press on the name of the current tab. Press on the active tab name again to open the filter.
- Filter tabs can be re-arranged by dragging and dropping.
- Keyboard navigation is supported: use arrows to switch between tabs, press Enter to open.
- Pressing arrow down icon in the upper right corner will open the full list of saved filter tabs as a drop-down menu.

**Note:**

To share filters, copy and send to others a URL of an active filter. After opening this URL, other users will be able to save this set of parameters as a permanent filter in their Zabbix account.

See also: [Page parameters](#).

Filter buttons



Apply specified filtering criteria (without saving).

Reset

Reset current filter and return to saved parameters of the current tab. On the Home tab, this will clear the filter.

Save as

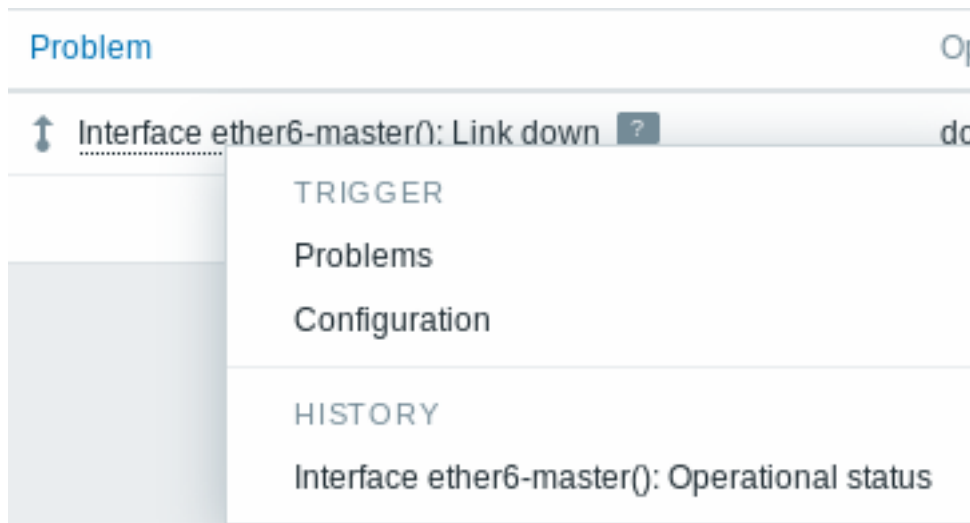
Save current filter parameters in a new tab. Only available on the Home tab.

Update

Replace tab parameters with currently specified parameters. Not available on the Home tab.

## Event menu

Clicking on the problem name brings up the event menu:



The event menu allows to:

- filter the problems of the trigger
- access the trigger configuration
- access a simple graph/item history of the underlying item(s)
- access an external ticket of the problem (if configured, see the Include event menu entry option when configuring [webhooks](#))

## Viewing details

The times for problem start and recovery in Monitoring → Problems are links. Clicking on them opens more details of the event.

Event details

Trigger details	
Host	New host
Trigger	CPU load too high on "New host" for 3 minutes
Severity	Warning
Problem expression	{New host:system.cpu.load.avg(3m)}>2
Recovery expression	
Event generation	Normal
Allow manual close	No
Enabled	Yes












Actions						
Step	Time	User/Recipient	Action	Message/Command	Status	Info
	2019-10-15 16:18:04	Admin (Zabbix Administrator)	✓			
	2019-10-15 16:17:42	Admin (Zabbix Administrator)	✉ +	OK.		
1	2019-10-15 16:12:36	Admin (Zabbix Administrator) @inbox.lv	✉	<b>Problem: CPU load too high on "New host" for 3 minutes</b>	Sent	
Problem started at 16:12:35 on 2019.10.15 Problem name: CPU load too high on "New host" for 3 minutes Host: New host Severity: Not classified Original problem ID: 295677						
	2019-10-15 16:12:35		📅			

Event details	
Event	CPU load too high on "New host" for 3 minutes
Operational data	1.99
Severity	Information
Time	2019-10-15 16:12:35
Acknowledged	Yes
Tags	Service: Operations
Description	

Event list [previous 20]						
Time	Recovery time	Status	Age	Duration	Ack	Actions
2019-10-15 16:12:35		PROBLEM	7m 29s	7m 29s	Yes	📅 ⬇️ ⬆️ ⬇️
2019-10-15 15:10:05	2019-10-15 16:08:35	RESOLVED	1h 9m 59s	58m 30s	No	
2019-10-15 14:58:05	2019-10-15 15:08:35	RESOLVED	1h 21m 59s	10m 30s	No	
2019-10-15 14:50:35	2019-10-15 14:54:35	RESOLVED	1h 29m 29s	4m	No	
2019-10-15 13:14:05	2019-10-15 13:25:35	RESOLVED	3h 5m 59s	11m 30s	No	
2019-10-15 13:02:05	2019-10-15 13:08:35	RESOLVED	3h 17m 59s	6m 30s	No	

Note how the problem severity differs for the trigger and the problem event - for the problem event it has been updated using the Update problem [screen](#).

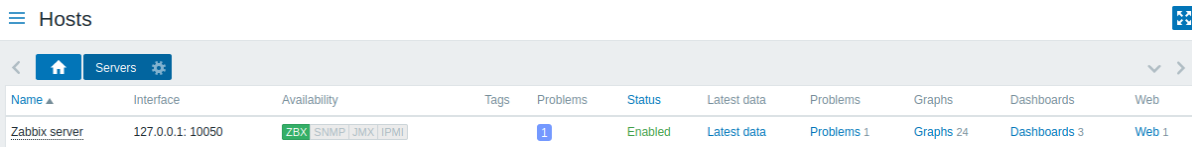
In the action list, the following icons are used to denote the activity type:


-  - problem event generated
-  - message has been sent
-  - problem event acknowledged
-  - problem event unacknowledged
-  - comment has been added
-  - problem severity has been increased (e.g. Information → Warning)
-  - problem severity has been decreased (e.g. Warning → Information)
-  - problem severity has been changed, but returned to the original level (e.g. Warning → Information → Warning)
-  - remote command has been executed
-  - problem event has recovered
-  - problem has been closed manually

### 3 Hosts

#### Overview

The Monitoring → Hosts section displays a full list of monitored hosts with detailed information about host interface, availability, tags, current problems, status (enabled/disabled), and links to easily navigate to the host's latest data, problem history, graphs, dashboards and web scenarios.



Column	Description
Name	Host's visible name. Clicking on the name brings up the <b>host menu</b> .  An orange wrench icon  after the name indicates that this host is in maintenance.  Clicking on the header row in this column will sort hosts by name in ascending (default) or descending order.
Interface	The main interface of the host is displayed.
Availability	<b>Availability</b> of the host is displayed. Four icons each represent a supported interface (Zabbix agent, SNMP, IPMI, JMX).  The current status of the interface is displayed by the respective color: <b>Green</b> - available <b>Red</b> - not available (upon mouseover, details of why the interface cannot be reached are displayed) <b>Gray</b> - unknown or not configured
Tags	Note that active Zabbix agent items do not affect host availability.
Problems	<b>Tags</b> of the host and all linked templates, with macros unresolved.  Square icons that show current open problems.  Icon color indicates problem severity. The number on an icon means the number of problems for the given severity.  Use the filter to select whether suppressed problems should be included (not included by default).
Status	Host status is displayed - Enabled or Disabled.  Clicking on the header row in this column will sort hosts by status in ascending or descending order.
Latest data	Clicking on the link will open Monitoring - Latest data page with all the latest data collected from the host.
Problems	Clicking on the link will open Monitoring - Problems section filtered to show only information for the given host.

Column	Description
Graphs	Clicking on the link will display graphs configured for the host. The number of graphs is displayed in gray. If a host has no graphs, the link is disabled (gray text) and no number is displayed.
Dashboards	Clicking on the link will display dashboards configured for the host. The number of dashboards is displayed in gray. If a host has no dashboards, the link is disabled (gray text) and no number is displayed.
Web	Clicking on the link will display web scenarios configured for the host. The number of web scenarios is displayed in gray. If a host has no web scenarios, the link is disabled (gray text) and no number is displayed.

## Buttons

View mode buttons being common for all sections are described on the [Monitoring](#) page.

## Using filter

You can use the filter to display only the hosts you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table. It is possible to filter hosts by name, host group, IP or DNS, interface port, tags, problem severity, status (enabled/disabled/any); you can also select whether to display suppressed problems and hosts that are currently in maintenance. Favorite filter settings can be saved as tabs and then quickly accessed by clicking on the [tabs above the filter](#).

## Notes:

- Name and Host group fields support multiple entries.
- Specifying a parent host group implicitly selects all nested host groups.
- By default problems of all severities are displayed, if not suppressed.
- By default hosts in maintenance are displayed, but suppressed problems on these hosts are not shown.
- When Severity filter is used and Show suppressed problems checkbox is unchecked, hosts with suppressed problems of the specified severity will not be displayed.
- Hosts can be filtered by host-level tags as well as tags from all linked templates, including parent templates.

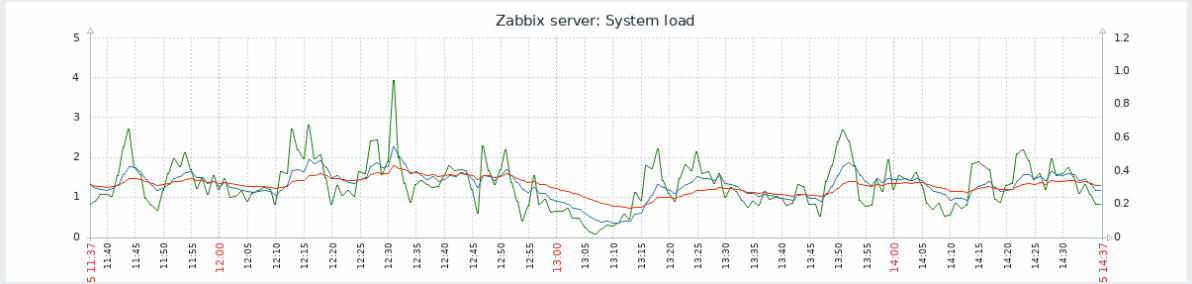
## 1 Graphs

### Overview

Host graphs can be accessed from Monitoring → Hosts by clicking on Graphs for the respective host.

Any [custom graph](#) that has been configured for the host can be displayed, however, no more than 20 graphs can be displayed at one time.

From:  To:



The View as option allows to view the data graphically or as values. Graphs for disabled hosts are also accessible.

Time period selector

Take note of the time period selector above the graph. It allows to select often required periods with one mouse click.

See also: [Time period selector](#)

Using filter

To view a specific graph, select it in the filter. The filter allows to specify one host at a time (host is mandatory), and then specify host graphs either by selecting from the list or by searching by the graph name pattern.

Host:

Search type:  Strict  Pattern

Graphs:

Buttons

Buttons to the right offer the following options:



Add graph to the favorites widget in the **Dashboard**.



The graph is in the favorites widget in the **Dashboard**. Click to remove graph from the favorites widget.

View mode buttons being common for all sections are described on the **Monitoring** page.

2 Web scenarios

Overview

Host **web scenario** information can be accessed from Monitoring → Hosts by clicking on Web for the respective host.



Filter

Host groups

Hosts

Host	Name ▲	Number of steps	Last check	Status
Zabbix server	Zabbix frontend	1	2020-08-28 10:13:23	OK

Displaying 1 of 1 found

The page shows a list of all web scenarios of the selected host. To view web scenarios for another host or host group without returning to the Monitoring → Hosts page, select that host or group in the filter.

Data of disabled hosts is also accessible. The name of a disabled host is listed in red.

The maximum number of scenarios displayed per page depends on the Rows per page user profile setting.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of web monitoring. You can extend this time period by changing the value of Max history display period parameter in the Administration → General menu section.

The scenario name is link to more detailed statistics about it:

Details of web scenario: Zabbix frontend

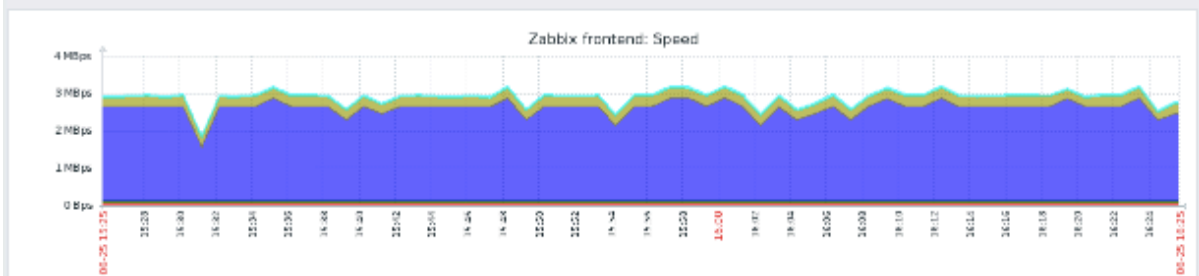
Step	Speed	Response time	Response code	Status
First page	55.98 KBps	64.9ms	200	OK
Login	275.77 KBps	112.2ms	200	OK
Login check	2.32 MBps	13.2ms	200	OK
Logout	62.86 KBps	57.3ms	200	OK
Logout check	70.25 KBps	51.2ms	200	OK
<b>TOTAL</b>		<b>298.8ms</b>		<b>OK</b>

Zoom out Last 1 hour

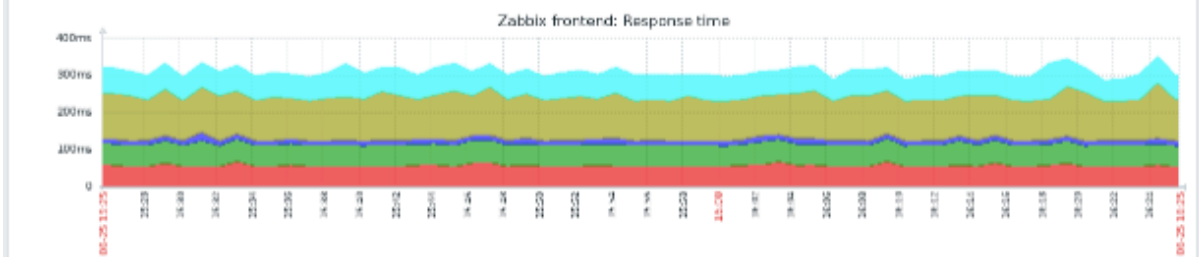
From

To

- Last 2 days
- Last 7 days
- Last 30 days
- Last 3 months
- Last 6 months
- Last 1 year
- Last 2 years
- Yesterday
- Day before yesterday
- This day last week
- Previous week
- Previous month
- Previous year
- Today
- Today so far
- This week
- This week so far
- This month
- This month so far
- This year
- This year so far
- Last 5 minutes
- Last 15 minutes
- Last 30 minutes
- Last 1 hour
- Last 3 hours
- Last 6 hours
- Last 12 hours
- Last 1 day



	[avg]	last	min	avg	max
Download speed for step "First page" of scenario "Zabbix frontend".	55.98 KBps	37.32 KBps	54.3 KBps	65.15 KBps	
Download speed for step "Login" of scenario "Zabbix frontend".	275.77 KBps	205.91 KBps	268.35 KBps	288.57 KBps	
Download speed for step "Login check" of scenario "Zabbix frontend".	2.32 MBps	1.44 MBps	2.47 MBps	2.74 MBps	
Download speed for step "Logout" of scenario "Zabbix frontend".	62.86 KBps	51.19 KBps	61.44 KBps	63.98 KBps	
Download speed for step "Logout check" of scenario "Zabbix frontend".	70.25 KBps	55.12 KBps	67.23 KBps	71.66 KBps	



	[avg]	last	min	avg	max
Response time for step "First page" of scenario "Zabbix frontend".	64.9ms	55.3ms	66.9ms	96.1ms	
Response time for step "Login" of scenario "Zabbix frontend".	112.2ms	107.3ms	116.21ms	150ms	
Response time for step "Login check" of scenario "Zabbix frontend".	13.2ms	11.2ms	12.76ms	21.7ms	
Response time for step "Logout" of scenario "Zabbix frontend".	57.3ms	55.7ms	58.86ms	70.3ms	
Response time for step "Logout check" of scenario "Zabbix frontend".	51.2ms	50.7ms	54.05ms	65.6ms	

## Buttons

View mode buttons being common for all sections are described on the [Monitoring](#) page.

## 4 Overview

### Overview

The Monitoring → Overview section may display either:

- Trigger overview - an overview of trigger states
- Data overview - a comparison of data for various hosts at once

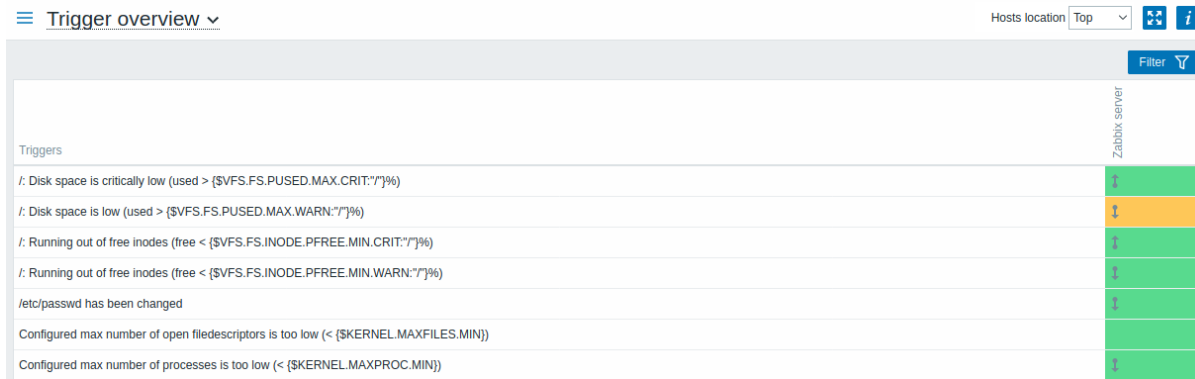
The following additional display options are available:

- select horizontal or vertical display of information in the Hosts location dropdown

Note that there is a hard-coded limit of 50 records displayed. There is no pagination. If more records exist, a message is displayed at the bottom of the table, asking to provide more specific filtering criteria.

### Overview of triggers

In the next screenshot Trigger overview is selected. As a result, the trigger states of a local host are displayed as colored blocks (the color of problem triggers depends on the problem severity color, which can be adjusted in the [problem update](#) screen):

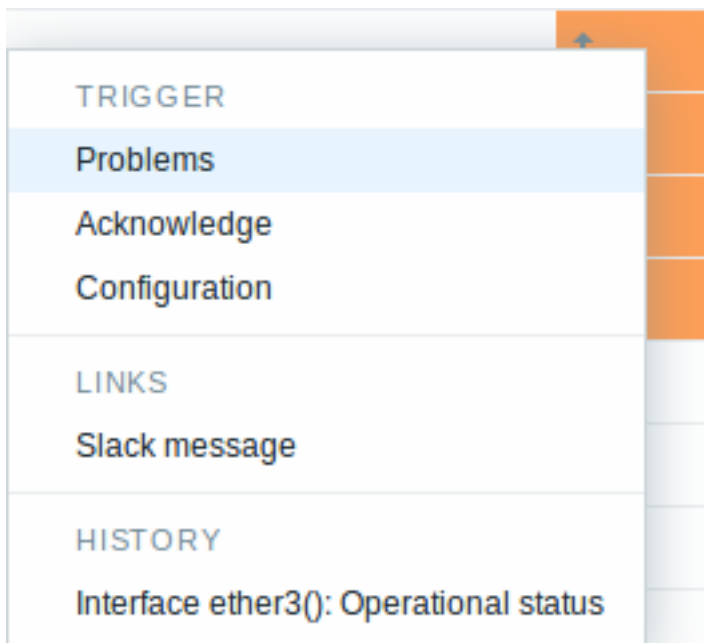


Note that recent trigger changes (within the last 2 minutes) will be displayed as blinking blocks.

Blue up and down arrows indicate triggers that have dependencies. On mouseover, dependency details are revealed.

A checkbox icon indicates acknowledged problems. All problems or resolved problems of the trigger must be acknowledged for this icon to be displayed.

Clicking on a trigger block provides context-dependent links to problem events of the trigger, the problem acknowledgment screen, trigger configuration, trigger URL or a simple graph/latest values list.



Buttons

Button to the right offers the following option:



Additional information on the page content is displayed if you roll the mouse over this button.

View mode buttons being common for all sections are described on the [Monitoring](#) page.

Using filter



You can use the filter to display only the problems you are interested in. For better search performance, data is searched with macros unresolved.


The filter is located above the table.

Parameter	Description
Show	Filter by problem status: <b>Recent problems</b> - unresolved and recently resolved problems are displayed (default) <b>Problems</b> - unresolved problems are displayed <b>Any</b> - history of all events is displayed
Host groups	Filter by host group.
Hosts	Filter by host.
Application	Filter by application.
Name	Filter by problem name.
Minimum severity	Filter by minimum problem severity.
Age (less than)	Mark the checkbox to filter by problem age.
Host inventory	Filter by inventory type and value.
Show unacknowledged only	Mark the checkbox to only display problems which are unacknowledged.
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.

Overview of data

In the next screenshot Data overview is selected. As a result, item data of a local host is displayed.

☰ Data overview ▾ Hosts location Top  

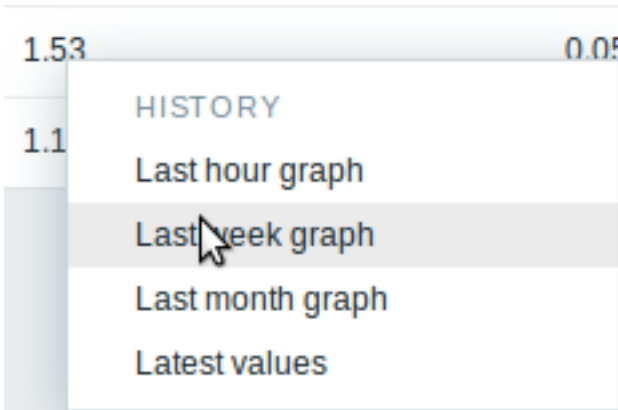
[Filter](#) 

Items	Zabbix server
/: Free inodes in %	99.355 %
/: Space utilization	86.536 %
/: Total space	585.81 GB
/: Used space	481.13 GB
Available memory	4.15 GB
Checksum of /etc/passwd	2664091933
Context switches per second	7261.7561
CPU guest nice time	0 %
CPU guest time	0 %
CPU idle time	73.7735 %

The color of problem items is based on the problem severity color, which can be adjusted in the [problem update](#) screen.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of latest data. You can extend this time period by changing the value of Max history display period parameter in the [Administration](#) → [General](#) menu section.


Clicking on a piece of data offers links to some predefined graphs or latest values.



Using filter

You can use the filter to display only the data you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table.

[Filter](#) 

Host groups	<input type="text" value="type here to search"/>	<input type="button" value="Select"/>
Hosts	<input type="text" value="type here to search"/>	<input type="button" value="Select"/>
Application	<input type="text"/>	<input type="button" value="Select"/>
Show suppressed problems <input type="checkbox"/>		
<input type="button" value="Apply"/> <input type="button" value="Reset"/>		

Parameter	Description
Host groups	Filter by host group.
Hosts	Filter by host.
Application	Filter by application.
Show suppressed problems	Mark the checkbox to display problems which would otherwise be suppressed (not shown) because of host maintenance.

## 5 Latest data

Overview

The section in Monitoring → Latest data can be used to view latest values gathered by items as well as to access various graphs for the items.

<input type="checkbox"/> Host ▲	Name	Last check	Last value	Change	
▶ Zabbix server	<b>CPU</b> (17 Items)				
▼ Zabbix server	<b>Disk sda</b> (6 Items)				
<input type="checkbox"/>	sda: Disk average queue size (avgqu-sz)	2020-08-10 12:22:23	0.2993	-0.016	<a href="#">Graph</a>
<input type="checkbox"/>	sda: Disk read rate	2020-08-10 12:22:23	0.0167 r/s	-0.2331 r/s	<a href="#">Graph</a>
<input type="checkbox"/>	sda: Disk read request avg waiting time (r_await)	2020-08-10 12:21:33	3.0661 ms	+3.0661 ms	<a href="#">Graph</a>
<input type="checkbox"/>	sda: Disk utilization	2020-08-10 12:22:23	4.2446 %	+0.0675 %	<a href="#">Graph</a>
<input type="checkbox"/>	sda: Disk write rate	2020-08-10 12:22:23	20.6899 w/s	+1.9027 w/s	<a href="#">Graph</a>
<input type="checkbox"/>	sda: Disk write request avg waiting time (w_await)	2020-08-10 12:21:35	18.234 ms	-1.2283 ms	<a href="#">Graph</a>
▼ Zabbix server	<b>Disk sdb</b> (6 Items)				
<input type="checkbox"/>	sdb: Disk average queue size (avgqu-sz)	2020-08-10 12:22:23	0		<a href="#">Graph</a>

In the list displayed, click on before a host and the relevant application to reveal latest values of that host and application.

You can expand all hosts and all applications, thus revealing all items by clicking on in the header row.

Items are grouped by host and application. Items are displayed with their name, last check time, last value, change amount and a link to a simple graph/history of item values.

An icon with a question mark is displayed next to the item name for all items that have a description. If you position the mouse cursor on this icon, the item description is displayed as a tooltip.

Note: The name of a disabled host is displayed in red. Data of disabled hosts, including graphs and item value lists, is also accessible in Latest data.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of latest data. You can extend this time period by changing the value of Max history display period parameter in the [Administration](#) → [General](#) menu section.

**Attention:**  
 For items with update frequency of 1 day or more the change amount will never be displayed (with the default setting). Also in this case the last value will not be displayed at all if it was received more than 24 hours ago.

### Buttons

View mode buttons being common for all sections are described on the [Monitoring](#) page.

### Using filter

You can use the filter to display only the items you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is located above the table to the right. You can use it to filter items by host group, host, application, a string in the item name; you can also select to display items that have no data gathered.

Specifying a parent host group implicitly selects all nested host groups.

Show details allows to extend displayable information on the items. Such details as refresh interval, history and trends settings, item type and item errors (fine/unsupported) are displayed. A link to item configuration is also available.



Filter

Host groups   Name

Hosts   Show items without data

Application   Show details

<input type="checkbox"/>	Host	Name	Last check	Last value	Change	
	New host	- other - (1 Item)				
<input checked="" type="checkbox"/>		CPU load average	2020-08-10 12:38:57	2.06	+0.09	<a href="#">Graph</a>
	Zabbix server	CPU (3 Items)				
<input type="checkbox"/>		Load average (1m avg)	2020-08-10 12:39:10	2.08	-0.06	<a href="#">Graph</a>
<input checked="" type="checkbox"/>		Load average (5m avg)	2020-08-10 12:38:15	1.43	+0.2	<a href="#">Graph</a>
<input type="checkbox"/>		Load average (15m avg)	2020-08-10 12:39:14	1.18	+0.06	<a href="#">Graph</a>

2 selected   Displaying 4 of 4 found

By default, items without data are shown but details are not displayed. For better page performance, the Show items without data option is checked and disabled if no host is selected in the filter.

### Ad-hoc graphs for comparing items

You may use the checkbox in the first column to select several items and then compare their data in a simple or stacked **ad-hoc graph**. To do that, select items of interest, then click on the required graph button below the table.

### Links to value history/simple graph

The last column in the latest value list offers:

- a **History** link (for all textual items) - leading to listings (Values/500 latest values) displaying the history of previous item values.
- a **Graph** link (for all numeric items) - leading to a **simple graph**. However, once the graph is displayed, a dropdown on the upper right offers a possibility to switch to Values/500 latest values as well.

View as

Timestamp	Load average (1m avg)
2020-07-13 17:57:10	0.97
2020-07-13 17:56:10	0.95
2020-07-13 17:55:10	1.21
2020-07-13 17:54:10	1.24
2020-07-13 17:53:10	2
2020-07-13 17:52:10	2.14
2020-07-13 17:51:10	2.33
2020-07-13 17:50:10	1.33
2020-07-13 17:49:10	1.25

The values displayed in this list are "raw", that is, no postprocessing is applied.

**Note:**

The total amount of values displayed is defined by the value of Limit for search and filter results parameter, set in **Administration** → **General**.

## 6 Screens

### Overview

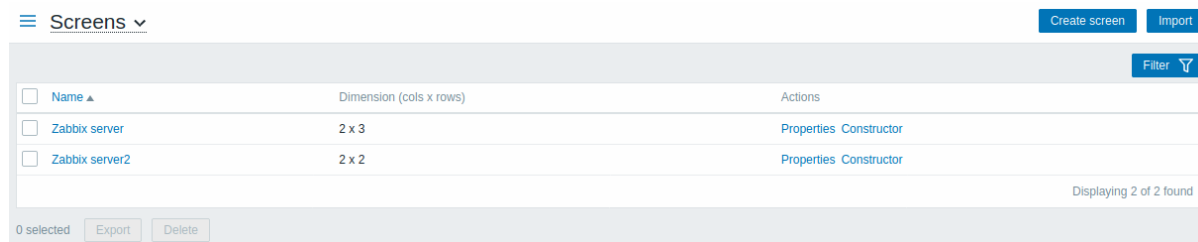
In the Monitoring → Screens section you can configure, manage and view Zabbix global **screens** and **slide shows**.

When you open this section, you will either see the last screen/slide show you accessed or a listing of all entities you have access to. Screen/slide show listing can be filtered by name.

All screens/slide shows can be either public or private. The public ones are available to all users, while private ones are accessible only to their owner and the users the entity is shared with.

Use the dropdown in the title bar to switch between screens and slide shows.

### Screen listing



Displayed data:

Column	Description
Name	Name of the screen. Click on the name to <b>view</b> the screen.
Dimensions	The number of columns and rows of the screen.
Actions	Two actions are available: <b>Properties</b> - edit general screen <b>properties</b> (name and dimensions) <b>Constructor</b> - access the grid of screen <b>elements</b> for editing

To **create** a new screen, click on the Create screen button in the top right-hand corner. To import a screen from an XML file, click on the Import button in the top right-hand corner. The user who imports the screen will be set as its owner.

### Mass editing options

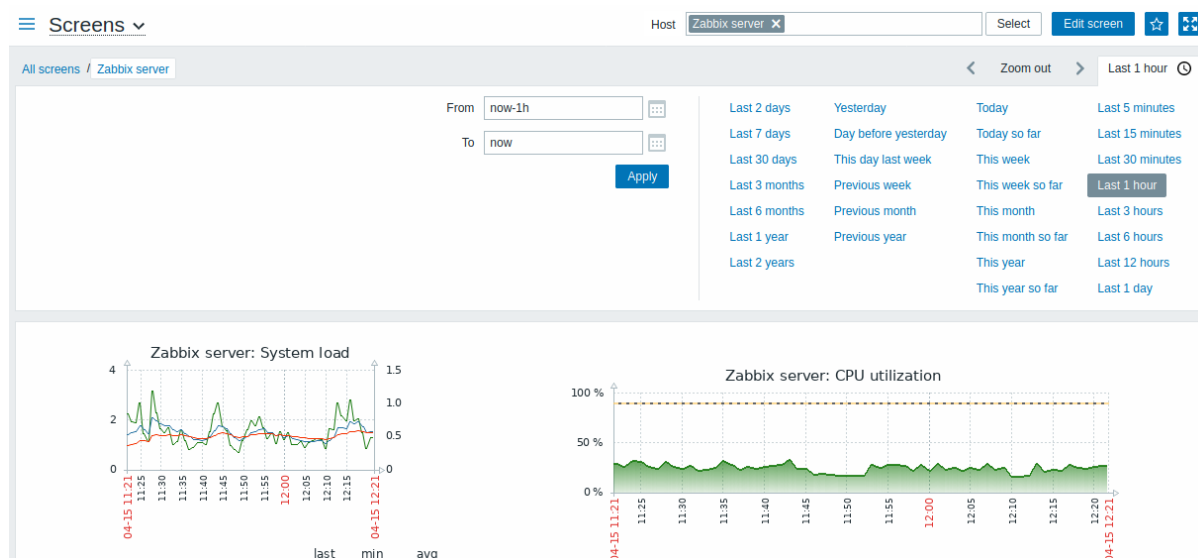
Buttons below the list offer some mass-editing options:

- Export - export the screens to a YAML, XML or JSON file
- Delete - delete the screens

To use these options, mark the checkboxes before the respective screens, then click on the required button.

### Viewing screens

To view a screen, click on its name in the list of all screens.



A field for selecting the host is available when there are screen elements with **dynamic**, **host-dependent** content.

### Time period selector

Take note of the time period selector above the screen. It allows to select often required periods with one mouse click, affecting the data displayed in graphs etc. See also: **Time period selector**

### Buttons

Buttons to the right offer the following options:

---

## Edit screen



Go to the screen constructor to edit the screen.

Add screen to the favorites widget in the **Dashboard**.

The screen is in the favorites widget in the **Dashboard**. Click to remove screen from the favorites widget.

---

View mode buttons being common for all sections are described on the **Monitoring** page.

### Slide show listing

Use the dropdown in the title bar to switch from screens to slide shows.

<input type="checkbox"/>	Name ▲	Delay	Number of slides	Actions
<input type="checkbox"/>	Zabbix	30s	2	Properties

0 selected Delete

Displayed data:

---

Column	Description
Name	Name of the slide show. Click on the name to <b>view</b> the slide show.
Delay	The default duration of showing one slide is displayed.
Number of slides	The number of slides in the slide show is displayed.
Actions	One action is available: <b>Properties</b> - edit slide show <b>properties</b>

---

To **create** a new slide show, click on the Create slide show button in the top right-hand corner.

### Mass editing options

A button below the list offers one mass-editing option:

- Delete - delete the slide shows

To use this option, mark the checkboxes before the respective slide shows and click on Delete.

### Viewing slide shows

To view a slide show, click on its name in the list of all slide shows.

A field for selecting the host is available when there are screen elements with **dynamic**, **host-dependent** content.

### Buttons

Buttons to the right offer the following options:

---

## Edit slide show



Go to the slide show properties.

Add slide show to the favorites widget in the **Dashboard**.

The slide show is in the favorites widget in the **Dashboard**. Click to remove slide show from the favorites widget.

Slow down or speed up a slide show.

---

View mode buttons being common for all sections are described on the **Monitoring** page.

### Referencing a screen



Screens can be referenced by both `elementid` and `screenname` GET parameters. For example,

`http://zabbix/zabbix/screens.php?screenname=Zabbix%20server`

will open the screen with that name (Zabbix server).

If both `elementid` (screen ID) and `screenname` (screen name) are specified, `screenname` has higher priority.

## 7 Maps

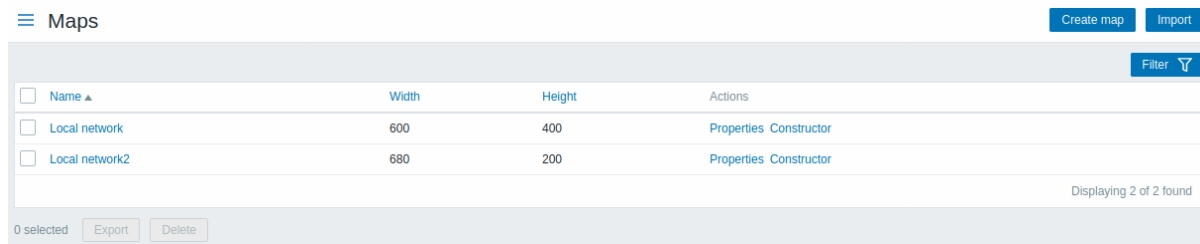
### Overview

In the Monitoring → Maps section you can configure, manage and view **network maps**.

When you open this section, you will either see the last map you accessed or a listing of all maps you have access to.

All maps can be either public or private. Public maps are available to all users, while private maps are accessible only to their owner and the users the map is shared with.

### Map listing



### Displayed data:

Column	Description
Name	Name of the map. Click on the name to <b>view</b> the map.
Width	Map width is displayed.
Height	Map height is displayed.
Actions	Two actions are available: <b>Properties</b> - edit general map <b>properties</b> <b>Constructor</b> - access the grid for adding <b>map elements</b>

To **configure** a new map, click on the Create map button in the top right-hand corner. To import a map from an XML file, click on the Import button in the top right-hand corner. The user who imports the map will be set as its owner.

Two buttons below the list offer some mass-editing options:

- Export - export the maps to a YAML, XML or JSON file
- Delete - delete the maps

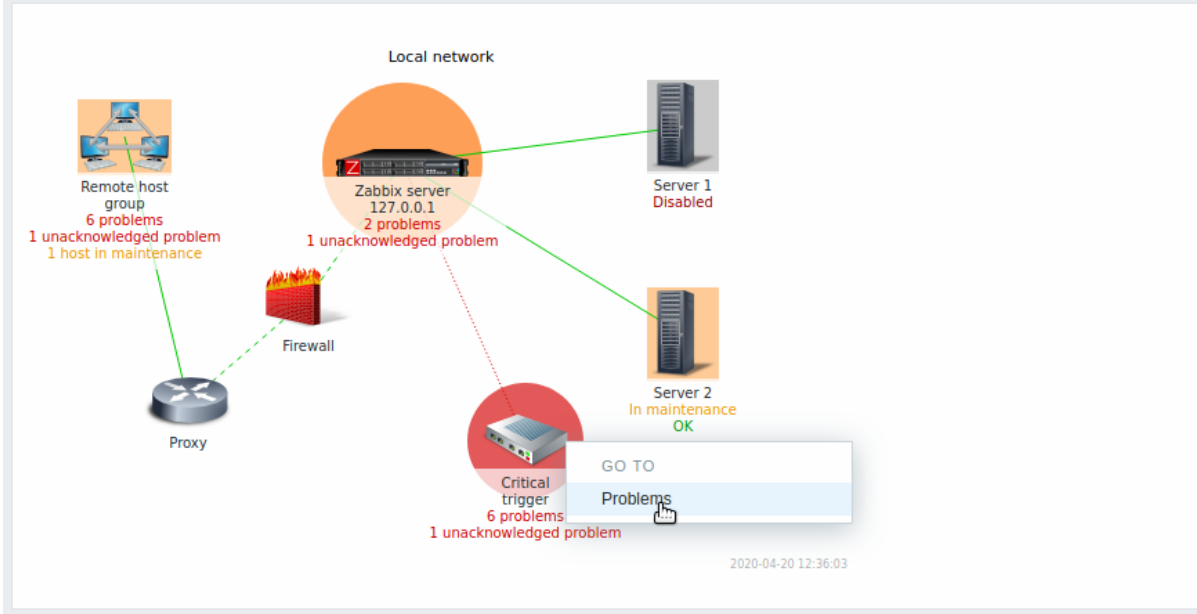
To use these options, mark the checkboxes before the respective maps, then click on the required button.

### Using filter

You can use the filter to display only the maps you are interested in. For better search performance, data is searched with macros unresolved.

### Viewing maps

To view a map, click on its name in the list of all maps.



You can use the dropdown in the map title bar to select the lowest severity level of the problem triggers to display. The severity marked as default is the level set in map configuration. If the map contains a submap, navigating to the submap will retain the higher-level map severity (except if it is Not classified, in this case it will not be passed to the submap).

Icon highlighting

If a map element is in problem status, it is highlighted with a round circle. The fill color of the circle corresponds to the severity color of the problem. Only problems on or above the selected severity level will be displayed with the element. If all problems are acknowledged, a thick green border around the circle is displayed.

Additionally:

- a host in **maintenance** is highlighted with an orange, filled square. Note that maintenance highlighting has priority over the problem severity highlighting.
- a disabled (not-monitored) host is highlighted with a gray, filled square.

Highlighting is displayed if the Icon highlighting check-box is marked in map **configuration**.

Recent change markers




Inward pointing red triangles around an element indicate a recent trigger status change - one that's happened within the last 30 minutes. These triangles are shown if the Mark elements on trigger status change check-box is marked in map **configuration**.

Links

Clicking on a map element opens a menu with some available links.

Buttons

Buttons to the right offer the following options:

	Go to map constructor to edit the map content.
	Add map to the favorites widget in the <b>Dashboard</b> .
	The map is in the favorites widget in the <b>Dashboard</b> . Click to remove map from the favorites widget.

View mode buttons being common for all sections are described on the **Monitoring** page.

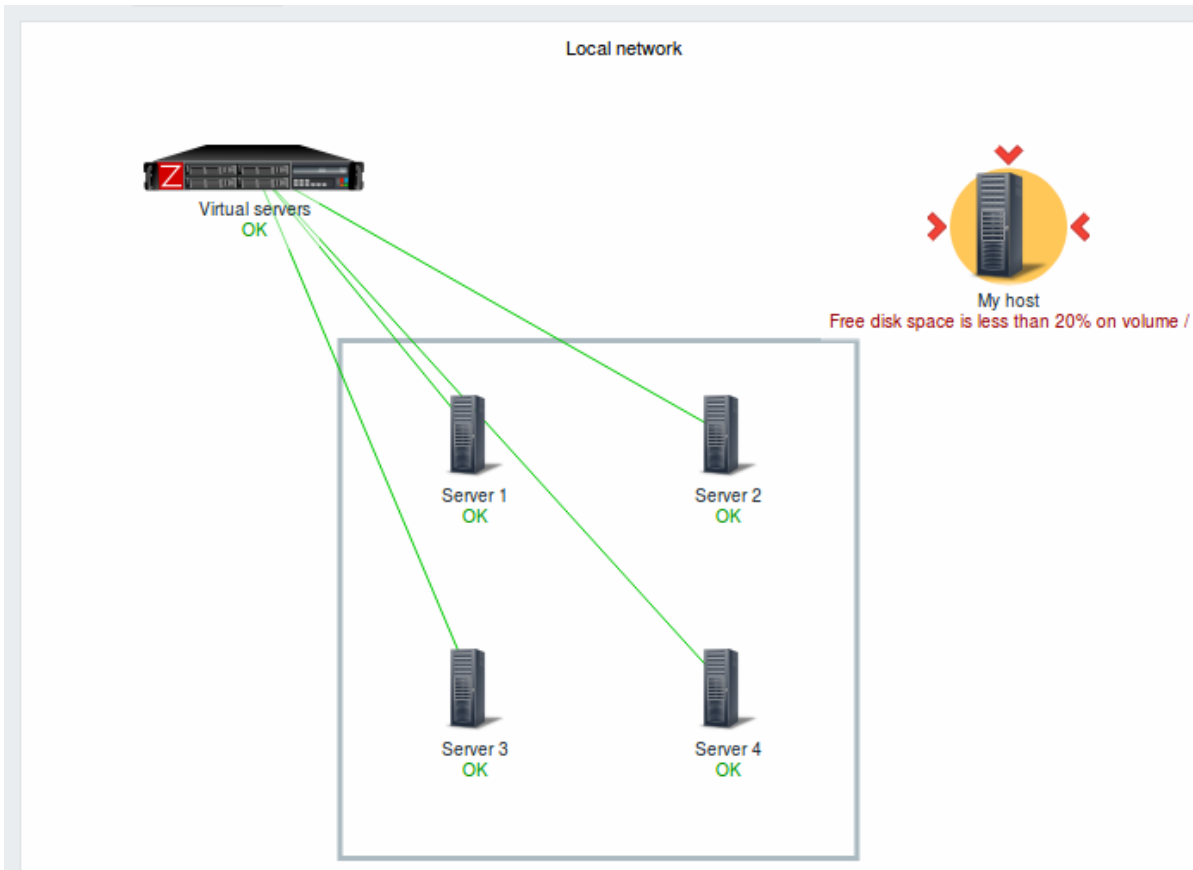
Readable summary in maps

A hidden "aria-label" property is available allowing map information to be read with a screen reader. Both general map description and individual element description is available, in the following format:

- for map description: <Map name>, <\* of \* items in problem state>, <\* problems in total>.
- for describing one element with one problem: <Element type>, Status <Element status>, <Element name>, <Problem description>.
- for describing one element with multiple problems: <Element type>, Status <Element status>, <Element name>, <\* problems>.
- for describing one element without problems: <Element type>, Status <Element status>, <Element name>.

For example, this description is available:

'Local network, 1 of 6 elements in problem state, 1 problem in total. Host, Status problem, My host, Free disk space is less than 20% on volume /



Referencing a network map

Network maps can be referenced by both `sysmapid` and `mapname` GET parameters. For example, <http://zabbix/zabbix/zabbix.php?action=map.view&mapname=Local%20network> will open the map with that name (Local network).

If both `sysmapid` (map ID) and `mapname` (map name) are specified, `mapname` has higher priority.

## 8 Discovery

Overview

In the Monitoring → Discovery section results of **network discovery** are shown. Discovered devices are sorted by the discovery rule.



Filter ▾

Discovery rule

SNMPv2 agent: iso.3.6.1.2.1.1.0

Discovered device ▾	Monitored host	Uptime/Downtime	
<b>Local network (14 devices)</b>			
192.168.3.114 (radix-ilo.zabbix.ian)	Integrated Lights-Out 4 2.61 Jul 27 2018		1d 2h 47m
192.168.3.72 (winxp.zabbix.ian)	Linux zeus 4.8.6.5-smp_2 SMP Sun Nov 13 14_58_11 CDT 2016 i686	7 days, 20:37:53	7d 20h 37m
192.168.3.70 (win2008i386.zabbix.ian)	Hardware_ x86 Family 6 Model 23 Stepping 6 AT_AT COMPATIBLE - Software_ Windows Version 6.0_Build 6001 Multiprocessor Free_	2 days, 02:23:47	2d 2h 23m

If a device is already monitored, the host name will be listed in the Monitored host column, and the duration of the device being discovered or lost after previous discovery is shown in the Uptime/Downtime column.

After that follow the columns showing the state of individual services for each discovered device (red cells show services that are down). Service uptime or downtime is included within the cell.

**Attention:**

Only those services that have been found on at least one device will have a column showing their state.

**Buttons**

View mode buttons being common for all sections are described on the **Monitoring** page.

**Using filter**

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

With nothing selected in the filter, all enabled discovery rules are displayed. To select a specific discovery rule for display, start typing its name in the filter. All matching enabled discovery rules will be listed for selection. More than one discovery rule can be selected.

**9 Services**

**Overview**

In the Monitoring → Services section the status of IT infrastructure or business **services** is displayed.

Period



Service	Status	Reason	Problem time	SLA / Acceptable SLA
root				
▸ Servers	OK			
▸ Business system	OK			
▾ Network service	OK			
Switch1 - Operational status was changed on Switch1 interface DEFAULT_VLAN	OK		<div style="width: 100%; height: 10px; background-color: green;"></div>	0.0000 100.0000 / 99.9000
▾ Public cloud service	Warning	Free disk space is less than 20% on volume /		
Cloud1 - Free disk space is less than 20% on volume /	Warning	Free disk space is less than 20% on volume /	80% <div style="width: 80%; height: 10px; background-color: red;"></div> 100%	100.0000 0.0000 / 99.9000

Only the last 20% of the indicator is displayed.

A list of the existing services is displayed along with data of their status and SLA. From the dropdown in the upper right corner you can select a desired period for display.

Displayed data:

Parameter	Description
Service	Service name.
Status	Status of service: <b>OK</b> - no problems <b>(trigger color and severity)</b> - indicates a problem and its severity
Reason	Indicates the reason of problem (if any).
Problem time	Displays SLA bar. Green/red ratio indicates the proportion of availability/problems. The bar displays the last 20% of SLA (from 80% to 100%). The bar contains a link to a graph of availability data.
SLA/Acceptable SLA	Displays current SLA/expected SLA value. If current value is below the acceptable level, it is displayed in red.

You can also click on the service name to access the Service availability report.

☰ Service availability report: Disc space Period  Year

From	Till	Ok	Problems	Downtime	SLA	Acceptable SLA
2020-04-27 00:00	2020-04-28 11:48	1d 11h 48m			100.0000	99.9
2020-04-20 00:00	2020-04-27 00:00	7d 0h 0m			100.0000	99.9
2020-04-13 00:00	2020-04-20 00:00	7d 0h 0m			100.0000	99.9
2020-04-06 00:00	2020-04-13 00:00	7d 0h 0m			100.0000	99.9
2020-03-30 00:00	2020-04-06 00:00	7d 0h 0m			100.0000	99.9

Here you can assess service availability data over a longer period of time on daily/weekly/monthly/yearly basis.

### Buttons

View mode buttons being common for all sections are described on the [Monitoring](#) page.

## 2 Inventory

### Overview

The Inventory menu features sections providing an overview of host inventory data by a chosen parameter as well as the ability to view host inventory details.

### 1 Overview

#### Overview

The Inventory → Overview section provides ways of having an overview of **host inventory** data.

For an overview to be displayed, choose host groups (or none) and the inventory field by which to display data. The number of hosts corresponding to each entry of the chosen field will be displayed.

☰ Host inventory overview Filter

Host groups

Grouping by

Type	Host count
Server	4
Zabbix server	1

The completeness of an overview depends on how much inventory information is maintained with the hosts.

Numbers in the Host count column are links; they lead to these hosts being filtered out in the Host Inventories table.

## Host inventory

Filter

Host groups

Field

Host	Group	Name	Type	OS	Serial number A	Tag	MAC address A
Zabbix server	Zabbix servers	martins-hp	Zabbix server	Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP			

Displaying 1 of 1 found

## 2 Hosts

### Overview

In the Inventory → Hosts section **inventory data** of hosts are displayed.

You can filter the hosts by host group(s) and by any inventory field to display only the hosts you are interested in.

## Host inventory

Filter

Host groups

Field

Host	Group	Name	Type	OS	Serial number A	Tag	MAC address A
Zabbix server	Zabbix servers	martins-hp	Zabbix server	Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP			

Displaying 1 of 1 found

To display all host inventories, select no host group in the filter, clear the comparison field in the filter and press "Filter".

While only some key inventory fields are displayed in the table, you can also view all available inventory information for that host. To do that, click on the host name in the first column.

### Inventory details

The **Overview** tab contains some general information about the host along with links to predefined scripts, latest monitoring data and host configuration options:

## Host inventory

Overview **Details**

Host name Zabbix server

Agent interfaces

IP address	DNS name	Connect to	Port
127.0.0.1		IP DNS	10050

SNMP interfaces

127.0.0.1		IP DNS	161
-----------	--	--------	-----

OS Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP

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Configuration [Host](#) [Applications 21](#) [Items 148](#) [Triggers 67](#) [Graphs 28](#) [Discovery 4](#) [Web 1](#)

The **Details** tab contains all available inventory details for the host:

Overview **Details**

Type Zabbix server

Name martins-hp

OS Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP

[Cancel](#)

The completeness of inventory data depends on how much inventory information is maintained with the host. If no information is maintained, the Details tab is disabled.

### 3 Reports

#### Overview

The Reports menu features several sections that contain a variety of predefined and user-customizable reports focused on displaying an overview of such parameters as system information, triggers and gathered data.

#### 1 System information

#### Overview

In Reports → System information a summary of key system data is displayed.

#### System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	8	2 / 6
Number of templates	137	
Number of items (enabled/disabled/not supported)	394	126 / 259 / 9
Number of triggers (enabled/disabled [problem/ok])	128	55 / 73 [1 / 54]
Number of users (online)	2	1
Required server performance, new values per second	1.67	
Database history tables upgraded	No	

This report is also displayed as a widget in the [Dashboard](#).

#### Displayed data

Parameter	Value	Details
Zabbix server is running	Status of Zabbix server: <b>Yes</b> - server is running <b>No</b> - server is not running Note: To display the rest of the information the web frontend needs the server to be running and there must be at least one trapper process started on the server (StartTrappers parameter in <code>zabbix_server.conf</code> file > 0).	Location and port of Zabbix server.
Number of hosts	Total number of hosts configured is displayed.	Number of monitored hosts/not monitored hosts.
Number of templates	Total number of templates is displayed.	

Parameter	Value	Details
Number of items	Total number of items is displayed.	Number of monitored/disabled/unsupported items. Items on disabled hosts are counted as disabled.
Number of triggers	Total number of triggers is displayed.	Number of enabled/disabled triggers. [Triggers in problem/ok state.] Triggers assigned to disabled hosts or depending on disabled items are counted as disabled.
Number of users	Total number of users configured is displayed.	Number of users online.
Required server performance, new values per second	The expected number of new values processed by Zabbix server per second is displayed.	Required server performance is an estimate and can be useful as a guideline. For precise numbers of values processed, use the <code>zabbix[wcache,values,all]</code> <b>internal item</b> .  Enabled items from monitored hosts are included in the calculation. Log items are counted as one value per item update interval. Regular interval values are counted; flexible and scheduling interval values are not. The calculation is not adjusted during a "nodata" maintenance period. Trapper items are not counted.
Database history tables upgraded	Database upgrade status: <b>No</b> - database history tables have not been upgraded	This field is displayed if database upgrade to extended range for numeric (float) values has not been completed. See <a href="#">instructions for enabling an extended range of numeric (float) values</a> .

System information will also display an error message if the database used does not have the required character set or collation (UTF-8).

## 2 Availability report

### Overview

In Reports → Availability report you can see what proportion of time each trigger has been in problem/ok state. The percentage of time for each state is displayed.

Thus it is easy to determine the availability situation of various elements on your system.

☰ Availability report Mode By host ▾

< Zoom out > Last 1 hour Filter ⌵

Host groups 
Select

Hosts 
Select

Apply
Reset

Host	Name	Problems	Ok	Graph
Zabbix server	/: Disk space is critically low (used > 90%)		100.0000%	<a href="#">Show</a>
Zabbix server	/: Disk space is low (used > 80%)	0.0556%	99.9444%	<a href="#">Show</a>
Zabbix server	/: Running out of free inodes (free < 10%)		100.0000%	<a href="#">Show</a>
Zabbix server	/: Running out of free inodes (free < 20%)		100.0000%	<a href="#">Show</a>
Zabbix server	/etc/passwd has been changed		100.0000%	<a href="#">Show</a>
Zabbix server	Configured max number of open filedescriptors is too low (< 256)		100.0000%	<a href="#">Show</a>



From the dropdown in the upper right corner you can choose the selection mode - whether to display triggers by hosts or by triggers belonging to a template.

☰ Availability report Mode By trigger template ▾

◀ Zoom out ▶ Last 1 hour Filter

Template group   
 Template   
 Template trigger   
 Host group

Apply Reset

Host	Name	Problems	Ok	Graph
My host	<a href="#">/etc/passwd has been changed</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">Configured max number of open filedescriptors is too low (&lt; 256)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">Configured max number of processes is too low (&lt; 1024)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">Getting closer to process limit (over 80% used)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">High CPU utilization (over 90% for 5m)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">High memory utilization (&gt;90% for 5m)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">High swap space usage (less than 50% free)</a>	100.0000%		<a href="#">Show</a>
My host	<a href="#">Lack of available memory (&lt; 20M of 15.54 GB)</a>		100.0000%	<a href="#">Show</a>
My host	<a href="#">Load average is too high (per CPU load over 1.5 for 5m)</a>		100.0000%	<a href="#">Show</a>

The name of the trigger is a link to the latest events of that trigger.

### Using filter

Filter can help narrow down the number of hosts and/or triggers displayed. For better search performance, data is searched with macros unresolved.

The filter is located below the Availability report bar. It can be opened and collapsed by clicking on the Filter tab on the left.

### Filtering by trigger template

In the by trigger template mode results can be filtered by one or several parameters listed below.

Parameter	Description
Template group	Select all hosts with triggers from templates belonging to that group. Any host group that includes at least one template can be selected.
Template	Select hosts with triggers from chosen template and all nested templates. Only triggers inherited from the selected template will be displayed. If a nested template has additional own triggers, those triggers will not be displayed.
//Template trigger //	Select hosts with chosen trigger. Other triggers of the selected hosts will not be displayed.
Host group	Select hosts belonging to the group.

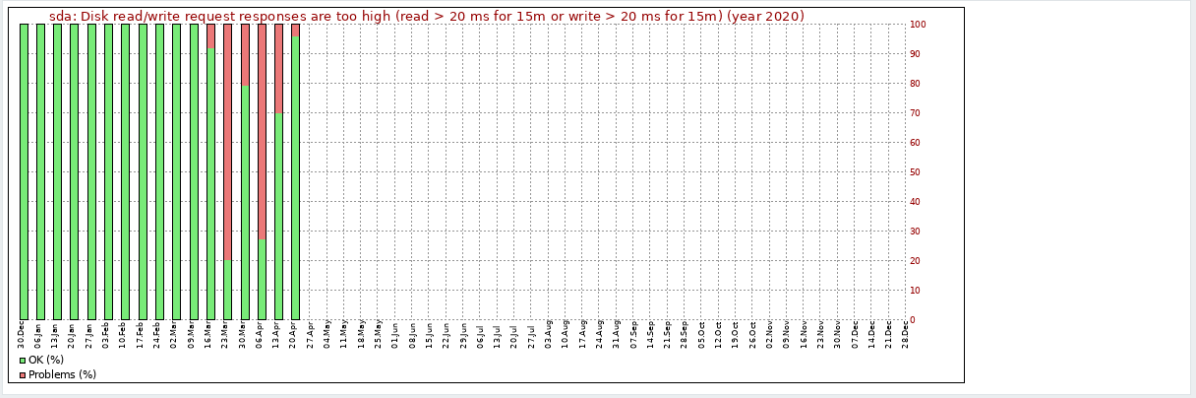
### Filtering by host

In the by host mode results can be filtered by host or by host group. Specifying a parent host group implicitly selects all nested host groups.

### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

Clicking on Show in the Graph column displays a bar graph where availability information is displayed in bar format each bar representing a past week of the current year.



The green part of a bar stands for OK time and red for problem time.

### 3 Triggers top 100

#### Overview

In Reports → Triggers top 100 you can see the triggers that have changed their state most often within the period of evaluation, sorted by the number of status changes.

#### 100 busiest triggers

Zoom out
Last 30 days
Filter

Host groups  Select

Hosts  Select

Severity  Not classified  Warning  High  
 Information  Average  Disaster

Apply Reset

Host	Trigger	Severity	Number of status changes
<a href="#">New host</a>	<a href="#">CPU load too high on New host for 3 minutes</a>	Warning	92
<a href="#">Zabbix server</a>	<a href="#">Disk I/O is overloaded on Zabbix server</a>	Warning	88
<a href="#">New host</a>	<a href="#">Disk I/O is overloaded on New host</a>	Warning	82
<a href="#">New host</a>	<a href="#">New host has just been restarted</a>	Information	19
<a href="#">Zabbix server</a>	<a href="#">Zabbix server has just been restarted</a>	Information	19
<a href="#">Zabbix server</a>	<a href="#">Lack of free swap space on Zabbix server</a>	Warning	16
<a href="#">New host</a>	<a href="#">Lack of free swap space on New host</a>	Warning	12
<a href="#">New host</a>	<a href="#">Zabbix agent on New host is unreachable for 5 minutes</a>	Average	8
<a href="#">Zabbix server</a>	<a href="#">Zabbix agent on Zabbix server is unreachable for 5 minutes</a>	Average	8
<a href="#">New host</a>	<a href="#">/etc/passwd has been changed on New host</a>	Warning	4

Both host and trigger column entries are links that offer some useful options:

- for host - links to user-defined scripts, latest data, inventory, graphs and screens for the host
- for trigger - links to latest events, the trigger configuration form and a simple graph

#### Using filter

You may use the filter to display triggers by host group, host or trigger severity. Specifying a parent host group implicitly selects all nested host groups. For better search performance, data is searched with macros unresolved.

The filter is located below the 100 busiest triggers bar. It can be opened and collapsed by clicking on the Filter tab on the left.

#### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

## 4 Audit

### Overview

In the Reports → Audit section users can view records of changes made in the frontend.

### Audit log

In this screen the audit log of various changes made in the frontend can be seen.

#### ☰ Audit log

The screenshot shows the Audit log interface. At the top right, there are navigation controls: a left arrow, 'Zoom out', a right arrow, a 'Last 3 months' time period selector with a refresh icon, and a 'Filter' tab with a filter icon. Below these are filter fields: 'Users' with a text input and a 'Select' button, 'Resource' with a dropdown menu showing 'Item', 'Resource ID' with a text input, and 'Action' with a dropdown menu showing 'All'. At the bottom of the filter section are 'Apply' and 'Reset' buttons. Below the filters is a table with the following data:

Time	User	IP	Resource	Action	ID	Description	Details
03/04/2021 10:25:55 AM	Admin	127.0.0.1	Item	Update	0		Item [agent.ping] [23287] Host [Zabbix server] History cleared
12/29/2020 01:21:02 PM	Admin	127.0.0.1	Item	Delete	30549	Trap	

### Displayed data:

Column	Description
Time	Timestamp of the audit record.
User	User of the activity.
IP	IP that was used in the activity.
Resource	Affected resource is displayed.
Action	Activity type is displayed - Login, Logout, Added, Updated, Deleted, Enabled or Disabled.
ID	ID of the affected resource is displayed.
Description	Description of the resource is displayed.
Details	Detailed information on the performed activity is displayed.

### Using filter

You may use the filter to narrow down the records by user, activity type and affected resource. For better search performance, data is searched with macros unresolved.

The filter is located below the Audit log bar. It can be opened and collapsed by clicking on the Filter tab on the left.

### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

## 5 Action log

### Overview

In the Reports → Action log section users can view details of operations (notifications, remote commands) executed within an action.

## Action log

Time	Action	Type	Recipient	Message	Status	Info
2020-06-09 15:47:16	Report problems to Zabbix administrators	Email	Admin (Zabbix Administrator) <i>marina.generalova@zabbix.com</i>	<b>Subject:</b> Resolved in 2m: High CPU utilization (over 75% for 5m) <b>Message:</b> Problem has been resolved at 15:47:13 on 2020.06.09 Problem name: High CPU utilization (over 75% for 5m) Problem duration: 2m Host: Zabbix server Severity: Warning Original problem ID: 1287	Sent	
2020-06-09 15:44:40	Report problems to Zabbix administrators	Email	Admin (Zabbix Administrator) <i>marina.generalova@zabbix.com</i>	<b>Subject:</b> Resolved in 3m: Zabbix agent is not available (for 1m) <b>Message:</b> Problem has been resolved at 15:44:37 on 2020.06.09 Problem name: Zabbix agent is not available (for 1m) Problem duration: 3m Host: Zabbix server Severity: Average Original problem ID: 1286	Sent	

Displayed data:

Column	Description
Time	Timestamp of the operation.
Action	Name of the action causing operations is displayed.
Type	Operation type is displayed - Email or Command.
Recipient(s)	User alias, name and surname (in parenthesis) and e-mail address of the notification recipient is displayed.
Message	The content of the message/remote command is displayed. A remote command is separated from the target host with a colon symbol: <code>&lt;host&gt; : &lt;command&gt;</code> . If the remote command is executed on Zabbix server, then the information has the following format: <code>Zabbix server : &lt;command&gt;</code>
Status	Operation status is displayed: In progress - action is in progress For actions in progress the number of retries left is displayed - the remaining number of times the server will try to send the notification. Sent - notification has been sent Executed - command has been executed Not sent - action has not been completed.
Info	Error information (if any) regarding the action execution is displayed.

### Using filter

You may use the filter to narrow down the records by the message recipient(s). For better search performance, data is searched with macros unresolved.

The filter is located below the Action log bar. It can be opened and collapsed by clicking on the Filter tab on the left.

### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

## 6 Notifications

### Overview

In the Reports → Notifications section a report on the number of notifications sent to each user is displayed.

From the dropdowns in the top right-hand corner you can choose the media type (or all), period (data for each day/week/month/year) and year for the notifications sent.

Month	Admin (Zabbix Administrator)	Database manager	guest	user (New User)
January				
February				
March				
April				48
May				568

Each column displays totals per one system user.

## 4 Configuration

### Overview

The Configuration menu contains sections for setting up major Zabbix functions, such as hosts and host groups, data gathering, data thresholds, sending problem notifications, creating data visualization and others.

### 1 Host groups

#### Overview

In the Configuration → Host groups section users can configure and maintain host groups. A host group can contain both templates and hosts.

A listing of existing host groups with their details is displayed. You can search and filter host groups by name.

Filter ⌵

Apply
Reset

<input type="checkbox"/> Name <span>▲</span>	Hosts	Templates	Members	Info
<input type="checkbox"/> Discovered hosts	Hosts	Templates		
<input type="checkbox"/> Hypervisors	Hosts	Templates		
<input type="checkbox"/> Linux servers	Hosts 4	Templates	Server1, Server2, Server3, Server4	
<input type="checkbox"/> Templates	Hosts	Templates		
<input type="checkbox"/> Templates/Applications	Hosts	Templates 14	Template App Apache by HTTP, Template App Apache by Zabbix agent, Template App Apache Tomcat JMX, Template App Generic Java JMX, Template App Nginx by HTTP, Template App Nginx by Zabbix agent, Template App RabbitMQ cluster by HTTP, Template App RabbitMQ cluster by Zabbix agent, Template App RabbitMQ node by HTTP, Template App RabbitMQ node by Zabbix agent, Template App Remote Zabbix proxy, Template App Remote Zabbix server, Template App Zabbix Proxy, Template App Zabbix Server	
<input type="checkbox"/> Templates/Databases	Hosts	Templates 2	Template DB MySQL, Template DB PostgreSQL	

Displayed data:

Column	Description
Name	Name of the host group. Clicking on the group name opens the host group <b>configuration form</b> .
Hosts	Number of hosts in the group (displayed in gray). Clicking on "Hosts" will, in the whole listing of hosts, filter out those that belong to the group.
Templates	Number of templates in the group (displayed in gray). Clicking on "Templates" will, in the whole listing of templates, filter out those that belong to the group.
Members	Names of group members. Template names are displayed in gray, monitored host names in blue and non-monitored host names in red. Clicking on a name will open the template/host configuration form.
Info	Error information (if any) regarding the host group is displayed.

Mass editing options

Buttons below the list offer some mass-editing options:

- Enable hosts - change the status of all hosts in the group to "Monitored"
- Disable hosts - change the status of all hosts in the group to "Not monitored"
- Delete - delete the host groups

To use these options, mark the checkboxes before the respective host groups, then click on the required button.

Using filter

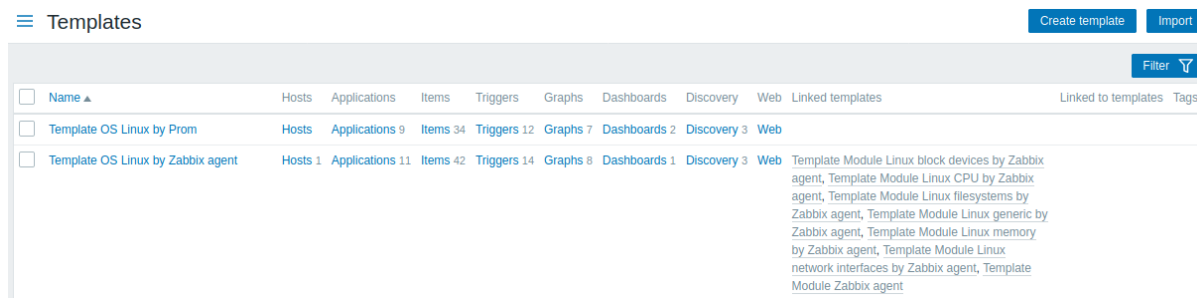
You can use the filter to display only the host groups you are interested in. For better search performance, data is searched with macros unresolved.

## 2 Templates

Overview

In the Configuration → Templates section users can configure and maintain templates.

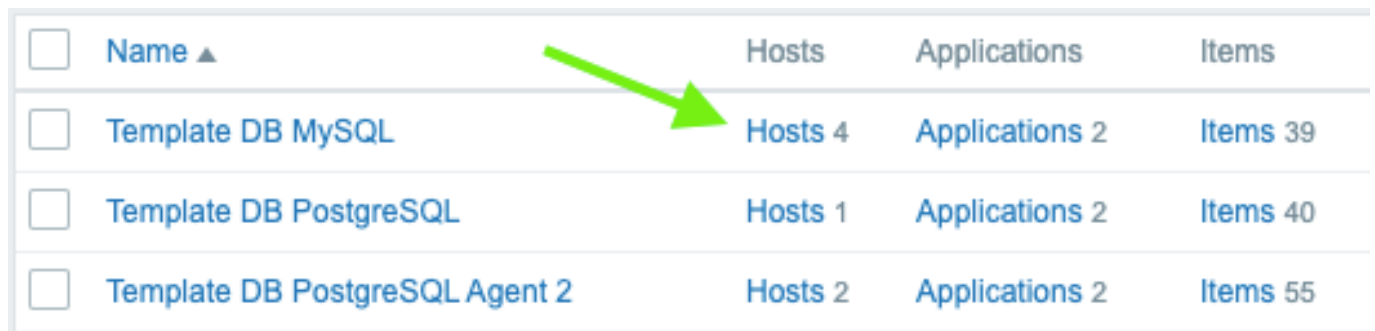
A listing of existing templates with their details is displayed.



Displayed data:

Column	Description
Name	Name of the template. Clicking on the template name opens the <a href="#">template configuration form</a> .
Hosts	Number of editable hosts to which the template is linked; read-only hosts are not included. Hosts column is available since Zabbix 5.0.3.
Entities (Applications, Items, Triggers, Graphs, Dashboards, Discovery, Web)	Number of the respective entities in the template (displayed in gray). Clicking on the entity name will, in the whole listing of that entity, filter out those that belong to the template.
Linked templates	Templates that are linked to the template, in a nested setup where the template will inherit all entities of the linked templates.
Linked to templates	The templates that the template is linked to ("children" templates that inherit all entities from this template).
Tags	Since Zabbix 5.0.3, this column no longer includes hosts. <a href="#">Tags</a> of the template, with macros unresolved.

To view all hosts, connected to a template, click on the Hosts hyperlink.



This will open host configuration [section](#) filtered out by the template name (thus, only those hosts to which the template is linked to will be displayed):

Host groups

**Templates**

Name

DNS

IP

Port

Monitored by

Proxy

Tags

---

**Name** ▲ Applications Items Triggers Graphs Discovery Web Interface Proxy

**MySQL server DC** Applications 17 Items 117 Triggers 31 Graphs 25 Discovery 5 Web 127.0.0.1:10050

To configure a new template, click on the Create template button in the top right-hand corner. To import a template from an XML file, click on the Import button in the top right-hand corner.

Using filter

You can use the filter to display only the templates you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available below Create template and Import buttons. If you click on it, a filter becomes available where you can filter templates by host group, directly linked templates and name.

Filter

Host groups

Linked templates

Name

Tags

Filtering is possible only by template-level tags (not inherited ones).

Mass editing options

Buttons below the list offer some mass-editing options:

- Export - export the template to a YAML, XML or JSON file
- Mass update - **update several properties** for a number of templates at once
- Delete - delete the template while leaving its linked entities (items, triggers etc.) with the hosts
- Delete and clear - delete the template and its linked entities from the hosts

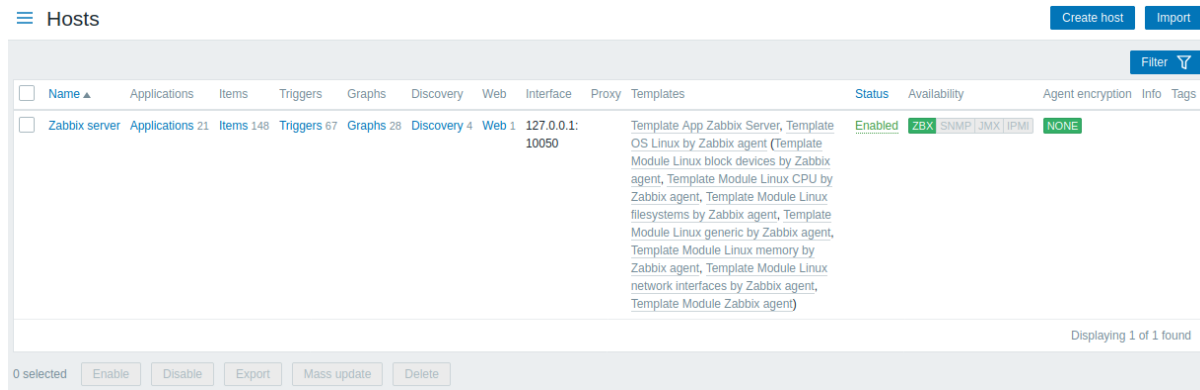
To use these options, mark the checkboxes before the respective templates, then click on the required button.

### 3 Hosts


Overview

In the Configuration → Hosts section users can configure and maintain hosts.

A listing of existing hosts with their details is displayed.



Displayed data:

Column	Description
Name	Name of the host. Clicking on the host name opens the host <b>configuration form</b> .
Elements (Applications, Items, Triggers, Graphs, Discovery, Web)	Clicking on the element name will display items, triggers etc. of the host. The number of the respective elements is displayed in gray.
Interface	The main interface of the host is displayed.
Proxy	Proxy name is displayed, if the host is monitored by a proxy. This column is only displayed if the Monitored by filter option is set to 'Any' or 'Proxy'.
Templates	The templates linked to the host are displayed. If other templates are contained in the linked template, those are displayed in parentheses, separated by a comma. Clicking on a template name will open its configuration form.
Status	Host status is displayed - Enabled or Disabled. By clicking on the status you can change it.  An orange wrench icon  before the host status indicates that this host is in maintenance. Maintenance details are displayed when the mouse pointer is positioned over the icon.
Availability	<b>Availability</b> of the host is displayed. Four icons each represent a supported interface (Zabbix agent, SNMP, IPMI, JMX). The current status of the interface is displayed by the respective color: <b>Green</b> - available <b>Red</b> - not available (upon mouseover, details of why the interface cannot be reached are displayed) <b>Gray</b> - unknown or not configured Note that active Zabbix agent items do not affect host availability.
Agent encryption	Encryption status for connections to the host is displayed: <b>None</b> - no encryption <b>PSK</b> - using pre-shared key <b>Cert</b> - using certificate
Info	Error information (if any) regarding the host is displayed.
Tags	<b>Tags</b> of the host, with macros unresolved.

To configure a new host, click on the Create host button in the top right-hand corner. To import a host from an XML file, click on the Import button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change host status to Monitored
- Disable - change host status to Not monitored
- Export - export the hosts to a YAML, XML or JSON file
- Mass update - **update several properties** for a number of hosts at once



- Delete - delete the hosts

To use these options, mark the checkboxes before the respective hosts, then click on the required button.

### Filter

You can use the filter to display only the hosts you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of hosts. If you click on it, a filter becomes available where you can filter hosts by host group, linked templates, name, if they are monitored by server or by proxy, proxy name, DNS, IP or port number.

### Reading host availability

Host availability icons reflect the current host interface status on Zabbix server. Therefore, in the frontend:

- If you disable a host, availability icons will not immediately turn gray (unknown status), because the server has to synchronize the configuration changes first;
- If you enable a host, availability icons will not immediately turn green (available), because the server has to synchronize the configuration changes and start polling the host first.

### Unknown host status

Zabbix server sets the host availability icon to gray (unknown status) for the corresponding agent interface (Zabbix, SNMP, IPMI, JMX) if:

- there are no enabled items on the interface (they were removed or disabled);
- there are only active Zabbix agent items;
- there are no pollers for that type of the interface (e.g. StartPollers=0);
- host is disabled;
- host is set to be monitored by proxy, a different proxy or by server if it was monitored by proxy;
- host is monitored by a proxy that appears to be offline (no updates received from the proxy during the maximum heartbeat interval - 1 hour).

Setting host availability to unknown is done after server configuration cache synchronization. Restoring host availability (available/unavailable) on hosts monitored by proxies is done after proxy configuration cache synchronization.

See also more details about host [unreachability](#).

### 1 Applications

#### Overview

The application list for a template can be accessed from Configuration → Templates and then clicking on Applications for the respective template.

The application list for a host can be accessed from Configuration → Hosts and then clicking on Applications for the respective host.

A list of existing applications is displayed.

☰ Applications Create application

All hosts / Zabbix server Enabled ZBX SNMP JMX IPMI Applications 21 Items 148 Triggers 67 Graphs 28 Discovery rules 4 Web scenarios 1 Filter

Application	Items	Info
Application	Items	Info
Template Module Linux CPU by Zabbix agent: CPU	Items 17	
Block devices discovery: Disk sda	Items 6	
Block devices discovery: Disk sdb	Items 6	
Block devices discovery: Disk sdc	Items 6	<span style="color: orange;">i</span>
Mounted filesystem discovery: Filesystem /	Items 4	
Template Module Linux filesystems by Zabbix agent: Filesystems	Items	
Template Module Linux generic by Zabbix agent: General	Items 9	
Network interface discovery: Interface enp4s0	Items 8	
Network interface discovery: Interface ppp0	Items 8	<span style="color: orange;">i</span>
Network interface discovery: Interface wlp3s0	Items 8	
Network interface discovery: Interface wwx001e101f0000	Items 8	<span style="color: orange;">i</span>
Template Module Linux generic by Zabbix agent: Inventory	Items 3	

Displayed data:

Column	Description
Application	Name of the application, displayed as a blue link for directly created applications. Clicking on the application name link opens the application <b>configuration form</b> . If the host application belongs to a template, the template name is displayed before the application name, as a gray link. Clicking on the template link will open the application list on the template level.
Items	Click on Items to view the items contained in the application. The number of items is displayed in gray.
Info	Error information (if any) regarding the application is displayed.

To configure a new application, click on the Create application button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change application status to Enabled
- Disable - change application status to Disabled
- Delete - delete the applications

To use these options, mark the checkboxes before the respective applications, then click on the required button.

2 Items

Overview

The item list for a template can be accessed from Configuration → Templates and then clicking on Items for the respective template.

The item list for a host can be accessed from Configuration → Hosts and then clicking on Items for the respective host.

A list of existing items is displayed.

☰ Items Create item

All hosts / Zabbix server Enabled ZBX SNMP JMX IPMI Applications 22 Items 156 Triggers 68 Graphs 31 Discovery rules 4 Web scenarios 1 Filter

Wizard	Name	Triggers	Key	Interval	History	Trends	Type	Applications	Status	Info
<input type="checkbox"/>	Mounted filesystem discovery: /: Free inodes in %	Triggers 2	vfs.fs.inode[/,pfree]	1m	7d	365d	Zabbix agent	Filesystem /	Enabled	
<input type="checkbox"/>	Mounted filesystem discovery: /: Space utilization	Triggers 2	vfs.fs.size[/,pused]	1m	7d	365d	Zabbix agent	Filesystem /	Enabled	
<input type="checkbox"/>	Mounted filesystem discovery: /: Total space	Triggers 2	vfs.fs.size[/,total]	1m	7d	365d	Zabbix agent	Filesystem /	Enabled	
<input type="checkbox"/>	Mounted filesystem discovery: /: Used space	Triggers 2	vfs.fs.size[/,used]	1m	7d	365d	Zabbix agent	Filesystem /	Enabled	
<input type="checkbox"/>	Template Module Linux memory by Zabbix agent: Available memory	Triggers 1	vm.memory.size[available]	1m	7d	365d	Zabbix agent	Memory	Enabled	
<input type="checkbox"/>	Template Module Linux generic by Zabbix agent: Checksum of /etc/passwd	Triggers 1	vfs.file.cksum[/etc/passwd]	15m	7d		Zabbix agent	Security	Enabled	
<input type="checkbox"/>	Template Module Linux CPU by Zabbix agent: Context switches per second		system.cpu.switches	1m	7d	365d	Zabbix agent	CPU	Enabled	

Displayed data:

Column	Description
Wizard	The wizard icon is a link to a wizard for creating a trigger based on the item.
Host	Host of the item. This column is displayed only if multiple hosts are selected in the filter.
Name	Name of the item, displayed as a blue link to item details. Clicking on the item name link opens the item <b>configuration form</b> . If the host item belongs to a template, the template name is displayed before the item name, as a gray link. Clicking on the template link will open the item list on the template level. If the item has been created from an item prototype, its name is preceded by the low level discovery rule name, in orange. Clicking on the discovery rule name will open the item prototype list.
Triggers	Moving the mouse over Triggers will display an info box displaying the triggers associated with the item. The number of the triggers is displayed in gray.
Key	Item key is displayed.
Interval	Frequency of the check is displayed. Note that passive items can also be checked immediately by pushing the Check now <b>button</b> .
History	How many days item data history will be kept is displayed.
Trends	How many days item trends history will be kept is displayed.
Type	Item type is displayed (Zabbix agent, SNMP agent, simple check, etc).
Applications	Item applications are displayed.
Status	Item status is displayed - Enabled, Disabled or Not supported. By clicking on the status you can change it - from Enabled to Disabled (and back); from Not supported to Disabled (and back).
Info	If everything is fine, no icon is displayed in this column. If there are errors, a red square icon with a cross is displayed. Move the mouse over the icon and you will see a tooltip with the error description.

To configure a new item, click on the Create item button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change item status to Enabled
- Disable - change item status to Disabled
- Check now - execute a check for new item values immediately. Supported for **passive** checks only (see **more details**). Note that when checking for values immediately, configuration cache is not updated, thus the values will not reflect very recent changes to item configuration.
- Clear history - delete history and trend data for items
- Copy - copy the items to other hosts or templates
- Mass update - **update several properties** for a number of items at once
- Delete - delete the items

To use these options, mark the checkboxes before the respective items, then click on the required button.

#### Using filter

You can use the filter to display only the items you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list. If you click on it, a filter becomes available where you can filter items by several properties.

All hosts / Zabbix server Enabled ZBX SNMP IPMI Applications 20 Items 141 Triggers 64 Graphs 27 Discovery rules 3 Web scenarios 1 Filter

Host groups  Select Type all Type of information all State all Normal Not supported

Hosts  Select Update interval  History  Status all Enabled Disabled

Application  Select Trends  With triggers all Yes No

Name  Inherited all Yes No

Key  Discovered all Yes No

Apply Reset

Subfilter affects only filtered data

APPLICATIONS  
CPU 17 Disk sda 6 Disk sdb 6 Disk sdc 6 ZBX 6 Filesystem 4 General 9 Interface enp4s0 8 Interface ppp0 8 Interface wlp3s0 8 Inventory 3 Memory 6 Monitoring agent 3 Security 1 Status 2 Zabbix raw items 7 Zabbix server 46

TYPES  
Calculated 6 Dependent item 19 IPMI agent 1 Zabbix agent 67 Zabbix agent (active) 1 Zabbix internal 47

TYPE OF INFORMATION  
Character 7 Numeric (float) 85 Numeric (unsigned) 46 Text 3

STATE  
Normal 119 Not supported 22

TEMPLATE  
Inherited items 88 Not inherited items 53

WITH TRIGGERS

Parameter	Description
Host groups	Filter by one or more host groups. Specifying a parent host group implicitly selects all nested host groups.
Hosts	Filter by one or more hosts.
Application	Filter by application.
Name	Filter by item name.
Key	Filter by item key.
Type	Filter by item type (Zabbix agent, SNMP agent, etc.).
Update interval	Filter by item update interval.
Type of information	Filter by type of information (Numeric unsigned, float, etc.).
History	Filter by how long item history is kept.
Trends	Filter by how long item trends are kept.
State	Filter by item state - Normal or Not supported.
Status	Filter by item status - Enabled or Disabled.
Triggers	Filter items with (or without) triggers.
Template	Filter items inherited (or not inherited) from a template.
Discovery	Filter items discovered (or not discovered) by low-level discovery.

The **Subfilter** below the filter offers further filtering options (for the data already filtered). You can select groups of items with a common parameter value. If you click on a group it gets highlighted and only the items with this parameter value remain in the list.

### 3 Triggers

#### Overview

The trigger list for a template can be accessed from Configuration → Templates and then clicking on Triggers for the respective template.

The trigger list for a host can be accessed from Configuration → Hosts and then clicking on Triggers for the respective host.

Triggers Create trigger

All hosts / Zabbix server Enabled ZBX SNMP JMX IPMI Applications 22 Items 156 Triggers 68 Graphs 31 Discovery rules 4 Web scenarios 1 Filter

Severity	Value	Name	Operational data	Expression	Status	Info	Tags
Average	OK	Mounted filesystem discovery: /: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"7"}%)	Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1})	{Zabbix server.vfs.fs.size[/,pused].last()}>{SVFS.FS.PUSED.MAX.CRIT:"7"} and (((Zabbix server.vfs.size[/,total].last())-{Zabbix server.vfs.size[/,used].last()}<5G or {Zabbix server.vfs.size[/,pused].timeleft(1h,100)}<1d)	Enabled		
Warning	OK	Mounted filesystem discovery: /: Disk space is low (used > {SVFS.FS.PUSED.MAX.WARN:"7"}%) Depends on: Zabbix server: /: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"7"}%)	Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1})	{Zabbix server.vfs.fs.size[/,pused].last()}>{SVFS.FS.PUSED.MAX.WARN:"7"} and (((Zabbix server.vfs.size[/,total].last())-{Zabbix server.vfs.size[/,used].last()}<10G or {Zabbix server.vfs.size[/,pused].timeleft(1h,100)}<1d)	Enabled		
Average	OK	Mounted filesystem discovery: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}%)	Free inodes: {ITEM.LASTVALUE1}	{Zabbix server.vfs.fs.inode[/,pfree].min(5m)}<{SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}	Enabled		
Warning	OK	Mounted filesystem discovery: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.WARN:"7"}%) Depends on: Zabbix server: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}%)	Free inodes: {ITEM.LASTVALUE1}	{Zabbix server.vfs.fs.inode[/,pfree].min(5m)}<{SVFS.FS.INODE.PFREE.MIN.WARN:"7"}	Enabled		
Information	OK	Template Module Linux generic by Zabbix agent: /etc/passwd has been changed Depends on: Zabbix server: Operating system description has changed Zabbix server: System name has changed (new name: {ITEM.VALUE})		{Zabbix server.vfs.file.cksum[/etc/passwd].diff()}>0	Enabled		

### Displayed data:

Column	Description
Severity	Severity of the trigger is displayed by both name and cell background color.
Value	Trigger value is displayed: <b>OK</b> - trigger is in OK state <b>PROBLEM</b> - trigger is in problem state
Host	Host of the trigger.
Name	This column is displayed only if multiple hosts are selected in the filter. Name of the trigger, displayed as a blue link to trigger details. Clicking on the trigger name link opens the trigger <b>configuration form</b> . If the host trigger belongs to a template, the template name is displayed before the trigger name, as a gray link. Clicking on the template link will open the trigger list on the template level. If the trigger has been created from a trigger prototype, its name is preceded by the low level discovery rule name, in orange. Clicking on the discovery rule name will open the trigger prototype list.
Operational data	Operational data definition of the trigger, containing arbitrary strings and macros that will resolve dynamically in Monitoring → Problems.
Expression	Trigger expression is displayed. The host-item part of the expression is displayed as a link, leading to the item configuration form.
Status	Trigger status is displayed - Enabled, Disabled or Unknown. By clicking on the status you can change it - from Enabled to Disabled (and back); from Unknown to Disabled (and back). Problems of a disabled trigger are no longer displayed in the frontend, but are not deleted.
Info	If everything is fine, no icon is displayed in this column. If there are errors, a red square icon with a cross is displayed. Move the mouse over the icon and you will see a tooltip with the error description.
Tags	If trigger contains tags, tag name and value are displayed in this column.

To configure a new trigger, click on the Create trigger button in the top right-hand corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change trigger status to Enabled
- Disable - change trigger status to Disabled
- Copy - copy the triggers to other hosts or templates
- Mass update - update several properties for a number of triggers at once
- Delete - delete the triggers

To use these options, mark the checkboxes before the respective triggers, then click on the required button.

### Using filter

You can use the filter to display only the triggers you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table.

Parameter	Description
Host groups	Filter by one or more host groups. Specifying a parent host group implicitly selects all nested host groups.
Hosts	Filter by one or more hosts. If host groups are already selected above, host selection is limited to those groups.
Name	Filter by trigger name.
Severity	Select to filter by one or several trigger severities.
State	Filter by trigger state.
Status	Filter by trigger status.
Value	Filter by trigger value.
Tags	Filter by trigger tag name and tag value. Several conditions can be set. There are two calculation types for conditions: <b>And/Or</b> - all conditions must be met, conditions having same tag name will be grouped by Or condition <b>Or</b> - enough if one condition is met There are two ways of matching the tag value: <b>Contains</b> - case-sensitive substring match (tag value contains the entered string) <b>Equals</b> - case-sensitive string match (tag value equals the entered string) When filtered, the tags specified here will be displayed first with the trigger. Macros and <b>macro functions</b> are supported both in tag name and tag value fields.
Inherited	Filter triggers inherited (or not inherited) from a template.
Discovered	Filter triggers discovered (or not discovered) by low-level discovery.
With dependencies	Filter triggers with (or without) dependencies.

#### 4 Graphs

##### Overview

The custom graph list for a template can be accessed from Configuration → Templates and then clicking on Graphs for the respective template.

The custom graph list for a host can be accessed from Configuration → Hosts and then clicking on Graphs for the respective host.

A list of existing graphs is displayed.

≡ Graphs Create graph

All hosts / Zabbix server Enabled ZBX SNMP JMX IPMI Applications 21 Items 148 Triggers 67 Graphs 28 Discovery rules 4 Web scenarios 1 Filter

<input type="checkbox"/> Name ▲	Width	Height	Graph type
<input type="checkbox"/> Mounted filesystem discovery: /: Disk space usage	600	340	Pie
<input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU jumps	900	200	Normal
<input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU usage	900	200	Stacked
<input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU utilization	900	200	Normal
<input type="checkbox"/> Network interface discovery: Interface enp4s0: Network traffic	900	200	Normal
<input type="checkbox"/> Network interface discovery: Interface ppp0: Network traffic	900	200	Normal
<input type="checkbox"/> Network interface discovery: Interface wlp3s0: Network traffic	900	200	Normal
<input type="checkbox"/> Network interface discovery: Interface wwx001e101f0000: Network traffic	900	200	Normal
<input type="checkbox"/> Template Module Linux memory by Zabbix agent: Memory usage	900	200	Normal
<input type="checkbox"/> Template Module Linux memory by Zabbix agent: Memory utilization	900	200	Normal
<input type="checkbox"/> Template Module Linux generic by Zabbix agent: Processes	900	200	Normal
<input type="checkbox"/> Block devices discovery: sda: Disk average waiting time	900	200	Normal

#### Displayed data:

Column	Description
Name	Name of the custom graph, displayed as a blue link to graph details. Clicking on the graph name link opens the graph <b>configuration form</b> . If the host graph belongs to a template, the template name is displayed before the graph name, as a gray link. Clicking on the template link will open the graph list on the template level. If the graph has been created from a graph prototype, its name is preceded by the low level discovery rule name, in orange. Clicking on the discovery rule name will open the graph prototype list.
Width	Graph width is displayed.
Height	Graph height is displayed.
Graph type	Graph type is displayed - Normal, Stacked, Pie or Exploded.

To configure a new graph, click on the Create graph button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- Copy - copy the graphs to other hosts or templates
- Delete - delete the graphs

To use these options, mark the checkboxes before the respective graphs, then click on the required button.

#### Using filter

You can filter graphs by host group and template/host. For better search performance, data is searched with macros unresolved.

#### 5 Discovery rules

##### Overview

The list of low-level discovery rules for a template can be accessed from Configuration → Templates and then clicking on Discovery for the respective template.

The list of low-level discovery rules for a host can be accessed from Configuration → Hosts and then clicking on Discovery for the respective host.

A list of existing low-level discovery rules is displayed. It is also possible to see all discovery rules independently of the template/host, or all discovery rules of a specific host group by making selections in the filter.

Discovery rules Create discovery rule

All hosts / Zabbixserver Enabled ZBX SNMP JMX IPMI Applications 22 Items 156 Triggers 68 Graphs 31 Discovery rules 3 Web scenarios 1 Filter

<input type="checkbox"/>	Host	Name ▲	Items	Triggers	Graphs	Hosts	Key	Interval	Type	Status	Info
<input type="checkbox"/>	Zabbixserver	Template Module Linux block devices by Zabbix agent: <a href="#">Get /proc/diskstats: Block devices discovery</a>	<a href="#">Item prototypes 8</a>	<a href="#">Trigger prototypes 1</a>	<a href="#">Graph prototypes 3</a>	<a href="#">Host prototypes</a>	vfs.dev.discovery		Dependent item	<span>Enabled</span>	
<input type="checkbox"/>	Zabbixserver	Template Module Linux filesystems by Zabbix agent: <a href="#">Mounted filesystem discovery</a>	<a href="#">Item prototypes 4</a>	<a href="#">Trigger prototypes 4</a>	<a href="#">Graph prototypes 1</a>	<a href="#">Host prototypes</a>	vfs.fs.discovery	1h	Zabbix agent	<span>Enabled</span>	
<input type="checkbox"/>	Zabbixserver	Template Module Linux network interfaces by Zabbix agent: <a href="#">Network interface discovery</a>	<a href="#">Item prototypes 8</a>	<a href="#">Trigger prototypes 3</a>	<a href="#">Graph prototypes 1</a>	<a href="#">Host prototypes</a>	net.if.discovery	1h	Zabbix agent	<span>Enabled</span>	

Displaying 3 of 3 found

0 selected Enable Disable Execute now Delete

Displayed data:

Column	Description
Host	The visible host name is displayed. In the absence of a visible host name, the technical host name is displayed.
Name	Name of the rule, displayed as a blue link. Clicking on the rule name opens the low-level discovery rule <b>configuration form</b> . If the discovery rule belongs to a template, the template name is displayed before the rule name, as a gray link. Clicking on the template link will open the rule list on the template level.
Items	A link to the list of item prototypes is displayed. The number of existing item prototypes is displayed in gray.
Triggers	A link to the list of trigger prototypes is displayed. The number of existing trigger prototypes is displayed in gray.
Graphs	A link to the list of graph prototypes displayed. The number of existing graph prototypes is displayed in gray.
Hosts	A link to the list of host prototypes displayed. The number of existing host prototypes is displayed in gray.
Key	The item key used for discovery is displayed.
Interval	The frequency of performing discovery is displayed. Note that discovery can also be performed immediately by pushing the Check now button below the list.
Type	The item type used for discovery is displayed (Zabbix agent, SNMP agent, etc).
Status	Discovery rule status is displayed - Enabled, Disabled or Not supported. By clicking on the status you can change it - from Enabled to Disabled (and back); from Not supported to Disabled (and back).
Info	If everything is fine, no icon is displayed in this column. If there are errors, a red square icon with a cross is displayed. Move the mouse over the icon and you will see a tooltip with the error description.

To configure a new low-level discovery rule, click on the Create discovery rule button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the low-level discovery rule status to Enabled
- Disable - change the low-level discovery rule status to Disabled
- Check now - perform discovery based on the discovery rules immediately. See **more details**. Note that when performing discovery immediately, the configuration cache is not updated, thus the result will not reflect very recent changes to discovery rule configuration
- Delete - delete the low-level discovery rules

To use these options, mark the checkboxes before the respective discovery rules, then click on the required button.

Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of discovery rules. If you click on it, a filter becomes available where you can filter discovery rules by host group, host, name, item key, item type and other parameters.



All hosts / Zabbix server Enabled ZBX SNMP IPMI Applications 20 Items 141 Triggers 64 Graphs 27 Discovery rules 3 Web scenarios 1 Filter

Host groups  Select Type all State all Normal Not supported

Hosts Zabbix server  Select Update interval  Status all Enabled Disabled

Name  Keep lost resources period

Key

Apply Reset

Parameter	Description
Host groups	Filter by one or more host groups. Specifying a parent host group implicitly selects all nested host groups.
Hosts	Filter by one or more hosts.
Name	Filter by discovery rule name.
Key	Filter by discovery item key.
Type	Filter by discovery item type.
Update interval	Filter by update interval.
Keep lost resources period	Not available for Zabbix trapper and dependent items. Filter by keep lost resources period.
SNMP OID	Filter by SNMP OID.
State	Only available if SNMP agent is selected as type. Filter by discovery rule state (all/normal/unsupported).
Status	Filter by discovery rule status (all/enabled/disabled).

## 6 Web scenarios

### Overview

The web scenario list for a template can be accessed from Configuration → Templates and then clicking on Web for the respective template.

The web scenario list for a host can be accessed from Configuration → Hosts and then clicking on Web for the respective host.

A list of existing web scenarios is displayed.

Web monitoring Create web scenario

Name ▲	Number of steps	Interval	Attempts	Authentication	HTTP proxy	Application	Status	Info
Zabbix frontend	1	1m	1	None	No	Web checks	Enabled	

0 selected Enable Disable Clear history Delete Displaying 1 of 1 found

Displayed data:

Column	Description
Name	Name of the web scenario. Clicking on the web scenario name opens the web scenario <b>configuration form</b> .
Number of steps	The number of steps contained in the scenario.
Update interval	How often the scenario is performed.
Attempts	How many attempts for executing web scenario steps are performed.
Authentication	Authentication method is displayed - Basic, NTLM on None.
HTTP proxy	Displays HTTP proxy or 'No' if not used.
Application	Web scenario application is displayed.
Status	Web scenario status is displayed - Enabled or Disabled. By clicking on the status you can change it.
Info	If everything is fine, no icon is displayed in this column. If there are errors, a red square icon with a cross is displayed. Move the mouse over the icon and you will see a tooltip with the error description.

To configure a new web scenario, click on the Create web scenario button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the scenario status to Enabled
- Disable - change the scenario status to Disabled
- Clear history - clear history and trend data for the scenarios
- Delete - delete the web scenarios

To use these options, mark the checkboxes before the respective web scenarios, then click on the required button.

#### Using filter

You can use the filter to display only the scenarios you are interested in. For better search performance, data is searched with macros unresolved.

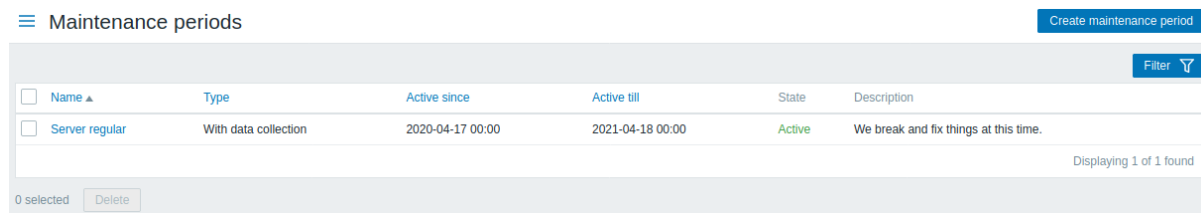
The Filter link is available above the list of web scenarios. If you click on it, a filter becomes available where you can filter scenarios by host group, host and status.

## 4 Maintenance

### Overview

In the Configuration → Maintenance section users can configure and maintain maintenance periods for hosts.

A listing of existing maintenance periods with their details is displayed.



#### Displayed data:

Column	Description
Name	Name of the maintenance period. Clicking on the maintenance period name opens the maintenance period <b>configuration form</b> .
Type	The type of maintenance is displayed: With data collection or No data collection
Active since	The date and time when executing maintenance periods becomes active. Note: This time does not activate a maintenance period; maintenance periods need to be set separately.
Active till	The date and time when executing maintenance periods stops being active.
State	The state of the maintenance period: <b>Approaching</b> - will become active soon <b>Active</b> - is active <b>Expired</b> - is not active any more
Description	Description of the maintenance period is displayed.

To configure a new maintenance period, click on the Create maintenance period button in the top right-hand corner.

#### Mass editing options

A button below the list offers one mass-editing option:

- Delete - delete the maintenance periods

To use this option, mark the checkboxes before the respective maintenance periods and click on Delete.

#### Using filter

You can use the filter to display only the maintenance periods you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of maintenance periods. If you click on it, a filter becomes available where you can filter maintenance periods by host group, name and state.

## 5 Actions

### Overview

In the Configuration → Actions section users can configure and maintain actions.

A listing of existing actions with their details is displayed. The actions displayed are actions assigned to the selected event source (trigger, discovery, autoregistration actions).

To view actions assigned to a different event source, change the source from the title dropdown.

For users without Super-admin rights actions are displayed according to permission settings. That means in some cases a user without Super-admin rights isn't able to view the complete action list because of certain permission restrictions. An action is displayed to the user without Super-admin rights if the following conditions are fulfilled:

- The user has read-write access to host groups, hosts, templates and triggers in action conditions
- The user has read-write access to host groups, hosts and templates in action operations, recovery operations and update operations
- The user has read access to user groups and users in action operations, recovery operations and update operations

### Trigger actions

Create action

Displayed data:

Column	Description
Name	Name of the action. Clicking on the action name opens the action <b>configuration form</b> .
Conditions	Action conditions are displayed.
Operations	Action operations are displayed. Since Zabbix 2.2, the operation list also displays the media type (e-mail, SMS or script) used for notification as well as the name and surname (in parentheses after the alias) of a notification recipient. Action operation can both be a <b>notification</b> or a <b>remote command</b> depending on the selected type of operation.
Status	Action status is displayed - Enabled or Disabled. By clicking on the status you can change it. See the <b>Escalations</b> section for more details as to what happens if an action is disabled during an escalation in progress.

To configure a new action, click on the Create action button in the top right-hand corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the action status to Enabled
- Disable - change the action status to Disabled
- Delete - delete the actions

To use these options, mark the checkboxes before the respective actions, then click on the required button.

### Using filter

You can use the filter to display only the actions you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of actions. If you click on it, a filter becomes available where you can filter actions by name and status.

## 6 Event correlation

### Overview

In the Configuration → Event correlation section users can configure and maintain global correlation rules for Zabbix events.

Displayed data:

Column	Description
Name	Name of the correlation rule. Clicking on the correlation rule name opens the rule <b>configuration form</b> .
Conditions	Correlation rule conditions are displayed.
Operations	Correlation rule operations are displayed.
Status	Correlation rule status is displayed - Enabled or Disabled. By clicking on the status you can change it.

To configure a new correlation rule, click on the Create correlation button in the top right-hand corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the correlation rule status to Enabled
- Disable - change the correlation rule status to Disabled
- Delete - delete the correlation rules

To use these options, mark the checkboxes before the respective correlation rules, then click on the required button.

### Using filter

You can use the filter to display only the correlation rules you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of correlation rules. If you click on it, a filter becomes available where you can filter correlation rules by name and status.

## 7 Discovery

### Overview

In the Configuration → Discovery section users can configure and maintain discovery rules.

A listing of existing discovery rules with their details is displayed.

Discovery rules

<input type="checkbox"/>	Name ▲	IP range	Proxy	Interval	Checks	Status
<input type="checkbox"/>	Local network	192.168.0.1-254		1h	HTTP, HTTPS, SNMPv2 agent, Zabbix agent	Enabled

0 selected Enable Disable Delete

### Displayed data:

Column	Description
Name	Name of the discovery rule. Clicking on the discovery rule name opens the discovery rule <b>configuration form</b> .
IP range	The range of IP addresses to use for network scanning is displayed.
Proxy	The proxy name is displayed, if discovery is performed by the proxy.
Interval	The frequency of performing discovery displayed.
Checks	The types of checks used for discovery are displayed.
Status	Action status is displayed - Enabled or Disabled. By clicking on the status you can change it.

To configure a new discovery rule, click on the Create discovery rule button in the top right-hand corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the discovery rule status to Enabled
- Disable - change the discovery rule status to Disabled
- Delete - delete the discovery rules

To use these options, mark the checkboxes before the respective discovery rules, then click on the required button.

### Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of discovery rules. If you click on it, a filter becomes available where you can filter discovery rules by name and status.

Filter

Name

Status Any Enabled Disabled

Apply Reset

## 8 Services

### Overview

In the Configuration → Services section users can configure and maintain an IT services hierarchy.

When you first open this section it only contains a root entry.

You can use it as a starting point of building the hierarchy of monitored infrastructure. Click on Add child to add services and then other services below the ones you have added.

## Services

Service	Action	Status calculation	Trigger
root	<a href="#">Add child</a>		
▼ SLA by service	<a href="#">Add child</a>	Problem, if all children have problems	
Server 1	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem	
Server 2	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem	
Server 3	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem	
Server 4	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem	
Server 5	<a href="#">Add child</a> <a href="#">Delete</a>	Problem, if at least one child has a problem	

For details on adding services, see the [Service monitoring](#) section.

## 5 Administration

### Overview

The Administration menu is for administrative functions of Zabbix. This menu is available to users of [Super Administrators](#) type only.

### 1 General

#### Overview

The Administration → General section contains a number of screens for setting frontend-related defaults and customizing Zabbix. The title dropdown allows you to switch between different administration screens.

**Z** GUI ▾

- GUI
- Autoregistration
- Housekeeping
- Images
- Icon mapping
- Regular expressions
- Macros
- Value mapping
- Trigger displaying options
- Modules
- Other

Default language: English (en\_US) ▾

Default time zone: (UTC-08:00) America/Los\_Angeles

Default theme: Blue ▾

Number of results to display and filter results: 1000

Number of overview tables: 10

Number of items to display inside table cell: 50

Alert when server is down:

\* Working time: {\$WORKING\_HOURS}

Show technical errors:

\* Max history display period: 1w

\* Time filter default period: 2h

\* Max period for time selector: 2y

**Update** **Reset defaults**

1 GUI

This screen provides customization of several frontend-related defaults.

Default language

Default time zone

Default theme

\* Limit for search and filter results

\* Max number of columns and rows in overview tables

\* Max count of elements to show inside table cell

Show warning if Zabbix server is down

\* Working time

Show technical errors

\* Max history display period

\* Time filter default period

\* Max period for time selector

Configuration parameters:

Parameter	Description
Default language	Default language for users who have not specified a language in their profiles and guest users. For more information, see <a href="#">Installation of additional frontend languages</a> .
Default time zone	Default <a href="#">time zone</a> for users who have not specified a time zone in their profiles and guest users.
Default theme	Default theme for users who have not specified a theme in their profiles and guest users.
Limit for search and filter results	Maximum amount of elements (rows) that will be displayed in a web-interface list, for example, in Configuration → Hosts. Note: If set to, for example, '50', only the first 50 elements will be displayed in all affected frontend lists. If some list contains more than fifty elements, the indication of that will be the '+' sign in "Displaying 1 to 50 of <b>50+</b> found". Also, if filtering is used and still there are more than 50 matches, only the first 50 will be displayed.
Max number of columns and rows in overview tables	Maximum number of columns and rows to display in Monitoring → Overview. The same limit applies to both columns and rows. If more rows and/or columns than shown exist, the system will display a warning at the bottom of the table: "Not all results are displayed. Please provide more specific search criteria."
Max count of elements to show inside table cell	For entries that are displayed in a single table cell, no more than configured here will be shown.
Show warning if Zabbix server is down	This parameter enables a warning message to be displayed in a browser window if the Zabbix server cannot be reached (possibly down). The message remains visible even if the user scrolls down the page. When hovered over, the message is temporarily hidden to reveal the contents underneath it. This parameter is supported since Zabbix 2.0.1.



Parameter	Description
Working time	This system-wide parameter defines working hours. In graphs, working time is displayed as a white background and non-working time is displayed as gray. See <a href="#">Time period specification</a> page for description of the time format. <b>User macros</b> are supported (since Zabbix 3.4.0).
Show technical errors	If checked, all registered users will be able to see technical errors (PHP/SQL). If unchecked, the information is only available to <b>Zabbix Super Admins</b> and users belonging to the user groups with enabled <b>debug mode</b> .
Max history display period	Maximum time period for which to display historical data in Monitoring subsections: Latest data, Web, Overview and in the Data overview screen element. Allowed range: 24 hours (default) - 1 week. <b>Time suffixes</b> , e.g. 1w (one week), 36h (36 hours), are supported.
Time filter default period	Time period to be used in graphs and dashboards by default. Allowed range: 1 minute - 10 years (default: 1 hour). <b>Time suffixes</b> , e.g. 10m (ten minutes), 5w (five weeks), are supported. Note: when a user changes the time period while viewing a graph, this time period is stored as user preference, replacing the global default or a previous user selection.
Max period for time selector	Maximum available time period for graphs and dashboards. Users will not be able to visualize older data. Allowed range: 1 year - 10 years (default: 2 years). <b>Time suffixes</b> , e.g. 1y (one year), 365w (365 weeks), are supported.

## 2 Autoregistration

In this screen you can configure the encryption level for active agent autoregistration.

Encryption level  No encryption  
 PSK

\* PSK identity

\* PSK

Parameters marked with an asterisk are mandatory.

Configuration parameters:

Parameter	Description
Encryption level	Select one or both options for encryption level: <b>No encryption</b> - unencrypted connections are allowed <b>PSK</b> - TLS encrypted connections with a pre-shared key are allowed
PSK identity	Enter the pre-shared key identity string. This field is only available if 'PSK' is selected as Encryption level. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.

---

Parameter	Description
PSK	Enter the pre-shared key (an even number of hexadecimal characters). Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library. Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952 This field is only available if 'PSK' is selected as Encryption level.

---

See also: [Secure autoregistration](#)

### 3 Housekeeper

The housekeeper is a periodical process, executed by Zabbix server. The process removes outdated information and information deleted by user.

### Events and alerts

Enable internal housekeeping

\* Trigger data storage period

\* Internal data storage period

\* Network discovery data storage period

\* Auto-registration data storage period

### Services

Enable internal housekeeping

\* Data storage period

### Audit

Enable internal housekeeping

\* Data storage period

### User sessions

Enable internal housekeeping

\* Data storage period

### History

Enable internal housekeeping

Override item history period

\* Data storage period

### Trends

Enable internal housekeeping

Override item trend period

\* Data storage period

[Update](#)

[Reset defaults](#)

In this section housekeeping tasks can be enabled or disabled on a per-task basis separately for: events and alerts/IT services/audit/user sessions/history/trends. If housekeeping is enabled, it is possible to set for how many days data records will be kept before being removed by the housekeeper.

Deleting an item/trigger will also delete problems generated by that item/trigger.

Also, an event will only be deleted by the housekeeper if it is not associated with a problem in any way. This means that if an event is either a problem or recovery event, it will not be deleted until the related problem record is removed. The housekeeper will delete problems first and events after, to avoid potential problems with stale events or problem records.

For history and trends an additional option is available: Override item history period and Override item trend period. This option allows to globally set for how many days item history/trends will be kept (1 hour to 25 years; or "0"), in this case overriding the values set for individual items in History storage period/Trend storage period fields in **item configuration**. Note, that the storage period will not be overridden for items that have configuration option Do not keep history and/or Do not keep trends enabled.

It is possible to override the history/trend storage period even if internal housekeeping is disabled. Thus, when using an external housekeeper, the history storage period could be set using the history Data storage period field.

**Attention:**

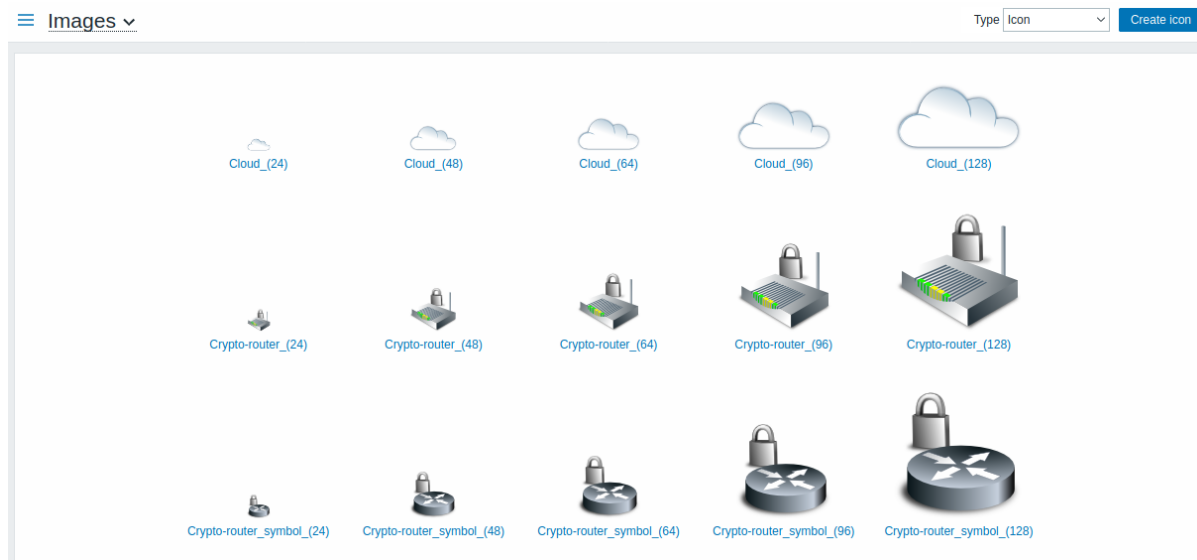
If using TimescaleDB, in order to take full advantage of TimescaleDB automatic partitioning of history and trends tables, Override item history period and Override item trend period options must be enabled. Otherwise the data kept in these tables will still be stored in partitions, however, the housekeeper will be cleaning the history and trends by deleting individual records rather than by dropping outdated partitions.

**Time suffixes** are supported in the period fields, e.g. 1d (one day), 1w (one week). Minimum is 1 day (1 hour for history), maximum 25 years.

Reset defaults button allows to revert any changes made.

#### 4 Images

The Images section displays all the images available in Zabbix. Images are stored in the database.



The Type dropdown allows you to switch between icon and background images:

- Icons are used to display **network map** elements
- Backgrounds are used as background images of network maps

#### Adding image

You can add your own image by clicking on the Create icon or Create background button in the top right corner.

\* Name

\* Upload  No file selected.

Image attributes:

Parameter	Description
Name	Unique name of an image.
Upload	Select the file (PNG, JPEG, GIF) from a local system to be uploaded to Zabbix. Note that it may be possible to upload other formats that will be converted to PNG during upload. GD library is used for image processing, therefore formats that are supported depend on the library version used (2.0.28 or higher is required by Zabbix).

**Note:**

Maximum size of the upload file is limited by value of ZBX\_MAX\_IMAGE\_SIZE that is 1024x1024 bytes or 1 MB.

The upload of an image may fail if the image size is close to 1 MB and the `max_allowed_packet` MySQL configuration parameter is at a default of 1MB. In this case, increase the [max\\_allowed\\_packet](#) parameter.

### 5 Icon mapping

This section allows to create the mapping of certain hosts with certain icons. Host inventory field information is used to create the mapping.

The mappings can then be used in [network map configuration](#) to assign appropriate icons to matching hosts automatically.

To create a new icon map, click on Create icon map in the top right corner.

\* Name

\* Mappings

	Inventory field	Expression	Icon	Action
1:	Type	server	Server_(96)	<a href="#">Remove</a>
2:	Type	router	Router_(96)	<a href="#">Remove</a>
3:	Type	workstation	Workstation_(96)	<a href="#">Remove</a>
<a href="#">Add</a>				
Default			Cloud_(24)	

Configuration parameters:

Parameter	Description
Name	Unique name of icon map.
Mappings	A list of mappings. The order of mappings determines which one will have priority. You can move mappings up and down the list with drag-and-drop.
Inventory field	Host inventory field that will be looked into to seek a match.
Expression	Regular expression describing the match.
Icon	Icon to use if a match for the expression is found.
Default	Default icon to use.

### 6 Regular expressions

This section allows to create custom regular expressions that can be used in several places in the frontend. See [Regular expressions](#) section for details.

### 7 Macros

This section allows to define system-wide **user macros** as name-value pairs. Note that macro values can be kept as plain text, secret text or Vault secret. Adding a description is also supported.

Macro	Value		Description
<input style="width: 100%;" type="text" value="{MYSQL_PASSWORD}"/>	<input style="width: 100%;" type="text" value="*****"/>	<input style="width: 100%;" type="text" value="description"/>	description
<input style="width: 100%;" type="text" value="{MYSQL_USERNAME}"/>	<input style="width: 100%;" type="text" value="*****"/>	<input style="width: 100%;" type="text" value="description"/>	description
<input style="width: 100%;" type="text" value="{SECRET_PASSWORD}"/>	<input style="width: 100%;" type="text" value="path/to/secret:password"/>	<input style="width: 100%;" type="text" value="description"/>	description
<input style="width: 100%;" type="text" value="{SECRET_USERNAME}"/>	<input style="width: 100%;" type="text" value="path/to/secret:username"/>	<input style="width: 100%;" type="text" value="description"/>	description
<input style="width: 100%;" type="text" value="{SNMP_COMMUNITY}"/>	<input style="width: 100%;" type="text" value="public"/>	<input style="width: 100%;" type="text" value="description"/>	description
<input style="width: 100%;" type="text" value="{WORKING_HOURS}"/>	<input style="width: 100%;" type="text" value="1-5,09:00-18:00"/>	<input style="width: 100%;" type="text" value="description"/>	description

[Add](#)

### 8 Value mapping

This section allows to manage value maps that are useful for human-readable representation of incoming data in Zabbix frontend.

☰ Value mapping ▾

<input type="checkbox"/> Name ▲	Value map	Used in Items
<input type="checkbox"/> Alarm state	0 ⇒ Ok 1 ⇒ Alarm	Yes
<input type="checkbox"/> APC Battery Replacement Status	1 ⇒ unknown 2 ⇒ notinstalled 3 ⇒ ok 4 ⇒ failed 5 ⇒ highTemperature 6 ⇒ replaceImmediately 7 ⇒ lowCapacity	
<input type="checkbox"/> APC Battery Status	1 ⇒ unknown 2 ⇒ batteryNormal 3 ⇒ batteryLow	
<input type="checkbox"/> CIM_LogicalDevice::Availability	1 ⇒ Other 2 ⇒ Unknown 3 ⇒ Running/Full Power 4 ⇒ Warning 5 ⇒ In Test 6 ⇒ Not Applicable 7 ⇒ Power Off 8 ⇒ Off Line 9 ⇒ Off Duty 10 ⇒ Degraded 11 ⇒ Not Installed 12 ⇒ Install Error 13 ⇒ Power Save - Unknown 14 ⇒ Power Save - Low Power Mode	

See [Value mapping](#) section for more details.

### 9 Trigger displaying options

This section allows to customize how trigger status is displayed in the frontend and **trigger severity** names and colors.

Use custom event status colors

\* Unacknowledged PROBLEM events   blinking

\* Acknowledged PROBLEM events   blinking

\* Unacknowledged RESOLVED events   blinking

\* Acknowledged RESOLVED events   blinking

\* Display OK triggers for

\* On status change triggers blink for

\* Not classified


\* Information

\* Warning

\* Average

\* High

\* Disaster



Parameter	Description
Use custom event status colors	Checking this parameter turns on the customization of colors for acknowledged/unacknowledged problems.
Unacknowledged PROBLEM events, Acknowledged PROBLEM events, Unacknowledged RESOLVED events, Acknowledged RESOLVED events	Enter new color code or click on the color to select a new one from the provided palette.
Display OK triggers for	If blinking checkbox is marked, triggers will blink for some time upon the status change to become more visible.
On status change triggers blink for	Time period for displaying OK triggers. Allowed range: 0 - 24 hours. <b>Time suffixes</b> , e.g. 5m, 2h, 1d, are supported.
Not classified, Information, Warning, Average, High, Disaster	Length of trigger blinking. Allowed range: 0 - 24 hours. <b>Time suffixes</b> , e.g. 5m, 2h, 1d, are supported.
	Custom severity names and/or colors to display instead of system default.
	Enter new color code or click on the color to select a new one from the provided palette.
	Note, that custom severity names entered here will be used in all locales. If you need to translate them to other languages for certain users, see <a href="#">Customizing trigger severities</a> page.

## 10 Modules

This section allows to administer custom **frontend modules**.

☰ Modules ▾ Scan directory

Filter 🔍

<input type="checkbox"/> Name ▲	Version	Author	Description	Status
<input type="checkbox"/> Example module	1.0	John Smith	Short description of the module.	Enabled

Displaying 1 of 1 found

0 selected Enable Disable

Click on Scan directory to register/unregister any custom modules. Registered modules will appear in the list, along with their details. Unregistered modules will be removed from the list.

You may filter modules by name or status (enabled/disabled). Click on the module status in the list to enable/disable a module. You may also mass enable/disable modules by selecting them in the list and then clicking on the Enable/Disable buttons below the list.

### 11 Other parameters

This section allows to configure miscellaneous other frontend parameters.



\* Group for discovered hosts

Default host inventory mode

User group for database down message

Log unmatched SNMP traps

### Authorization

\* Login attempts

\* Login blocking interval

### Security

Validate URI schemes

Valid URI schemes

\* X-Frame-Options HTTP header

Use iframe sandboxing

Iframe sandboxing exceptions

### Communication with Zabbix server

\* Network timeout

\* Connection timeout

\* Network timeout for media type test

\* Network timeout for script execution

\* Network timeout for item test

Parameter	Description
Group for discovered hosts	Hosts discovered by <b>network discovery</b> and <b>agent autoregistration</b> will be automatically placed in the host group, selected here.

Parameter	Description	
Default host inventory mode	Default <b>mode</b> for host inventory. It will be followed whenever a new host or host prototype is created by server or frontend, unless overridden during host discovery/autoregistration by the //Set host inventory mode operation.    User group for database down message//	User group for sending alarm message or 'None'. Zabbix server depends on the availability of back-end database. It cannot work without a database. If the database is down, selected users can be notified by Zabbix. Notifications will be sent to the user group set here using all configured user media en-

Parameter	Description
Log unmatched SNMP traps	Log <b>SNMP trap</b> if no corresponding SNMP interfaces have been found.

#### Authorization

Parameter	Description
Login attempts	Number of unsuccessful login attempts before the possibility to log in gets blocked.
Login blocking interval	Period of time for which logging in will be prohibited when Login attempts limit is exceeded.

#### Security

Parameter	Description
Validate URI schemes	Uncheck the box to disable URI scheme validation against the whitelist defined in Valid URI schemes. (enabled by default).
Valid URI schemes	A comma-separated list of allowed URI schemes. Applies to all fields in the frontend where URIs are used (for example, map element URLs). this field is editable only if Validate URI schemes is selected.
X-Frame-Options HTTP header	Value of HTTP X-Frame-options header. Supported values: <b>SAMEORIGIN</b> (default) - the page can only be displayed in a frame on the same origin as the page itself. <b>DENY</b> - the page cannot be displayed in a frame, regardless of the site attempting to do so. <b>null</b> - disable X-Frame-options header (not recommended). Or a list (string) of comma-separated hostnames. If a listed hostname is not among allowed, the SAMEORIGIN option is used.
Use iframe sandboxing	This parameter determines whether retrieved URL content should be put into the sandbox or not. Note, that turning off sandboxing is not recommended.
Iframe sandboxing exceptions	If sandboxing is enabled and this field is empty, all sandbox attribute restrictions apply. To disable some of the restrictions, specified them in this field. This disables only restrictions listed here, other restrictions will still be applied. See <a href="#">sandbox attribute</a> description for additional information.

#### Communication with Zabbix server

Parameter	Description
Network timeout	How many seconds to wait before closing an idle socket (if a connection to Zabbix server has been established earlier, but frontend can not finish read/send data operation during this time, the connection will be dropped). Allowed range: 1 - 300s (default: 3s).
Connection timeout	How many seconds to wait before stopping an attempt to connect to Zabbix server. Allowed range: 1 - 30s (default: 3s).
Network timeout for media type test	How many seconds to wait for a response when testing a media type. Allowed range: 1 - 300s (default: 65s).
Network timeout for script execution	How many seconds to wait for a response when executing a script. Allowed range: 1 - 300s (default: 60s).
Network timeout for item test	How many seconds to wait for returned data when testing an item. Allowed range: 1 - 300s (default: 60s).

## 2 Proxies

## Overview

In the Administration → Proxies section proxies for **distributed monitoring** can be configured in the Zabbix frontend.

## Proxies

A listing of existing proxies with their details is displayed.

<input type="checkbox"/>	Name	Mode	Encryption	Compression	Last seen (age)	Host count	Item count	Required performance (vps)	Hosts
<input type="checkbox"/>	Remote proxy	Active	NONE	ON	21h 15m 15s				New host
<input type="checkbox"/>	New proxy	Active	NONE	OFF	Never				

Displayed data:

Column	Description
Name	Name of the proxy. Clicking on the proxy name opens the proxy <b>configuration form</b> .
Mode	Proxy mode is displayed - Active or Passive.
Encryption	Encryption status for connections from the proxy is displayed: <b>None</b> - no encryption <b>PSK</b> - using pre-shared key <b>Cert</b> - using certificate
Last seen (age)	The time when the proxy was last seen by the server is displayed.
Host count	The number of enabled hosts assigned to the proxy is displayed.
Item count	The number of enabled items on enabled hosts assigned to the proxy is displayed.
Required performance (vps)	Required proxy performance is displayed (the number of values that need to be collected per second).
Hosts	All hosts monitored by the proxy are listed. Clicking on the host name opens the host configuration form.

To configure a new proxy, click on the Create proxy button in the top right-hand corner.

## Mass editing options

Buttons below the list offer some mass-editing options:

- Enable hosts - change the status of hosts monitored by the proxy to Monitored
- Disable hosts - change the status of hosts monitored by the proxy to Not monitored
- Delete - delete the proxies

To use these options, mark the checkboxes before the respective proxies, then click on the required button.

## Using filter

You can use the filter to display only the proxies you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of proxies. If you click on it, a filter becomes available where you can filter proxies by name and mode.

Name  Mode Any Active Passive

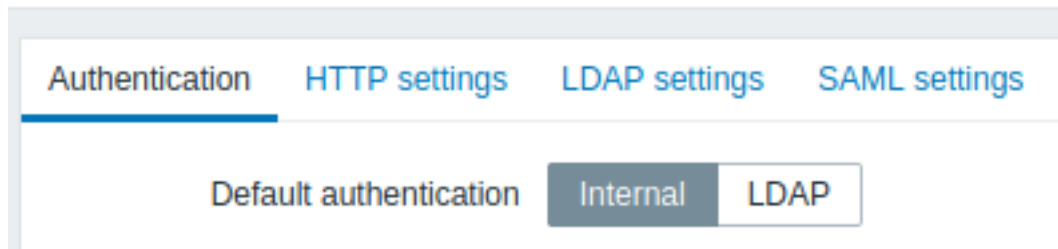
## 3 Authentication

### Overview

In Administration → Authentication the global user authentication method to Zabbix can be specified. The available methods are internal, HTTP, LDAP and SAML authentication.

Note that the authentication method can be fine-tuned on the **user group** level.

## ☰ Authentication



By default, internal Zabbix authentication is used globally. To change:

- to HTTP - navigate to the HTTP settings tab and enter authentication details;
- to LDAP - select LDAP as Default authentication and enter authentication details in the LDAP settings tab;
- to SAML - navigate to the SAML settings tab and enter authentication details.

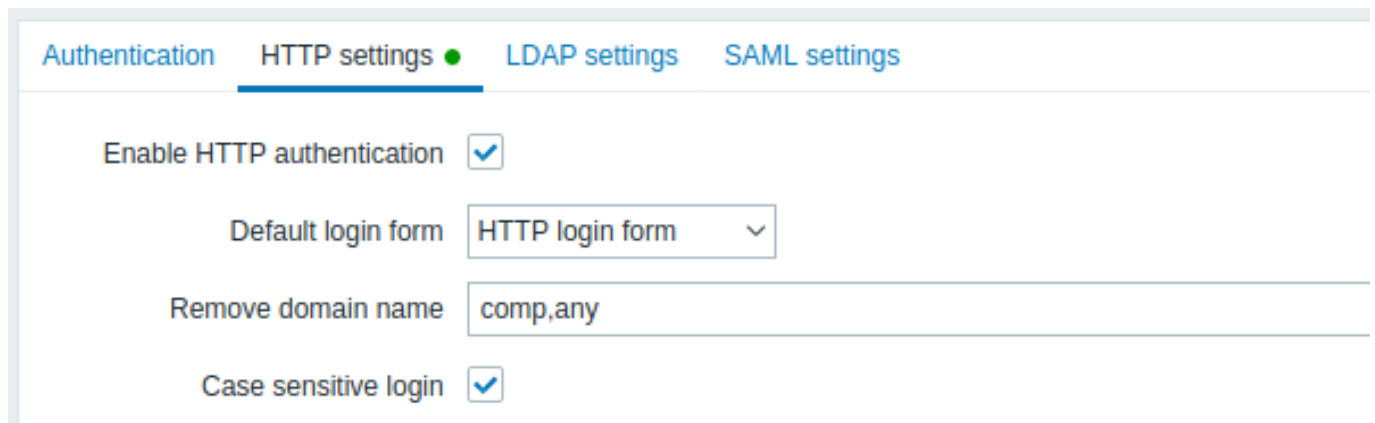
When done, click on Update at the bottom of the form.

### HTTP authentication

HTTP or web server-based authentication (for example: Basic Authentication, NTLM/Kerberos) can be used to check user names and passwords. Note that a user must exist in Zabbix as well, however its Zabbix password will not be used.

**Attention:**

Be careful! Make sure that web server authentication is configured and works properly before switching it on.



Configuration parameters:

Parameter	Description
Enable HTTP authentication	Mark the checkbox to enable HTTP authentication.
Default login form	Specify whether to direct non-authenticated users to: <b>Zabbix login form</b> - standard Zabbix login page. <b>HTTP login form</b> - HTTP login page. It is recommended to enable web-server based authentication for the <code>index_http.php</code> page only. If Default login form is set to 'HTTP login page' the user will be logged in automatically if web server authentication module will set valid user login in the <code>\$_SERVER</code> variable. Supported <code>\$_SERVER</code> keys are <code>PHP_AUTH_USER</code> , <code>REMOTE_USER</code> , <code>AUTH_USER</code> .
Remove domain name	A comma-delimited list of domain names that should be removed from the username. E.g. <code>comp,any</code> - if username is 'Admin@any', 'comp\Admin', user will be logged in as 'Admin'; if username is 'notacompany\Admin', login will be denied.

Parameter	Description
Case sensitive login	Unmark the checkbox to disable case-sensitive login (enabled by default) for usernames. E.g. disable case-sensitive login and log in with, for example, 'ADMIN' user even if the Zabbix user is 'Admin'. Note that with case-sensitive login disabled the login will be denied if multiple users exist in Zabbix database with similar alias (e.g. Admin, admin).

**Note:**

In case of web server authentication all users (even with **frontend access** set to Internal) will be authenticated by the web server, not by Zabbix!

**Note:**

For internal users who are unable to log in using HTTP credentials (with HTTP login form set as default) leading to the 401 error, you may want to add a `ErrorDocument 401 /index.php?form=default` line to basic authentication directives, which will redirect to the regular Zabbix login form.

LDAP authentication

External LDAP authentication can be used to check user names and passwords. Note that a user must exist in Zabbix as well, however its Zabbix password will not be used.

While LDAP authentication is set globally, some user groups can still be authenticated by Zabbix. These groups must have **frontend access** set to Internal. Vice versa, if internal authentication is used globally, LDAP authentication details can be specified and used for specific user groups whose **frontend access** is set to LDAP.

Zabbix LDAP authentication works at least with Microsoft Active Directory and OpenLDAP.

Authentication   HTTP settings   **LDAP settings** ●   SAML settings

---

Enable LDAP authentication

\* LDAP host

\* Port

\* Base DN

\* Search attribute

Bind DN

Case sensitive login

Bind password

Test authentication [must be a valid LDAP user]

\* Login

\* User password

Configuration parameters:

Parameter	Description
Enable LDAP authentication	Mark the checkbox to enable LDAP authentication.
LDAP host	Name of LDAP server. For example: ldap://ldap.zabbix.com For secure LDAP server use ldaps protocol. ldaps://ldap.zabbix.com With OpenLDAP 2.x.x and later, a full LDAP URI of the form ldap://hostname:port or ldaps://hostname:port may be used.
Port	Port of LDAP server. Default is 389. For secure LDAP connection port number is normally 636. Not used when using full LDAP URIs.
Base DN	Base path to search accounts: ou=Users,ou=system (for OpenLDAP), DC=company,DC=com (for Microsoft Active Directory)
Search attribute	LDAP account attribute used for search: uid (for OpenLDAP), sAMAccountName (for Microsoft Active Directory)
Bind DN	LDAP account for binding and searching over the LDAP server, examples: uid=ldap_search,ou=system (for OpenLDAP), CN=ldap_search,OU=user_group,DC=company,DC=com (for Microsoft Active Directory) Anonymous binding is also supported.
Case-sensitive login	Unmark the checkbox to disable case-sensitive login (enabled by default) for usernames. E.g. disable case-sensitive login and log in with, for example, 'ADMIN' user even if the Zabbix user is 'Admin'. Note that with case-sensitive login disabled the login will be denied if multiple users exist in Zabbix database with similar alias (e.g. Admin, admin).
Bind password	LDAP password of the account for binding and searching over the LDAP server.
Test authentication	Header of a section for testing
Login	Name of a test user (which is currently logged in the Zabbix frontend). This user name must exist in the LDAP server. Zabbix will not activate LDAP authentication if it is unable to authenticate the test user.
User password	LDAP password of the test user.

**Warning:**

In case of trouble with certificates, to make a secure LDAP connection (ldaps) work you may need to add a `TLS_REQCERT allow` line to the `/etc/openldap/ldap.conf` configuration file. It may decrease the security of connection to the LDAP catalog.

**Note:**

It is recommended to create a separate LDAP account (Bind DN) to perform binding and searching over the LDAP server with minimal privileges in the LDAP instead of using real user accounts (used for logging in the Zabbix frontend). Such an approach provides more security and does not require changing the Bind password when the user changes his own password in the LDAP server.  
In the table above it's `ldap_search` account name.

### SAML authentication

SAML 2.0 authentication can be used to sign in to Zabbix. Note that a user must exist in Zabbix, however, its Zabbix password will not be used. If authentication is successful, then Zabbix will match a local username (alias) with the username attribute returned by SAML.

**Note:**

If SAML authentication is enabled, users will be able to choose between logging in locally or via SAML Single Sign-On.

### Setting up the identity provider

In order to work with Zabbix, a SAML identity provider ([onelogin.com](https://onelogin.com), [auth0.com](https://auth0.com), [okta.com](https://okta.com), etc.) needs to be configured in the following way:

- Assertion Consumer URL should be set to `<path_to_zabbix_ui>/index_sso.php?acs`
- Single Logout URL should be set to `<path_to_zabbix_ui>/index_sso.php?sls`

`<path_to_zabbix_ui>` examples: `%% https://example.com/zabbix/ui, http://another.example.com/zabbix, http://<any_public_ip_address> %%`

#### Setting up Zabbix

**Attention:**

It is required to install php-openssl if you want to use SAML authentication in the frontend.

To use SAML authentication Zabbix should be configured in the following way:

1. Private key and certificate should be stored in the `// ui/conf/certs///`, unless custom paths are provided in `zabbix.conf.php`.

By default, Zabbix will look in the following locations:

- `ui/conf/certs/sp.key` - SP private key file
- `ui/conf/certs/sp.crt` - SP cert file
- `ui/conf/certs/idp.crt` - IDP cert file

2. All of the most important settings can be configured in the Zabbix frontend. However, it is possible to specify additional settings in the `configuration file`.

The screenshot shows the 'SAML settings' configuration page in the Zabbix frontend. The page has a navigation bar with tabs for 'Authentication', 'HTTP settings', 'LDAP settings', and 'SAML settings' (which is selected). The main content area contains several configuration options:

- Enable SAML authentication**:
- \* IdP entity ID**:
- \* SSO service URL**:
- SLO service URL**:
- \* Username attribute**:
- \* SP entity ID**:
- SP name ID format**:
- Sign**:
  - Messages
  - Assertions
  - AuthN requests
  - Logout requests
  - Logout responses
- Encrypt**:
  - Name ID
  - Assertions
- Case sensitive login**:

Configuration parameters, available in the Zabbix frontend:



Parameter	Description
Enable SAML authentication	Mark the checkbox to enable SAML authentication.
IDP entity ID	The unique identifier of SAML identity provider.
SSO service URL	The URL users will be redirected to when logging in.
SLO Service URL	The URL users will be redirected to when logging out. If left empty, the SLO service will not be used.
// Username attribute//	SAML attribute to be used as a username when logging into Zabbix. List of supported values is determined by the identity provider.  Examples: uid userprincipalname samaccountname username userusername urn:oid:0.9.2342.19200300.100.1.1 urn:oid:1.3.6.1.4.1.5923.1.1.1.13 urn:oid:0.9.2342.19200300.100.1.44
SP entity ID	The unique identifier of SAML service provider.
SP name ID format	Defines which name identifier format should be used.  Examples: urn:oasis:names:tc:SAML:2.0:nameid-format:persistent urn:oasis:names:tc:SAML:2.0:nameid-format:transient urn:oasis:names:tc:SAML:2.0:nameid-format:kerberos urn:oasis:names:tc:SAML:2.0:nameid-format:entity
Sign	Mark the checkboxes to select entities for which SAML signature should be enabled: // Messages Assertions AuthN requests Logout requests Logout responses //
Encrypt	Mark the checkboxes to select entities for which SAML encryption should be enabled: // Assertions Name ID //
Case-sensitive login	Mark the checkbox to enable case-sensitive login (disabled by default) for usernames. E.g. disable case-sensitive login and log in with, for example, 'ADMIN' user even if the Zabbix user is 'Admin'. Note that with case-sensitive login disabled the login will be denied if multiple users exist in Zabbix database with similar alias (e.g. Admin, admin).

#### Advanced settings

Additional SAML parameters can be configured in the Zabbix frontend configuration file (zabbix.conf.php):

- `$SSO['SP_KEY'] = '<path to the SP private key file>';`
- `$SSO['SP_CERT'] = '<path to the SP cert file>';`
- `$SSO['IDP_CERT'] = '<path to the IDP cert file>';`
- `$SSO['SETTINGS']`

#### Note:

Zabbix uses [OneLogin's SAML PHP Toolkit](#) library (version 3.4.1). The structure of `$SSO['SETTINGS']` section should be similar to the structure used by the library. For the description of configuration options, see official library [documentation](#).

Only the following options can be set as part of `$SSO['SETTINGS']`:

- `strict`
- `baseurl`
- `compress`

- contactPerson
- organization
- sp (only options specified in this list)
  - attributeConsumingService
  - x509certNew
- idp (only options specified in this list)
  - singleLogoutService (only one option)
    - \* responseUrl
  - certFingerprint
  - certFingerprintAlgorithm
  - x509certMulti
- security (only options specified in this list)
  - signMetadata
  - wantNameId
  - requestedAuthnContext
  - requestedAuthnContextComparison
  - wantXMLValidation
  - relaxDestinationValidation
  - destinationStrictlyMatches
  - rejectUnsolicitedResponsesWithInResponseTo
  - signatureAlgorithm
  - digestAlgorithm
  - lowercaseUrlencoding

All other options will be taken from the database and cannot be overridden. The debug option will be ignored.

In addition, if Zabbix UI is behind a proxy or a load balancer, the custom use\_proxy\_headers option can be used:

- false (default) - ignore the option;
- true - use X-Forwarded-\* HTTP headers for building the base URL.

**Configuration example:**

```

$SSO['SETTINGS'] = [
  'security' => [
    'signatureAlgorithm' => 'http://www.w3.org/2001/04/xmldsig-more#rsa-sha384'
    'digestAlgorithm' => 'http://www.w3.org/2001/04/xmldsig-more#sha384',
    // ...
  ],
  // ...
];

```

**4 User groups**

Overview

In the Administration → User groups section user groups of the system are maintained.

User groups

A listing of existing user groups with their details is displayed.

☰ User groups Create user group

<input type="checkbox"/> Name ▲	#	Members	Frontend access	Debug mode	Status
<input type="checkbox"/> Disabled	Users 1	guest	System default	Disabled	Disabled
<input type="checkbox"/> Enabled debug mode	Users		System default	Enabled	Enabled
<input type="checkbox"/> Guests	Users 1	guest	Internal	Disabled	Enabled
<input type="checkbox"/> No access to the frontend	Users		Disabled	Disabled	Enabled
<input type="checkbox"/> Zabbix administrators	Users 1	Admin (Zabbix Administrator)	System default	Disabled	Enabled

Filter

Displaying 5 of 5 found

0 selected Enable Disable Enable debug mode Disable debug mode Delete

Displayed data:

Column	Description
Name	Name of the user group. Clicking on the user group name opens the user group <a href="#">configuration form</a> .
#	The number of users in the group. Clicking on Users will display the respective users filtered out in the user list.
Members	Aliases of individual users in the user group (with name and surname in parentheses). Clicking on the alias will open the user configuration form. Users from disabled groups are displayed in red.
Frontend access	Frontend access level is displayed: <b>System default</b> - Zabbix, LDAP or HTTP authentication; depending on the chosen authentication <a href="#">method</a> <b>Internal</b> - the user is authenticated by Zabbix regardless of system settings <b>Disabled</b> - frontend access for this user is disabled. By clicking on the current level you can change it.
Debug mode	<a href="#">Debug mode</a> status is displayed - Enabled or Disabled. By clicking on the status you can change it.
Status	User group status is displayed - Enabled or Disabled. By clicking on the status you can change it.

To configure a new user group, click on the Create user group button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the user group status to Enabled
- Disable - change the user group status to Disabled
- Enable debug mode - enable debug mode for the user groups
- Disable debug mode - disable debug mode for the user groups
- Delete - delete the user groups

To use these options, mark the checkboxes before the respective user groups, then click on the required button.

#### Using filter

You can use the filter to display only the user groups you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of user groups. If you click on it, a filter becomes available where you can filter user groups by name and status.

## 5 User roles

### Overview

In the Administration → User roles section roles that can be assigned to system users and specific permissions for each role are maintained.

### Default user roles

By default, Zabbix is configured with four user roles, which have a pre-defined set of permissions:

- Admin role
- Guest role
- Super admin role
- User role

<input type="checkbox"/> Name ▲	#	Users
<input type="checkbox"/> Admin role	Users 1	<a href="#">db_manager (Database manager)</a>
<input type="checkbox"/> Guest role	Users	
<input type="checkbox"/> Super admin role	Users 2	<a href="#">Admin (Zabbix Administrator)</a> , <a href="#">ljohnson (Lewis Johnson)</a>
<input type="checkbox"/> User role	Users 4	<a href="#">gslone (George Slone)</a> , <a href="#">guest (John Snow)</a> , <a href="#">test_admin</a> , <a href="#">test_guest</a>

**Note:**

Default Super admin role cannot be modified or deleted, because at least one Super admin user with unlimited privileges must exist in Zabbix.

Zabbix users with type Super admins and proper permissions can modify or delete existing roles or create new custom roles.

To create a new role, click on the Create user role button at the top right corner. To update an existing role, press on the role name to open the configuration form.

\* Name

User type

**Access to UI elements**

Monitoring	<input checked="" type="checkbox"/> Dashboard	<input checked="" type="checkbox"/> Problems	<input checked="" type="checkbox"/> Hosts
	<input checked="" type="checkbox"/> Overview	<input checked="" type="checkbox"/> Latest data	<input checked="" type="checkbox"/> Screens
	<input checked="" type="checkbox"/> Maps	<input checked="" type="checkbox"/> Discovery	<input checked="" type="checkbox"/> Services
Inventory	<input checked="" type="checkbox"/> Overview	<input checked="" type="checkbox"/> Hosts	
Reports	<input type="checkbox"/> System information	<input checked="" type="checkbox"/> Availability report	<input checked="" type="checkbox"/> Triggers top 100
	<input type="checkbox"/> Audit	<input type="checkbox"/> Action log	<input checked="" type="checkbox"/> Notifications

Available permission options along with default permission sets for pre-existing user roles in Zabbix are described below.

Parameter	Description	Default user roles	
		Super admin role	AdminUser Guest role role role
Name	Role visible name.	Super admin role	AdminUser Guest role role role
User type	Selected user type determines the list of available permissions. Upon selecting a user type, all available permissions for this user type are granted by default. Uncheck the checkbox(es) to revoke certain permissions for the user role. Checkboxes for permissions not available for this user type are grayed out.	Super admin	AdminUser User

Access to UI elements  
Monitoring

Parameter	Description	Default user roles			
Dashboard	Enable/disable access to a specific Monitoring menu section and underlying pages.	Yes	Yes	Yes	Yes
Problems					
Hosts					
Overview					
Latest data					
Screens					
Maps					
Discovery				No	No
Services				Yes	Yes
Inventory					
Overview	Enable/disable access to a specific Inventory menu section and underlying pages.	Yes	Yes	Yes	Yes
Hosts					
Reports					
System information	Enable/disable access to a specific Reports menu section and underlying pages.	Yes	No	No	No
Availability report			Yes	Yes	Yes
Triggers top 100					
Audit			No	No	No
Action log					
Notifications			Yes		
Configuration					
Host groups	Enable/disable access to a specific Configuration menu section and underlying pages.	Yes	Yes	No	No
Templates					
Hosts					
Maintenance					
Actions					
Event correlation			No		
Discovery			Yes		
Services					
Administration					
General	Enable/disable access to a specific Administration menu section and underlying pages.	Yes	No	No	No
Proxies					
Authentication					
User groups					
User roles					
Users					
Media types					
Scripts					
Queue					
Default access to new UI elements	Enable/disable access to the custom UI elements. Modules, if present, will be listed below.	Yes	Yes	Yes	Yes
Access to modules					

Parameter	Description	Default user roles			
<Module name>	Allow/deny access to a specific module. Only enabled modules are shown in this section. It is not possible to grant or restrict access to a module that is currently disabled.	Yes	Yes	Yes	Yes
Default access to new modules	Enable/disable access to modules that may be added in the future.				
Access to API Enabled	Enable/disable access to API.	Yes	Yes	Yes	No
API methods	Select Allow list to allow only specified API methods or Deny list to restrict only specified API methods.  In the search field, start typing the method name, then select the method from the auto-complete list. You can also press the Select button and select methods from the full list available for this user type. Note, that if certain action from the Access to actions block is unchecked, users will not be able to use API methods related to this action.  Wildcards are supported. Examples: <code>dashboard.*</code> (all methods of 'dashboard.' API service) * (any method), <code>*.export</code> (methods with '.export' name from all API services).  If no methods have been specified the Allow/Deny list rule will be ignored.				
Access to actions Create and edit dashboards and screens	Clearing this checkbox will also revoke the rights to use <code>.create</code> , <code>.update</code> and <code>.delete</code> API methods for the corresponding elements.	Yes	Yes	Yes	No
Create and edit maps Create and edit maintenance					No
Add problem comments	Clearing this checkbox will also revoke the rights to perform corresponding action via <code>event.acknowledge</code> API method.				Yes

Parameter	Description	Default user roles
Change severity Acknowledge problems Close problems Execute scripts	Clearing this checkbox will also revoke the rights to use the <code>script.execute</code> API method.	
Default access to new actions	Enable/disable access to new actions.	

Notes:

- Each user may have only one role assigned.
- If an element is restricted, users will not be able to access it even by entering a direct URL to this element into the browser.
- Users of type User or Admin cannot change their own role settings.
- Users of type Super admin can modify settings of their own role (not available for the default Super admin role), but not the user type.
- Users of all levels cannot change their own user type.

See also:

- [Configuring a user](#)

## 6 Users

Overview

In the Administration → Users section users of the system are maintained.

Users

A listing of existing users with their details is displayed.

Alias	Name	Surname	User role	Groups	Is online?	Login	Frontend access	API access	Debug mode	Status
Admin	Zabbix	Administrator	Super admin role	Zabbix administrators	Yes (2020-10-27 10:12:02)	Ok	System default	Enabled	Enabled	Enabled
db_manager	Database manager		Admin role	Hello	No	Ok	System default	Enabled	Disabled	Enabled
gstone	George	Stone	User role	Hello	No	Ok	System default	Enabled	Disabled	Enabled

From the dropdown to the right in the Users bar you can choose whether to display all users or those belonging to one particular group.

Displayed data:

Column	Description
Alias	Alias of the user, used for logging into Zabbix. Clicking on the alias opens the user <a href="#">configuration form</a> .
Name	First name of the user.
Surname	Second name of the user.
User role	<a href="#">User role</a> is displayed.
Groups	Groups that the user is a member of are listed. Clicking on the user group name opens the user group configuration form. Disabled groups are displayed in red.
Is online?	The on-line status of the user is displayed - Yes or No. The time of last user activity is displayed in parentheses.
Login	The login status of the user is displayed - Ok or Blocked. A user can become temporarily blocked upon exceeding the number of unsuccessful login attempts set in the <a href="#">Administration→General</a> section (five by default). By clicking on Blocked you can unblock the user.
Frontend access	Frontend access level is displayed - System default, Internal or Disabled, depending on the one set for the whole user group.
API access	API access status is displayed - Enabled or Disabled, depending on the one set for the user role.

Column	Description
Debug mode	Debug mode status is displayed - Enabled or Disabled, depending on the one set for the whole user group.
Status	User status is displayed - Enabled or Disabled, depending on the one set for the whole user group.

To configure a new user, click on the Create user button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- Unblock - re-enable system access to blocked users
- Delete - delete the users

To use these options, mark the check-boxes before the respective users, then click on the required button.

#### Using filter

You can use the filter to display only the users you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of users. If you click on it, a filter becomes available where you can filter users by alias, name, surname and user role.

## 7 Media types

### Overview

In the Administration → Media types section users can configure and maintain media type information.

Media type information contains general instructions for using a medium as delivery channel for notifications. Specific details, such as the individual e-mail addresses to send a notification to are kept with individual users.

A listing of existing media types with their details is displayed.

#### Displayed data:

Column	Description
Name	Name of the media type. Clicking on the name opens the media type <b>configuration form</b> .
Type	Type of the media (e-mail, SMS, etc) is displayed.
Status	Media type status is displayed - Enabled or Disabled. By clicking on the status you can change it.
Used in actions	All actions where the media type is used directly (selected in the Send only to dropdown) are displayed. Clicking on the action name opens the action configuration form.



Column	Description
Details	Detailed information of the media type is displayed.
Actions	The following action is available: <b>Test</b> - click to open a testing form where you can enter media type parameters (e.g. a recipient address with test subject and body) and send a test message to verify that the configured media type works. See also: <a href="#">Media type testing</a> .

To configure a new media type, click on the Create media type button in the top right-hand corner.

To import a media type from XML, click on the Import button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- Enable - change the media type status to Enabled
- Disable - change the media type status to Disabled
- Export - export the media types to a YAML, XML or JSON file
- Delete - delete the media types

To use these options, mark the checkboxes before the respective media types, then click on the required button.

Using filter

You can use the filter to display only the media types you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of media types. If you click on it, a filter becomes available where you can filter media types by name and status.

## 8 Scripts

Overview

In the Administration → Scripts section user-defined global scripts can be configured and maintained. Each script can be applied to different hosts as needed. See also [Command execution](#).

The scripts, depending on the set user permissions, are available for execution by clicking on the host in various frontend locations (Dashboard, Problems, Latest data, Maps) and can also be run as an action operation. The scripts are executed on the Zabbix server (proxy) or agent.

Both on Zabbix agent and Zabbix proxy remote scripts are disabled by default. They can be enabled by:

- adding the `AllowKey=system.run[*]` parameter in agent configuration;
- setting the `EnableRemoteCommands` parameter to '1' in proxy configuration

A listing of existing scripts with their details is displayed.

<input type="checkbox"/>	Name ▲	Type	Execute on	Commands	User group	Host group	Host access
<input type="checkbox"/>	Detect operating system	Script	Server (proxy)	sudo /usr/bin/nmap -O {HOST.CONN}	Zabbix administrators	All	Read
<input type="checkbox"/>	MyScripts/Check disk space	Script	Agent	sleep 5 df -h	All	All	Read
<input type="checkbox"/>	MyScripts/Check disk space no sleep	Script	Agent	df -h	All	All	Read
<input type="checkbox"/>	Ping	Script	Server (proxy)	ping -c 3 {HOST.CONN}; case \$? in [01]) true;; *) false;; esac	All	All	Read
<input type="checkbox"/>	Traceroute	Script	Server (proxy)	/usr/bin/traceroute {HOST.CONN}	All	All	Read

0 selected

Displayed data:

Column	Description
Name	Name of the script. Clicking on the script name opens the script <b>configuration form</b> .
Type	Script type is displayed - Script or IPMI command.
Execute on	It is displayed whether the script will be executed on Zabbix server or agent.
Commands	All commands to be executed within the script are displayed.
User group	The user group that the script is available to is displayed (or All for all user groups).
Host group	The host group that the script is available for is displayed (or All for all host groups).
Host access	The permission level for the host group is displayed - Read or Write. Only users with the required permission level will have access to executing the script.

To configure a new script, click on the Create script button in the top right-hand corner.

Mass editing options

A button below the list offers one mass-editing option:

- Delete - delete the scripts

To use this option, mark the checkboxes before the respective scripts and click on Delete.

Using filter

You can use the filter to display only the scripts you are interested in. For better search performance, data is searched with macros unresolved.

The Filter link is available above the list of scripts. If you click on it, a filter becomes available where you can filter scripts by name.

The screenshot shows a filter interface. At the top right, there is a 'Filter' button with a funnel icon. Below it, there is a search box labeled 'Name' with a text input field. Below the search box, there are two buttons: 'Apply' and 'Reset'.

Configuring a global script

\* Name

Type

Execute on

\* Commands

Description

User group

Host group

Required host permissions

Enable confirmation

Confirmation text

Script attributes:

Parameter	Description
Name	Unique name of the script. Since Zabbix 2.2 the name can be prefixed with the desired path, for example, Default/, putting the script into the respective directory. When accessing scripts through the menu in monitoring sections, they will be organized according to the given directories. A script cannot have the same name as an existing directory (and vice versa). A script name must be unique within its directory. Unescaped script names are validated for uniqueness, i.e. "Ping" and "\Ping" cannot be added in the same folder. A single backslash escapes any symbol directly after it. For example, characters '/' and '\' can be escaped by backslash, i.e. \/ or \\.
Type	Click the respective button to select script type - <b>IPMI command</b> or <b>Script</b> .

Parameter	Description
Execute on	Click the respective button to execute the script on: <b>Zabbix agent</b> - the script will be executed by Zabbix agent (if the system.run item is <b>allowed</b> ) on the host <b>Zabbix server (proxy)</b> - the script will be executed by Zabbix server or proxy (if enabled by <b>EnableRemoteCommands</b> ) - depending on whether the host is monitored by server or proxy <b>Zabbix server</b> - the script will be executed by Zabbix server only
Commands	Enter full path to the commands to be executed within the script.  The following macros are supported: host-related - {HOST.CONN}, {HOST.IP}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}; user-related - {USER.ALIAS}, {USER.FULLNAME}, {USER.NAME}, {USER.SURNAME}; custom <b>user macros</b> .  Notes: If a macro may resolve to a value with spaces (for example, host name), don't forget to quote as needed. User-related macros are supported since Zabbix 5.0.2 to allow passing information about the user that launched the script. If the script was executed automatically under an action operation, these macros will not be resolved.
Description	Enter a description for the script.
User group	Select the user group that the script will be available to (or All for all user groups).
Host group	Select the host group that the script will be available for (or All for all host groups).
Required host permissions	Select the permission level for the host group - Read or Write. Only users with the required permission level will have access to executing the script.
Enable confirmation	Mark the checkbox to display a confirmation message before executing the script. This feature might be especially useful with potentially dangerous operations (like a reboot script) or ones that might take a long time.
Confirmation text	Enter a custom confirmation text for the confirmation popup enabled with the checkbox above (for example, Remote system will be rebooted. Are you sure?). To see how the text will look like, click on Test confirmation next to the field.  All macros supported for script commands are also supported for the confirmation text. Note: the macros will not be expanded when testing the confirmation message.

### Script execution and result

Scripts run by Zabbix server are executed by the order described in **Command execution** section including exit code checking. The script result will be displayed in a pop-up window that will appear after the script is run.

Note: The return value of the script is standard output together with standard error.

See an example of a script and the result window below:

```
uname -v
/tmp/non_existing_script.sh
echo "This script was started by {USER.ALIAS}"
```

## Uname

```
uname -v
/tmp/non_existing_script.sh
echo "This script was started by Admin"

#102-Ubuntu SMP Mon May 11 10:07:26 UTC 2020
sh: 2: /tmp/non_existing_script.sh: not found
This script was started by Admin
```

Script timeout

Zabbix agent

You may encounter a situation when a timeout occurs while executing a script.

See an example of a script running on Zabbix agent and the result window below:

## Check disk space A



- Timeout while executing a shell script.
- Cannot execute script

```
sleep 5
df -h
```

The error message, in this case, is the following:

Timeout while executing a shell script.

In order to avoid such a situation, it is advised to optimize the script itself (instead of adjusting Timeout parameter to a corresponding value (in our case, > '5') by modifying the [Zabbix agent configuration](#) and [Zabbix server configuration](#)).

In case still the Timeout parameter is changed in [Zabbix agent configuration](#) following error message appears:

Get value from agent failed: ZBX\_TCP\_READ() timed out.

It means that modification was made in [Zabbix agent configuration](#) and it is required to modify Timeout setting also in [Zabbix server configuration](#).

Zabbix server/proxy

See an example of a script running on Zabbix server and the result window below:

## Check disk space S



- Timeout while executing a shell script.
- Cannot execute script

```
sleep 11
df -h
```

It is also advised to optimize the script itself (instead of adjusting TrapperTimeout parameter to a corresponding value (in our case, > '11') by modifying the [Zabbix server configuration](#)).

## 9 Queue

### Overview

In the Administration → Queue section items that are waiting to be updated are displayed.

Ideally, when you open this section it should all be "green" meaning no items in the queue. If all items are updated without delay, there are none waiting. However, due to lacking server performance, connection problems or problems with agents, some items may get delayed and the information is displayed in this section. For more details, see the [Queue](#) section.

#### Note:

Queue is available only if Zabbix server is running.

From the title dropdown you can select:

- queue overview by item type
- queue overview by proxy
- list of delayed items

### Overview by item type

In this screen it is easy to locate if the problem is related to one or several item types.

☰ Queue overview ▾

Items	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
Zabbix agent	1	11	1	0	0	0
Zabbix agent (active)	0	0	0	0	0	0
Simple check	0	0	0	0	0	0
SNMPv1 agent	0	0	0	0	0	0
SNMPv2 agent	0	0	0	0	0	0
SNMPv3 agent	0	0	0	0	0	0
Zabbix internal	0	0	0	0	0	0
Zabbix aggregate	0	0	0	0	0	0
External check	0	0	0	0	0	0
Database monitor	0	0	0	0	0	0
HTTP agent	0	0	0	0	0	0

Each line contains an item type. Each column shows the number of waiting items - waiting for 5-10 seconds/10-30 seconds/30-60 seconds/1-5 minutes/5-10 minutes or over 10 minutes respectively.

### Overview by proxy

In this screen it is easy to locate if the problem is related to one of the proxies or the server.

### ☰ Queue overview by proxy ▾

Proxy	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
Remote proxy	0	8	11	0	0	0
Server	0	0	0	0	0	0

Total: 2

Each line contains a proxy, with the server last in the list. Each column shows the number of waiting items - waiting for 5-10 seconds/10-30 seconds/30-60 seconds/1-5 minutes/5-10 minutes or over 10 minutes respectively.

#### List of waiting items

In this screen, each waiting item is listed.

### ☰ Queue details ▾

Scheduled check	Delayed by	Host	Name	Proxy
2019-09-02 11:46:40	58s	My host	CPU idle time	Remote proxy
2019-09-02 11:46:41	57s	My host	CPU interrupt time	Remote proxy
2019-09-02 11:46:42	56s	My host	CPU iowait time	Remote proxy
2019-09-02 11:46:43	55s	My host	CPU nice time	Remote proxy
2019-09-02 11:46:44	54s	My host	CPU softirq time	Remote proxy
2019-09-02 11:46:45	53s	My host	CPU steal time	Remote proxy
2019-09-02 11:46:46	52s	My host	CPU system time	Remote proxy

Displayed data:

Column	Description
Scheduled check	The time when the check was due is displayed.
Delayed by	The length of the delay is displayed.
Host	Host of the item is displayed.
Name	Name of the waiting item is displayed.
Proxy	The proxy name is displayed, if the host is monitored by proxy.

#### Possible error messages

You may encounter a situation when no data is displayed and the following error message appears:



Error message in this case is the following:


Cannot display item queue. Permission denied

This happens when PHP configuration parameters \$ZBX\_SERVER\_PORT or \$ZBX\_SERVER in zabbix.conf.php point to existing Zabbix server which uses different database.

### 3 User profile

#### Overview

In the user profile you can customize some Zabbix frontend features, such as the interface language, color theme, number of rows displayed in the lists etc. The changes made here will apply for the user only.

To access the user profile configuration form, click on the  user settings near the bottom of the Zabbix menu (not available for a guest user).

#### Configuration

The **User** tab allows you to set various user preferences.

User   Media 1   Messaging ●

---

Password

Language

Time zone

Theme

Auto-login

Auto-logout

\* Refresh

\* Rows per page

URL (after login)

Parameter	Description
Password	Click on the link to display two fields for entering a new password.
Language	Select the interface language of your choice or select <b>System default</b> to use default system settings. For more information, see <a href="#">Installation of additional frontend languages</a> .
Time zone	Select the time zone to override global <a href="#">time zone</a> on user level or select <b>System default</b> to use global time zone settings.
Theme	Select a color theme specifically for your profile: <b>System default</b> - use default system settings <b>Blue</b> - standard blue theme <b>Dark</b> - alternative dark theme <b>High-contrast light</b> - light theme with high contrast <b>High-contrast dark</b> - dark theme with high contrast
Auto-login	Mark this checkbox to make Zabbix remember you and log you in automatically for 30 days. Browser cookies are used for this.
Auto-logout	With this checkbox marked you will be logged out automatically, after the set amount of seconds (minimum 90 seconds, maximum 1 day). <a href="#">Time suffixes</a> are supported, e.g. 90s, 5m, 2h, 1d. Note that this option will not work: * When Monitoring menu pages perform background information refreshes. In case pages refreshing data in a specific time interval (dashboards, graphs, screens, latest data, etc.) are left open session lifetime is extended, respectively disabling auto-logout feature; * If logging in with the Remember me for 30 days option checked. Auto-logout can accept 0, meaning that Auto-logout becomes disabled after profile settings update.



Parameter	Description
Refresh	You can set how often the information in the pages will be refreshed on the Monitoring menu, except for Dashboard, which uses its own refresh parameters for every widget. <b>Time suffixes</b> are supported, e.g. 30s, 5m, 2h, 1d.
Rows per page	You can set how many rows will be displayed per page in the lists. Fewer rows (and fewer records to display) mean faster loading times.
URL (after login)	You can set a specific URL to be displayed after the login. Instead of the default Monitoring → Dashboard it can be, for example, the URL of Monitoring → Triggers.

The **Media** tab allows you to specify the **media details** for the user, such as the types, the addresses to use and when to use them to deliver notifications.

**Note:**

Only **admin level** users (Admin and Super Admin) can change their own media details.

The **Messaging** tab allows you to set **global notifications**.

### 1 Global notifications

#### Overview

Global notifications are a way of displaying issues that are currently happening right on the screen you're at in Zabbix frontend.

Without global notifications, working in some other location than Problems or the Dashboard would not show any information regarding issues that are currently happening. Global notifications will display this information regardless of where you are.

Global notifications involve both showing a message and **playing a sound**.

**Attention:**

The auto play of sounds may be disabled in recent browser versions by default. In this case, you need to change this setting manually.

#### Configuration

Global notifications can be enabled per user in the Messaging tab of **profile configuration**.

Frontend messaging

Message timeout

Play sound

Trigger severity

<input checked="" type="checkbox"/> Recovery	<input type="text" value="alarm_ok"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> Not classified	<input type="text" value="no_sound"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> Information	<input type="text" value="alarm_information"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> Warning	<input type="text" value="alarm_warning"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> Average	<input type="text" value="alarm_average"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> High	<input type="text" value="alarm_high"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>
<input checked="" type="checkbox"/> Disaster	<input type="text" value="alarm_disaster"/>	<input type="button" value="Play"/>	<input type="button" value="Stop"/>

Show suppressed problems



Parameter	Description
Frontend messaging	Mark the checkbox to enable global notifications.
Message timeout	You can set for how long the message will be displayed. By default, messages will stay on screen for 60 seconds. <b>Time suffixes</b> are supported, e.g. 30s, 5m, 2h, 1d.
Play sound	You can set how long the sound will be played. <b>Once</b> - sound is played once and fully. <b>10 seconds</b> - sound is repeated for 10 seconds. <b>Message timeout</b> - sound is repeated while the message is visible.
Trigger severity	You can set the trigger severities that global notifications and sounds will be activated for. You can also select the sounds appropriate for various severities. If no severity is marked then no messages will be displayed at all. Also, recovery messages will only be displayed for those severities that are marked. So if you mark Recovery and Disaster, global notifications will be displayed for the problems and the recoveries of disaster severity triggers.
Show suppressed problems	Mark the checkbox to display notifications for problems which would otherwise be suppressed (not shown) because of host maintenance.

Global messages displayed

As the messages arrive, they are displayed in a floating section on the right hand side. This section can be repositioned freely by dragging the section header.





For this section, several controls are available:

-  **Snooze** button silences the currently active alarm sound;
-  **Mute/Unmute** button switches between playing and not playing the alarm sounds at all.

## 2 Sound in browsers

### Overview

For the sounds to be played in Zabbix frontend, Frontend messaging must be enabled in the user profile Messaging tab, with all trigger severities checked, and sounds should also be enabled in the global notification pop-up window.

If for some reasons audio cannot be played on the device, the  button in the global notification pop-up window will permanently remain in the "mute" state and the message "Cannot support notification audio for this device." will be displayed upon hovering over the  button.

Sounds, including the default audio clips, are supported in MP3 format only.


The sounds of Zabbix frontend have been successfully tested in recent Firefox/Opera browsers on Linux and Chrome, Firefox, Microsoft Edge, Opera and Safari browsers on Windows.

#### **Attention:**

The auto play of sounds may be disabled in recent browser versions by default. In this case, you need to change this setting manually.

## 4 Global search

It is possible to search Zabbix frontend for hosts, host groups and templates.

The search input box is located below the Zabbix logo in the menu. The search can be started by pressing Enter or clicking on the  search icon.



If there is a host that contains the entered string in any part of the name, a dropdown will appear, listing all such hosts (with the matching part highlighted in orange). The dropdown will also list a host if that host's visible name is a match to the technical name entered as a search string; the matching host will be listed, but without any highlighting.

#### Searchable attributes

Hosts can be searched by the following properties:

- Host name
- Visible name
- IP address
- DNS name

Host groups can be searched by name. Specifying a parent host group implicitly selects all nested host groups.

Templates can be searched by name or visible name. If you search by a name that is different from the visible name (of a template/host), in the search results it is displayed below the visible name in parentheses.

#### Search results

Search results consist of three separate blocks for hosts, host groups and templates.

☰ Search: Zabbix server

Hosts													
Host	IP	DNS	Latest data	Problems	Graphs	Dashboards	Web	Applications	Items	Triggers	Graphs	Discovery	Web
Zabbix server	127.0.0.1		Latest data	Problems	Graphs	Dashboards	Web	Applications 19	Items 132	Triggers 63	Graphs 24	Discovery 3	Web 1
Displaying 1 of 1 found													
Host groups													
Host group	Latest data	Problems	Web	Hosts	Templates								
Zabbix servers	Latest data	Problems	Web	Hosts 1	Templates								
Displaying 1 of 1 found													
Templates													
Template	Applications	Items	Triggers	Graphs	Dashboards	Discovery	Web						
Template App Remote Zabbix server	Applications 1	Items 47	Triggers 34	Graphs 6	Dashboards 1	Discovery	Web						
Template App Zabbix Server	Applications 1	Items 46	Triggers 34	Graphs 6	Dashboards 1	Discovery	Web						
Displaying 2 of 2 found													

It is possible to collapse/expand each individual block. The entry count is displayed at the bottom of each block, for example, Displaying 13 of 13 found. Total entries displayed within one block are limited to 100.

Each entry provides links to monitoring and configuration data. See the [full list](#) of links.

For all configuration data (such as items, triggers, graphs) the amount of entities found is displayed by a number next to the entity name, in gray. **Note** that if there are zero entities, no number is displayed.

Enabled hosts are displayed in blue, disabled hosts in red.

#### Links available

For each entry the following links are available:

- Hosts
  - Monitoring
  - \* Latest data

- \* Problems
- \* Graphs
- \* Host dashboards
- \* Web scenarios
- Configuration
  - \* Applications
  - \* Items
  - \* Triggers
  - \* Graphs
  - \* Discovery rules
  - \* Web scenarios
- Host groups
  - Monitoring
    - \* Latest data
    - \* Problems
    - \* Web scenarios
  - Configuration
    - \* Hosts
    - \* Templates
- Templates
  - Configuration
    - \* Applications
    - \* Items
    - \* Triggers
    - \* Graphs
    - \* Template dashboards
    - \* Discovery rules
    - \* Web scenarios

## 5 Frontend maintenance mode

### Overview

Zabbix web frontend can be temporarily disabled in order to prohibit access to it. This can be useful for protecting the Zabbix database from any changes initiated by users, thus protecting the integrity of database.

Zabbix database can be stopped and maintenance tasks can be performed while Zabbix frontend is in maintenance mode.

Users from defined IP addresses will be able to work with the frontend normally during maintenance mode.

### Configuration

In order to enable maintenance mode, the `maintenance.inc.php` file (located in `/conf` of the Zabbix HTML document directory on the webserver) must be modified to uncomment the following lines:

```
// Maintenance mode.
define('ZBX_DENY_GUI_ACCESS', 1);

// Array of IP addresses, which are allowed to connect to frontend (optional).
$ZBX_GUI_ACCESS_IP_RANGE = array('127.0.0.1');

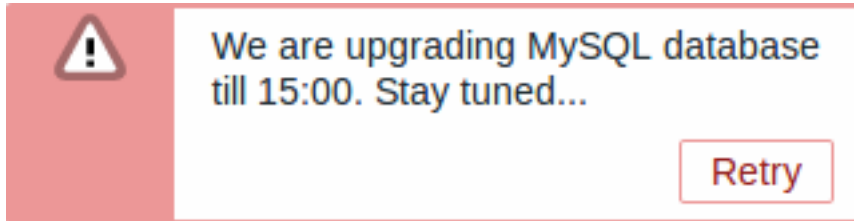
// Message shown on warning screen (optional).
$ZBX_GUI_ACCESS_MESSAGE = 'We are upgrading MySQL database till 15:00. Stay tuned...';
```

Parameter	Details
<b>ZBX_DENY_GUI_ACCESS</b>	Enable maintenance mode: 1 - maintenance mode is enabled, disabled otherwise
<b>ZBX_GUI_ACCESS_IP_RANGE</b>	Array of IP addresses, which are allowed to connect to frontend (optional). For example: <code>array('192.168.1.1', '192.168.1.2')</code>

Parameter	Details
<b>ZBX_GUI_ACCESS_MESSAGE</b>	A message you can enter to inform users about the maintenance (optional).

## Display

The following screen will be displayed when trying to access the Zabbix frontend while in maintenance mode. The screen is refreshed every 30 seconds in order to return to a normal state without user intervention when the maintenance is over.



IP addresses defined in ZBX\_GUI\_ACCESS\_IP\_RANGE will be able to access the frontend as always.

## 6 Page parameters

### Overview

Most Zabbix web interface pages support various HTTP GET parameters that control what will be displayed. They may be passed by specifying parameter=value pairs after the URL, separated from the URL by a question mark (?) and from each other by ampersands (&).

Monitoring → Problems

The following parameters are supported:

- **show** - filter option "Show": 1 - recent problems, 2 - all, 3 - in problem state
- **application** - filter option "Application": freeform string
- **name** - filter option "Problem": freeform string
- **severities** - filter option "Severity": array of selected severities in a format 'severities[\*]=\*' (replace \* with severity level): 0 - not classified, 1 - information, 2 - warning, 3 - average, 4 - high, 5 - disaster
- **inventory** - filter option "Host inventory": array of inventory fields: [field], [value]
- **evaltype** - filter option "Tags", tag filtering strategy: 0 - And/Or, 2 - Or
- **tags** - filter option "Tags": array of defined tags: [tag], [operator], [value]
- **show\_tags** - filter option "Show tags": 0 - none, 1 - one, 2 - two, 3 - three
- **tag\_name\_format** - filter option "Tag name": 0 - full name, 1 - shortened, 2 - none
- **tag\_priority** - filter option "Tag display priority": comma-separated string of tag display priority
- **show\_suppressed** - filter option "Show suppressed problems": should be 'show\_suppressed=1' to show
- **unacknowledged** - filter option "Show unacknowledged only": should be 'unacknowledged=1' to show
- **compact\_view** - filter option "Compact view": should be 'compact\_view=1' to show
- **highlight\_row** - filter option "Highlight whole row" (use problem color as background color for every problem row): should be '1' to highlight; can be set only when 'compact\_view' is set
- **filter\_name** - filter properties option "Name": freeform string
- **filter\_show\_counter** - filter properties option "Show number of records": 1 - show, 0 - do not show
- **filter\_custom\_time** - filter properties option "Set custom time period": 1 - set, 0 - do not set
- **sort** - sort column: clock, host, severity, name
- **sortorder** - sort order or results: DESC - descending, ASC - ascending
- **age\_state** - filter option "Age less than": should be 'age\_state=1' to enable 'age'. Is used only when 'show' equals 3.
- **age** - filter option "Age less than": days
- **groupids** - filter option "Host groups": array of host groups IDs
- **hostids** - filter option "Hosts": array of host IDs
- **triggerids** - filter option "Triggers": array of trigger IDs
- **show\_timeline** - filter option "Show timeline": should be 'show\_timeline=1' to show
- **details** - filter option "Show details": should be 'details=1' to show
- **from** - date range start, can be 'relative' (e.g.: now-1m). Is used only when 'filter\_custom\_time' equals 1.
- **to** - date range end, can be 'relative' (e.g.: now-1m). Is used only when 'filter\_custom\_time' equals 1.

Fullscreen/kiosk mode

Fullscreen and kiosk modes in supported frontend pages can be activated using URL parameters. For example, in dashboards:

- `/zabbix.php?action=dashboard.view&fullscreen=1` - activate fullscreen mode
- `/zabbix.php?action=dashboard.view&kiosk=1` - activate kiosk mode
- `/zabbix.php?action=dashboard.view&fullscreen=0` - activate normal mode

## 7 Definitions

### Overview

While many things in the frontend can be configured using the frontend itself, some customisations are currently only possible by editing a definitions file.

This file is `defines.inc.php` located in `/include` of the Zabbix HTML document directory.

### Parameters

Parameters in this file that could be of interest to users:

- `ZBX_MIN_PERIOD`

Minimum graph period, in seconds. One minute by default.

- `GRAPH_YAXIS_SIDE_DEFAULT`

Default location of Y axis in simple graphs and default value for drop down box when adding items to custom graphs. Possible values: 0 - left, 1 - right.

Default: 0

- `SCREEN_REFRESH_RESPONSIVENESS` (available since 2.0.4)

Used in screens and defines the number of seconds after which query skipping will be switched off. Otherwise, if a screen element is in update status all queries on update are skipped until a response is received. With this parameter in use, another update query might be sent after N seconds without having to wait for the response to the first one.

Default: 10

- `ZBX_SESSION_NAME` (available since 4.0.0)

String used as the name of the Zabbix frontend session cookie.

Default: `zbx_sessionid`

- `ZBX_DATA_CACHE_TTL` (available since 5.2.0)

TTL timeout in seconds used to invalidate data cache of **Vault response**. Set 0 to disable Vault response caching.

Default: 60

## 8 Creating your own theme

### Overview

By default, Zabbix provides a number of predefined themes. You may follow the step-by-step procedure provided here in order to create your own. Feel free to share the result of your work with Zabbix community if you created something nice.

### Step 1

To define your own theme you'll need to create a CSS file and save it in the `assets/styles/` folder (for example, `custom-theme.css`). You can either copy the files from a different theme and create your theme based on it or start from scratch.

### Step 2

Add your theme to the list of themes returned by the `APP::getThemes()` method. You can do this by overriding the `ZBase::getThemes()` method in the APP class. This can be done by adding the following code before the closing brace in `include/classes/core/APP.php`:

```
public static function getThemes() {
    return array_merge(parent::getThemes(), [
        'custom-theme' => _('Custom theme')
    ]);
}
```

**Attention:**

Note that the name you specify within the first pair of quotes must match the name of the theme file without extension.

To add multiple themes, just list them under the first theme, for example:

```
public static function getThemes() {
    return array_merge(parent::getThemes(), [
        'custom-theme' => _('Custom theme'),
        'anothertheme' => _('Another theme'),
        'onemoretheme' => _('One more theme')
    ]);
}
```

Note that every theme except the last one must have a trailing comma.

**Note:**

To change graph colors, the entry must be added in the graph\_theme database table.

**Step 3**

Activate the new theme.

In Zabbix frontend, you may either set this theme to be the default one or change your theme in the user profile.

Enjoy the new look and feel!

**9 Debug mode**

Overview

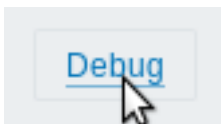
Debug mode may be used to diagnose performance problems with frontend pages.

Configuration

Debug mode can be activated for individual users who belong to a user group:

- when configuring a **user group**;
- when viewing configured **user groups**.

When Debug mode is enabled for a user group, its users will see a Debug button in the lower right corner of the browser window:



Clicking on the Debug button opens a new window below the page contents which contains the SQL statistics of the page, along with a list of API calls and individual SQL statements:



```

***** Script profiler *****
Total time: 0.249825
Total SQL time: 0.139814
SQL count: 143 (selects: 117 | executes: 26)
Peak memory usage: 6M
Memory limit: 128M

1. hostgroup.get [latest.php:124]

Parameters:          Result:
Array                Array
(                    (
  [output] => Array   [4] => Array
    (                (
      [0] => groupid  [groupid] => 4
    )
  )
)

```

Hide debug

In case of performance problems with the page, this window may be used to search for the root cause of the problem.

**Warning:**  
Enabled Debug mode negatively affects frontend performance.

### 10 Cookies used by Zabbix

#### Overview

This page provides a list of cookies used by Zabbix.

Name	Description	Values	Expires/Max-Age	HttpOnly <sup>a</sup>	Secure <sup>a</sup>
ZBX_SESSION_ID	Zabbix frontend session data, stored as JSON encoded by base64		Session (expires when the browsing session ends)	+	+ (only if HTTPS is enabled on a web server)
tab	Active tab number; this cookie is only used on pages with multiple tabs (e.g. Host, Trigger or Action configuration page) and is created, when a user navigates from a primary tab to another tab (such as Tags or Dependencies tab).	Example: 1	Session (expires when the browsing session ends)	-	-

0 is used for the primary tab.

Name	Description	Values	Expires/Max-Age	HttpOnly <sup>a</sup>	Secure <sup>a</sup>
browserwarning	Warning about using an outdated browser should be ignored.	yes	Session (expires when the browsing session ends)	-	-
system-message-ok	A message to show as soon as page is reloaded.	Plain text message	Session (expires when the browsing session ends) or as soon as page is reloaded	+	-
system-message-error	An error message to show as soon as page is reloaded.	Plain text message	Session (expires when the browsing session ends) or as soon as page is reloaded	+	-

HttpOnly<sup>a</sup>

<sup>a</sup>According to [specification](#) these are voltages on chip pins and generally speaking may need scaling.

Secure<sup>a</sup>

<sup>a</sup>Secure indicates that the cookie should only be transmitted over a secure HTTPS connection from the client. When set to 'true', the cookie will only be set if a secure connection exists.

**Note:**

Forcing 'HttpOnly' flag on Zabbix cookies by a webserver directive is not supported.

## 11 Time zones

### Overview

Since Zabbix 5.2 the frontend time zone can be set globally in the frontend and adjusted for individual users.

The screenshot shows the Zabbix configuration interface. The 'Default time zone' dropdown menu is open, displaying a list of time zones. The selected option is 'System: (UTC+02:00) Europe/Riga'. Other visible options include 'System: (UTC+02:00) Europe/Riga', '(UTC-01:00) America/Scoresbysund', '(UTC-01:00) Atlantic/Azores', '(UTC-01:00) Atlantic/Cape\_Verde', '(UTC-02:00) America/Noronha', '(UTC-02:00) Atlantic/South\_Georgia', '(UTC-03:00) America/Araguaina', '(UTC-03:00) America/Argentina/Buenos\_Aires', '(UTC-03:00) America/Argentina/Catamarca', '(UTC-03:00) America/Argentina/Cordoba', and '(UTC-03:00) America/Argentina/Jujuy'. Other configuration options visible include 'Default language' (English (en\_US)), 'Default theme', and various system settings like 'Limit for search and filter results', 'Max number of columns and rows in overview tables', 'Max count of elements to show inside table cell', 'Show warning if Zabbix server is down', 'Working time', 'Show technical errors', and 'Max history display period'.

If System is selected, the web server time zone will be used for the frontend (including the value of 'date.timezone' of php.ini, if set), while Zabbix server will use the time zone of the machine it is running on.

**Note:**

Zabbix server will only use the specified global/user timezone when expanding macros in notifications (e.g. {EVENT.TIME} can expand to a different time zone per user) and for the time limit when notifications are sent (see "When active" setting in user [media configuration](#)).

## Configuration

The global timezone:

- can be set manually when [installing](#) the frontend
- can be modified in Administration → General → [GUI](#)

User-level time zone:

- can be set when [configuring/updating](#) a user
- can be set by each user in their [user profile](#)

## 19. API

**Overview** Zabbix API allows you to programmatically retrieve and modify the configuration of Zabbix and provides access to historical data. It is widely used to:

- Create new applications to work with Zabbix;
- Integrate Zabbix with third party software;
- Automate routine tasks.

The Zabbix API is a web based API and is shipped as part of the web frontend. It uses the JSON-RPC 2.0 protocol which means two things:

- The API consists of a set of separate methods;
- Requests and responses between the clients and the API are encoded using the JSON format.

More info about the protocol and JSON can be found in the [JSON-RPC 2.0 specification](#) and the [JSON format homepage](#).

**Structure** The API consists of a number of methods that are nominally grouped into separate APIs. Each of the methods performs one specific task. For example, the `host.create` method belongs to the `host` API and is used to create new hosts. Historically, APIs are sometimes referred to as "classes".

**Note:**

Most APIs contain at least four methods: `get`, `create`, `update` and `delete` for retrieving, creating, updating and deleting data respectively, but some of the APIs may provide a totally different set of methods.

**Performing requests** Once you've set up the frontend, you can use remote HTTP requests to call the API. To do that you need to send HTTP POST requests to the `api_jsonrpc.php` file located in the frontend directory. For example, if your Zabbix frontend is installed under `http://company.com/zabbix`, the HTTP request to call the `apiinfo.version` method may look like this:

```
POST http://company.com/zabbix/api_jsonrpc.php HTTP/1.1
Content-Type: application/json-rpc
```

```
{"jsonrpc": "2.0", "method": "apiinfo.version", "id": 1, "auth": null, "params": {}}
```

The request must have the `Content-Type` header set to one of these values: `application/json-rpc`, `application/json` or `application/jsonrequest`.

**Note:**

You can use any HTTP client or a JSON-RPC testing tool to perform API requests manually, but for developing applications we suggest you use one of the [community maintained libraries](#).

**Example workflow** The following section will walk you through some usage examples in more detail.

**Authentication** Before you can access any data inside of Zabbix you'll need to log in and obtain an authentication token. This can be done using the `user.login` method. Let us suppose that you want to log in as a standard Admin user. Then your JSON request will look like this:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "user": "Admin",
    "password": "zabbix"
  },
  "id": 1,
  "auth": null
}
```

Let's take a closer look at the request object. It has the following properties:

- `jsonrpc` - the version of the JSON-RPC protocol used by the API; the Zabbix API implements JSON-RPC version 2.0;
- `method` - the API method being called;
- `params` - parameters that will be passed to the API method;
- `id` - an arbitrary identifier of the request;
- `auth` - a user authentication token; since we don't have one yet, it's set to `null`.

If you provided the credentials correctly, the response returned by the API will contain the user authentication token:

```
{
  "jsonrpc": "2.0",
  "result": "0424bd59b807674191e7d77572075f33",
  "id": 1
}
```

The response object in turn contains the following properties:

- `jsonrpc` - again, the version of the JSON-RPC protocol;
- `result` - the data returned by the method;
- `id` - identifier of the corresponding request.

**Retrieving hosts** We now have a valid user authentication token that can be used to access the data in Zabbix. For example, let's use the `host.get` method to retrieve the IDs, host names and interfaces of all configured `hosts`:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": [
      "hostid",
      "host"
    ],
    "selectInterfaces": [
      "interfaceid",
      "ip"
    ]
  },
  "id": 2,
  "auth": "0424bd59b807674191e7d77572075f33"
}
```

**Attention:**

Note that the `auth` property is now set to the authentication token we've obtained by calling `user.login`.

The response object will contain the requested data about the hosts:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10084",
```

```

        "host": "Zabbix server",
        "interfaces": [
            {
                "interfaceid": "1",
                "ip": "127.0.0.1"
            }
        ]
    },
    "id": 2
}

```

**Note:**

For performance reasons we recommend to always list the object properties you want to retrieve and avoid retrieving everything.

**Creating a new item** Let's create a new **item** on "Zabbix server" using the data we've obtained from the previous `host.get` request. This can be done by using the `item.create` method:

```

{
    "jsonrpc": "2.0",
    "method": "item.create",
    "params": {
        "name": "Free disk space on /home/joe/",
        "key_": "vfs.fs.size[/home/joe/,free]",
        "hostid": "10084",
        "type": 0,
        "value_type": 3,
        "interfaceid": "1",
        "delay": 30
    },
    "auth": "0424bd59b807674191e7d77572075f33",
    "id": 3
}

```

A successful response will contain the ID of the newly created item, which can be used to reference the item in the following requests:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "24759"
        ]
    },
    "id": 3
}

```

**Note:**

The `item.create` method as well as other create methods can also accept arrays of objects and create multiple items with one API call.

**Creating multiple triggers** So if create methods accept arrays, we can add multiple **triggers** like so:

```

{
    "jsonrpc": "2.0",
    "method": "trigger.create",
    "params": [
        {
            "description": "Processor load is too high on {HOST.NAME}",
            "expression": "{Linux server:system.cpu.load[percpu,avg1].last()}>5",
        },
        {

```

```

        "description": "Too many processes on {HOST.NAME}",
        "expression": "{Linux server:proc.num[].avg(5m)}>300",
    }
],
"auth": "0424bd59b807674191e7d77572075f33",
"id": 4
}

```

A successful response will contain the IDs of the newly created triggers:

```

{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "17369",
      "17370"
    ]
  },
  "id": 4
}

```

**Updating an item** Enable an item, that is, set its status to "0":

```

{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "10092",
    "status": 0
  },
  "auth": "0424bd59b807674191e7d77572075f33",
  "id": 5
}

```

A successful response will contain the ID of the updated item:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "10092"
    ]
  },
  "id": 5
}

```

**Note:**

The `item.update` method as well as other update methods can also accept arrays of objects and update multiple items with one API call.

**Updating multiple triggers** Enable multiple triggers, that is, set their status to 0:

```

{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": [
    {
      "triggerid": "13938",
      "status": 0
    },
    {
      "triggerid": "13939",
      "status": 0
    }
  ]
}

```

```

    ],
    "auth": "0424bd59b807674191e7d77572075f33",
    "id": 6
}

```

A successful response will contain the IDs of the updated triggers:

```

{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938",
      "13939"
    ]
  },
  "id": 6
}

```

**Note:**

This is the preferred method of updating. Some API methods like `host.massupdate` allow to write more simple code, but it's not recommended to use those methods, since they will be removed in the future releases.

**Error handling** Up to that point everything we've tried has worked fine. But what happens if we try to make an incorrect call to the API? Let's try to create another host by calling `host.create` but omitting the mandatory `groups` parameter.

```

{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "Linux server",
    "interfaces": [
      {
        "type": 1,
        "main": 1,
        "useip": 1,
        "ip": "192.168.3.1",
        "dns": "",
        "port": "10050"
      }
    ]
  },
  "id": 7,
  "auth": "0424bd59b807674191e7d77572075f33"
}

```

The response will then contain an error message:

```

{
  "jsonrpc": "2.0",
  "error": {
    "code": -32602,
    "message": "Invalid params.",
    "data": "No groups for host \"Linux server\"."
  },
  "id": 7
}

```

If an error occurred, instead of the `result` property, the response object will contain an `error` property with the following data:

- `code` - an error code;
- `message` - a short error summary;
- `data` - a more detailed error message.

Errors can occur in different cases, such as, using incorrect input values, a session timeout or trying to access unexisting objects. Your application should be able to gracefully handle these kinds of errors.

**API versions** To simplify API versioning, since Zabbix 2.0.4, the version of the API matches the version of Zabbix itself. You can use the [apiinfo.version](#) method to find out the version of the API you're working with. This can be useful for adjusting your application to use version-specific features.

We guarantee feature backward compatibility inside of a major version. When making backward incompatible changes between major releases, we usually leave the old features as deprecated in the next release, and only remove them in the release after that. Occasionally, we may remove features between major releases without providing any backward compatibility. It is important that you never rely on any deprecated features and migrate to newer alternatives as soon as possible.

**Note:**

You can follow all of the changes made to the API in the [API changelog](#).

**Further reading** You now know enough to start working with the Zabbix API, but don't stop here. For further reading we suggest you have a look at the [list of available APIs](#).

## Method reference

This section provides an overview of the functions provided by the Zabbix API and will help you find your way around the available classes and methods.

**Monitoring** The Zabbix API allows you to access history and other data gathered during monitoring.

History

Retrieve historical values gathered by Zabbix monitoring processes for presentation or further processing.

[History API](#)

Trends

Retrieve trend values calculated by Zabbix server for presentation or further processing.

[Trend API](#)

Events

Retrieve events generated by triggers, network discovery and other Zabbix systems for more flexible situation management or third-party tool integration.

[Event API](#)

Problems

Retrieve problems according to the given parameters.

[Problem API](#)

Service monitoring

Retrieve detailed service layer availability information about any service.

[Service SLA calculation](#)

Tasks

Interact with Zabbix server task manager, creating tasks and retrieving response.

[Task API](#)

**Configuration** The Zabbix API allows you to manage the configuration of your monitoring system.

Hosts and host groups

Manage host groups, hosts and everything related to them, including host interfaces, host macros and maintenance periods.

[Host API](#) | [Host group API](#) | [Host interface API](#) | [User macro API](#) | [Maintenance API](#)

Items and applications

Define items to monitor. Create or remove applications and assign items to them.

[Item API](#) | [Application API](#)



## Triggers

Configure triggers to notify you about problems in your system. Manage trigger dependencies.

### [Trigger API](#)

## Graphs

Edit graphs or separate graph items for better presentation of the gathered data.

### [Graph API](#) | [Graph item API](#)

## Templates

Manage templates and link them to hosts or other templates.

### [Template API](#)

## Export and import

Export and import Zabbix configuration data for configuration backups, migration or large-scale configuration updates.

### [Configuration API](#)

## Low-level discovery

Configure low-level discovery rules as well as item, trigger and graph prototypes to monitor dynamic entities.

### [LLD rule API](#) | [Item prototype API](#) | [Trigger prototype API](#) | [Graph prototype API](#) | [Host prototype API](#)

## Event correlation

Create custom event correlation rules.

### [Correlation API](#)

## Actions and alerts

Define actions and operations to notify users about certain events or automatically execute remote commands. Gain access to information about generated alerts and their receivers.

### [Action API](#) | [Alert API](#)

## Services

Manage services for service-level monitoring and retrieve detailed SLA information about any service.

### [Service API](#)

## Dashboards

Manage dashboards.

### [Dashboard API](#) | [Template dashboard API](#)

## Screens

Edit global and template-level screens or each screen item individually.

### [Screen API](#) | [Screen item API](#)

## Maps

Configure maps to create detailed dynamic representations of your IT infrastructure.

### [Map API](#)

## Web monitoring

Configure web scenarios to monitor your web applications and services.

### [Web scenario API](#)

## Network discovery

Manage network-level discovery rules to automatically find and monitor new hosts. Gain full access to information about discovered services and hosts.

### [Discovery rule API](#) | [Discovery check API](#) | [Discovered host API](#) | [Discovered service API](#)

**Administration** With the Zabbix API you can change administration settings of your monitoring system.

#### Users

Add users that will have access to Zabbix, assign them to user groups and grant permissions. Set access rules using user roles. Configure media types and the ways users will receive alerts.

[User API](#) | [User group API](#) | [Role API](#) | [Media type API](#) | [Audit log API](#)

#### General

Change certain global configuration options.

[Autoregistration API](#) | [Icon map API](#) | [Image API](#) | [User macro API](#) | [Settings API](#) | [Housekeeping API](#) | [Value map API](#)

#### Proxies

Manage the proxies used in your distributed monitoring setup.

[Proxy API](#)

#### Authentication

Change authentication configuration options.

[Authentication API](#)

#### Scripts

Configure and execute scripts to help you with your daily tasks.

[Script API](#)

**API information** Retrieve the version of the Zabbix API so that your application could use version-specific features.

[API info API](#)

### Action

This class is designed to work with actions.

Object references:

- [Action](#)
- [Action condition](#)
- [Action operation](#)

Available methods:

- [action.create](#) - create new actions
- [action.delete](#) - delete actions
- [action.get](#) - retrieve actions
- [action.update](#) - update actions

#### > Action object

The following objects are directly related to the `action` API.

#### Action

The action object has the following properties.

Property	Type	Description
<code>actionid</code>	string	(readonly) ID of the action.

Property	Type	Description
<b>esc_period</b> (required)	string	Default operation step duration. Must be at least 60 seconds. Accepts seconds, time unit with suffix and user macro.  Note that escalations are supported only for trigger and internal actions. In trigger actions, escalations are not supported in problem recovery and update operations. (constant) Type of events that the action will handle.  Refer to the <b>event "source" property</b> for a list of supported event types.
<b>eventsource</b> (required)	integer	Name of the action.
<b>name</b> (required)	string	Whether the action is enabled or disabled.
<b>status</b>	integer	Possible values: 0 - (default) enabled; 1 - disabled.
<b>pause_suppress</b>	integer	Whether to pause escalation during maintenance periods or not.  Possible values: 0 - Don't pause escalation; 1 - (default) Pause escalation.  Note that this parameter is valid for trigger actions only.

#### Action operation

The action operation object defines an operation that will be performed when an action is executed. It has the following properties.

Property	Type	Description
operationid	string	(readonly) ID of the action operation.
<b>operationtype</b> (required)	integer	Type of operation.  Possible values: 0 - send message; 1 - remote command; 2 - add host; 3 - remove host; 4 - add to host group; 5 - remove from host group; 6 - link to template; 7 - unlink from template; 8 - enable host; 9 - disable host; 10 - set host inventory mode.  Note that only types '0' and '1' are supported for trigger actions, only '0' is supported for internal actions. All types are supported for discovery and autoregistration actions.
actionid	string	ID of the action that the operation belongs to.

Property	Type	Description
esc_period	string	<p>Duration of an escalation step in seconds. Must be greater than 60 seconds. Accepts seconds, time unit with suffix and user macro. If set to 0 or 0s, the default action escalation period will be used.</p> <p>Default: 0s.</p> <p>Note that escalations are supported only for trigger and internal actions. In trigger actions, escalations are not supported in problem recovery and update operations.</p>
esc_step_from	integer	<p>Step to start escalation from.</p> <p>Default: 1.</p> <p>Note that escalations are supported only for trigger and internal actions. In trigger actions, escalations are not supported in problem recovery and update operations.</p>
esc_step_to	integer	<p>Step to end escalation at.</p> <p>Default: 1.</p> <p>Note that escalations are supported only for trigger and internal actions. In trigger actions, escalations are not supported in problem recovery and update operations.</p>

Property	Type	Description
evaltype	integer	<p>Operation condition evaluation method.</p> <p>Possible values:  0 - (default) AND / OR;  1 - AND;  2 - OR.</p>
opcommand	object	<p>Object containing the data about the command run by the operation.</p> <p>The operation command object is <a href="#">described in detail below</a>.</p>
opcommand_grouparray		<p>Required for remote command operations. Host groups to run remote commands on.</p> <p>Each object has the following properties:  opcommand_grpid - (string, readonly) ID of the object;  operationid - (string) ID of the operation;  groupid - (string) ID of the host group.</p> <p>Required for remote command operations if opcommand_hst is not set.</p>

Property	Type	Description
opcommand_hstarray		<p>Host to run remote commands on.</p> <p>Each object has the following properties:  opcommand_hstid - (string, readonly) ID of the object;  operationid - (string) ID of the operation;  hostid - (string) ID of the host; if set to 0 the command will be run on the current host.</p> <p>Required for remote command operations if opcommand_grp is not set.</p>
opconditions	array	<p>Operation conditions used for trigger actions.</p> <p>The operation condition object is <a href="#">described in detail below</a>.</p>
opgroup	array	<p>Host groups to add hosts to.</p> <p>Each object has the following properties:  operationid - (string) ID of the operation;  groupid - (string) ID of the host group.</p> <p>Required for "add to host group" and "remove from host group" operations.</p>

Property	Type	Description
opmessage	object	<p>Object containing the data about the message sent by the operation.</p> <p>The operation message object is <a href="#">described in detail below</a>.</p> <p>Required for message operations.</p>
opmessage_grparray		<p>User groups to send messages to.</p> <p>Each object has the following properties:  operationid - (string) ID of the operation;  usrgrpuid - (string) ID of the user group.</p> <p>Required for message operations if opmessage_usr is not set.</p>
opmessage_usr array		<p>Users to send messages to.</p> <p>Each object has the following properties:  operationid - (string) ID of the operation;  userid - (string) ID of the user.</p> <p>Required for message operations if opmessage_grp is not set.</p>



Property	Type	Description
optemplate	array	<p>Templates to link the hosts to.</p> <p>Each object has the following properties:  <b>operationid</b> - (string) ID of the operation;  <b>templateid</b> - (string) ID of the template.</p> <p>Required for "link to template" and "unlink from template" operations.  Inventory mode set host to.</p>
opinventory	object	<p>Object has the following properties:  <b>operationid</b> - (string) ID of the operation;  <b>inventory_mode</b> - (string) Inventory mode.</p> <p>Required for "Set host inventory mode" operations.</p>

#### Action operation command

The operation command object contains data about the command that will be run by the operation.

Property	Type	Description
command	string	Command to run. Required when type IN (0,1,2,3)
<b>type</b> (required)	integer	<p>Type of operation command.</p> <p>Possible values:  0 - custom script;  1 - IPMI;  2 - SSH;  3 - Telnet;  4 - global script.</p>

Property	Type	Description
authtype	integer	<p>Authentication method used for SSH commands.</p> <p>Possible values: 0 - password; 1 - public key.</p>
execute_on	integer	<p>Required for SSH commands. Target on which the custom script operation command will be executed.</p> <p>Possible values: 0 - Zabbix agent; 1 - Zabbix server; 2 - Zabbix server (proxy).</p>
password	string	<p>Required for custom script commands. Password used for SSH commands with password authentication and Telnet commands.</p>
port	string	<p>Port number used for SSH and Telnet commands.</p>
privatekey	string	<p>Name of the private key file used for SSH commands with public key authentication.</p>
publickey	string	<p>Required for SSH commands with public key authentication. Name of the public key file used for SSH commands with public key authentication.</p> <p>Required for SSH commands with public key authentication.</p>

Property	Type	Description
scriptid	string	ID of the script used for global script commands.
username	string	Required for global script commands. User name used for authentication.  Required for SSH and Telnet commands.

#### Action operation message

The operation message object contains data about the message that will be sent by the operation.

Property	Type	Description
default_msg	integer	Whether to use the default action message text and subject.  Possible values: 0 - use the data from the operation; 1 - (default) use the data from the media type.
mediatypeid	string	ID of the media type that will be used to send the message.
message	string	Operation message text.
subject	string	Operation message subject.

#### Action operation condition

The action operation condition object defines a condition that must be met to perform the current operation. It has the following properties.

Property	Type	Description
opconditionid	string	(readonly) ID of the action operation condition
<b>conditiontype</b> (required)	integer	Type of condition.  Possible values: 14 - event acknowledged.
<b>value</b> (required)	string	Value to compare with.

Property	Type	Description
operationid	string	(readonly) ID of the operation.
operator	integer	Condition operator.  Possible values: 0 - (default) =.

The following operators and values are supported for each operation condition type.

Condition	Condition name	Supported operators	Expected value
14	Event acknowledged	=	Whether the event is acknowledged.  Possible values: 0 - not acknowledged; 1 - acknowledged.

#### Action recovery operation

The action recovery operation object defines an operation that will be performed when a problem is resolved. Recovery operations are possible for trigger actions and internal actions. It has the following properties.

Property	Type	Description
operationid	string	(readonly) ID of the action operation.
<b>operationtype</b> (required)	integer	Type of operation.  Possible values for trigger actions: 0 - send message; 1 - remote command; 11 - notify all involved.  Possible values for internal actions: 0 - send message; 11 - notify all involved.
actionid	string	ID of the action that the recovery operation belongs to.

Property	Type	Description
opcommand	object	<p>Object containing the data about the command run by the recovery operation.</p> <p>The operation command object is <a href="#">described in detail above</a>.</p>
opcommand_grparray		<p>Required for remote command operations. Host groups to run remote commands on.</p> <p>Each object has the following properties:  opcommand_grpid - (string, readonly) ID of the object;  operationid - (string) ID of the operation;  groupid - (string) ID of the host group.</p>
opcommand_hstarray		<p>Required for remote command operations if opcommand_hst is not set. Host to run remote commands on.</p> <p>Each object has the following properties:  opcommand_hstid - (string, readonly) ID of the object;  operationid - (string) ID of the operation;  hostid - (string) ID of the host; if set to 0 the command will be run on the current host.</p>
		<p>Required for remote command operations if opcommand_grp is not set.</p>

Property	Type	Description
opmessage	object	Object containing the data about the message sent by the recovery operation.  The operation message object is <b>described in detail above</b> .
opmessage_grparray		Required for message operations. User groups to send messages to.  Each object has the following properties: operationid - (string) ID of the operation; usrgrpId - (string) ID of the user group.
opmessage_usr array		Required for message operations if opmessage_usr is not set. Users to send messages to.  Each object has the following properties: operationid - (string) ID of the operation; userid - (string) ID of the user.
		Required for message operations if opmessage_grp is not set.

#### Action update operation

The action update operation object defines an operation that will be performed when a problem is updated (commented upon, acknowledged, severity changed, or manually closed). Update operations are possible for trigger actions. It has the following properties.

Property	Type	Description
operationid	string	(readonly) ID of the action operation.
<b>operationtype</b> (required)	integer	Type of operation.  Possible values for trigger actions: 0 - send message; 1 - remote command; 12 - notify all involved.
opcommand	object	Object containing the data about the command run by the update operation.  The operation command object is <a href="#">described in detail above</a> .
opcommand_grp	array	Required for remote command operations. Host groups to run remote commands on.
		Each object has the following properties: groupid - (string) ID of the host group.
opcommand_hst	array	Required for remote command operations if opcommand_grp is not set. Host to run remote commands on.
		Each object has the following properties: hostid - (string) ID of the host; if set to 0 the command will be run on the current host.
		Required for remote command operations if opcommand_grp is not set.

Property	Type	Description
opmessage	object	Object containing the data about the message sent by the update operation.
opmessage_grparray		The operation message object is <b>described in detail above</b> . User groups to send messages to.
opmessage_usr array		Each object has the following properties: usrgrpId - (string) ID of the user group.  Required only for send message operations if opmessage_usr is not set. Is ignored for send update message operations. Users to send messages to.
		Each object has the following properties: userid - (string) ID of the user.  Required only for send message operations if opmessage_grp is not set. Is ignored for send update message operations.

#### Action filter

The action filter object defines a set of conditions that must be met to perform the configured action operations. It has the following properties.

Property	Type	Description
<b>conditions</b> (required)	array	Set of filter conditions to use for filtering results.



Property	Type	Description
<b>evaltype</b> (required)	integer	Filter condition evaluation method.  Possible values: 0 - and/or; 1 - and; 2 - or; 3 - custom expression. (readonly) Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its <code>formulaid</code> . The value of <code>eval_formula</code> is equal to the value of <code>formula</code> for filters with a custom expression.
<code>eval_formula</code>	string	Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its <code>formulaid</code> . The value of <code>eval_formula</code> is equal to the value of <code>formula</code> for filters with a custom expression.
<code>formula</code>	string	User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its <code>formulaid</code> . The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.  Required for custom expression filters.

#### Action filter condition

The action filter condition object defines a specific condition that must be checked before running the action operations.

---

Property	Type	Description
conditionid	string	(readonly) ID of the action condition.

Property	Type	Description
<b>conditiontype</b> (required)	integer	<p>Type of condition.</p> <p>Possible values for trigger actions:  0 - host group;  1 - host;  2 - trigger;  3 - trigger name;  4 - trigger severity;  6 - time period;  13 - host template;  15 - application;  16 - problem is suppressed;  25 - event tag;  26 - event tag value.</p> <p>Possible values for discovery actions:  7 - host IP;  8 - discovered service type;  9 - discovered service port;  10 - discovery status;  11 - uptime or downtime duration;  12 - received value;  18 - discovery rule;  19 - discovery check;  20 - proxy;  21 - discovery object.</p> <p>Possible values for autoregistration actions:  20 - proxy;  22 - host name;  24 - host metadata.</p> <p>Possible values for internal actions:  0 - host group;  1 - host;  13 - host template;  15 - application;  23 - event type.</p>

Property	Type	Description
<b>value</b> (required)	string	Value to compare with.
value2	string	Secondary value to compare with. Required for trigger actions when condition type is 26.
actionid	string	(readonly) ID of the action that the condition belongs to.
formulaid	string	Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
operator	integer	Condition operator.  Possible values: 0 - (default) equals; 1 - does not equal; 2 - contains; 3 - does not contain; 4 - in; 5 - is greater than or equals; 6 - is less than or equals; 7 - not in; 8 - matches; 9 - does not match; 10 - Yes; 11 - No.

**Note:**

To better understand how to use filters with various types of expressions, see examples on the [action.get](#) and [action.create](#) method pages.

The following operators and values are supported for each condition type.

Condition	Condition name	Supported operators	Expected value
0	Host group	equals, does not equal	Host group ID.
1	Host	equals, does not equal	Host ID.
2	Trigger	equals, does not equal	Trigger ID.
3	Trigger name	contains, does not contain	Trigger name.
4	Trigger severity	equals, does not equal, is greater than or equals, is less than or equals	Trigger severity. Refer to the <a href="#">trigger "severity" property</a> for a list of supported trigger severities.
5	Trigger value	equals	Trigger value. Refer to the <a href="#">trigger "value" property</a> for a list of supported trigger values.
6	Time period	in, not in	Time when the event was triggered as a <a href="#">time period</a> .
7	Host IP	equals, does not equal	One or several IP ranges to check separated by commas. Refer to the <a href="#">network discovery configuration</a> section for more information on supported formats of IP ranges.
8	Discovered service type	equals, does not equal	Type of discovered service. The type of service matches the type of the discovery check used to detect the service. Refer to the <a href="#">discovery check "type" property</a> for a list of supported types.
9	Discovered service port	equals, does not equal	One or several port ranges separated by commas.
10	Discovery status	equals	Status of a discovered object.  Possible values: 0 - host or service up; 1 - host or service down; 2 - host or service discovered; 3 - host or service lost.
11	Uptime or downtime duration	is greater than or equals, is less than or equals	Time indicating how long has the discovered object been in the current status in seconds.
12	Received values	equals, does not equal, is greater than or equals, is less than or equals, contains, does not contain	Value returned when performing a Zabbix agent, SNMPv1, SNMPv2 or SNMPv3 discovery check.
13	Host template	equals, does not equal	Linked template ID.
15	Application	equals, contains, does not contain	Name of the application.

Condition	Condition name	Supported operators	Expected value
16	Problem is suppressed	Yes, No	No value required: using the "Yes" operator means that problem must be suppressed, "No" - not suppressed.
18	Discovery rule	equals, does not equal	ID of the discovery rule.
19	Discovery check	equals, does not equal	ID of the discovery check.
20	Proxy	equals, does not equal	ID of the proxy.
21	Discovery object	equals	Type of object that triggered the discovery event.  Possible values: 1 - discovered host; 2 - discovered service.
22	Host name	contains, does not contain, matches, does not match	Host name. Using a regular expression is supported for operators matches and does not match in autoregistration conditions.
23	Event type	equals	Specific internal event.  Possible values: 0 - item in "not supported" state; 1 - item in "normal" state; 2 - LLD rule in "not supported" state; 3 - LLD rule in "normal" state; 4 - trigger in "unknown" state; 5 - trigger in "normal" state.
24	Host metadata	contains, does not contain, matches, does not match	Metadata of the auto-registered host. Using a regular expression is supported for operators matches and does not match.
25	Tag	equals, does not equal, contains, does not contain	Event tag.
26	Tag value	equals, does not equal, contains, does not contain	Event tag value.

### action.create

#### Description

object action.create(object/array actions)

This method allows to create new actions.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Actions to create.

Additionally to the [standard action properties](#), the method accepts the following parameters.

Parameter	Type	Description
filter	object	Action <b>filter</b> object for the action.
operations	array	Action <b>operations</b> to create for the action.
recovery_operations	array	Action <b>recovery operations</b> to create for the action.
acknowledge_operations	array	Action <b>update operations</b> to create for the action.

**Return values**

(object) Returns an object containing the IDs of the created actions under the `actionids` property. The order of the returned IDs matches the order of the passed actions.

**Examples****Create a trigger action**

Create an action that will be run when a trigger from host "10084" that has the word "memory" in its name goes into problem state. The action must first send a message to all users in user group "7". If the event is not resolved in 4 minutes, it will run script "3" on all hosts in group "2". On trigger recovery it will notify all users who received any messages regarding the problem before. On trigger update, message with custom subject and body will be sent to all who left acknowledgments and comments via all media types.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Trigger action",
    "eventsources": 0,
    "status": 0,
    "esc_period": "2m",
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "conditiontype": 1,
          "operator": 0,
          "value": "10084"
        },
        {
          "conditiontype": 3,
          "operator": 2,
          "value": "memory"
        }
      ]
    }
  }
},
```

```

"operations": [
  {
    "operationtype": 0,
    "esc_period": "0s",
    "esc_step_from": 1,
    "esc_step_to": 2,
    "evaltype": 0,
    "opmessage_grp": [
      {
        "usrgrp": "7"
      }
    ],
    "opmessage": {
      "default_msg": 1,
      "mediatypeid": "1"
    }
  },
  {
    "operationtype": 1,
    "esc_step_from": 3,
    "esc_step_to": 4,
    "evaltype": 0,
    "opconditions": [
      {
        "conditiontype": 14,
        "operator": 0,
        "value": "0"
      }
    ],
    "opcommand_grp": [
      {
        "groupid": "2"
      }
    ],
    "opcommand": {
      "type": 4,
      "scriptid": "3"
    }
  }
],
"recovery_operations": [
  {
    "operationtype": "11",
    "opmessage": {
      "default_msg": 1
    }
  }
],
"acknowledge_operations": [
  {
    "operationtype": "12",
    "opmessage": {
      "default_msg": 0,
      "message": "Custom update operation message body",
      "subject": "Custom update operation message subject"
    }
  }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```



Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "17"
    ]
  },
  "id": 1
}
```

Create a discovery action

Create an action that will link discovered hosts to template "10091".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Discovery action",
    "eventsourcing": 1,
    "status": 0,
    "esc_period": "0s",
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "conditiontype": 21,
          "value": "1"
        },
        {
          "conditiontype": 10,
          "value": "2"
        }
      ]
    },
    "operations": [
      {
        "esc_step_from": 1,
        "esc_period": "0s",
        "optemplate": [
          {
            "templateid": "10091"
          }
        ],
        "operationtype": 6,
        "esc_step_to": 1
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "18"
    ]
  },
}
```

```
    "id": 1
  }
}
```

#### Using a custom expression filter

Create a trigger action that will use a custom filter condition. The action must send a message for each trigger with severity higher or equal to "Warning" for hosts "10084" and "10106". The formula IDs "A", "B" and "C" have been chosen arbitrarily.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Trigger action",
    "eventsources": 0,
    "status": 0,
    "esc_period": "2m",
    "filter": {
      "evaltype": 3,
      "formula": "A and (B or C)",
      "conditions": [
        {
          "conditiontype": 4,
          "operator": 5,
          "value": "2",
          "formulaid": "A"
        },
        {
          "conditiontype": 1,
          "operator": 0,
          "value": "10084",
          "formulaid": "B"
        },
        {
          "conditiontype": 1,
          "operator": 0,
          "value": "10106",
          "formulaid": "C"
        }
      ]
    },
    "operations": [
      {
        "operationtype": 0,
        "esc_period": "0s",
        "esc_step_from": 1,
        "esc_step_to": 2,
        "evaltype": 0,
        "opmessage_grp": [
          {
            "usrgrp": "7"
          }
        ],
        "opmessage": {
          "default_msg": 1,
          "mediatypeid": "1"
        }
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "18"
    ]
  },
  "id": 1
}
```

Create agent autoregistration rule

Add a host to host group "Linux servers" when host name contains "SRV" or metadata contains "CentOS".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Register Linux servers",
    "eventsources": "2",
    "status": "0",
    "filter": {
      "evaltype": "2",
      "formula": "A or B",
      "conditions": [
        {
          "conditiontype": "22",
          "operator": "2",
          "value": "SRV",
          "value2": "",
          "formulaid": "B"
        },
        {
          "conditiontype": "24",
          "operator": "2",
          "value": "CentOS",
          "value2": "",
          "formulaid": "A"
        }
      ]
    }
  },
  "operations": [
    {
      "actionid": "9",
      "operationtype": "4",
      "esc_period": "0",
      "esc_step_from": "1",
      "esc_step_to": "1",
      "evaltype": "0",
      "opgroup": [
        {
          "operationid": "16",
          "groupid": "2"
        }
      ]
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      19
    ]
  },
  "id": 1
}
```

See also

- [Action filter](#)
- [Action operation](#)

Source

CAction::create() in ui/include/classes/api/services/CAction.php.

### action.delete

Description

object action.delete(array actionIds)

This method allows to delete actions.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the actions to delete.

Return values

(object) Returns an object containing the IDs of the deleted actions under the `actionids` property.

Examples

Delete multiple actions

Delete two actions.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.delete",
  "params": [
    "17",
    "18"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "17",
      "18"
    ]
  },
}
```

```
"id": 1  
}
```

#### Source

CAction::delete() in ui/include/classes/api/services/CAction.php.

### action.get

#### Description

integer/array action.get(object parameters)

The method allows to retrieve actions according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
actionids	string/array	Return only actions with the given IDs.
groupids	string/array	Return only actions that use the given host groups in action conditions.
hostids	string/array	Return only actions that use the given hosts in action conditions.
triggerids	string/array	Return only actions that use the given triggers in action conditions.
mediatypeids	string/array	Return only actions that use the given media types to send messages.
usrgrpids	string/array	Return only actions that are configured to send messages to the given user groups.
userids	string/array	Return only actions that are configured to send messages to the given users.
scriptids	string/array	Return only actions that are configured to run the given scripts.

Parameter	Type	Description
selectFilter	query	Return a <b>filter</b> property with the action condition filter.
selectOperations	query	Return an <b>operations</b> property with action operations.
selectRecoveryOperations	query	Return a <b>recovery-Operations</b> property with action recovery operations.
selectAcknowledgeOperations	query	Return an <b>acknowledgeOperations</b> property with action update operations.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <b>actionid</b> , <b>name</b> and <b>status</b> .
countOutput	boolean	These parameters being common for all get methods are described in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieve trigger actions

Retrieve all configured trigger actions together with action conditions and operations.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.get",
  "params": {
```

```

    "output": "extend",
    "selectOperations": "extend",
    "selectRecoveryOperations": "extend",
    "selectAcknowledgeOperations": "extend",
    "selectFilter": "extend",
    "filter": {
        "eventsources": 0
    }
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "actionid": "3",
      "name": "Report problems to Zabbix administrators",
      "eventsources": "0",
      "status": "1",
      "esc_period": "1h",
      "pause_suppressed": "1",
      "filter": {
        "evaltype": "0",
        "formula": "",
        "conditions": [],
        "eval_formula": ""
      },
      "acknowledgeOperations": [
        {
          "operationid": "31",
          "operationtype": "12",
          "evaltype": "0",
          "opmessage": {
            "default_msg": "1",
            "subject": "",
            "message": "",
            "mediatypeid": "0"
          }
        },
        {
          "operationid": "32",
          "operationtype": "0",
          "evaltype": "0",
          "opmessage": {
            "default_msg": "0",
            "subject": "Updated: {TRIGGER.NAME}",
            "message": "{USER.FULLNAME} updated problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}",
            "mediatypeid": "1"
          },
          "opmessage_grp": [
            {
              "usrgrp": "7"
            }
          ],
          "opmessage_usr": []
        },
        {
          "operationid": "33",
          "operationtype": "1",

```

```

        "evaltype": "0",
        "opcommand": {
            "type": "0",
            "scriptid": "0",
            "execute_on": "0",
            "port": "",
            "authtype": "0",
            "username": "",
            "password": "",
            "publickey": "",
            "privatekey": "",
            "command": "notify.sh"
        },
        "opcommand_hst": [
            {
                "hostid": "0"
            }
        ],
        "opcommand_grp": []
    },
    ],
    "operations": [
        {
            "operationid": "3",
            "actionid": "3",
            "operationtype": "0",
            "esc_period": "0",
            "esc_step_from": "1",
            "esc_step_to": "1",
            "evaltype": "0",
            "opconditions": [],
            "opmessage": [
                {
                    "default_msg": "1",
                    "subject": "",
                    "message": "",
                    "mediatypeid" => "0"
                }
            ],
            "opmessage_grp": [
                {
                    "usrgrp": "7"
                }
            ]
        }
    ],
    "recoveryOperations": [
        {
            "operationid": "7",
            "actionid": "3",
            "operationtype": "11",
            "evaltype": "0",
            "opconditions": [],
            "opmessage": {
                "default_msg": "0",
                "subject": "{TRIGGER.STATUS}: {TRIGGER.NAME}",
                "message": "Trigger: {TRIGGER.NAME}\r\nTrigger status: {TRIGGER.STATUS}\r\nTrigger",
                "mediatypeid": "0"
            }
        }
    ]
}

```



```
],
  "id": 1
}
```

#### Retrieve discovery actions

Retrieve all configured discovery actions together with action conditions and operations. The filter uses the "and" evaluation type, so the formula property is empty and eval\_formula is generated automatically.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.get",
  "params": {
    "output": "extend",
    "selectOperations": "extend",
    "selectFilter": "extend",
    "filter": {
      "eventsources": 1
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "actionid": "2",
      "name": "Auto discovery. Linux servers.",
      "eventsources": "1",
      "status": "1",
      "esc_period": "0s",
      "pause_suppressed": "1",
      "filter": {
        "evaltype": "0",
        "formula": "",
        "conditions": [
          {
            "conditiontype": "10",
            "operator": "0",
            "value": "0",
            "value2": "",
            "formulaid": "B"
          },
          {
            "conditiontype": "8",
            "operator": "0",
            "value": "9",
            "value2": "",
            "formulaid": "C"
          },
          {
            "conditiontype": "12",
            "operator": "2",
            "value": "Linux",
            "value2": "",
            "formulaid": "A"
          }
        ]
      },
      "eval_formula": "A and B and C"
    }
  ]
}
```

```

    },
    "operations": [
        {
            "operationid": "1",
            "actionid": "2",
            "operationtype": "6",
            "esc_period": "0s",
            "esc_step_from": "1",
            "esc_step_to": "1",
            "evaltype": "0",
            "opconditions": [],
            "optemplate": [
                {
                    "templateid": "10001"
                }
            ]
        },
        {
            "operationid": "2",
            "actionid": "2",
            "operationtype": "4",
            "esc_period": "0s",
            "esc_step_from": "1",
            "esc_step_to": "1",
            "evaltype": "0",
            "opconditions": [],
            "opgroup": [
                {
                    "groupid": "2"
                }
            ]
        }
    ]
},
    "id": 1
}

```

See also

- [Action filter](#)
- [Action operation](#)

Source

CAction::get() in ui/include/classes/api/services/CAction.php.

## action.update

Description

object action.update(object/array actions)

This method allows to update existing actions.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Action properties to be updated.

The `actionid` property must be defined for each action, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the **standard action properties**, the method accepts the following parameters.

Parameter	Type	Description
filter	object	Action <b>filter</b> object to replace the current filter.
operations	array	Action <b>operations</b> to replace existing operations.
recovery_operations	array	Action <b>recovery operations</b> to replace existing recovery operations.
acknowledge_operations	array	Action <b>update operations</b> to replace existing update operations.

#### Return values

(object) Returns an object containing the IDs of the updated actions under the `actionids` property.

#### Examples

##### Disable action

Disable action, that is, set its status to "1".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.update",
  "params": {
    "actionid": "2",
    "status": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "2"
    ]
  },
  "id": 1
}
```

#### See also

- [Action filter](#)
- [Action operation](#)

#### Source

CAction::update() in `ui/include/classes/api/services/CAction.php`.

#### Alert

This class is designed to work with alerts.

Object references:

- [Alert](#)

Available methods:

- [alert.get](#) - retrieve alerts

## > Alert object

The following objects are directly related to the `Alert` API.

Alert

### Note:

Alerts are created by the Zabbix server and cannot be modified via the API.

The alert object contains information about whether certain action operations have been executed successfully. It has the following properties.

Property	Type	Description
alertid	string	ID of the alert.
actionid	string	ID of the action that generated the alert.
alerttype	integer	Alert type.  Possible values: 0 - message; 1 - remote command.
clock	timestamp	Time when the alert was generated.
error	string	Error text if there are problems sending a message or running a command.
esc_step	integer	Action escalation step during which the alert was generated.
eventid	string	ID of the event that triggered the action.
mediatypeid	string	ID of the media type that was used to send the message.
message	text	Message text. Used for message alerts.
retries	integer	Number of times Zabbix tried to send the message.

Property	Type	Description
sendto	string	Address, user name or other identifier of the recipient. Used for message alerts.
status	integer	Status indicating whether the action operation has been executed successfully.  Possible values for message alerts: 0 - message not sent. 1 - message sent. 2 - failed after a number of retries. 3 - new alert is not yet processed by alert manager.  Possible values for command alerts: 0 - command not run. 1 - command run. 2 - tried to run the command on the Zabbix agent but it was unavailable.
subject	string	Message subject. Used for message alerts.
userid	string	ID of the user that the message was sent to.
p_eventid	string	ID of problem event, which generated the alert.
acknowledgeid	string	ID of acknowledgment, which generated the alert.

## alert.get

Description

`integer/array alert.get(object parameters)`

The method allows to retrieve alerts according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
alertids	string/array	Return only alerts with the given IDs.
actionids	string/array	Return only alerts generated by the given actions.
eventids	string/array	Return only alerts generated by the given events.
groupids	string/array	Return only alerts generated by objects from the given host groups.
hostids	string/array	Return only alerts generated by objects from the given hosts.
mediatypeids	string/array	Return only message alerts that used the given media types.
objectids	string/array	Return only alerts generated by the given objects
userids	string/array	Return only message alerts that were sent to the given users.
eventobject	integer	Return only alerts generated by events related to objects of the given type.  See event <a href="#">"object"</a> for a list of supported object types.  Default: 0 - trigger.

Parameter	Type	Description
eventsources	integer	Return only alerts generated by events of the given type.  See event <b>"source"</b> for a list of supported event types.  Default: 0 - trigger events.
time_from	timestamp	Return only alerts that have been generated after the given time.
time_till	timestamp	Return only alerts that have been generated before the given time.
selectHosts	query	Return a <b>hosts</b> property with data of hosts that triggered the action operation.
selectMediatypes	query	Return a <b>mediatypes</b> property with an array of the media types that were used for the message alert.
selectUsers	query	Return a <b>users</b> property with an array of the users that the message was addressed to.
sortfield	string/array	Sort the result by the given properties.  Possible values are: alertid, clock, eventid, mediatypeid, sendto and status.
countOutput	boolean	These parameters being common for all get methods are described in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	

Parameter	Type	Description
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve alerts by action ID

Retrieve all alerts generated by action "3".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "alert.get",
  "params": {
    "output": "extend",
    "actionids": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "alertid": "1",
      "actionid": "3",
      "eventid": "21243",
      "userid": "1",
      "clock": "1362128008",
      "mediatypeid": "1",
      "sendto": "support@company.com",
      "subject": "PROBLEM: Zabbix agent on Linux server is unreachable for 5 minutes: ",
      "message": "Trigger: Zabbix agent on Linux server is unreachable for 5 minutes: \nTrigger stat",
      "status": "0",
      "retries": "3",
      "error": "",
      "esc_step": "1",
      "alerttype": "0",
      "p_eventid": "0",
      "acknowledgeid": "0"
    }
  ],
  "id": 1
}
```

See also

- [Host](#)
- [Media type](#)
- [User](#)

Source

CAAlert::get() in `ui/include/classes/api/services/CAAlert.php`.



## API info

This class is designed to retrieve meta information about the API.

Available methods:

- [apiinfo.version](#) - retrieving the version of the Zabbix API

### apiinfo.version

Description

```
string apiinfo.version(array)
```

This method allows to retrieve the version of the Zabbix API.

#### Attention:

This method is only available to unauthenticated users and must be called without the `auth` parameter in the JSON-RPC request.

Parameters

(array) The method accepts an empty array.

Return values

(string) Returns the version of the Zabbix API.

#### Note:

Starting from Zabbix 2.0.4 the version of the API matches the version of Zabbix.

Examples

Retrieving the version of the API

Retrieve the version of the Zabbix API.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "apiinfo.version",
  "params": [],
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "4.0.0",
  "id": 1
}
```

Source

CAPInfo::version() in `ui/include/classes/api/services/CAPInfo.php`.

## Application

This class is designed to work with applications.

Object references:

- [Application](#)

Available methods:

- `application.create` - creating new applications
- `application.delete` - deleting applications
- `application.get` - retrieving application
- `application.massadd` - updating application
- `application.update` - adding items to applications

## > Application object

The following objects are directly related to the `application` API.

Application

The application object has the following properties.

Property	Type	Description
<code>applicationid</code>	string	(readonly) ID of the application.
<b><code>hostid</code></b> (required)	string	ID of the host that the application belongs to.  Cannot be updated.
<b><code>name</code></b> (required)	string	Name of the application
<code>flags</code>	integer	(readonly) Origin of the application.  Possible values: 0 - a plain application; 4 - a discovered application.
<code>templateids</code>	array	(readonly) IDs of the parent template applications.

## **application.create**

Description

object `application.create(object/array applications)`

This method allows to create new applications.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Applications to create.

The method accepts applications with the [standard application properties](#).

Return values

(object) Returns an object containing the IDs of the created applications under the `applicationids` property. The order of the returned IDs matches the order of the passed applications.

Examples

## Creating an application

Create an application to store SNMP items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "application.create",
  "params": {
    "name": "SNMP Items",
    "hostid": "10050"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "applicationids": [
      "356"
    ]
  },
  "id": 1
}
```

Source

CApplication::create() in ui/include/classes/api/services/CApplication.php.

## application.delete

Description

object application.delete(array applicationIds)

This method allows to delete applications.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the applications to delete.

Return values

(object) Returns an object containing the IDs of the deleted applications under the applicationids property.

Examples

Deleting multiple applications

Delete two applications.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "application.delete",
  "params": [
    "356",
    "358"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
}
```

```
}
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "applicationids": [
      "356",
      "358"
    ]
  },
  "id": 1
}
```

Source

CApplication::delete() in ui/include/classes/api/services/CApplication.php.

## application.get

Description

integer/array application.get(object parameters)

The method allows to retrieve applications according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
applicationids	string/array	Return only applications with the given IDs.
groupids	string/array	Return only applications that belong to hosts from the given host groups.
hostids	string/array	Return only applications that belong to the given hosts.
inherited	boolean	If set to <code>true</code> return only applications inherited from a template.
itemids	string/array	Return only applications that contain the given items.
templated	boolean	If set to <code>true</code> return only applications that belong to templates.

Parameter	Type	Description
templateids	string/array	Return only applications that belong to the given templates.
selectHost	query	Return a <b>host</b> property with the host that the application belongs to.
selectItems	query	Return an <b>items</b> property with the items contained in the application.
selectDiscoveryRule	query	Return a <b>discoveryRule</b> property with the LLD rule that created the application.
selectApplicationDiscovery	query	Return an <b>applicationDiscovery</b> property with the application discovery object.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: applicationid and name. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving applications from a host

Retrieve all applications from a host sorted by name.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "application.get",
  "params": {
    "output": "extend",
    "hostids": "10001",
    "sortfield": "name"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "applicationid": "13",
      "hostid": "10001",
      "name": "CPU",
      "templateids": []
    },
    {
      "applicationid": "5",
      "hostid": "10001",
      "name": "Filesystems",
      "templateids": []
    },
    {
      "applicationid": "21",
      "hostid": "10001",
      "name": "General",
      "templateids": []
    },
    {
      "applicationid": "15",
      "hostid": "10001",
      "name": "Memory",
      "templateids": []
    }
  ],
  "id": 1
}
```

See also

- [Host](#)
- [Item](#)

Source

CApplication::get() in ui/include/classes/api/services/CApplication.php.

### **application.massadd**

Description

object application.massadd(object parameters)

This method allows to simultaneously add multiple items to the given applications.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters containing the IDs of the applications to update and the items to add to the applications.

The method accepts the following parameters.

Parameter	Type	Description
<b>applications</b> (required)	array/object	Applications to be updated.  The applications must have the <code>applicationid</code> property defined.
items	array/object	Items to add to the given applications.  The items must have the <code>itemid</code> property defined.

**Return values**

(object) Returns an object containing the IDs of the updated applications under the `applicationids` property.

**Examples****Adding items to multiple applications**

Add the given items to two applications.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "application.massadd",
  "params": {
    "applications": [
      {
        "applicationid": "247"
      },
      {
        "applicationid": "246"
      }
    ],
    "items": [
      {
        "itemid": "22800"
      },
      {
        "itemid": "22801"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "applicationids": [
      "247",
      "246"
    ]
  },
  "id": 1
}
```

See also

- [Item](#)

Source

CApplication::massAdd() in ui/include/classes/api/services/CApplication.php.

## application.update

Description

object application.update(object/array applications)

This method allows to update existing applications.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) [Application properties](#) to be updated.

The applicationid property must be defined for each application, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated applications under the applicationids property.

Examples

Changing the name of an application

Change the name of the application to "Processes and performance".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "application.update",
  "params": {
    "applicationid": "13",
    "name": "Processes and performance"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "applicationids": [
      "13"
    ]
  },
}
```



```
"id": 1  
}
```

Source

CApplication::update() in ui/include/classes/api/services/CApplication.php.

## Audit log

This class is designed to work with audit log.

Object references:

- [Audit log object](#)

Available methods:

- [auditlog.get](#) - retrieve audit log records

### > Audit log object

The following objects are directly related to the auditlog API.

Audit log

The audit log object contains information about user actions. It has the following properties.

Property	Type	Description
auditid	string	(readonly) ID of audit log entry.
userid	string	Audit log entry author userid.
action	integer	Audit log entry action.  Possible values are: 0 - Add; 1 - Update; 2 - Delete; 3 - Login; 4 - Logout; 5 - Enable; 6 - Disable.
clock	timestamp	Audit log entry creation timestamp.

Property	Type	Description
resourcetype	integer	<p>Audit log entry resource type.</p> <p>Possible values are:</p> <ul style="list-style-type: none"> <li>0 - User;</li> <li>2 - Configuration of Zabbix;</li> <li>3 - Media type;</li> <li>4 - Host;</li> <li>5 - Action;</li> <li>6 - Graph;</li> <li>7 - Graph element;</li> <li>11 - User group;</li> <li>12 - Application;</li> <li>13 - Trigger;</li> <li>14 - Host group;</li> <li>15 - Item;</li> <li>16 - Image;</li> <li>17 - Value map;</li> <li>18 - Service;</li> <li>19 - Map;</li> <li>20 - Screen;</li> <li>22 - Web scenario;</li> <li>23 - Discovery rule;</li> <li>24 - Slide show;</li> <li>25 - Script;</li> <li>26 - Proxy;</li> <li>27 - Maintenance;</li> <li>28 - Regular expression;</li> <li>29 - Macro;</li> <li>30 - Template;</li> <li>31 - Trigger prototype;</li> <li>32 - Icon mapping;</li> <li>33 - Dashboard;</li> <li>34 - Event correlation;</li> <li>35 - Graph prototype;</li> <li>36 - Item prototype;</li> <li>37 - Host prototype;</li> <li>38 - Autoregistration;</li> <li>39 - Module.</li> </ul>
note	string	Audit log entry short description.
ip	string	Audit log entry author IP address.
resourceid	string	Audit log entry resource identifier.

Property	Type	Description
resourcename	string	Audit log entry resource human readable name.

#### Audit log details

Property	Type	Description
table_name	string	Database table name.
field_name	string	Database table field name.
oldvalue	string	Database table field old value.
newvalue	string	Database table field new value.

### auditlog.get

#### Description

integer/array auditlog.get(object parameters)

The method allows to retrieve audit log records according to the given parameters.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
auditids	string/array	Return only audit log with the given IDs.
userids	string/array	Return only audit log that were created by the given users.
time_from	timestamp	Returns only audit log entries that have been created after or at the given time.
time_till	timestamp	Returns only audit log entries that have been created before or at the given time.
selectDetails	query	Returns audit log entries with per field changes as <a href="#">details</a> property.  Available only for entries with action "1 - Update", for actions of other types returns empty array.

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.
filter	object	<p>Possible values are: auditid, userid, clock.</p> <p>Return only results that exactly match the given filter.</p> <p>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.</p> <p>Additionally supports filtering by details property fields: table_name, field_name.</p>
search	object	<p>Case insensitive sub-string search in content of fields: note, ip, resourcename, oldvalue, newvalue.</p>
countOutput	boolean	<p>These parameters being common for all get methods are described in the <a href="#">reference commentary</a>.</p>
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve audit log

Retrieve two latest audit log records.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "auditlog.get",
  "params": {
    "output": "extend",
    "sortfield": "clock",
    "sortorder": "DESC",
    "limit": 2
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "auditid": "189",
      "userid": "1",
      "clock": "1580913141",
      "action": "3",
      "resourcetype": "0",
      "note": "",
      "ip": "127.0.0.1",
      "resourceid": "0",
      "resourcename": ""
    },
    {
      "auditid": "188",
      "userid": "1",
      "clock": "1580903029",
      "action": "3",
      "resourcetype": "0",
      "note": "",
      "ip": "127.0.0.1",
      "resourceid": "0",
      "resourcename": ""
    }
  ],
  "id": 2
}
```

Retrieve audit log records having substring "test" in oldvalue field.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "auditlog.get",
  "params": {
    "output": ["auditid", "resourcename"],
    "search": {
      "newvalue": "test"
    },
    "selectDetails": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "auditid": "5",
      "resourcename": "Mattermost2",
      "details": [
        {
          "table_name": "media_type",
          "field_name": "event_menu_url",
          "oldvalue": "http://test",
          "newvalue": "http://test{EVENT.TAGS.__test}"
        }
      ]
    },
    {
      "auditid": "7",
      "resourcename": "Email",
      "details": [
        {
          "table_name": "media_type",
          "field_name": "name",
          "oldvalue": "Email",
          "newvalue": "Email test"
        }
      ]
    }
  ],
  "id": 20
}

```

See also

- [Audit log object](#)

Source

CAuditLog::get() in ui/include/classes/api/services/CAuditLog.php.

## Authentication

This class is designed to work with authentication settings.

Object references:

- [Authentication](#)

Available methods:

- [authentication.get](#) - retrieve authentication
- [authentication.update](#) - update authentication

## > Authentication object

The following object are directly related to the authentication API.

Authentication

The authentication object has the following properties.

Property	Type	Description
authentication_type	integer	Default authentication.  Possible values: 0 - (default) Internal; 1 - LDAP.
http_auth_enable	integer	Enable HTTP authentication.  Possible values: 0 - (default) Disable; 1 - Enable.
http_login_form	integer	Default login form.  Possible values: 0 - (default) Zabbix login form; 1 - HTTP login form.
http_strip_domain	string	Remove domain name.
http_case_sensitive	integer	HTTP case sensitive login.  Possible values: 0 - Off; 1 - (default) On.
ldap_configured	integer	Enable LDAP authentication.  Possible values: 0 - Disable; 1 - (default) Enable.
ldap_host	string	LDAP host.
ldap_port	integer	LDAP port.
ldap_base_dn	string	LDAP base DN.
ldap_search_attribute	string	LDAP search attribute.
ldap_bind_dn	string	LDAP bind DN.
ldap_case_sensitive	integer	LDAP case sensitive login.  Possible values: 0 - Off; 1 - (default) On.
ldap_bind_password	string	LDAP bind password.
saml_auth_enable	integer	Enable SAML authentication.  Possible values: 0 - (default) Disable; 1 - Enable.
saml_idp_entityid	string	SAML IdP entity ID.

Property	Type	Description
saml_sso_url	string	SAML SSO service URL.
saml_slo_url	string	SAML SLO service URL.
saml_username_attribute	string	SAML username attribute.
saml_sp_entityid	string	SAML SP entity ID.
saml_nameid_format	string	SAML SP name ID format.
saml_sign_messages	integer	SAML sign messages.  Possible values: 0 - (default) Do not sign messages; 1 - Sign messages.
saml_sign_assertions	integer	SAML sign assertions.  Possible values: 0 - (default) Do not sign assertions; 1 - Sign assertions.
saml_sign_authn_requests	integer	SAML sign AuthN requests.  Possible values: 0 - (default) Do not sign AuthN requests; 1 - Sign AuthN requests.
saml_sign_logout_requests	integer	SAML sign logout requests.  Possible values: 0 - (default) Do not sign logout requests; 1 - Sign logout requests.
saml_sign_logout_responses	integer	SAML sign logout responses.  Possible values: 0 - (default) Do not sign logout responses; 1 - Sign logout responses.



Property	Type	Description
saml_encrypt_name_id	integer	SAML encrypt name ID.  Possible values: 0 - (default) Do not encrypt name ID; 1 - Encrypt name ID.
saml_encrypt_assertions	integer	SAML encrypt assertions.  Possible values: 0 - (default) Do not encrypt assertions; 1 - Encrypt assertions.
saml_case_sensitive_login	integer	SAML case sensitive login.  Possible values: 0 - Off; 1 - (default) On.

## authentication.get

### Description

object authentication.get(object parameters)

The method allows to retrieve authentication object according to the given parameters.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

Parameter	Type	Description
output	query	This parameter being common for all get methods described in the <a href="#">reference commentary</a> .

### Return values

(object) Returns authentication object.

### Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "authentication.get",
```

```
"params": {
  "output": "extend"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "authentication_type": "0",
    "http_auth_enabled": "0",
    "http_login_form": "0",
    "http_strip_domains": "",
    "http_case_sensitive": "1",
    "ldap_configured": "0",
    "ldap_host": "",
    "ldap_port": "389",
    "ldap_base_dn": "",
    "ldap_search_attribute": "",
    "ldap_bind_dn": "",
    "ldap_case_sensitive": "1",
    "ldap_bind_password": "",
    "saml_auth_enabled": "0",
    "saml_idp_entityid": "",
    "saml_sso_url": "",
    "saml_slo_url": "",
    "saml_username_attribute": "",
    "saml_sp_entityid": "",
    "saml_nameid_format": "",
    "saml_sign_messages": "0",
    "saml_sign_assertions": "0",
    "saml_sign_authn_requests": "0",
    "saml_sign_logout_requests": "0",
    "saml_sign_logout_responses": "0",
    "saml_encrypt_nameid": "0",
    "saml_encrypt_assertions": "0",
    "saml_case_sensitive": "0"
  },
  "id": 1
}
```

Source

CAuthentication::get() in ui/include/classes/api/services/CAuthentication.php.

## authentication.update

Description

object authentication.update(object authentication)

This method allows to update existing authentication settings.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Authentication properties to be updated.

Return values

(array) Returns array with the names of updated parameters.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "authentication.update",
  "params": {
    "http_auth_enabled": 1,
    "http_case_sensitive": 0,
    "http_login_form": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    "http_auth_enabled",
    "http_case_sensitive",
    "http_login_form"
  ],
  "id": 1
}
```

Source

CAuthentication::update() in ui/include/classes/api/services/CAuthentication.php.

## Autoregistration

This class is designed to work with autoregistration.

Object references:

- [Autoregistration](#)

Available methods:

- [autoregistration.get](#) - retrieve autoregistration
- [autoregistration.update](#) - update autoregistration

### > Autoregistration object

The following objects are directly related to the autoregistration API.

Autoregistration

The autoregistration object has the following properties.

Property	Type	Description
tls_accept	integer	Type of allowed incoming connections for autoregistration.  Possible values: 1 - allow unsecure connections; 2 - allow TLS with PSK. 3 - allow both unsecure and TLS with PSK connections.
tls_psk_identity	string	(writeonly) PSK identity string. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.
tls_psk	string	(writeonly) PSK value string (an even number of hexadecimal characters).

### autoregistration.get

#### Description

object autoregistration.get(object parameters)

The method allows to retrieve autoregistration object according to the given parameters.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

Parameter	Type	Description
output	query	This parameter being common for all get methods described in the <a href="#">reference commentary</a> .

#### Return values

(object) Returns autoregistration object.

#### Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "autoregistration.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tls_accept": "3"
  },
  "id": 1
}
```

Source

CAutoregistration::get() in ui/include/classes/api/services/CAutoregistration.php.

### autoregistration.update

Description

object autoregistration.update(object autoregistration)

This method allows to update existing autoregistration.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Autoregistration properties to be updated.

Return values

(boolean ) Returns boolean true as result on successful update.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "autoregistration.update",
  "params": {
    "tls_accept": "3",
    "tls_psk_identity": "PSK 001",
    "tls_psk": "11111595725ac58dd977beef14b97461a7c1045b9a1c923453302c5473193478"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

Source

CAutoregistration::update() in ui/include/classes/api/services/CAutoregistration.php.

## Configuration

This class is designed to export and import Zabbix configuration data.

Available methods:

- `configuration.export` - exporting the configuration
- `configuration.import` - importing the configuration

### configuration.export

Description

`string configuration.export(object parameters)`

This method allows to export configuration data as a serialized string.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the objects to be exported and the format to use.

Parameter	Type	Description
<b>format</b> (required)	string	Format in which the data must be exported.  Possible values: yaml - YAML; xml - XML; json - JSON.
prettyprint	boolean	Make the output more human readable by adding indentation.  Possible values: true - add indentation; false - (default) do not add indentation.

Parameter	Type	Description
<b>options</b> (required)	object	<p>Objects to be exported.</p> <p>The options object has the following parameters:</p> <ul style="list-style-type: none"> <li>groups - (array) IDs of host groups to export;</li> <li>hosts - (array) IDs of hosts to export;</li> <li>images - (array) IDs of images to export;</li> <li>maps - (array) IDs of maps to export;</li> <li>mediaTypes - (array) IDs of media types to export;</li> <li>screens - (array) IDs of screens to export;</li> <li>templates - (array) IDs of templates to export;</li> <li>valueMaps - (array) IDs of value maps to export.</li> </ul>

#### Return values

(string) Returns a serialized string containing the requested configuration data.

#### Examples

##### Exporting a host

Export the configuration of a host as an XML string.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "configuration.export",
  "params": {
    "options": {
      "hosts": [
        "10161"
      ]
    },
    "format": "xml"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "<?xml version='1.0' encoding='UTF-8'?\n<zabbix_export><version>5.2</version><date>2020
  "id": 1
}
```

Source

CConfiguration::export() in ui/include/classes/api/services/CConfiguration.php.

## configuration.import

Description

boolean configuration.import(object parameters)

This method allows to import configuration data from a serialized string.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the data to import and rules how the data should be handled.

Parameter	Type	Description
<b>format</b> (required)	string	Format of the serialized string.  Possible values: yaml - YAML; xml - XML; json - JSON.
<b>source</b> (required)	string	Serialized string containing the configuration data.
<b>rules</b> (required)	object	Rules on how new and existing objects should be imported.  The rules parameter is described in detail in the table below.

### Note:

If no rules are given, the configuration will not be updated.

The rules object supports the following parameters.



Parameter	Type	Description
applications	object	<p>Rules on how to import applications.</p> <p>Supported parameters:  <b>createMissing</b> - (boolean) if set to true, new applications will be created; default: false;  <b>deleteMissing</b> - (boolean) if set to true, applications not present in the imported data will be deleted from the database; default: false.</p>
discoveryRules	object	<p>Rules on how to import LLD rules.</p> <p>Supported parameters:  <b>createMissing</b> - (boolean) if set to true, new LLD rules will be created; default: false;  <b>updateExisting</b> - (boolean) if set to true, existing LLD rules will be updated; default: false;  <b>deleteMissing</b> - (boolean) if set to true, LLD rules not present in the imported data will be deleted from the database; default: false.</p>

Parameter	Type	Description
graphs	object	<p>Rules on how to import graphs.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new graphs will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing graphs will be updated; default: false;  <b>deleteMissing</b>  - (boolean) if set to true, graphs not present in the imported data will be deleted from the database; default: false.</p>
groups	object	<p>Rules on how to import host groups.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new host groups will be created; default: false.</p>
hosts	object	<p>Rules on how to import hosts.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new hosts will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing hosts will be updated; default: false.</p>

Parameter	Type	Description
httptests	object	<p>Rules on how to import web scenarios.</p> <p>Supported parameters:</p> <p><code>createMissing</code> - (boolean) if set to true, new web scenarios will be created; default: false;</p> <p><code>updateExisting</code> - (boolean) if set to true, existing web scenarios will be updated; default: false;</p> <p><code>deleteMissing</code> - (boolean) if set to true, web scenarios not present in the imported data will be deleted from the database; default: false.</p>
images	object	<p>Rules on how to import images.</p> <p>Supported parameters:</p> <p><code>createMissing</code> - (boolean) if set to true, new images will be created; default: false;</p> <p><code>updateExisting</code> - (boolean) if set to true, existing images will be updated; default: false.</p>

Parameter	Type	Description
items	object	<p>Rules on how to import items.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new items will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing items will be updated; default: false;  <b>deleteMissing</b>  - (boolean) if set to true, items not present in the imported data will be deleted from the database; default: false.</p>
maps	object	<p>Rules on how to import maps.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new maps will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing maps will be updated; default: false.</p>
mediaTypes	object	<p>Rules on how to import media types.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new media types will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing media types will be updated; default: false.</p>

Parameter	Type	Description
screens	object	<p>Rules on how to import screens.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new screens will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing screens will be updated; default: false.</p>
templateLinkage	object	<p>Rules on how to import template links.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new links between templates and host will be created; default: false;  <b>deleteMissing</b>  - (boolean) if set to true, template links not present in the imported data will be deleted from the database; default: false.</p>
templates	object	<p>Rules on how to import templates.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new templates will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing templates will be updated; default: false.</p>

Parameter	Type	Description
templateDashboardObject		<p>Rules on how to import template dashboards.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new template screens will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing template screens will be updated; default: false;  <b>deleteMissing</b>  - (boolean) if set to true, template screens not present in the imported data will be deleted from the database; default: false.</p>
triggers	object	<p>Rules on how to import triggers.</p> <p>Supported parameters:  <b>createMissing</b>  - (boolean) if set to true, new triggers will be created; default: false;  <b>updateExisting</b>  - (boolean) if set to true, existing triggers will be updated; default: false;  <b>deleteMissing</b>  - (boolean) if set to true, triggers not present in the imported data will be deleted from the database; default: false.</p>

Parameter	Type	Description
valueMaps	object	<p>Rules on how to import value maps.</p> <p>Supported parameters:  createMissing - (boolean) if set to true, new value maps will be created; default: false;  updateExisting - (boolean) if set to true, existing value maps will be updated; default: false.</p>

**Return values**

(boolean) Returns true if importing has been successful.

**Examples**

**Importing hosts and items**

Import the host and items contained in the XML string. If any items in XML are missing, they will be deleted from the database, and everything else will be left unchanged.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "configuration.import",
  "params": {
    "format": "xml",
    "rules": {
      "applications": {
        "createMissing": true,
        "deleteMissing": false
      },
      "valueMaps": {
        "createMissing": true,
        "updateExisting": false
      },
      "hosts": {
        "createMissing": true,
        "updateExisting": true
      },
      "items": {
        "createMissing": true,
        "updateExisting": true,
        "deleteMissing": true
      }
    },
    "source": "<?xml version='1.0' encoding='UTF-8'?>\n<zabbix_export><version>5.2</version><date>
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

Source

CConfiguration::import() in ui/include/classes/api/services/CConfiguration.php.

## Correlation

This class is designed to work with correlations.

Object references:

- [Correlation](#)

Available methods:

- [correlation.create](#) - creating new correlations
- [correlation.delete](#) - deleting correlations
- [correlation.get](#) - retrieving correlations
- [correlation.update](#) - updating correlations

### > Correlation object

The following objects are directly related to the `correlation` API.

Correlation

The correlation object has the following properties.

Property	Type	Description
correlationid	string	(readonly) ID of the correlation.
<b>name</b> (required)	string	Name of the correlation.
description	string	Description of the correlation.
status	integer	Whether the correlation is enabled or disabled.  Possible values are: 0 - (default) enabled; 1 - disabled.

Correlation operation

The correlation operation object defines an operation that will be performed when a correlation is executed. It has the following properties.



Property	Type	Description
<b>type</b> (required)	integer	Type of operation.  Possible values: 0 - close old events; 1 - close new event.

#### Correlation filter

The correlation filter object defines a set of conditions that must be met to perform the configured correlation operations. It has the following properties.

Property	Type	Description
<b>evaltype</b> (required)	integer	Filter condition evaluation method.  Possible values: 0 - and/or; 1 - and; 2 - or; 3 - custom expression.
<b>conditions</b> (required)	array	Set of filter conditions to use for filtering results.
eval_formula	string	(readonly) Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its formulaid. The value of eval_formula is equal to the value of formula for filters with a custom expression.

Property	Type	Description
formula	string	User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its formulaid. The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.  Required for custom expression filters.

#### Correlation filter condition

The correlation filter condition object defines a specific condition that must be checked before running the correlation operations.

Property	Type	Description
<b>type</b> (required)	integer	Type of condition.  Possible values: 0 - old event tag; 1 - new event tag; 2 - new event host group; 3 - event tag pair; 4 - old event tag value; 5 - new event tag value.
tag	string	Event tag (old or new). Required when type of condition is: 0, 1, 4, 5.
groupid	string	Host group ID. Required when type of condition is: 2.
oldtag	string	Old event tag. Required when type of condition is: 3.

Property	Type	Description
newtag	string	Old event tag. Required when type of condition is: 3.
value	string	Event tag (old or new) value. Required when type of condition is: 4, 5.
formulaid	string	Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
operator	integer	Condition operator. Required when type of condition is: 2, 4, 5.

**Note:**

To better understand how to use filters with various types of expressions, see examples on the [correlation.get](#) and [correlation.create](#) method pages.

The following operators and values are supported for each condition type.

Condition	Condition name	Supported operators	Expected value
2	Host group	=, <>	Host group ID.
4	Old event tag value	=, <>, like, not like	string
5	New event tag value	=, <>, like, not like	string

**correlation.create**

Description

`object correlation.create(object/array correlations)`

This method allows to create new correlations.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Correlations to create.

Additionally to the **standard correlation properties**, the method accepts the following parameters.

Parameter	Type	Description
<b>operations</b> (required)	array	Correlation <b>operations</b> to create for the correlation.
<b>filter</b> (required)	object	Correlation <b>filter</b> object for the correlation.

#### Return values

(object) Returns an object containing the IDs of the created correlations under the `correlationids` property. The order of the returned IDs matches the order of the passed correlations.

#### Examples

Create a new event tag correlation

Create a correlation using evaluation method AND/OR with one condition and one operation. By default the correlation will be enabled.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.create",
  "params": {
    "name": "new event tag correlation",
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "type": 1,
          "tag": "ok"
        }
      ]
    },
    "operations": [
      {
        "type": 0
      }
    ]
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

#### Using a custom expression filter

Create a correlation that will use a custom filter condition. The formula IDs "A" or "B" have been chosen arbitrarily. Condition type will be "Host group" with operator "<>".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "correlation.create",
  "params": {
    "name": "new host group correlation",
    "description": "a custom description",
    "status": 0,
    "filter": {
      "evaltype": 3,
      "formula": "A or B",
      "conditions": [
        {
          "type": 2,
          "operator": 1,
          "formulaid": "A"
        },
        {
          "type": 2,
          "operator": 1,
          "formulaid": "B"
        }
      ]
    },
    "operations": [
      {
        "type": 1
      }
    ]
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "2"
    ]
  },
  "id": 1
}

```

See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::create() in ui/include/classes/api/services/CCorrelation.php.

## correlation.delete

Description

object correlation.delete(array correlationids)

This method allows to delete correlations.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the correlations to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted correlations under the `correlationids` property.

#### Example

Delete multiple correlations

Delete two correlations.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.delete",
  "params": [
    "1",
    "2"
  ],
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlaionids": [
      "1",
      "2"
    ]
  },
  "id": 1
}
```

#### Source

`CCorrelation::delete()` in `ui/include/classes/api/services/CCorrelation.php`.

### correlation.get

#### Description

`integer/array correlation.get(object parameters)`

The method allows to retrieve correlations according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
<code>correlationids</code>	string/array	Return only correlations with the given IDs.

Parameter	Type	Description
selectFilter	query	Return a <b>filter</b> property with the correlation conditions.
selectOperations	query	Return an <b>operations</b> property with the correlation operations.
sortfield	string/array	Sort the result by the given properties.  Possible values are: correlationid, name and status.
countOutput	boolean	These parameters being common for all <b>get</b> methods are described in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieve correlations

Retrieve all configured correlations together with correlation conditions and operations. The filter uses the "and/or" evaluation type, so the `formula` property is empty and `eval_formula` is generated automatically.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.get",
  "params": {
    "output": "extend",
    "selectOperations": "extend",
    "selectFilter": "extend"
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "correlationid": "1",
      "name": "Correlation 1",
      "description": "",
      "status": "0",
      "filter": {
        "evaltype": "0",
        "formula": "",
        "conditions": [
          {
            "type": "3",
            "oldtag": "error",
            "newtag": "ok",
            "formulaid": "A"
          }
        ],
        "eval_formula": "A"
      },
      "operations": [
        {
          "type": "0"
        }
      ]
    }
  ],
  "id": 1
}

```

See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::get() in ui/include/classes/api/services/CCorrelation.php.

## correlation.update

Description

object correlation.update(object/array correlations)

This method allows to update existing correlations.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Correlation properties to be updated.

The `correlationid` property must be defined for each correlation, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard correlation properties](#), the method accepts the following parameters.

Parameter	Type	Description
filter	object	Correlation <a href="#">filter</a> object to replace the current filter.
operations	array	Correlation <a href="#">operations</a> to replace existing operations.



Return values

(object) Returns an object containing the IDs of the updated correlations under the `correlationids` property.

Examples

Disable correlation

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.update",
  "params": {
    "correlationid": "1",
    "status": "1"
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

Replace conditions, but keep the evaluation method

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.update",
  "params": {
    "correlationid": "1",
    "filter": {
      "conditions": [
        {
          "type": 3,
          "oldtag": "error",
          "newtag": "ok"
        }
      ]
    }
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::update() in ui/include/classes/api/services/CCorrelation.php.

## Dashboard

This class is designed to work with dashboards.

Object references:

- [Dashboard](#)
- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user group](#)
- [Dashboard user](#)

Available methods:

- [dashboard.create](#) - creating new dashboards
- [dashboard.delete](#) - deleting dashboards
- [dashboard.get](#) - retrieving dashboards
- [dashboard.update](#) - updating dashboards

### > Dashboard object

The following objects are directly related to the dashboard API.

Dashboard

The dashboard object has the following properties:

Property	Type	Description
dashboardid	string	(readonly) ID of the dashboard.
<b>name</b> (required)	string	Name of the dashboard.
userid	string	Dashboard owner user ID.
private	integer	Type of dashboard sharing.  Possible values: 0 - public dashboard; 1 - (default) private dashboard.

Dashboard widget

The dashboard widget object has the following properties:

Property	Type	Description
widgetid	string	(readonly) ID of the dashboard widget.

Property	Type	Description
<b>type</b> (required)	string	Type of the dashboard widget.  Possible values: actionlog - Action log; clock - Clock; dataover - Data overview; discovery - Discovery status; favgraphs - Favorite graphs; favmaps - Favorite maps; favscreens - Favorite screens; graph - Graph (classic); graphprototype - Graph prototype; hostavail - Host availability; map - Map; navtree - Map Navigation Tree; plaintext - Plain text; problemhosts - Problem hosts; problems - Problems; problemsbysv - Problems by severity; svggraph - Graph; systeminfo - System information; trigover - Trigger overview; url - URL; web - Web monitoring.
name	string	Custom widget name.
x	integer	A horizontal position from the left side of the dashboard.  Valid values range from 0 to 23.
y	integer	A vertical position from the top of the dashboard.  Valid values range from 0 to 62.

Property	Type	Description
width	integer	The widget width.
height	integer	Valid values range from 1 to 24. The widget height.
view_mode	integer	Valid values range from 2 to 32. The widget view mode.
fields	array	Possible values: 0 - (default) default widget view; 1 - with hidden header. Array of the <b>dashboard widget field</b> objects.

#### Dashboard widget field

The dashboard widget field object has the following properties:

Property	Type	Description
<b>type</b> (required)	integer	Type of the widget field.  Possible values: 0 - Integer; 1 - String; 2 - Host group; 3 - Host; 4 - Item; 5 - Item prototype; 6 - Graph; 7 - Graph prototype; 8 - Map.
name	string	Widget field name.
<b>value</b> (required)	mixed	Widget field value depending of type.

#### Dashboard user group

List of dashboard permissions based on user groups. It has the following properties:

Property	Type	Description
<b>usrgrp_id</b> (required)	string	User group ID.

Property	Type	Description
<b>permission</b> (required)	integer	Type of permission level.  Possible values: 2 - read only; 3 - read-write.

#### Dashboard user

List of dashboard permissions based on users. It has the following properties:

Property	Type	Description
<b>userid</b> (required)	string	User ID.
<b>permission</b> (required)	integer	Type of permission level.  Possible values: 2 - read only; 3 - read-write.

### dashboard.create

#### Description

object dashboard.create(object/array dashboards)

This method allows to create new dashboards.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) Dashboards to create.

Additionally to the [standard dashboard properties](#), the method accepts the following parameters.

Parameter	Type	Description
widgets	array	Dashboard <b>widgets</b> to be created for the dashboard.
users	array	Dashboard <b>user</b> shares to be created on the dashboard.
userGroups	array	Dashboard <b>user group</b> shares to be created on the dashboard.

#### Return values

(object) Returns an object containing the IDs of the created dashboards under the `dashboardids` property. The order of the returned IDs matches the order of the passed dashboards.

#### Examples

Creating a dashboard

Create a dashboard named "My dashboard" with one Problems widget with tags and using two types of sharing (user group and user).

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "widgets": [
      {
        "type": "problems",
        "x": 0,
        "y": 0,
        "width": 12,
        "height": 5,
        "view_mode": 0,
        "fields": [
          {
            "type": 1,
            "name": "tags.tag.0",
            "value": "service"
          },
          {
            "type": 0,
            "name": "tags.operator.0",
            "value": 1
          },
          {
            "type": 1,
            "name": "tags.value.0",
            "value": "zabbix_server"
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpId": "7",
        "permission": "2"
      }
    ],
    "users": [
      {
        "userid": "4",
        "permission": "3"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 1
}
```

See also

- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::create() in ui/include/classes/api/services/CDashboard.php.

## dashboard.delete

Description

object dashboard.delete(array dashboardids)

This method allows to delete dashboards.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the dashboards to delete.

Return values

(object) Returns an object containing the IDs of the deleted dashboards under the `dashboardids` property.

Examples

Deleting multiple dashboards

Delete two dashboards.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.delete",
  "params": [
    "2",
    "3"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2",
      "3"
    ]
  },
  "id": 1
}
```

Source

CDashboard::delete() in ui/include/classes/api/services/CDashboard.php.

## dashboard.get

Description

integer/array dashboard.get(object parameters)

The method allows to retrieve dashboards according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
dashboardids	string/array	Return only dashboards with the given IDs.
selectWidgets	query	Return a <b>widgets</b> property with the dashboard widgets that are used in the dashboard.
selectUsers	query	Return a <b>users</b> property with users that the dashboard is shared with.
selectUserGroups	query	Return a <b>userGroups</b> property with user groups that the dashboard is shared with.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible value is: dashboardid. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

Return values

(integer/array) Returns either:



- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving a dashboard by ID

Retrieve all data about dashboards "1" and "2".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.get",
  "params": {
    "output": "extend",
    "selectWidgets": "extend",
    "selectUsers": "extend",
    "selectUserGroups": "extend",
    "dashboardids": [
      "1",
      "2"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dashboardid": "1",
      "name": "Dashboard",
      "userid": "1",
      "private": "0",
      "users": [],
      "userGroups": [],
      "widgets": [
        {
          "widgetid": "9",
          "type": "systeminfo",
          "name": "",
          "x": "12",
          "y": "8",
          "width": "12",
          "height": "5",
          "view_mode": 0,
          "fields": []
        },
        {
          "widgetid": "8",
          "type": "problemsbysv",
          "name": "",
          "x": "12",
          "y": "4",
          "width": "12",
          "height": "4",
          "view_mode": 0,
          "fields": []
        },
        {
          "widgetid": "7",
          "type": "problemhosts",

```

```

        "name": "",
        "x": "12",
        "y": "0",
        "width": "12",
        "height": "4",
        "view_mode": 0,
        "fields": []
    },
    {
        "widgetid": "6",
        "type": "discovery",
        "name": "",
        "x": "6",
        "y": "9",
        "width": "6",
        "height": "4",
        "view_mode": 0,
        "fields": []
    },
    {
        "widgetid": "5",
        "type": "web",
        "name": "",
        "x": "0",
        "y": "9",
        "width": "6",
        "height": "4",
        "view_mode": 0,
        "fields": []
    },
    {
        "widgetid": "4",
        "type": "problems",
        "name": "",
        "x": "0",
        "y": "3",
        "width": "12",
        "height": "6",
        "view_mode": 0,
        "fields": []
    },
    {
        "widgetid": "3",
        "type": "favmaps",
        "name": "",
        "x": "8",
        "y": "0",
        "width": "4",
        "height": "3",
        "view_mode": 0,
        "fields": []
    },
    {
        "widgetid": "2",
        "type": "favscreens",
        "name": "",
        "x": "4",
        "y": "0",
        "width": "4",
        "height": "3",
        "view_mode": 0,
        "fields": []
    }

```

```

    },
    {
        "widgetid": "1",
        "type": "favgraphs",
        "name": "",
        "x": "0",
        "y": "0",
        "width": "4",
        "height": "3",
        "view_mode": 0,
        "fields": []
    }
]
},
{
    "dashboardid": "2",
    "name": "My dashboard",
    "userid": "1",
    "private": "1",
    "users": [
        {
            "userid": "4",
            "permission": "3"
        }
    ],
    "userGroups": [
        {
            "usrgrp": "7",
            "permission": "2"
        }
    ],
    "widgets": [
        {
            "widgetid": "10",
            "type": "problems",
            "name": "",
            "x": "0",
            "y": "0",
            "width": "12",
            "height": "5",
            "view_mode": 0,
            "fields": [
                {
                    "type": "2",
                    "name": "groupids",
                    "value": "4"
                }
            ]
        }
    ]
}
],
"id": 1
}

```

See also

- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::get() in ui/include/classes/api/services/CDashboard.php.

## dashboard.update

### Description

object dashboard.update(object/array dashboards)

This method allows to update existing dashboards.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Dashboard properties to be updated.

The dashboardid property must be defined for each dashboard, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard dashboard properties](#), the method accepts the following parameters.

Parameter	Type	Description
widgets	array	Dashboard <a href="#">widgets</a> to replace existing dashboard widgets.  Dashboard widgets are updated by widgetid property. Widgets without widgetid property will be created.
users	array	Dashboard <a href="#">user</a> shares to replace the existing elements.
userGroups	array	Dashboard <a href="#">user group</a> shares to replace the existing elements.

### Return values

(object) Returns an object containing the IDs of the updated dashboards under the dashboardids property.

### Examples

#### Renaming a dashboard

Rename a dashboard to "SQL server status".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.update",
  "params": {
    "dashboardid": "2",
```

```
    "name": "SQL server status"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 1
}
```

Change dashboard owner

Available only for admins and super admins.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.update",
  "params": {
    "dashboardid": "2",
    "userid": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 2
}
```

See also

- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::update() in ui/include/classes/api/services/CDashboard.php.

### Discovered host

This class is designed to work with discovered hosts.

Object references:

- [Discovered host](#)

Available methods:

- `dhost.get` - retrieve discovered hosts

### > Discovered host object

The following objects are directly related to the `dhost` API.

Discovered host

**Note:**

Discovered host are created by the Zabbix server and cannot be modified via the API.

The discovered host object contains information about a host discovered by a network discovery rule. It has the following properties.

Property	Type	Description
<code>dhostid</code>	string	ID of the discovered host.
<code>druleid</code>	string	ID of the discovery rule that detected the host.
<code>lastdown</code>	timestamp	Time when the discovered host last went down.
<code>lastup</code>	timestamp	Time when the discovered host last went up.
<code>status</code>	integer	Whether the discovered host is up or down. A host is up if it has at least one active discovered service.  Possible values: 0 - host up; 1 - host down.

### `dhost.get`

Description

integer/array `dhost.get(object parameters)`

The method allows to retrieve discovered hosts according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
<code>dhostids</code>	string/array	Return only discovered hosts with the given IDs.

Parameter	Type	Description
druleids	string/array	Return only discovered hosts that have been created by the given discovery rules.
dserviceids	string/array	Return only discovered hosts that are running the given services.
selectDRules	query	Return a <b>drules</b> property with an array of the discovery rules that detected the host.
selectDServices	query	Return a <b>dservices</b> property with the discovered services running on the host.
limitSelects	integer	Supports count. Limits the number of records returned by subselects.
sortfield	string/array	Applies to the following subselects: selectDServices - results will be sorted by dserviceid. Sort the result by the given properties.
countOutput	boolean	Possible values are: dhostid and druleid. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	

Parameter	Type	Description
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve discovered hosts by discovery rule

Retrieve all hosts and the discovered services they are running that have been detected by discovery rule "4".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dhost.get",
  "params": {
    "output": "extend",
    "selectDServices": "extend",
    "druleids": "4"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dservices": [
        {
          "dserviceid": "1",
          "dhostid": "1",
          "type": "4",
          "key_": "",
          "value": "",
          "port": "80",
          "status": "0",
          "lastup": "1337697227",
          "lastdown": "0",
          "dcheckid": "5",
          "ip": "192.168.1.1",
          "dns": "station.company.lan"
        }
      ],
      "dhostid": "1",
      "druleid": "4",
      "status": "0",
      "lastup": "1337697227",
      "lastdown": "0"
    },
    {
      "dservices": [
        {
          "dserviceid": "2",
          "dhostid": "2",
          "type": "4",
          "key_": "",
          "value": ""
        }
      ]
    }
  ]
}
```



```

        "port": "80",
        "status": "0",
        "lastup": "1337697234",
        "lastdown": "0",
        "dcheckid": "5",
        "ip": "192.168.1.4",
        "dns": "john.company.lan"
    }
],
"dhostid": "2",
"druleid": "4",
"status": "0",
"lastup": "1337697234",
"lastdown": "0"
},
{
    "dservices": [
        {
            "dserviceid": "3",
            "dhostid": "3",
            "type": "4",
            "key_": "",
            "value": "",
            "port": "80",
            "status": "0",
            "lastup": "1337697234",
            "lastdown": "0",
            "dcheckid": "5",
            "ip": "192.168.1.26",
            "dns": "printer.company.lan"
        }
    ],
    "dhostid": "3",
    "druleid": "4",
    "status": "0",
    "lastup": "1337697234",
    "lastdown": "0"
},
{
    "dservices": [
        {
            "dserviceid": "4",
            "dhostid": "4",
            "type": "4",
            "key_": "",
            "value": "",
            "port": "80",
            "status": "0",
            "lastup": "1337697234",
            "lastdown": "0",
            "dcheckid": "5",
            "ip": "192.168.1.7",
            "dns": "mail.company.lan"
        }
    ],
    "dhostid": "4",
    "druleid": "4",
    "status": "0",
    "lastup": "1337697234",
    "lastdown": "0"
}
],

```

```
"id": 1
}
```

See also

- [Discovered service](#)
- [Discovery rule](#)

Source

CDHost::get() in ui/include/classes/api/services/CDHost.php.

## Discovered service

This class is designed to work with discovered services.

Object references:

- [Discovered service](#)

Available methods:

- [dservice.get](#) - retrieve discovered services

### > Discovered service object

The following objects are directly related to the dservice API.

Discovered service

**Note:**

Discovered services are created by the Zabbix server and cannot be modified via the API.

The discovered service object contains information about a service discovered by a network discovery rule on a host. It has the following properties.

Property	Type	Description
dserviceid	string	ID of the discovered service.
dcheckid	string	ID of the discovery check used to detect the service.
dhostid	string	ID of the discovered host running the service.
dns	string	DNS of the host running the service.
ip	string	IP address of the host running the service.
lastdown	timestamp	Time when the discovered service last went down.
lastup	timestamp	Time when the discovered service last went up.

Property	Type	Description
port	integer	Service port number.
status	integer	Status of the service.
value	string	Possible values: 0 - service up; 1 - service down. Value returned by the service when performing a Zabbix agent, SNMPv1, SNMPv2 or SNMPv3 discovery check.

### **dservice.get**

#### Description

`integer/array dservice.get(object parameters)`

The method allows to retrieve discovered services according to the given parameters.

#### **Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
dserviceids	string/array	Return only discovered services with the given IDs.
dhostids	string/array	Return only discovered services that belong to the given discovered hosts.
dcheckids	string/array	Return only discovered services that have been detected by the given discovery checks.
druleids	string/array	Return only discovered services that have been detected by the given discovery rules.

Parameter	Type	Description
selectDRules	query	Return a <b>drules</b> property with an array of the discovery rules that detected the service.
selectDHosts	query	Return a <b>dhosts</b> property with an array the discovered hosts that the service belongs to.
selectHosts	query	Return a <b>hosts</b> property with the hosts with the same IP address and proxy as the service.
limitSelects	integer	Supports count. Limits the number of records returned by subselects.
sortfield	string/array	Applies to the following subselects: selectHosts - result will be sorted by hostid. Sort the result by the given properties.
countOutput	boolean	Possible values are: dserviceid, dhostid and ip. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve services discovered on a host

Retrieve all discovered services detected on discovered host "11".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dservice.get",
  "params": {
    "output": "extend",
    "dhostids": "11"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dserviceid": "12",
      "dhostid": "11",
      "value": "",
      "port": "80",
      "status": "1",
      "lastup": "0",
      "lastdown": "1348650607",
      "dcheckid": "5",
      "ip": "192.168.1.134",
      "dns": "john.local"
    },
    {
      "dserviceid": "13",
      "dhostid": "11",
      "value": "",
      "port": "21",
      "status": "1",
      "lastup": "0",
      "lastdown": "1348650610",
      "dcheckid": "6",
      "ip": "192.168.1.134",
      "dns": "john.local"
    }
  ],
  "id": 1
}
```

See also

- [Discovered host](#)
- [Discovery check](#)
- [Host](#)

Source

`CDSservice::get()` in `ui/include/classes/api/services/CDSservice.php`.

#### Discovery check

This class is designed to work with discovery checks.

Object references:

- [Discovery check](#)

Available methods:

- [dcheck.get](#) - retrieve discovery checks

### > **Discovery check object**

The following objects are directly related to the `dcheck` API.

Discovery check

The discovery check object defines a specific check performed by a network discovery rule. It has the following properties.

Property	Type	Description
<code>dcheckid</code>	string	(readonly) ID of the discovery check.
<code>druleid</code>	string	(readonly) ID of the discovery rule that the check belongs to.
<code>key_</code>	string	The value of this property differs depending on the type of the check: - key to query for Zabbix agent checks, required; - SNMP OID for SNMPv1, SNMPv2 and SNMPv3 checks, required.
<code>ports</code>	string	One or several port ranges to check separated by commas. Used for all checks except for ICMP.
<code>snmp_community</code>	string	Default: 0. SNMP community.
<code>snmpv3_authpassphrase</code>	string	Required for SNMPv1 and SNMPv2 agent checks. Authentication passphrase used for SNMPv3 agent checks with security level set to <code>authNoPriv</code> or <code>authPriv</code> .

Property	Type	Description
snmpv3_authprot	integer	Authentication protocol used for SNMPv3 agent checks with security level set to authNoPriv or authPriv.  Possible values: 0 - (default) MD5; 1 - SHA1.
snmpv3_context	string	SNMPv3 context name. Used only by SNMPv3 checks.
snmpv3_privpass	string	Privacy passphrase used for SNMPv3 agent checks with security level set to authPriv.
snmpv3_privprot	integer	Privacy protocol used for SNMPv3 agent checks with security level set to authPriv.  Possible values: 0 - (default) DES; 1 - AES.
snmpv3_security	integer	Security level used for SNMPv3 agent checks.  Possible values: 0 - noAuthNoPriv; 1 - authNoPriv; 2 - authPriv.
snmpv3_security	string	Security name used for SNMPv3 agent checks.

Property	Type	Description
<b>type</b> (required)	integer	Type of check.  Possible values: 0 - SSH; 1 - LDAP; 2 - SMTP; 3 - FTP; 4 - HTTP; 5 - POP; 6 - NNTP; 7 - IMAP; 8 - TCP; 9 - Zabbix agent; 10 - SNMPv1 agent; 11 - SNMPv2 agent; 12 - ICMP ping; 13 - SNMPv3 agent; 14 - HTTPS; 15 - Telnet.
uniq	integer	Whether to use this check as a device uniqueness criteria. Only a single unique check can be configured for a discovery rule. Used for Zabbix agent, SNMPv1, SNMPv2 and SNMPv3 agent checks.  Possible values: 0 - (default) do not use this check as a uniqueness criteria; 1 - use this check as a uniqueness criteria.
host_source	integer	Source for host name.  Possible values: 1 - (default) DNS; 2 - IP; 3 - discovery value of this check.



Property	Type	Description
name_source	integer	Source for visible name.  Possible values: 0 - (default) not specified; 1 - DNS; 2 - IP; 3 - discovery value of this check.

## dcheck.get

### Description

integer/array dcheck.get(object parameters)

The method allows to retrieve discovery checks according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
dcheckids	string/array	Return only discovery checks with the given IDs.
druleids	string/array	Return only discovery checks that belong to the given discovery rules.
dserviceids	string/array	Return only discovery checks that have detected the given discovered services.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: dcheckid and druleid. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	

Parameter	Type	Description
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve discovery checks for a discovery rule

Retrieve all discovery checks used by discovery rule "6".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dcheck.get",
  "params": {
    "output": "extend",
    "dcheckids": "6"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dcheckid": "6",
      "druleid": "4",
      "type": "3",
      "key_": "",
      "snmp_community": "",
      "ports": "21",
      "snmpv3_securityname": "",
      "snmpv3_securitylevel": "0",
      "snmpv3_authpassphrase": "",
      "snmpv3_privpassphrase": "",
      "uniq": "0",
      "snmpv3_authprotocol": "0",
      "snmpv3_privprotocol": "0",
      "host_source": "1",
      "name_source": "0"
    }
  ],
  "id": 1
}
```

#### Source

CDCheck::get() in ui/include/classes/api/services/CDCheck.php.

## Discovery rule

This class is designed to work with network discovery rules.

### Note:

This API is meant to work with network discovery rules. For the low-level discovery rules see the [LLD rule API](#).

Object references:

- [Discovery rule](#)

Available methods:

- [drule.create](#) - create new discovery rules
- [drule.delete](#) - delete discovery rules
- [drule.get](#) - retrieve discovery rules
- [drule.update](#) - update discovery rules

### > Discovery rule object

The following objects are directly related to the `drule` API.

Discovery rule

The discovery rule object defines a network discovery rule. It has the following properties.

Property	Type	Description
<code>druleid</code>	string	(readonly) ID of the discovery rule.
<b><code>iprange</code></b> (required)	string	One or several IP ranges to check separated by commas.  Refer to the <a href="#">network discovery configuration</a> section for more information on supported formats of IP ranges.
<b><code>name</code></b> (required)	string	Name of the discovery rule.
<code>delay</code>	string	Execution interval of the discovery rule. Accepts seconds, time unit with suffix and user macro.  Default: 1h.
<code>nextcheck</code>	timestamp	(readonly) Time when the discovery rule will be executed next.
<code>proxy_hostid</code>	string	ID of the proxy used for discovery.

Property	Type	Description
status	integer	Whether the discovery rule is enabled.  Possible values: 0 - (default) enabled; 1 - disabled.

## drule.create

### Description

object drule.create(object/array discoveryRules)

This method allows to create new discovery rules.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Discovery rules to create.

Additionally to the [standard discovery rule properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>dchecks</b> (required)	array	Discovery <b>checks</b> to create for the discovery rule.

### Return values

(object) Returns an object containing the IDs of the created discovery rules under the `druleids` property. The order of the returned IDs matches the order of the passed discovery rules.

### Examples

Create a discovery rule

Create a discovery rule to find machines running the Zabbix agent in the local network. The rule must use a single Zabbix agent check on port 10050.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.create",
  "params": {
    "name": "Zabbix agent discovery",
    "iprange": "192.168.1.1-255",
    "dchecks": [
      {
        "type": "9",
        "key_": "system.uname",
        "ports": "10050",
        "uniq": "0"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "6"
    ]
  },
  "id": 1
}
```

See also

- [Discovery check](#)

Source

CDRule::create() in ui/include/classes/api/services/CDRule.php.

### **drule.delete**

Description

object drule.delete(array discoveryRuleIds)

This method allows to delete discovery rules.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the discovery rules to delete.

Return values

(object) Returns an object containing the IDs of the deleted discovery rules under the druleids property.

Examples

Delete multiple discovery rules

Delete two discovery rules.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.delete",
  "params": [
    "4",
    "6"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "4",
      "6"
    ]
  },
}
```

```
"id": 1  
}
```

#### Source

CDRule::delete() in ui/include/classes/api/services/CDRule.php.

### drule.get

#### Description

integer/array drule.get(object parameters)

The method allows to retrieve discovery rules according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
dhostids	string/array	Return only discovery rules that created the given discovered hosts.
druleids	string/array	Return only discovery rules with the given IDs.
dserviceids	string/array	Return only discovery rules that created the given discovered services.
selectDChecks	query	Return a <b>dchecks</b> property with the discovery checks used by the discovery rule.
selectDHosts	query	Supports count. Return a <b>dhosts</b> property with the discovered hosts created by the discovery rule.
		Supports count.

Parameter	Type	Description
limitSelects	integer	Limits the number of records returned by subselects.
		Applies to the following subselects: selectDChecks - results will be sorted by dcheckid; selectDHosts - results will be sorted by dhostsid. Sort the result by the given properties.
sortfield	string/array	Possible values are: druleid and name. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve all discovery rules

Retrieve all configured discovery rules and the discovery checks they use.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.get",
  "params": {
    "output": "extend",
    "selectDChecks": "extend"
  },
}
```

```
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "druleid": "2",
      "proxy_hostid": "0",
      "name": "Local network",
      "iprange": "192.168.3.1-255",
      "delay": "5s",
      "nextcheck": "1348754327",
      "status": "0",
      "dchecks": [
        {
          "dcheckid": "7",
          "druleid": "2",
          "type": "3",
          "key_": "",
          "snmp_community": "",
          "ports": "21",
          "snmpv3_securityname": "",
          "snmpv3_securitylevel": "0",
          "snmpv3_authpassphrase": "",
          "snmpv3_privpassphrase": "",
          "uniq": "0",
          "snmpv3_authprotocol": "0",
          "snmpv3_privprotocol": "0",
          "host_source": "1",
          "name_source": "0"
        },
        {
          "dcheckid": "8",
          "druleid": "2",
          "type": "4",
          "key_": "",
          "snmp_community": "",
          "ports": "80",
          "snmpv3_securityname": "",
          "snmpv3_securitylevel": "0",
          "snmpv3_authpassphrase": "",
          "snmpv3_privpassphrase": "",
          "uniq": "0",
          "snmpv3_authprotocol": "0",
          "snmpv3_privprotocol": "0",
          "host_source": "1",
          "name_source": "0"
        }
      ]
    },
    {
      "druleid": "6",
      "proxy_hostid": "0",
      "name": "Zabbix agent discovery",
      "iprange": "192.168.1.1-255",
      "delay": "1h",
      "nextcheck": "0",
      "status": "0",
      "dchecks": [
```



```

    {
        "dcheckid": "10",
        "druleid": "6",
        "type": "9",
        "key_": "system.uname",
        "snmp_community": "",
        "ports": "10050",
        "snmpv3_securityname": "",
        "snmpv3_securitylevel": "0",
        "snmpv3_authpassphrase": "",
        "snmpv3_privpassphrase": "",
        "uniq": "0",
        "snmpv3_authprotocol": "0",
        "snmpv3_privprotocol": "0",
        "host_source": "2",
        "name_source": "3"
    }
]
},
"id": 1
}

```

See also

- [Discovered host](#)
- [Discovery check](#)

Source

CDRule::get() in ui/include/classes/api/services/CDRule.php.

## drule.update

Description

object drule.update(object/array discoveryRules)

This method allows to update existing discovery rules.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Discovery rule properties to be updated.

The `druleid` property must be defined for each discovery rule, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard discovery rule properties](#), the method accepts the following parameters.

Parameter	Type	Description
dchecks	array	Discovery <a href="#">checks</a> to replace existing checks.

Return values

(object) Returns an object containing the IDs of the updated discovery rules under the `druleids` property.

Examples

Change the IP range of a discovery rule

Change the IP range of a discovery rule to "192.168.2.1-255".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.update",
  "params": {
    "druleid": "6",
    "iprange": "192.168.2.1-255"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "6"
    ]
  },
  "id": 1
}
```

See also

- [Discovery check](#)

Source

CDRule::update() in ui/include/classes/api/services/CDRule.php.

## Event

This class is designed to work with events.

Object references:

- [Event](#)

Available methods:

- [event.get](#) - retrieving events
- [event.acknowledge](#) - acknowledging events

### > Event object

The following objects are directly related to the event API.

Event

**Note:**

Events are created by the Zabbix server and cannot be modified via the API.

The event object has the following properties.

Property	Type	Description
eventid	string	ID of the event.

Property	Type	Description
source	integer	Type of the event.  Possible values: 0 - event created by a trigger; 1 - event created by a discovery rule; 2 - event created by active agent autoregistration; 3 - internal event.
object	integer	Type of object that is related to the event.  Possible values for trigger events: 0 - trigger.  Possible values for discovery events: 1 - discovered host; 2 - discovered service.  Possible values for autoregistration events: 3 - auto-registered host.  Possible values for internal events: 0 - trigger; 4 - item; 5 - LLD rule.
objectid	string	ID of the related object.
acknowledged	integer	Whether the event has been acknowledged.
clock	timestamp	Time when the event was created.
ns	integer	Nanoseconds when the event was created.
name	string	Resolved event name.

Property	Type	Description
value	integer	<p>State of the related object.</p> <p>Possible values for trigger events: 0 - OK; 1 - problem.</p> <p>Possible values for discovery events: 0 - host or service up; 1 - host or service down; 2 - host or service discovered; 3 - host or service lost.</p> <p>Possible values for internal events: 0 - "normal" state; 1 - "unknown" or "not supported" state.</p> <p>This parameter is not used for active agent autoregistration events.</p>
severity	integer	<p>Event current severity.</p> <p>Possible values: 0 - not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.</p>
r_eventid	string	Recovery event ID
c_eventid	string	<p>ID of the event that was used to override (close) current event under global correlation rule. See <code>correlationid</code> to identify exact correlation rule. This parameter is only defined when the event is closed by global correlation rule.</p>

Property	Type	Description
correlationid	string	ID of the correlation rule that generated closing of the problem. This parameter is only defined when the event is closed by global correlation rule.
userid	string	User ID if the event was manually closed.
suppressed	integer	Whether the event is suppressed.  Possible values: 0 - event is in normal state; 1 - event is suppressed.
opdata	string	Operational data with expanded macros.
urls	array of <b>Media type URLs</b>	Active media types URLs.

#### Event tag

The event tag object has the following properties.

Property	Type	Description
tag	string	Event tag name.
value	string	Event tag value.

#### Media type URLs

Object with media type url have the following properties.

Property	Type	Description
name	string	Media type defined URL name.
url	string	Media type defined URL value.

Results will contain entries only for active media types with enabled event menu entry. Macro used in properties will be expanded, but if one of properties contain non expanded macro both properties will be excluded from results. Supported macros described on [page](#).

#### **event.acknowledge**

##### Description

`object event.acknowledge(object/array parameters)`

This method allows to update events. Following update actions can be performed:

- Close event. If event is already resolved, this action will be skipped.
- Acknowledge event. If event is already acknowledged, this action will be skipped.
- Unacknowledge event. If event is not acknowledged, this action will be skipped.
- Add message.

- Change event severity. If event already has same severity, this action will be skipped.

**Attention:**

Only trigger events can be updated.  
 Only problem events can be updated.  
 Read/Write rights for trigger are required to close the event or to change event’s severity.  
 To close an event, manual close should be allowed in the trigger.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Parameters containing the IDs of the events and update operations that should be performed.

Parameter	Type	Description
<b>eventids</b> (required)	string/object	IDs of the events to acknowledge.
<b>action</b> (required)	integer	Event update action(s). This is bitmask field, any combination of values is acceptable.  Possible values: 1 - close problem; 2 - acknowledge event; 4 - add message; 8 - change severity; 16 - unacknowledge event.
message	string	Text of the message. <b>Required</b> , if action contains 'add message' flag.
severity	integer	New severity for events. <b>Required</b> , if action contains 'change severity' flag.  Possible values: 0 - not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.

Return values

(object) Returns an object containing the IDs of the updated events under the eventids property.

Examples

## Acknowledging an event

Acknowledge a single event and leave a message.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.acknowledge",
  "params": {
    "eventids": "20427",
    "action": 6,
    "message": "Problem resolved."
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "eventids": [
      "20427"
    ]
  },
  "id": 1
}
```

## Changing event's severity

Change severity for multiple events and leave a message.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.acknowledge",
  "params": {
    "eventids": ["20427", "20428"],
    "action": 12,
    "message": "Maintenance required to fix it.",
    "severity": 4
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "eventids": [
      "20427",
      "20428"
    ]
  },
  "id": 1
}
```

Source

CEvent::acknowledge() in ui/include/classes/api/services/CEvent.php.

## event.get

## Description

integer/array `event.get(object parameters)`

The method allows to retrieve events according to the given parameters.

### Attention:

This method may return events of a deleted entity if these events have not been removed by the housekeeper yet.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
eventids	string/array	Return only events with the given IDs.
groupids	string/array	Return only events created by objects that belong to the given host groups.
hostids	string/array	Return only events created by objects that belong to the given hosts.
objectids	string/array	Return only events created by the given objects.
applicationids	string/array	Return only events created by objects that belong to the given applications.
source	integer	Applies only if object is trigger or item. Return only events with the given type.  Refer to the <a href="#">event object page</a> for a list of supported event types.  Default: 0 - trigger events.



Parameter	Type	Description
object	integer	<p>Return only events created by objects of the given type.</p> <p>Refer to the <a href="#">event object page</a> for a list of supported object types.</p> <p>Default: 0 - trigger.</p>
acknowledged	boolean	<p>If set to true return only acknowledged events.</p>
suppressed	boolean	<p>true - return only suppressed events; false - return events in the normal state.</p>
severities	integer/array	<p>Return only events with given event severities. Applies only if object is trigger.</p>
evaltype	integer	<p>Rules for tag searching.</p>
tags	array of objects	<p>Possible values: 0 - (default) And/Or; 2 - Or.</p> <p>Return only events with given tags. Exact match by tag and case-insensitive search by value and operator.</p> <p>Format: [{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].</p> <p>An empty array returns all events.</p>
eventid_from	string	<p>Possible operator types: 0 - (default) Like; 1 - Equal.</p> <p>Return only events with IDs greater or equal to the given ID.</p>

Parameter	Type	Description
eventid_till	string	Return only events with IDs less or equal to the given ID.
time_from	timestamp	Return only events that have been created after or at the given time.
time_till	timestamp	Return only events that have been created before or at the given time.
problem_time_from	timestamp	Returns only events that were in the problem state starting with <code>problem_time_from</code> . Applies only if the source is trigger event and object is trigger. Mandatory if <code>problem_time_till</code> is specified.
problem_time_till	timestamp	Returns only events that were in the problem state until <code>problem_time_till</code> . Applies only if the source is trigger event and object is trigger. Mandatory if <code>problem_time_from</code> is specified.
value	integer/array	Return only events with the given values.
selectHosts	query	Return a <code>hosts</code> property with hosts containing the object that created the event. Supported only for events generated by triggers, items or LLD rules.
selectRelatedObject	query	Return a <code>relatedObject</code> property with the object that created the event. The type of object returned depends on the event type.

---

Parameter	Type	Description
select_alerts	query	Return an <b>alerts</b> property with alerts generated by the event. Alerts are sorted in reverse chronological order.

Parameter	Type	Description
select_acknowledges	query	<p>Return an <code>acknowledges</code> property with event updates. Event updates are sorted in reverse chronological order.</p> <p>The event update object has the following properties:</p> <ul style="list-style-type: none"> <li><code>acknowledgeid</code> - (string) acknowledgment's ID;</li> <li><code>userid</code> - (string) ID of the user that updated the event;</li> <li><code>eventid</code> - (string) ID of the updated event;</li> <li><code>clock</code> - (timestamp) time when the event was updated;</li> <li><code>message</code> - (string) text of the message;</li> <li><code>action</code> - (integer) update action that was performed see <code>event.acknowledge</code>;</li> <li><code>old_severity</code> - (integer) event severity before this update action;</li> <li><code>new_severity</code> - (integer) event severity after this update action;</li> <li><code>alias</code> - (string) alias of the user that updated the event;</li> <li><code>name</code> - (string) name of the user that updated the event;</li> <li><code>surname</code> - (string) surname of the user that updated the event.</li> </ul>

Parameter	Type	Description
selectTags	query	Return a <b>tags</b> property with event tags.
selectSuppressionData	query	Return a <b>suppression_data</b> property with the list of maintenances: <b>maintenanceid</b> - (string) ID of the maintenance; <b>suppress_until</b> - (integer) time until the event is suppressed.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <b>eventid</b> , <b>objectid</b> and <b>clock</b> .
countOutput	boolean	These parameters being common for all <b>get</b> methods are described in detail in the <b>reference commentary</b> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

#### Examples

##### Retrieving trigger events

Retrieve the latest events from trigger "13926."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.get",
  "params": {
    "output": "extend",
    "select_acknowledges": "extend",
```

```

    "selectTags": "extend",
    "selectSuppressionData": "extend",
    "objectids": "13926",
    "sortfield": ["clock", "eventid"],
    "sortorder": "DESC"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "9695",
      "source": "0",
      "object": "0",
      "objectid": "13926",
      "clock": "1347970410",
      "value": "1",
      "acknowledged": "1",
      "ns": "413316245",
      "name": "MySQL is down",
      "severity": "5",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",
      "userid": "0",
      "opdata": "",
      "acknowledges": [
        {
          "acknowledgeid": "1",
          "userid": "1",
          "eventid": "9695",
          "clock": "1350640590",
          "message": "Problem resolved.\n\r----[BULK ACKNOWLEDGE]----",
          "action": "6",
          "old_severity": "0",
          "new_severity": "0",
          "alias": "Admin",
          "name": "Zabbix",
          "surname": "Administrator"
        }
      ],
    },
    {
      "suppression_data": [
        {
          "maintenanceid": "15",
          "suppress_until": "1472511600"
        }
      ],
      "suppressed": "1",
      "tags": [
        {
          "tag": "service",
          "value": "mysqld"
        },
        {
          "tag": "error",
          "value": ""
        }
      ]
    }
  ]
}

```

```

    },
    {
      "eventid": "9671",
      "source": "0",
      "object": "0",
      "objectid": "13926",
      "clock": "1347970347",
      "value": "0",
      "acknowledged": "0",
      "ns": "0",
      "name": "Unavailable by ICMP ping",
      "severity": "4",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",
      "userid": "0",
      "opdata": "",
      "acknowledges": [],
      "suppression_data": [],
      "suppressed": "0",
      "tags": []
    }
  ],
  "id": 1
}

```

Retrieving events by time period

Retrieve all events that have been created between October 9 and 10, 2012, in reverse chronological order.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "event.get",
  "params": {
    "output": "extend",
    "time_from": "1349797228",
    "time_till": "1350661228",
    "sortfield": ["clock", "eventid"],
    "sortorder": "desc"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "20616",
      "source": "0",
      "object": "0",
      "objectid": "14282",
      "clock": "1350477814",
      "value": "1",
      "acknowledged": "0",
      "ns": "0",
      "name": "Less than 25% free in the history cache",
      "severity": "3",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",

```

```

        "userid": "0",
        "opdata": "",
        "suppressed": "0"
    },
    {
        "eventid": "20617",
        "source": "0",
        "object": "0",
        "objectid": "14283",
        "clock": "1350477814",
        "value": "0",
        "acknowledged": "0",
        "ns": "0",
        "name": "Zabbix trapper processes more than 75% busy",
        "severity": "3",
        "r_eventid": "0",
        "c_eventid": "0",
        "correlationid": "0",
        "userid": "0",
        "opdata": "",
        "suppressed": "0"
    },
    {
        "eventid": "20618",
        "source": "0",
        "object": "0",
        "objectid": "14284",
        "clock": "1350477815",
        "value": "1",
        "acknowledged": "0",
        "ns": "0",
        "name": "High ICMP ping loss",
        "severity": "3",
        "r_eventid": "0",
        "c_eventid": "0",
        "correlationid": "0",
        "userid": "0",
        "opdata": "",
        "suppressed": "0"
    }
],
    "id": 1
}

```

See also

- [Alert](#)
- [Item](#)
- [Host](#)
- [LLD rule](#)
- [Trigger](#)

Source

CEvent::get() in ui/include/classes/api/services/CEvent.php.

## Graph

This class is designed to work with items.

Object references:

- [Graph](#)



Available methods:

- **graph.create** - creating new graphs
- **graph.delete** - deleting graphs
- **graph.get** - retrieving graphs
- **graph.update** - updating graphs

## > Graph object

The following objects are directly related to the `graph` API.

Graph

The graph object has the following properties.

Property	Type	Description
<code>graphid</code>	string	(readonly) ID of the graph.
<b>height</b> (required)	integer	Height of the graph in pixels.
<b>name</b> (required)	string	Name of the graph
<b>width</b> (required)	integer	Width of the graph in pixels.
<code>flags</code>	integer	(readonly) Origin of the graph.  Possible values are: 0 - (default) a plain graph; 4 - a discovered graph.
<code>graphtype</code>	integer	Graph's layout type.  Possible values: 0 - (default) normal; 1 - stacked; 2 - pie; 3 - exploded.
<code>percent_left</code>	float	Left percentile.
<code>percent_right</code>	float	Default: 0. Right percentile.
<code>show_3d</code>	integer	Default: 0. Whether to show pie and exploded graphs in 3D.  Possible values: 0 - (default) show in 2D; 1 - show in 3D.

Property	Type	Description
show_legend	integer	Whether to show the legend on the graph.  Possible values: 0 - hide; 1 - (default) show.
show_work_period	integer	Whether to show the working time on the graph.  Possible values: 0 - hide; 1 - (default) show.
show_triggers	integer	Whether to show the trigger line on the graph.  Possible values: 0 - hide; 1 - (default) show.
templateid	string	(readonly) ID of the parent template graph.
yaxismax	float	The fixed maximum value for the Y axis.
yaxismin	float	Default: 100. The fixed minimum value for the Y axis.
ymax_itemid	string	Default: 0. ID of the item that is used as the maximum value for the Y axis.
ymax_type	integer	Maximum value calculation method for the Y axis.  Possible values: 0 - (default) calculated; 1 - fixed; 2 - item.
ymin_itemid	string	ID of the item that is used as the minimum value for the Y axis.

Property	Type	Description
ymin_type	integer	Minimum value calculation method for the Y axis.  Possible values: 0 - (default) calculated; 1 - fixed; 2 - item.

## graph.create

### Description

object graph.create(object/array graphs)

This method allows to create new graphs.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Graphs to create.

Additionally to the [standard graph properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>gitems</b>	array	Graph <b>items</b> to be created for the graph. (required)

### Return values

(object) Returns an object containing the IDs of the created graphs under the `graphids` property. The order of the returned IDs matches the order of the passed graphs.

### Examples

#### Creating a graph

Create a graph with two items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.create",
  "params": {
    "name": "MySQL bandwidth",
    "width": 900,
    "height": 200,
    "gitems": [
      {
        "itemid": "22828",
        "color": "00AA00"
      },
      {
        "itemid": "22829",
        "color": "3333FF"
      }
    ]
  }
}
```

```
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652"
    ]
  },
  "id": 1
}
```

See also

- [Graph item](#)

Source

CGraph::create() in ui/include/classes/api/services/CGraph.php.

## graph.delete

Description

object graph.delete(array graphIds)

This method allows to delete graphs.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the graphs to delete.

Return values

(object) Returns an object containing the IDs of the deleted graphs under the `graphids` property.

Examples

Deleting multiple graphs

Delete two graphs.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.delete",
  "params": [
    "652",
    "653"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
```

```

        "652",
        "653"
    ]
},
"id": 1
}

```

Source

CGraph::delete() in ui/include/classes/api/services/CGraph.php.

## graph.get

Description

integer/array graph.get(object parameters)

The method allows to retrieve graphs according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
graphids	string/array	Return only graphs with the given IDs.
groupids	string/array	Return only graphs that belong to hosts in the given host groups.
templateids	string/array	Return only graph that belong to the given templates.
hostids	string/array	Return only graphs that belong to the given hosts.
itemids	string/array	Return only graphs that contain the given items.
templated	boolean	If set to <code>true</code> return only graphs that belong to templates.
inherited	boolean	If set to <code>true</code> return only graphs inherited from a template.
expandName	flag	Expand macros in the graph name.

Parameter	Type	Description
selectGroups	query	Return a <b>groups</b> property with the host groups that the graph belongs to.
selectTemplates	query	Return a <b>templates</b> property with the templates that the graph belongs to.
selectHosts	query	Return a <b>hosts</b> property with the hosts that the graph belongs to.
selectItems	query	Return an <b>items</b> property with the items used in the graph.
selectGraphDiscovery	query	Return a <b>graphDiscovery</b> property with the graph discovery object. The graph discovery objects links the graph to a graph prototype from which it was created.  It has the following properties: <b>graphid</b> - (string) ID of the graph; <b>parent_graphid</b> - (string) ID of the graph prototype from which the graph has been created.
selectGraphItems	query	Return a <b>gitems</b> property with the items used in the graph.
selectDiscoveryRule	query	Return a <b>discoveryRule</b> property with the low-level discovery rule that created the graph.

Parameter	Type	Description
filter	object	Return only those results that exactly match the given filter.  Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.  Supports additional filters: host - technical name of the host that the graph belongs to; hostid - ID of the host that the graph belongs to. Sort the result by the given properties.
sortfield	string/array	Possible values are: graphid, name and graphtype. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving graphs from hosts

Retrieve all graphs from host "10107" and sort them by name.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.get",
  "params": {
    "output": "extend",
    "hostids": 10107,
    "sortfield": "name"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "graphid": "612",
      "name": "CPU jumps",
      "width": "900",
      "height": "200",
      "yaxismin": "0",
      "yaxismax": "100",
      "templateid": "439",
      "show_work_period": "1",
      "show_triggers": "1",
      "graphtype": "0",
      "show_legend": "1",
      "show_3d": "0",
      "percent_left": "0",
      "percent_right": "0",
      "ymin_type": "0",
      "ymax_type": "0",
      "ymin_itemid": "0",
      "ymax_itemid": "0",
      "flags": "0"
    },
    {
      "graphid": "613",
      "name": "CPU load",
      "width": "900",
      "height": "200",
      "yaxismin": "0",
      "yaxismax": "100",
      "templateid": "433",
      "show_work_period": "1",
      "show_triggers": "1",
      "graphtype": "0",
      "show_legend": "1",
      "show_3d": "0",
      "percent_left": "0",
      "percent_right": "0",
      "ymin_type": "1",
      "ymax_type": "0",
      "ymin_itemid": "0",
      "ymax_itemid": "0",
      "flags": "0"
    },
    {
      "graphid": "614",
      "name": "CPU utilization",
      "width": "900",
```



```

        "height": "200",
        "yaxismin": "0",
        "yaxismax": "100",
        "templateid": "387",
        "show_work_period": "1",
        "show_triggers": "0",
        "graphtype": "1",
        "show_legend": "1",
        "show_3d": "0",
        "percent_left": "0",
        "percent_right": "0",
        "ymin_type": "1",
        "ymax_type": "1",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "flags": "0"
    },
    {
        "graphid": "645",
        "name": "Disk space usage /",
        "width": "600",
        "height": "340",
        "yaxismin": "0",
        "yaxismax": "0",
        "templateid": "0",
        "show_work_period": "0",
        "show_triggers": "0",
        "graphtype": "2",
        "show_legend": "1",
        "show_3d": "1",
        "percent_left": "0",
        "percent_right": "0",
        "ymin_type": "0",
        "ymax_type": "0",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "flags": "4"
    }
],
    "id": 1
}

```

See also

- [Discovery rule](#)
- [Graph item](#)
- [Item](#)
- [Host](#)
- [Host group](#)
- [Template](#)

Source

CGraph::get() in ui/include/classes/api/services/CGraph.php.

### **graph.update**

Description

object graph.update(object/array graphs)

This method allows to update existing graphs.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Graph properties to be updated.

The `graphid` property must be defined for each graph, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard graph properties](#) the method accepts the following parameters.

Parameter	Type	Description
<code>gitems</code>	array	Graph <code>items</code> to replace existing graph items. If a graph item has the <code>gitemid</code> property defined it will be updated, otherwise a new graph item will be created.

**Return values**

(object) Returns an object containing the IDs of the updated graphs under the `graphids` property.

**Examples**

Setting the maximum for the Y scale

Set the the maximum of the Y scale to a fixed value of 100.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.update",
  "params": {
    "graphid": "439",
    "ymax_type": 1,
    "yaxismax": 100
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "439"
    ]
  },
  "id": 1
}
```

**Source**

`CGraph::update()` in `ui/include/classes/api/services/CGraph.php`.

## Graph item

This class is designed to work with hosts.

Object references:

- [Graph item](#)

Available methods:

- [graphitem.get](#) - retrieving graph items

### > Graph item object

The following objects are directly related to the `graphitem` API.

Graph item

#### Note:

Graph items can only be modified via the `graph` API.

The graph item object has the following properties.

Property	Type	Description
<code>gitemid</code>	string	(readonly) ID of the graph item.
<b>color</b> (required)	string	Graph item's draw color as a hexadecimal color code.
<b>itemid</b> (required)	string	ID of the item.
<code>calc_fnc</code>	integer	Value of the item that will be displayed.  Possible values: 1 - minimum value; 2 - (default) average value; 4 - maximum value; 7 - all values; 9 - last value, used only by pie and exploded graphs.
<code>drawtype</code>	integer	Draw style of the graph item.  Possible values: 0 - (default) line; 1 - filled region; 2 - bold line; 3 - dot; 4 - dashed line; 5 - gradient line.
<code>graphid</code>	string	ID of the graph that the graph item belongs to.

Property	Type	Description
sortorder	integer	Position of the item in the graph.  Default: starts with 0 and increases by one with each entry.
type	integer	Type of graph item.  Possible values: 0 - (default) simple; 2 - graph sum, used only by pie and exploded graphs.
yaxisside	integer	Side of the graph where the graph item's Y scale will be drawn.  Possible values: 0 - (default) left side; 1 - right side.

## graphitem.get

### Description

integer/array graphitem.get(object parameters)

The method allows to retrieve graph items according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
graphids	string/array	Return only graph items that belong to the given graphs.
itemids	string/array	Return only graph items with the given item IDs.

Parameter	Type	Description
type	integer	Return only graph items with the given type.
selectGraphs	query	Refer to the <a href="#">graph item object page</a> for a list of supported graph item types. Return a <a href="#">graphs</a> property with an array of graphs that the item belongs to.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: <code>gitemid</code> . These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary page</a> .
editable	boolean	
limit	integer	
output	query	
preservekeys	boolean	
sortorder	string/array	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving graph items from a graph

Retrieve all graph items used in a graph with additional information about the item and the host.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphitem.get",
  "params": {
    "output": "extend",
    "graphids": "387"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
```

```

    {
        "gitemid": "1242",
        "graphid": "387",
        "itemid": "22665",
        "drawtype": "1",
        "sortorder": "1",
        "color": "FF5555",
        "yaxisside": "0",
        "calc_fnc": "2",
        "type": "0",
        "key_": "system.cpu.util[,steal]",
        "hostid": "10001",
        "flags": "0",
        "host": "Linux"
    },
    {
        "gitemid": "1243",
        "graphid": "387",
        "itemid": "22668",
        "drawtype": "1",
        "sortorder": "2",
        "color": "55FF55",
        "yaxisside": "0",
        "calc_fnc": "2",
        "type": "0",
        "key_": "system.cpu.util[,softirq]",
        "hostid": "10001",
        "flags": "0",
        "host": "Linux"
    },
    {
        "gitemid": "1244",
        "graphid": "387",
        "itemid": "22671",
        "drawtype": "1",
        "sortorder": "3",
        "color": "009999",
        "yaxisside": "0",
        "calc_fnc": "2",
        "type": "0",
        "key_": "system.cpu.util[,interrupt]",
        "hostid": "10001",
        "flags": "0",
        "host": "Linux"
    }
],
"id": 1
}

```

See also

- [Graph](#)

Source

CGraphItem::get() in ui/include/classes/api/services/CGraphItem.php.

### Graph prototype

This class is designed to work with graph prototypes.

Object references:

- [Graph prototype](#)

Available methods:

- `graphprototype.create` - creating new graph prototypes
- `graphprototype.delete` - deleting graph prototypes
- `graphprototype.get` - retrieving graph prototypes
- `graphprototype.update` - updating graph prototypes

### > Graph prototype object

The following objects are directly related to the `graphprototype` API.

Graph prototype

The graph prototype object has the following properties.

Property	Type	Description
<code>graphid</code>	string	(readonly) ID of the graph prototype.
<b>height</b> (required)	integer	Height of the graph prototype in pixels.
<b>name</b> (required)	string	Name of the graph prototype.
<b>width</b> (required)	integer	Width of the graph prototype in pixels.
<code>graphtype</code>	integer	Graph prototypes's layout type.  Possible values: 0 - (default) normal; 1 - stacked; 2 - pie; 3 - exploded.
<code>percent_left</code>	float	Left percentile.
<code>percent_right</code>	float	Right percentile.
<code>show_3d</code>	integer	Whether to show discovered pie and exploded graphs in 3D.  Possible values: 0 - (default) show in 2D; 1 - show in 3D.
<code>show_legend</code>	integer	Whether to show the legend on the discovered graph.  Possible values: 0 - hide; 1 - (default) show.

Property	Type	Description
show_work_period	integer	Whether to show the working time on the discovered graph.  Possible values: 0 - hide; 1 - (default) show.
templateid	string	(readonly) ID of the parent template graph prototype.
yaxismax	float	The fixed maximum value for the Y axis.
yaxismin	float	The fixed minimum value for the Y axis.
ymax_itemid	string	ID of the item that is used as the maximum value for the Y axis.
ymax_type	integer	Maximum value calculation method for the Y axis.  Possible values: 0 - (default) calculated; 1 - fixed; 2 - item.
ymin_itemid	string	ID of the item that is used as the minimum value for the Y axis.
ymin_type	integer	Minimum value calculation method for the Y axis.  Possible values: 0 - (default) calculated; 1 - fixed; 2 - item.
discover	integer	Graph prototype discovery status.  Possible values: 0 - (default) new graphs will be discovered; 1 - new graphs will not be discovered and existing graphs will be marked as lost.



## graphprototype.create

### Description

object graphprototype.create(object/array graphPrototypes)

This method allows to create new graph prototypes.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Graph prototypes to create.

Additionally to the [standard graph prototype properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>gitems</b> (required)	array	Graph <b>items</b> to be created for the graph prototypes. Graph items can reference both items and item prototypes, but at least one item prototype must be present.

### Return values

(object) Returns an object containing the IDs of the created graph prototypes under the `graphids` property. The order of the returned IDs matches the order of the passed graph prototypes.

### Examples

#### Creating a graph prototype

Create a graph prototype with two items.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.create",
  "params": {
    "name": "Disk space usage {#FSNAME}",
    "width": 900,
    "height": 200,
    "gitems": [
      {
        "itemid": "22828",
        "color": "00AA00"
      },
      {
        "itemid": "22829",
        "color": "3333FF"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652"
    ]
  },
  "id": 1
}
```

See also

- [Graph item](#)

Source

CGraphPrototype::create() in ui/include/classes/api/services/CGraphPrototype.php.

### graphprototype.delete

Description

object graphprototype.delete(array graphPrototypeIds)

This method allows to delete graph prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the graph prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted graph prototypes under the `graphids` property.

Examples

Deleting multiple graph prototypes

Delete two graph prototypes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.delete",
  "params": [
    "652",
    "653"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652",
      "653"
    ]
  },
  "id": 1
}
```

Source

CGraphPrototype::delete() in ui/include/classes/api/services/CGraphPrototype.php.

## graphprototype.get

Description

integer/array graphprototype.get(object parameters)

The method allows to retrieve graph prototypes according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
discoveryids	string/array	Return only graph prototypes that belong to the given discovery rules.
graphids	string/array	Return only graph prototypes with the given IDs.
groupids	string/array	Return only graph prototypes that belong to hosts in the given host groups.
hostids	string/array	Return only graph prototypes that belong to the given hosts.
inherited	boolean	If set to <code>true</code> return only graph prototypes inherited from a template.
itemids	string/array	Return only graph prototypes that contain the given item prototypes.
templated	boolean	If set to <code>true</code> return only graph prototypes that belong to templates.
templateids	string/array	Return only graph prototypes that belong to the given templates.
selectDiscoveryRuleQuery		Return a <code>discoveryRule</code> property with the LLD rule that the graph prototype belongs to.

Parameter	Type	Description
selectGraphItems	query	Return a <b>gitems</b> property with the graph items used in the graph prototype.
selectGroups	query	Return a <b>groups</b> property with the host groups that the graph prototype belongs to.
selectHosts	query	Return a <b>hosts</b> property with the hosts that the graph prototype belongs to.
selectItems	query	Return an <b>items</b> property with the <b>items</b> and <b>item prototypes</b> used in the graph prototype.
selectTemplates	query	Return a <b>templates</b> property with the templates that the graph prototype belongs to.
filter	object	Return only those results that exactly match the given filter.  Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.  Supports additional filters: <b>host</b> - technical name of the host that the graph prototype belongs to; <b>hostid</b> - ID of the host that the graph prototype belongs to.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <b>graphid</b> , <b>name</b> and <b>graphtype</b> .

Parameter	Type	Description
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving graph prototypes from a LLD rule

Retrieve all graph prototypes from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.get",
  "params": {
    "output": "extend",
    "discoveryids": "27426"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "graphid": "1017",
      "parent_itemid": "27426",
      "name": "Disk space usage {#FSNAME}",
      "width": "600",
      "height": "340",
      "yaxismin": "0.0000",
      "yaxismax": "0.0000",
      "templateid": "442",
      "show_work_period": "0",
      "show_triggers": "0",
      "graphtype": "2",
      "show_legend": "1",
      "show_3d": "1",
      "percent_left": "0.0000",
      "percent_right": "0.0000",
    }
  ]
}
```

```

        "ymin_type": "0",
        "ymax_type": "0",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "discover": "0"
    }
],
    "id": 1
}

```

See also

- [Discovery rule](#)
- [Graph item](#)
- [Item](#)
- [Host](#)
- [Host group](#)
- [Template](#)

Source

CGraphPrototype::get() in ui/include/classes/api/services/CGraphPrototype.php.

## graphprototype.update

Description

object graphprototype.update(object/array graphPrototypes)

This method allows to update existing graph prototypes.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Graph prototype properties to be updated.

The `graphid` property must be defined for each graph prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard graph prototype properties](#), the method accepts the following parameters.

Parameter	Type	Description
gitems	array	Graph <a href="#">items</a> to replace existing graph items. If a graph item has the <code>gitemid</code> property defined it will be updated, otherwise a new graph item will be created.

Return values

(object) Returns an object containing the IDs of the updated graph prototypes under the `graphids` property.

Examples

Changing the size of a graph prototype

Change the size of a graph prototype to 1100 to 400 pixels.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.update",
  "params": {
    "graphid": "439",
    "width": 1100,
    "height": 400
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "439"
    ]
  },
  "id": 1
}
```

Source

CGraphPrototype::update() in ui/include/classes/api/services/CGraphPrototype.php.

## History

This class is designed to work with history data.

Object references:

- [History](#)

Available methods:

- [history.get](#) - retrieving history data.

### > History object

The following objects are directly related to the `history` API.

#### Note:

History objects differ depending on the item's type of information. They are created by the Zabbix server and cannot be modified via the API.

#### Float history

The float history object has the following properties.

Property	Type	Description
clock	timestamp	Time when that value was received.
itemid	string	ID of the related item.
ns	integer	Nanoseconds when the value was received.
value	float	Received value.

#### Integer history

The integer history object has the following properties.

Property	Type	Description
clock	timestamp	Time when that value was received.
itemid	string	ID of the related item.
ns	integer	Nanoseconds when the value was received.
value	integer	Received value.

### String history

The string history object has the following properties.

Property	Type	Description
clock	timestamp	Time when that value was received.
itemid	string	ID of the related item.
ns	integer	Nanoseconds when the value was received.
value	string	Received value.

### Text history

The text history object has the following properties.

Property	Type	Description
id	string	ID of the history entry.
clock	timestamp	Time when that value was received.
itemid	string	ID of the related item.
ns	integer	Nanoseconds when the value was received.
value	text	Received value.

### Log history

The log history object has the following properties.

Property	Type	Description
id	string	ID of the history entry.
clock	timestamp	Time when that value was received.
itemid	string	ID of the related item.
logeventid	integer	Windows event log entry ID.
ns	integer	Nanoseconds when the value was received.
severity	integer	Windows event log entry level.
source	string	Windows event log entry source.
timestamp	timestamp	Windows event log entry time.
value	text	Received value.

## history.get

### Description

`integer/array history.get(object parameters)`

The method allows to retrieve history data according to the given parameters.

See also: [known issues](#)

#### Attention:

This method may return historical data of a deleted entity if this data has not been removed by the housekeeper yet.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.



## Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
history	integer	History object types to return.  Possible values: 0 - numeric float; 1 - character; 2 - log; 3 - numeric unsigned; 4 - text.  Default: 3.
hostids	string/array	Return only history from the given hosts.
itemids	string/array	Return only history from the given items.
time_from	timestamp	Return only values that have been received after or at the given time.
time_till	timestamp	Return only values that have been received before or at the given time.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>itemid</code> and <code>clock</code> .
countOutput	boolean	These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

## Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving item history data

Return 10 latest values received from a numeric(float) item.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "history.get",
  "params": {
    "output": "extend",
    "history": 0,
    "itemids": "23296",
    "sortfield": "clock",
    "sortorder": "DESC",
    "limit": 10
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23296",
      "clock": "1351090996",
      "value": "0.085",
      "ns": "563157632"
    },
    {
      "itemid": "23296",
      "clock": "1351090936",
      "value": "0.16",
      "ns": "549216402"
    },
    {
      "itemid": "23296",
      "clock": "1351090876",
      "value": "0.18",
      "ns": "537418114"
    },
    {
      "itemid": "23296",
      "clock": "1351090816",
      "value": "0.21",
      "ns": "522659528"
    },
    {
      "itemid": "23296",
      "clock": "1351090756",
      "value": "0.215",
      "ns": "507809457"
    },
    {
      "itemid": "23296",
      "clock": "1351090696",
      "value": "0.255",
      "ns": "495509699"
    }
  ]
}
```

```

    },
    {
      "itemid": "23296",
      "clock": "1351090636",
      "value": "0.36",
      "ns": "477708209"
    },
    {
      "itemid": "23296",
      "clock": "1351090576",
      "value": "0.375",
      "ns": "463251343"
    },
    {
      "itemid": "23296",
      "clock": "1351090516",
      "value": "0.315",
      "ns": "447947017"
    },
    {
      "itemid": "23296",
      "clock": "1351090456",
      "value": "0.275",
      "ns": "435307141"
    }
  ],
  "id": 1
}

```

#### Source

CHistory::get() in ui/include/classes/api/services/CHistory.php.

#### Host

This class is designed to work with hosts.

Object references:

- [Host](#)
- [Host inventory](#)

Available methods:

- [host.create](#) - creating new hosts
- [host.delete](#) - deleting hosts
- [host.get](#) - retrieving hosts
- [host.massadd](#) - adding related objects to hosts
- [host.massremove](#) - removing related objects from hosts
- [host.massupdate](#) - replacing or removing related objects from hosts
- [host.update](#) - updating hosts

#### > Host object

The following objects are directly related to the host API.

Host

The host object has the following properties.

Property	Type	Description
hostid	string	(readonly) ID of the host.
<b>host</b> (required)	string	Technical name of the host.
available	integer	(readonly) Availability of Zabbix agent.  Possible values are: 0 - (default) unknown; 1 - available; 2 - unavailable.
description	text	Description of the host.
disable_until	timestamp	(readonly) The next polling time of an unavailable Zabbix agent.
error	string	(readonly) Error text if Zabbix agent is unavailable.
errors_from	timestamp	(readonly) Time when Zabbix agent became unavailable.
flags	integer	(readonly) Origin of the host.  Possible values: 0 - a plain host; 4 - a discovered host.
inventory_mode	integer	Host inventory population mode.  Possible values are: -1 - (default) disabled; 0 - manual; 1 - automatic.
ipmi_authtype	integer	IPMI authentication algorithm.  Possible values are: -1 - (default) default; 0 - none; 1 - MD2; 2 - MD5 4 - straight; 5 - OEM; 6 - RMCP+.

Property	Type	Description
ipmi_available	integer	(readonly) Availability of IPMI agent.  Possible values are: 0 - (default) unknown; 1 - available; 2 - unavailable.
ipmi_disable_untiltimestamp		(readonly) The next polling time of an unavailable IPMI agent.
ipmi_error	string	(readonly) Error text if IPMI agent is unavailable.
ipmi_errors_frontimestamp		(readonly) Time when IPMI agent became unavailable.
ipmi_password	string	IPMI password.
ipmi_privilege	integer	IPMI privilege level.  Possible values are: 1 - callback; 2 - (default) user; 3 - operator; 4 - admin; 5 - OEM.
ipmi_username	string	IPMI username.
jmx_available	integer	(readonly) Availability of JMX agent.  Possible values are: 0 - (default) unknown; 1 - available; 2 - unavailable.
jmx_disable_untiltimestamp		(readonly) The next polling time of an unavailable JMX agent.
jmx_error	string	(readonly) Error text if JMX agent is unavailable.
jmx_errors_frontimestamp		(readonly) Time when JMX agent became unavailable.
maintenance_frontimestamp		(readonly) Starting time of the effective maintenance.

Property	Type	Description
maintenance_status	integer	(readonly) Effective maintenance status.  Possible values are: 0 - (default) no maintenance; 1 - maintenance in effect.
maintenance_type	integer	(readonly) Effective maintenance type.  Possible values are: 0 - (default) maintenance with data collection; 1 - maintenance without data collection.
maintenanceid	string	(readonly) ID of the maintenance that is currently in effect on the host.
name	string	Visible name of the host.
proxy_hostid	string	Default: host property value. ID of the proxy that is used to monitor the host.
snmp_available	integer	(readonly) Availability of SNMP agent.  Possible values are: 0 - (default) unknown; 1 - available; 2 - unavailable.
snmp_disable_until	timestamp	(readonly) The next polling time of an unavailable SNMP agent.
snmp_error	string	(readonly) Error text if SNMP agent is unavailable.
snmp_errors_from	timestamp	(readonly) Time when SNMP agent became unavailable.

Property	Type	Description
status	integer	Status and function of the host.  Possible values are: 0 - (default) monitored host; 1 - unmonitored host.
tls_connect	integer	Connections to host.  Possible values are: 1 - (default) No encryption; 2 - PSK; 4 - certificate.
tls_accept	integer	Connections from host.  Possible bitmap values are: 1 - (default) No encryption; 2 - PSK; 4 - certificate.
tls_issuer	string	Certificate issuer.
tls_subject	string	Certificate subject.
tls_psk_identity	string	PSK identity. Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.
tls_psk	string	The preshared key, at least 32 hex digits. Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled.

## Host inventory

The host inventory object has the following properties.

**Note:**

Each property has it's own unique ID number, which is used to associate host inventory fields with items.

ID	Property	Type	Description
4	alias	string	Alias.
11	asset_tag	string	Asset tag.
28	chassis	string	Chassis.
23	contact	string	Contact person.
32	contract_number	string	Contract number.
47	date_hw_decomm	string	HW decommissioning date.
46	date_hw_expiry	string	HW maintenance expiry date.
45	date_hw_install	string	HW installation date.
44	date_hw_purchase	string	HW purchase date.
34	deployment_status	string	Deployment status.
14	hardware	string	Hardware.
15	hardware_full	string	Detailed hardware.
39	host_netmask	string	Host subnet mask.
38	host_networks	string	Host networks.
40	host_router	string	Host router.
30	hw_arch	string	HW architecture.
33	installer_name	string	Installer name.
24	location	string	Location.
25	location_lat	string	Location latitude.
26	location_lon	string	Location longitude.
12	macaddress_a	string	MAC address A.
13	macaddress_b	string	MAC address B.
29	model	string	Model.
3	name	string	Name.
27	notes	string	Notes.
41	oob_ip	string	OOB IP address.
42	oob_netmask	string	OOB host subnet mask.
43	oob_router	string	OOB router.
5	os	string	OS name.
6	os_full	string	Detailed OS name.
7	os_short	string	Short OS name.
61	poc_1_cell	string	Primary POC mobile number.
58	poc_1_email	string	Primary email.
57	poc_1_name	string	Primary POC name.
63	poc_1_notes	string	Primary POC notes.
59	poc_1_phone_a	string	Primary POC phone A.
60	poc_1_phone_b	string	Primary POC phone B.
62	poc_1_screen	string	Primary POC screen name.
68	poc_2_cell	string	Secondary POC mobile number.
65	poc_2_email	string	Secondary POC email.
64	poc_2_name	string	Secondary POC name.
70	poc_2_notes	string	Secondary POC notes.
66	poc_2_phone_a	string	Secondary POC phone A.
67	poc_2_phone_b	string	Secondary POC phone B.
69	poc_2_screen	string	Secondary POC screen name.
8	serialno_a	string	Serial number A.
9	serialno_b	string	Serial number B.
48	site_address_a	string	Site address A.
49	site_address_b	string	Site address B.
50	site_address_c	string	Site address C.
51	site_city	string	Site city.
53	site_country	string	Site country.
56	site_notes	string	Site notes.
55	site_rack	string	Site rack location.
52	site_state	string	Site state.
54	site_zip	string	Site ZIP/postal code.
16	software	string	Software.
18	software_app_a	string	Software application A.
19	software_app_b	string	Software application B.
20	software_app_c	string	Software application C.
21	software_app_d	string	Software application D.



ID	Property	Type	Description
22	software_app_e	string	Software application E.
17	software_full	string	Software details.
10	tag	string	Tag.
1	type	string	Type.
2	type_full	string	Type details.
35	url_a	string	URL A.
36	url_b	string	URL B.
37	url_c	string	URL C.
31	vendor	string	Vendor.

## Host tag

The host tag object has the following properties.

Property	Type	Description
<b>tag</b> (required)	string	Host tag name.
value	string	Host tag value.

## host.create

### Description

object `host.create(object/array hosts)`

This method allows to create new hosts.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Hosts to create.

Additionally to the [standard host properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>groups</b> (required)	object/array	Host <a href="#">groups</a> to add the host to.  The host groups must have the <code>groupid</code> property defined.
interfaces	object/array	<a href="#">Interfaces</a> to be created for the host.
tags	object/array	Host <a href="#">tags</a> .
templates	object/array	<a href="#">Templates</a> to be linked to the host.  The templates must have the <code>templateid</code> property defined.
macros	object/array	<a href="#">User macros</a> to be created for the host.

Parameter	Type	Description
inventory	object	Host <b>inventory</b> properties.

#### Return values

(object) Returns an object containing the IDs of the created hosts under the `host_ids` property. The order of the returned IDs matches the order of the passed hosts.

#### Examples

##### Creating a host

Create a host called "Linux server" with an IP interface and tags, add it to a group, link a template to it and set the MAC addresses in the host inventory.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "Linux server",
    "interfaces": [
      {
        "type": 1,
        "main": 1,
        "useip": 1,
        "ip": "192.168.3.1",
        "dns": "",
        "port": "10050"
      }
    ],
    "groups": [
      {
        "groupid": "50"
      }
    ],
    "tags": [
      {
        "tag": "Host name",
        "value": "Linux server"
      }
    ],
    "templates": [
      {
        "templateid": "20045"
      }
    ],
    "macros": [
      {
        "macro": "${USER_ID}",
        "value": "123321"
      },
      {
        "macro": "${USER_LOCATION}",
        "value": "0:0:0",
        "description": "latitude, longitude and altitude coordinates"
      }
    ],
    "inventory_mode": 0,
    "inventory": {
      "macaddress_a": "01234",
      "macaddress_b": "56768"
    }
  }
}
```

```
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "107819"
    ]
  },
  "id": 1
}
```

Creating a host with SNMP interface

Create a host called "SNMP host" with an SNMPv3 interface with details.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "SNMP host",
    "interfaces": [
      {
        "type": 2,
        "main": 1,
        "useip": 1,
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
          "version": 3,
          "bulk": 0,
          "securityname": "mysecurityname",
          "contextname": "",
          "securitylevel": 1
        }
      }
    ],
    "groups": [
      {
        "groupid": "4"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10658"
    ]
  },
  "id": 1
}
```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)
- [Host inventory](#)
- [Host tag](#)

Source

`CHost::create()` in `ui/include/classes/api/services/CHost.php`.

## **host.delete**

Description

object `host.delete(array hosts)`

This method allows to delete hosts.

### **Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of hosts to delete.

Return values

(object) Returns an object containing the IDs of the deleted hosts under the `hostids` property.

Examples

Deleting multiple hosts

Delete two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.delete",
  "params": [
    "13",
    "32"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "13",
      "32"
    ]
  },
  "id": 1
}
```

Source

`CHost::delete()` in `ui/include/classes/api/services/CHost.php`.

## host.get

### Description

integer/array `host.get(object parameters)`

The method allows to retrieve hosts according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
groupids	string/array	Return only hosts that belong to the given groups.
applicationids	string/array	Return only hosts that have the given applications.
dserviceids	string/array	Return only hosts that are related to the given discovered services.
graphids	string/array	Return only hosts that have the given graphs.
hostids	string/array	Return only hosts with the given host IDs.
httpstestids	string/array	Return only hosts that have the given web checks.
interfaceids	string/array	Return only hosts that use the given interfaces.
itemids	string/array	Return only hosts that have the given items.
maintenanceids	string/array	Return only hosts that are affected by the given maintenances.
monitored_hosts	flag	Return only monitored hosts.
proxy_hosts	flag	Return only proxies.
proxyids	string/array	Return only hosts that are monitored by the given proxies.
templated_hosts	flag	Return both hosts and templates.

Parameter	Type	Description
templateids	string/array	Return only hosts that are linked to the given templates.
triggerids	string/array	Return only hosts that have the given triggers.
with_items	flag	Return only hosts that have items.
with_item_prototypes	flag	Overrides the with_monitored_items and with_simple_graph_items parameters. Return only hosts that have item prototypes.
with_simple_graph_item_prototypes	flag	Overrides the with_simple_graph_item_prototypes parameter. Return only hosts that have item prototypes, which are enabled for creation and have numeric type of information.
with_applications	flag	Return only hosts that have applications.
with_graphs	flag	Return only hosts that have graphs.
with_graph_prototypes	flag	Return only hosts that have graph prototypes.
with_httptests	flag	Return only hosts that have web checks.
with_monitored_httptests	flag	Overrides the with_monitored_httptests parameter. Return only hosts that have enabled web checks.
with_monitored_items	flag	Return only hosts that have enabled items.
with_monitored_triggers	flag	Overrides the with_simple_graph_items parameter. Return only hosts that have enabled triggers. All of the items used in the trigger must also be enabled.

Parameter	Type	Description
with_simple_graphflags	flag	Return only hosts that have items with numeric type of information.
with_triggers	flag	Return only hosts that have triggers.
withProblemsSuppressed	boolean	Overrides the with_monitored_triggers parameter. Return hosts that have suppressed problems.
evaltype	integer	Possible values: null - (default) all hosts; true - only hosts with suppressed problems; false - only hosts with unsuppressed problems. Rules for tag searching.
severities	integer/array	Possible values: 0 - (default) And/Or; 2 - Or. Return hosts that have only problems with given severities. Applies only if problem object is trigger.

Parameter	Type	Description
tags	array/object	<p>Return only hosts with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.</p> <p>Format:  <pre>[{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].</pre> </p> <p>An empty array returns all hosts.</p> <p>Possible operator values:  0 - (default) Contains;  1 - Equals.</p>
inheritedTags	boolean	<p>Return hosts that have given tags also in all of their linked templates. Default:</p> <p>Possible values:  true - linked templates must also have given tags;  false - (default) linked template tags are ignored.</p>
selectApplications query		<p>Return an <b>applications</b> property with host applications.</p>
selectDiscoveries query		<p>Supports count. Return a <b>discoveries</b> property with host low-level discovery rules.</p> <p>Supports count.</p>



Parameter	Type	Description
selectDiscoveryRule	query	Return a <b>discoveryRule</b> property with the low-level discovery rule that created the host (from host prototype in VMware monitoring).
selectGraphs	query	Return a <b>graphs</b> property with host graphs.
selectGroups	query	Supports count. Return a <b>groups</b> property with host groups data that the host belongs to.

Parameter	Type	Description
selectHostDiscovery	query	<p>Return a <code>hostDiscovery</code> property with host discovery object data.</p> <p>The host discovery object links a discovered host to a host prototype or a host prototypes to an LLD rule and has the following properties:</p> <ul style="list-style-type: none"> <li><code>host</code> - (string) host of the host prototype;</li> <li><code>hostid</code> - (string) ID of the discovered host or host prototype;</li> <li><code>parent_hostid</code> - (string) ID of the host prototype from which the host has been created;</li> <li><code>parent_itemid</code> - (string) ID of the LLD rule that created the discovered host;</li> <li><code>lastcheck</code> - (timestamp) time when the host was last discovered;</li> <li><code>ts_delete</code> - (timestamp) time when a host that is no longer discovered will be deleted.</li> </ul>
selectHttpTests	query	<p>Return an <code>httpTests</code> property with host web scenarios.</p>
selectInterfaces	query	<p>Supports count. Return an <code>interfaces</code> property with host interfaces.</p>
selectInventory	query	<p>Supports count. Return an <code>inventory</code> property with host inventory data.</p>

Parameter	Type	Description
selectItems	query	Return an <b>items</b> property with host items.
selectMacros	query	Supports count. Return a <b>macros</b> property with host macros.
selectParentTemplates	query	Return a <b>parentTemplates</b> property with templates that the host is linked to.
selectDashboards	query	Supports count. Return a <b>dashboards</b> property.
selectTags	query	Supports count. Return a <b>tags</b> property with host tags.
selectInheritedTags	query	Return an <b>inheritedTags</b> property with tags that are on all templates which are linked to host.
selectTriggers	query	Return a <b>triggers</b> property with host triggers.
filter	object	Supports count. Return only those results that exactly match the given filter.  Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.  Allows filtering by interface properties.

Parameter	Type	Description
limitSelects	integer	Limits the number of records returned by subselects.  Applies to the following subselects: selectParentTemplates - results will be sorted by host; selectInterfaces; selectItems - sorted by name; selectDiscoveries - sorted by name; selectTriggers - sorted by description; selectGraphs - sorted by name; selectApplications - sorted by name; selectDashboards - sorted by name. Return results that match the given wildcard search.
search	object	Accepts an array, where the keys are property names, and the values are strings to search for. If no additional options are given, this will perform a LIKE "%...%" search.  Allows searching by interface properties. Works only with text fields. Return only hosts that have inventory data matching the given wildcard search.
searchInventory	object	This parameter is affected by the same additional parameters as search.

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>hostid</code> , <code>host</code> , <code>name</code> , <code>status</code> .
countOutput	boolean	These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving data by name

Retrieve all data about two hosts named "Zabbix server" and "Linux server".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "filter": {
      "host": [
        "Zabbix server",
        "Linux server"
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "maintenances": [],
      "hostid": "10160",
      "proxy_hostid": "0",
      "host": "Zabbix server",

```

```

    "status": "0",
    "disable_until": "0",
    "error": "",
    "available": "0",
    "errors_from": "0",
    "lastaccess": "0",
    "ipmi_authtype": "-1",
    "ipmi_privilege": "2",
    "ipmi_username": "",
    "ipmi_password": "",
    "ipmi_disable_until": "0",
    "ipmi_available": "0",
    "snmp_disable_until": "0",
    "snmp_available": "0",
    "maintenanceid": "0",
    "maintenance_status": "0",
    "maintenance_type": "0",
    "maintenance_from": "0",
    "ipmi_errors_from": "0",
    "snmp_errors_from": "0",
    "ipmi_error": "",
    "snmp_error": "",
    "jmx_disable_until": "0",
    "jmx_available": "0",
    "jmx_errors_from": "0",
    "jmx_error": "",
    "name": "Zabbix server",
    "description": "The Zabbix monitoring server.",
    "tls_connect": "1",
    "tls_accept": "1",
    "tls_issuer": "",
    "tls_subject": "",
    "tls_psk_identity": "",
    "tls_psk": ""
  },
  {
    "maintenances": [],
    "hostid": "10167",
    "proxy_hostid": "0",
    "host": "Linux server",
    "status": "0",
    "disable_until": "0",
    "error": "",
    "available": "0",
    "errors_from": "0",
    "lastaccess": "0",
    "ipmi_authtype": "-1",
    "ipmi_privilege": "2",
    "ipmi_username": "",
    "ipmi_password": "",
    "ipmi_disable_until": "0",
    "ipmi_available": "0",
    "snmp_disable_until": "0",
    "snmp_available": "0",
    "maintenanceid": "0",
    "maintenance_status": "0",
    "maintenance_type": "0",
    "maintenance_from": "0",
    "ipmi_errors_from": "0",
    "snmp_errors_from": "0",
    "ipmi_error": "",
    "snmp_error": "",

```

```

        "jmx_disable_until": "0",
        "jmx_available": "0",
        "jmx_errors_from": "0",
        "jmx_error": "",
        "name": "Linux server",
        "description": "",
        "tls_connect": "1",
        "tls_accept": "1",
        "tls_issuer": "",
        "tls_subject": "",
        "tls_psk_identity": "",
        "tls_psk": ""
    }
],
    "id": 1
}

```

#### Retrieving host groups

Retrieve names of the groups host "Zabbix server" is member of, but no host details themselves.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "host.get",
    "params": {
        "output": ["hostid"],
        "selectGroups": "extend",
        "filter": {
            "host": [
                "Zabbix server"
            ]
        }
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 2
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "hostid": "10085",
            "groups": [
                {
                    "groupid": "2",
                    "name": "Linux servers",
                    "internal": "0",
                    "flags": "0"
                },
                {
                    "groupid": "4",
                    "name": "Zabbix servers",
                    "internal": "0",
                    "flags": "0"
                }
            ]
        }
    ],
    "id": 2
}

```

#### Retrieving linked templates

Retrieve the IDs and names of templates linked to host "10084".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid"],
    "selectParentTemplates": [
      "templateid",
      "name"
    ],
    "hostids": "10084"
  },
  "id": 1,
  "auth": "70785d2b494a7302309b48afcdb3a401"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10084",
      "parentTemplates": [
        {
          "name": "Linux",
          "templateid": "10001"
        },
        {
          "name": "Zabbix Server",
          "templateid": "10047"
        }
      ]
    }
  ],
  "id": 1
}
```

Searching by host inventory data

Retrieve hosts that contain "Linux" in the host inventory "OS" field.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": [
      "host"
    ],
    "selectInventory": [
      "os"
    ],
    "searchInventory": {
      "os": "Linux"
    }
  },
  "id": 2,
  "auth": "7f9e00124c75e8f25facd5c093f3e9a0"
}
```

Response:



```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10084",
      "host": "Zabbix server",
      "inventory": {
        "os": "Linux Ubuntu"
      }
    },
    {
      "hostid": "10107",
      "host": "Linux server",
      "inventory": {
        "os": "Linux Mint"
      }
    }
  ],
  "id": 1
}

```

#### Searching by host tags

Retrieve hosts that have tag "Host name" equal to "Linux server".

#### Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid"],
    "selectTags": "extend",
    "evaltype": 0,
    "tags": [
      {
        "tag": "Host name",
        "value": "Linux server",
        "operator": 1
      }
    ]
  },
  "auth": "7f9e00124c75e8f25facd5c093f3e9a0",
  "id": 1
}

```

#### Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10085",
      "tags": [
        {
          "tag": "Host name",
          "value": "Linux server"
        },
        {
          "tag": "OS",
          "value": "RHEL 7"
        }
      ]
    }
  ],
  "id": 1
}

```

```
    "id": 1
  }
}
```

Retrieve hosts that have these tags not only on host level but also in their linked parent templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "tags": [{"tag": "A", "value": "1", "operator": "0"}],
    "inheritedTags": true
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10623",
      "name": "PC room 1"
    },
    {
      "hostid": "10601",
      "name": "Office"
    }
  ],
  "id": 1
}
```

Searching host with tags and template tags

Retrieve a host with tags and all tags that are linked to parent templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "hostids": 10502,
    "selectTags": ["tag", "value"],
    "selectInheritedTags": ["tag", "value"]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10502",
      "name": "Desktop",
      "tags": [
        {
          "tag": "A",
          "value": "1"
        }
      ]
    }
  ]
}
```

```

    }
    ],
    "inheritedTags": [
      {
        "tag": "B",
        "value": "2"
      }
    ]
  }
},
"id": 1
}

```

Searching hosts by problem severity

Retrieve hosts that have "Disaster" problems.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "severities": 5
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10160",
      "name": "Zabbix server"
    }
  ],
  "id": 1
}

```

Retrieve hosts that have "Average" and "High" problems.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "severities": [3, 4]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "20170",
      "name": "Database"
    }
  ],

```

```

    {
        "hostid": "20183",
        "name": "workstation"
    }
],
"id": 1
}

```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

`CHost::get()` in `ui/include/classes/api/services/CHost.php`.

### **host.massadd**

Description

`object host.massadd(object parameters)`

This method allows to simultaneously add multiple related objects to all the given hosts.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to update and the objects to add to all the hosts.

The method accepts the following parameters.

Parameter	Type	Description
<b>hosts</b> (required)	object/array	Hosts to be updated.
groups	object/array	The hosts must have the <code>hostid</code> property defined. Host groups to add to the given hosts.
interfaces	object/array	The host groups must have the <code>groupid</code> property defined. <a href="#">Host interfaces</a> to be created for the given hosts.
macros	object/array	<a href="#">User macros</a> to be created for the given hosts.

Parameter	Type	Description
templates	object/array	<p>Templates to link to the given hosts.</p> <p>The templates must have the <code>templateid</code> property defined.</p>

#### Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

#### Examples

##### Adding macros

Add two new macros to two hosts.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massadd",
  "params": {
    "hosts": [
      {
        "hostid": "10160"
      },
      {
        "hostid": "10167"
      }
    ],
    "macros": [
      {
        "macro": "${TEST1}",
        "value": "MACROTEST1"
      },
      {
        "macro": "${TEST2}",
        "value": "MACROTEST2",
        "description": "Test description"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10160",
      "10167"
    ]
  },
  "id": 1
}
```

#### See also

- [host.update](#)

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

CHost::massAdd() in ui/include/classes/api/services/CHost.php.

### host.massremove

Description

`object host.massremove(object parameters)`

This method allows to remove related objects from multiple hosts.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to update and the objects that should be removed.

Parameter	Type	Description
<b>hostids</b> (required)	string/array	IDs of the hosts to be updated.
groupids	string/array	Host groups to remove the given hosts from.
interfaces	object/array	Host interfaces to remove from the given hosts.  The host interface object must have the <code>ip</code> , <code>dns</code> and <code>port</code> properties defined.
macros	string/array	User macros to delete from the given hosts.
templateids	string/array	Templates to unlink from the given hosts.
templateids_clear	string/array	Templates to unlink and clear from the given hosts.

Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

Examples

Unlinking templates

Unlink a template from two hosts and delete all of the templated entities.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massremove",
```

```

    "params": {
      "hostids": ["69665", "69666"],
      "templateids_clear": "325"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
  }
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "69665",
      "69666"
    ]
  },
  "id": 1
}

```

See also

- [host.update](#)
- [User macro](#)
- [Host interface](#)

Source

CHost::massRemove() in ui/include/classes/api/services/CHost.php.

### host.massupdate

Description

object host.massupdate(object parameters)

This method allows to simultaneously replace or remove related objects and update properties on multiple hosts.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to update and the properties that should be updated.

Additionally to the [standard host properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>hosts</b> (required)	object/array	<b>Hosts</b> to be updated.  The hosts must have the <code>hostid</code> property defined.
groups	object/array	Host <b>groups</b> to replace the current host groups the hosts belong to.  The host groups must have the <code>groupid</code> property defined.

Parameter	Type	Description
interfaces	object/array	Host <b>interfaces</b> to replace the current host interfaces on the given hosts.
inventory	object	Host <b>inventory</b> properties.  Host inventory mode cannot be updated using the <code>inventory</code> parameter, use <code>inventory_mode</code> instead.
macros	object/array	<b>User macros</b> to replace the current user macros on the given hosts.
templates	object/array	<b>Templates</b> to replace the currently linked templates on the given hosts.  The templates must have the <code>templateid</code> property defined.
templates_clear	object/array	<b>Templates</b> to unlink and clear from the given hosts.  The templates must have the <code>templateid</code> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated hosts under the `host_ids` property.

#### Examples

##### Enabling multiple hosts

Enable monitoring of two hosts, i.e., set their status to 0.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massupdate",
  "params": {
    "hosts": [
      {
        "hostid": "69665"
      },
      {
        "hostid": "69666"
      }
    ]
  },
}
```



```
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "69665",
      "69666"
    ]
  },
  "id": 1
}
```

See also

- [host.update](#)
- [host.massadd](#)
- [host.massremove](#)
- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

`CHost::massUpdate()` in `ui/include/classes/api/services/CHost.php`.

## **host.update**

Description

`object host.update(object/array hosts)`

This method allows to update existing hosts.

### **Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host properties to be updated.

The `hostid` property must be defined for each host, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Note, however, that updating the host technical name will also update the host's visible name (if not given or empty) by the host's technical name value.

Additionally to the [standard host properties](#), the method accepts the following parameters.

Parameter	Type	Description
groups	object/array	<p>Host <b>groups</b> to replace the current host groups the host belongs to.</p> <p>The host groups must have the <b>groupid</b> property defined. All host groups that are not listed in the request will be unlinked.</p>
interfaces	object/array	<p>Host <b>interfaces</b> to replace the current host interfaces.</p> <p>All interfaces that are not listed in the request will be removed.</p>
tags	object/array	<p>Host <b>tags</b> to replace the current host tags.</p> <p>All tags that are not listed in the request will be removed.</p>
inventory	object	Host <b>inventory</b> properties.
macros	object/array	<p><b>User macros</b> to replace the current user macros.</p> <p>All macros that are not listed in the request will be removed.</p>
templates	object/array	<p><b>Templates</b> to replace the currently linked templates. All templates that are not listed in the request will be only unlinked.</p> <p>The templates must have the <b>templateid</b> property defined.</p>

Parameter	Type	Description
templates_clear	object/array	<p><b>Templates</b> to unlink and clear from the host.</p> <p>The templates must have the <code>templateid</code> property defined.</p>

**Note:**

As opposed to the Zabbix frontend, when `name` (visible host name) is the same as `host` (technical host name), updating host via API will not automatically update `name`. Both properties need to be updated explicitly.

Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

Examples

Enabling a host

Enable host monitoring, i.e. set its status to 0.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}
```

Unlinking templates

Unlink and clear two templates from host.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "templates_clear": [
      {
        "templateid": "10124"
      },
      {
        "templateid": "10125"
      }
    ]
  }
}
```

```
    ]
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}
```

Updating host macros

Replace all host macros with two new ones.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "macros": [
      {
        "macro": "${PASS}",
        "value": "password"
      },
      {
        "macro": "${DISC}",
        "value": "sda",
        "description": "Updated description"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}
```

Updating host inventory

Change inventory mode and add location

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
```

```
    "hostid": "10387",
    "inventory_mode": 0,
    "inventory": {
      "location": "Latvia, Riga"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10387"
    ]
  },
  "id": 1
}
```

Updating host tags

Replace all host tags with a new one.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10387",
    "tags": {
      "tag": "OS",
      "value": "CentOS 7"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10387"
    ]
  },
  "id": 1
}
```

See also

- [host.massadd](#)
- [host.massupdate](#)
- [host.massremove](#)
- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)
- [Host inventory](#)
- [Host tag](#)

Source

CHost::update() in ui/include/classes/api/services/CHost.php.

## Host group

This class is designed to work with host groups.

Object references:

- [Host group](#)

Available methods:

- [hostgroup.create](#) - creating new host groups
- [hostgroup.delete](#) - deleting host groups
- [hostgroup.get](#) - retrieving host groups
- [hostgroup.massadd](#) - adding related objects to host groups
- [hostgroup.massremove](#) - removing related objects from host groups
- [hostgroup.massupdate](#) - replacing or removing related objects from host groups
- [hostgroup.update](#) - updating host groups

### > Host group object

The following objects are directly related to the `hostgroup` API.

Host group

The host group object has the following properties.

Property	Type	Description
groupid	string	(readonly) ID of the host group.
<b>name</b> (required)	string	Name of the host group.
flags	integer	(readonly) Origin of the host group.  Possible values: 0 - a plain host group; 4 - a discovered host group.
internal	integer	(readonly) Whether the group is used internally by the system. An internal group cannot be deleted.  Possible values: 0 - (default) not internal; 1 - internal.

### hostgroup.create

Description

```
object hostgroup.create(object/array hostGroups)
```

This method allows to create new host groups.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Host groups to create. The method accepts host groups with the [standard host group properties](#).

**Return values**

(object) Returns an object containing the IDs of the created host groups under the `groupids` property. The order of the returned IDs matches the order of the passed host groups.

**Examples****Creating a host group**

Create a host group called "Linux servers".

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.create",
  "params": {
    "name": "Linux servers"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "107819"
    ]
  },
  "id": 1
}
```

**Source**

`CHostGroup::create()` in `ui/include/classes/api/services/CHostGroup.php`.

**hostgroup.delete****Description**

`object hostgroup.delete(array hostGroupIds)`

This method allows to delete host groups.

A host group can not be deleted if:

- it contains hosts that belong to this group only;
- it is marked as internal;
- it is used by a host prototype;
- it is used in a global script;
- it is used in a correlation condition.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(array) IDs of the host groups to delete.

## Return values

(object) Returns an object containing the IDs of the deleted host groups under the `groupids` property.

## Examples

### Deleting multiple host groups

Delete two host groups.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.delete",
  "params": [
    "107824",
    "107825"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "107824",
      "107825"
    ]
  },
  "id": 1
}
```

## Source

`CHostGroup::delete()` in `ui/include/classes/api/services/CHostGroup.php`.

## hostgroup.get

### Description

`integer/array hostgroup.get(object parameters)`

The method allows to retrieve host groups according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
<code>graphids</code>	string/array	Return only host groups that contain hosts or templates with the given graphs.
<code>groupids</code>	string/array	Return only host groups with the given host group IDs.



Parameter	Type	Description
hostids	string/array	Return only host groups that contain the given hosts.
maintenanceids	string/array	Return only host groups that are affected by the given maintenances.
monitored_hosts	flag	Return only host groups that contain monitored hosts.
real_hosts	flag	Return only host groups that contain hosts.
templated_hosts	flag	Return only host groups that contain templates.
templateids	string/array	Return only host groups that contain the given templates.
triggerids	string/array	Return only host groups that contain hosts or templates with the given triggers.
with_applications	flag	Return only host groups that contain hosts with applications.
with_graphs	flag	Return only host groups that contain hosts with graphs.
with_graph_prototypes	flag	Return only host groups that contain hosts with graph prototypes.
with_hosts_and_templates	flag	Return only host groups that contain hosts or templates.
with_httpstests	flag	Return only host groups that contain hosts with web checks.
		Overrides the <code>with_monitored_httpstests</code> parameter.

Parameter	Type	Description
with_items	flag	Return only host groups that contain hosts or templates with items.
with_item_prototypes	flag	Overrides the with_monitored_items and with_simple_graph_items parameters. Return only host groups that contain hosts with item prototypes.
with_simple_graph_item_prototypes	flag	Overrides the with_simple_graph_item_prototypes parameter. Return only host groups that contain hosts with item prototypes, which are enabled for creation and have numeric type of information.
with_monitored_hosts	flag	Return only host groups that contain hosts with enabled web checks.
with_monitored_items	flag	Return only host groups that contain hosts or templates with enabled items.
with_monitored_triggers	flag	Overrides the with_simple_graph_items parameter. Return only host groups that contain hosts with enabled triggers. All of the items used in the trigger must also be enabled.
with_simple_graph_items	flag	Return only host groups that contain hosts with numeric items.
with_triggers	flag	Return only host groups that contain hosts with triggers.
		Overrides the with_monitored_triggers parameter.

Parameter	Type	Description
selectDiscoveryRule	query	Return a <b>discoveryRule</b> property with the LLD rule that created the host group.
selectGroupDiscovery	query	Return a <b>groupDiscovery</b> property with the host group discovery object.  The host group discovery object links a discovered host group to a host group prototype and has the following properties: <b>groupid</b> - (string) ID of the discovered host group; <b>lastcheck</b> - (timestamp) time when the host group was last discovered; <b>name</b> - (string) name of the host group prototype; <b>parent_group_prototypeid</b> - (string) ID of the host group prototype from which the host group has been created; <b>ts_delete</b> - (timestamp) time when a host group that is no longer discovered will be deleted.
selectHosts	query	Return a <b>hosts</b> property with the hosts that belong to the host group.
selectTemplates	query	Supports count. Return a <b>templates</b> property with the templates that belong to the host group.  Supports count.

Parameter	Type	Description
limitSelects	integer	Limits the number of records returned by subselects.
		Applies to the following subselects: selectHosts - results will be sorted by host; selectTemplates - results will be sorted by host. Sort the result by the given properties.
sortfield	string/array	Possible values are: groupid, name.
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving data by name

Retrieve all data about two host groups named "Zabbix servers" and "Linux servers".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.get",
  "params": {
    "output": "extend",
    "filter": {
      "name": [
        "Zabbix servers",
```

```

        "Linux servers"
    ]
}
},
"auth": "6f38cddc44cfbb6c1bd186f9a220b5a0",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "groupid": "2",
      "name": "Linux servers",
      "internal": "0"
    },
    {
      "groupid": "4",
      "name": "Zabbix servers",
      "internal": "0"
    }
  ],
  "id": 1
}

```

See also

- [Host](#)
- [Template](#)

Source

`CHostGroup::get()` in `ui/include/classes/api/services/CHostGroup.php`.

### **hostgroup.massadd**

Description

`object hostgroup.massadd(object parameters)`

This method allows to simultaneously add multiple related objects to all the given host groups.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects to add to all the host groups.

The method accepts the following parameters.

Parameter	Type	Description
<b>groups</b> (required)	object/array	Host groups to be updated.  The host groups must have the <code>groupid</code> property defined.

Parameter	Type	Description
hosts	object/array	Hosts to add to all host groups.  The hosts must have the <code>hostid</code> property defined.
templates	object/array	Templates to add to all host groups.  The templates must have the <code>templateid</code> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

#### Examples

##### Adding hosts to host groups

Add two hosts to host groups with IDs 5 and 6.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.massadd",
  "params": {
    "groups": [
      {
        "groupid": "5"
      },
      {
        "groupid": "6"
      }
    ],
    "hosts": [
      {
        "hostid": "30050"
      },
      {
        "hostid": "30001"
      }
    ]
  },
  "auth": "f223adf833b2bf2ff38574a67bba6372",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "5",
      "6"
    ]
  },
  "id": 1
}
```

#### See also

- [Host](#)
- [Template](#)

Source

CHostGroup::massAdd() in ui/include/classes/api/services/CHostGroup.php.

### hostgroup.massremove

Description

object hostgroup.massremove(object parameters)

This method allows to remove related objects from multiple host groups.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects that should be removed.

Parameter	Type	Description
<b>groupids</b> (required)	string/array	IDs of the host groups to be updated.
hostids	string/array	Hosts to remove from all host groups.
templateids	string/array	Templates to remove from all host groups.

Return values

(object) Returns an object containing the IDs of the updated host groups under the groupids property.

Examples

Removing hosts from host groups

Remove two hosts from the given host groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.massremove",
  "params": {
    "groupids": [
      "5",
      "6"
    ],
    "hostids": [
      "30050",
      "30001"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "5",
      "6"
    ]
  }
}
```

```
},  
  "id": 1  
}
```

Source

CHostGroup::massRemove() in ui/include/classes/api/services/CHostGroup.php.

## hostgroup.massupdate

Description

object hostgroup.massupdate(object parameters)

This method allows to simultaneously replace or remove related objects for multiple host groups.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects that should be updated.

Parameter	Type	Description
<b>groups</b> (required)	object/array	Host groups to be updated.  The host groups must have the <code>groupid</code> property defined.
hosts	object/array	Hosts to replace the current hosts on the given host groups.  The hosts must have the <code>hostid</code> property defined.
templates	object/array	Templates to replace the current templates on the given host groups.  The templates must have the <code>templateid</code> property defined.

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Replacing hosts in a host group

Replace all hosts in the host group with ID.

Request:

```
{  
  "jsonrpc": "2.0",
```



```

"method": "hostgroup.massupdate",
"params": {
  "groups": [
    {
      "groupid": "6"
    }
  ],
  "hosts": [
    {
      "hostid": "30050"
    }
  ]
},
"auth": "f223adf833b2bf2ff38574a67bba6372",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "6",
    ]
  },
  "id": 1
}

```

See also

- [hostgroup.update](#)
- [hostgroup.massadd](#)
- [Host](#)
- [Template](#)

Source

CHostGroup::massUpdate() in ui/include/classes/api/services/CHostGroup.php.

## hostgroup.update

Description

object `hostgroup.update(object/array hostGroups)`

This method allows to update existing hosts groups.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) [Host group properties](#) to be updated.

The `groupid` property must be defined for each host group, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Renaming a host group

Rename a host group to "Linux hosts."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.update",
  "params": {
    "groupid": "7",
    "name": "Linux hosts"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "7"
    ]
  },
  "id": 1
}
```

Source

CHostGroup::update() in ui/include/classes/api/services/CHostGroup.php.

## Host interface

This class is designed to work with host interfaces.

Object references:

- [Host interface](#)

Available methods:

- [hostinterface.create](#) - creating new host interfaces
- [hostinterface.delete](#) - deleting host interfaces
- [hostinterface.get](#) - retrieving host interfaces
- [hostinterface.massadd](#) - adding host interfaces to hosts
- [hostinterface.massremove](#) - removing host interfaces from hosts
- [hostinterface.replacehostinterfaces](#) - replacing host interfaces on a host
- [hostinterface.update](#) - updating host interfaces

### > Host interface object

The following objects are directly related to the `hostinterface` API.

Host interface

The host interface object has the following properties.

#### Attention:

Note that both IP and DNS are required. If you do not want to use DNS, set it to an empty string.

Property	Type	Description
interfaceid	string	(readonly) ID of the interface.

Property	Type	Description
<b>dns</b> (required)	string	DNS name used by the interface.
<b>hostid</b> (required)	string	Can be empty if the connection is made via IP. ID of the host the interface belongs to.
<b>ip</b> (required)	string	IP address used by the interface.
<b>main</b> (required)	integer	Can be empty if the connection is made via DNS. Whether the interface is used as default on the host. Only one interface of some type can be set as default on a host.
<b>port</b> (required)	string	Possible values are: 0 - not default; 1 - default. Port number used by the interface. Can contain user macros.
<b>type</b> (required)	integer	Interface type.  Possible values are: 1 - agent; 2 - SNMP; 3 - IPMI; 4 - JMX.
<b>useip</b> (required)	integer	Whether the connection should be made via IP.  Possible values are: 0 - connect using host DNS name; 1 - connect using host IP address for this host interface.
details	array	Additional object for interface. <b>Required</b> if interface 'type' is SNMP.

The details object has the following properties.

Property	Type	Description
<b>version</b> (required)	integer	SNMP interface version.  Posibile values are: 1 - SNMPv1; 2 - SNMPv2c; 3 - SNMPv3
bulk	integer	Whether to use bulk SNMP requests.  Posibile values are: 0 - don't use bulk requests; 1 - (default) - use bulk requests.
community	string	SNMP community. Used only by SNMPv1 and SNMPv2 interfaces.
securityname	string	SNMPv3 security name. Used only by SNMPv3 interfaces.
securitylevel	integer	SNMPv3 security level. Used only by SNMPv3 interfaces.  Posibile values are: 0 - (default) - noAuthNoPriv; 1 - authNoPriv; 2 - authPriv.
authpassphrasestring		SNMPv3 authentication passphrase. Used only by SNMPv3 interfaces.
privpassphrase	string	SNMPv3 privacy passphrase. Used only by SNMPv3 interfaces.
authprotocol	integer	SNMPv3 authentication protocol. Used only by SNMPv3 interfaces.  Posibile values are: 0 - (default) - MD5; 1 - SHA.

Property	Type	Description
privprotocol	integer	SNMPv3 privacy protocol. Used only by SNMPv3 interfaces.
contextname	string	SNMPv3 context name. Used only by SNMPv3 interfaces.

## hostinterface.create

### Description

object `hostinterface.create(object/array hostInterfaces)`

This method allows to create new host interfaces.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Host interfaces to create. The method accepts host interfaces with the [standard host interface properties](#).

### Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property. The order of the returned IDs matches the order of the passed host interfaces.

### Examples

Create a new interface

Create a secondary IP agent interface on host "30052."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.create",
  "params": {
    "hostid": "30052",
    "dns": "",
    "ip": "127.0.0.1",
    "main": 0,
    "port": "10050",
    "type": 1,
    "useip": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
```

```
        "30062"
    ]
},
"id": 1
}
```

See also

- [hostinterface.massadd](#)
- [host.massadd](#)

Source

CHostInterface::create() in ui/include/classes/api/services/CHostInterface.php.

## hostinterface.delete

Description

object `hostinterface.delete(array hostInterfaceIds)`

This method allows to delete host interfaces.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the host interfaces to delete.

Return values

(object) Returns an object containing the IDs of the deleted host interfaces under the `interfaceids` property.

Examples

Delete a host interface

Delete the host interface with ID 30062.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.delete",
  "params": [
    "30062"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30062"
    ]
  },
  "id": 1
}
```

See also

- [hostinterface.massremove](#)
- [host.massremove](#)

Source

CHostInterface::delete() in ui/include/classes/api/services/CHostInterface.php.

## hostinterface.get

Description

integer/array hostinterface.get(object parameters)

The method allows to retrieve host interfaces according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
hostids	string/array	Return only host interfaces used by the given hosts.
interfaceids	string/array	Return only host interfaces with the given IDs.
itemids	string/array	Return only host interfaces used by the given items.
triggerids	string/array	Return only host interfaces used by items in the given triggers.
selectItems	query	Return an <b>items</b> property with the items that use the interface.
selectHosts	query	Supports count. Return a <b>hosts</b> property with an array of hosts that use the interface.
limitSelects	integer	Limits the number of records returned by subselects.
		Applies to the following subselects: <b>selectItems</b> .

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: interfaceid, dns, ip. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
nodeids	string/array	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve host interfaces

Retrieve all data about the interfaces used by host "30057."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.get",
  "params": {
    "output": "extend",
    "hostids": "30057"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "interfaceid": "30050",
      "hostid": "30057",
      "main": "1",
      "type": "1",
    }
  ]
}
```



```

        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "10050",
        "details": []
    },
    {
        "interfaceid": "30067",
        "hostid": "30057",
        "main": "0",
        "type": "1",
        "useip": "0",
        "ip": "",
        "dns": "localhost",
        "port": "10050",
        "details": []
    },
    {
        "interfaceid": "30068",
        "hostid": "30057",
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
            "version": "2",
            "bulk": "0",
            "community": "${SNMP_COMMUNITY}"
        }
    }
],
    "id": 1
}

```

See also

- [Host](#)
- [Item](#)

Source

CHostInterface::get() in ui/include/classes/api/services/CHostInterface.php.

### hostinterface.massadd

Description

object hostinterface.massadd(object parameters)

This method allows to simultaneously add host interfaces to multiple hosts.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the host interfaces to be created on the given hosts.

The method accepts the following parameters.

Parameter	Type	Description
<b>hosts</b> (required)	object/array	Hosts to be updated.  The hosts must have the <code>hostid</code> property defined.
<b>interfaces</b> (required)	object/array	<b>Host interfaces</b> to create on the given hosts.

#### Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property.

#### Examples

##### Creating interfaces

Create an interface on two hosts.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.massadd",
  "params": {
    "hosts": [
      {
        "hostid": "30050"
      },
      {
        "hostid": "30052"
      }
    ],
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "main": 0,
      "port": "10050",
      "type": 1,
      "useip": 1
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30069",
      "30070"
    ]
  },
  "id": 1
}
```

#### See also

- [hostinterface.create](#)
- [host.massadd](#)
- [Host](#)

Source

CHostInterface::massAdd() in ui/include/classes/api/services/CHostInterface.php.

## hostinterface.massremove

Description

object hostinterface.massremove(object parameters)

This method allows to remove host interfaces from the given hosts.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to be updated and the interfaces to be removed.

Parameter	Type	Description
<b>hostids</b> (required)	string/array	IDs of the hosts to be updated.
<b>interfaces</b> (required)	object/array	Host interfaces to remove from the given hosts.  The host interface object must have the ip, dns and port properties defined

Return values

(object) Returns an object containing the IDs of the deleted host interfaces under the `interfaceids` property.

Examples

Removing interfaces

Remove the "127.0.0.1" SNMP interface from two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.massremove",
  "params": {
    "hostids": [
      "30050",
      "30052"
    ],
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "port": "161"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30069",
      "30070"
    ]
  },
  "id": 1
}
```

See also

- [hostinterface.delete](#)
- [host.massremove](#)

Source

CHostInterface::massRemove() in ui/include/classes/api/services/CHostInterface.php.

### hostinterface.replacehostinterfaces

Description

object `hostinterface.replacehostinterfaces(object parameters)`

This method allows to replace all host interfaces on a given host.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the ID of the host to be updated and the new host interfaces.

Parameter	Type	Description
<b>hostid</b> (required)	string	ID of the host to be updated.
<b>interfaces</b> (required)	object/array	<b>Host interfaces</b> to replace the current host interfaces with.

Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property.

Examples

Replacing host interfaces

Replace all host interfaces with a single agent interface.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.replacehostinterfaces",
  "params": {
    "hostid": "30052",
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "main": 1,
      "port": "10050",

```

```
        "type": 1,
        "useip": 1
    }
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30081"
    ]
  },
  "id": 1
}
```

See also

- [host.update](#)
- [host.massupdate](#)

Source

`CHostInterface::replaceHostInterfaces()` in `ui/include/classes/api/services/CHostInterface.php`.

## hostinterface.update

Description

object `hostinterface.update(object/array hostInterfaces)`

This method allows to update existing host interfaces.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Host interface properties** to be updated.

The `interfaceid` property must be defined for each host interface, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host interfaces under the `interfaceids` property.

Examples

Changing a host interface port

Change the port of a host interface.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.update",
  "params": {
    "interfaceid": "30048",
    "port": "30050"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30048"
    ]
  },
  "id": 1
}
```

Source

CHostInterface::update() in ui/include/classes/api/services/CHostInterface.php.

## Host prototype

This class is designed to work with host prototypes.

Object references:

- [Host prototype](#)
- [Host prototype inventory](#)
- [Group link](#)
- [Group prototype](#)

Available methods:

- [hostprototype.create](#) - creating new host prototypes
- [hostprototype.delete](#) - deleting host prototypes
- [hostprototype.get](#) - retrieving host prototypes
- [hostprototype.update](#) - updating host prototypes

### > Host prototype object

The following objects are directly related to the `hostprototype` API.

Host prototype

The host prototype object has the following properties.

Property	Type	Description
hostid	string	(readonly) ID of the host prototype.
<b>host</b> (required)	string	Technical name of the host prototype.
name	string	Visible name of the host prototype.
status	integer	Default: <code>host</code> property value. Status of the host prototype.  Possible values are: 0 - (default) monitored host; 1 - unmonitored host.

Property	Type	Description
inventory_mode	integer	Host inventory population mode.  Possible values are: -1 - (default) disabled; 0 - manual; 1 - automatic.
templateid	string	(readonly) ID of the parent template host prototype.
discover	integer	Host prototype discovery status.  Possible values: 0 - (default) new hosts will be discovered; 1 - new hosts will not be discovered and existing hosts will be marked as lost.
custom_interfaces	integer	Source of interfaces for hosts created by the host prototype.  Possible values: 0 - (default) inherit interfaces from parent host; 1 - use host prototypes custom interfaces.

### Group link

The group link object links a host prototype with a host group and has the following properties.

Property	Type	Description
group_prototypeid	string	(readonly) ID of the group link.
<b>groupid</b> (required)	string	ID of the host group.
hostid	string	(readonly) ID of the host prototype
templateid	string	(readonly) ID of the parent template group link.

### Group prototype

The group prototype object defines a group that will be created for a discovered host and has the following properties.

Property	Type	Description
group_prototypeid	string	(readonly) ID of the group prototype.
<b>name</b> (required)	string	Name of the group prototype.

Property	Type	Description
hostid	string	(readonly) ID of the host prototype
templateid	string	(readonly) ID of the parent template group prototype.

#### Host prototype tag

The host prototype tag object has the following properties.

Property	Type	Description
<b>tag</b> (required)	string	Host prototype tag name.
value	string	Host prototype tag value.

#### Custom interface

The custom interface object has the following properties.

Property	Type	Description
dns	string	DNS name used by the interface.  <b>Required</b> if the connection is made via DNS. Can contain macros.
ip	string	IP address used by the interface.  <b>Required</b> if the connection is made via IP. Can contain macros.
<b>main</b> (required)	integer	Whether the interface is used as default on the host. Only one interface of some type can be set as default on a host.  Possible values are: 0 - not default; 1 - default.
<b>port</b> (required)	string	Port number used by the interface. Can contain user and LLD macros.
<b>type</b> (required)	integer	Interface type.  Possible values are: 1 - agent; 2 - SNMP; 3 - IPMI; 4 - JMX.



Property	Type	Description
<b>useip</b> (required)	integer	Whether the connection should be made via IP.  Possible values are: 0 - connect using host DNS name; 1 - connect using host IP address for this host interface.
details	array	Additional object for interface. <b>Required</b> if interface 'type' is SNMP.

#### Custom interface details

The details object has the following properties.

Property	Type	Description
<b>version</b> (required)	integer	SNMP interface version.  Possible values are: 1 - SNMPv1; 2 - SNMPv2c; 3 - SNMPv3
bulk	integer	Whether to use bulk SNMP requests.  Possible values are: 0 - don't use bulk requests; 1 - (default) - use bulk requests.
community	string	SNMP community. Used only by SNMPv1 and SNMPv2 interfaces.
securityname	string	SNMPv3 security name. Used only by SNMPv3 interfaces.

Property	Type	Description
securitylevel	integer	SNMPv3 security level. Used only by SNMPv3 interfaces.
authpassphrasestring		<p>Possible values are:</p> <p>0 - (default) - noAuthNoPriv;  1 - authNoPriv;  2 - authPriv.</p> <p>SNMPv3 authentication passphrase. Used only by SNMPv3 interfaces.</p>
privpassphrase	string	SNMPv3 privacy passphrase. Used only by SNMPv3 interfaces.
authprotocol	integer	SNMPv3 authentication protocol. Used only by SNMPv3 interfaces.
privprotocol	integer	<p>Possible values are:</p> <p>0 - (default) - MD5;  1 - SHA.</p> <p>SNMPv3 privacy protocol. Used only by SNMPv3 interfaces.</p>
contextname	string	<p>Possible values are:</p> <p>0 - (default) - DES;  1 - AES.</p> <p>SNMPv3 context name. Used only by SNMPv3 interfaces.</p>

## hostprototype.create

### Description

object `hostprototype.create(object/array hostPrototypes)`

This method allows to create new host prototypes.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Host prototypes to create.

Additionally to the [standard host prototype properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>groupLinks</b> (required)	array	Group <b>links</b> to be created for the host prototype.
<b>ruleid</b> (required)	string	ID of the LLD rule that the host prototype belongs to.
groupPrototypes	array	Group <b>prototypes</b> to be created for the host prototype.
macros	object/array	<b>User macros</b> to be created for the host prototype.
tags	object/array	Host prototype <b>tags</b> .
interfaces	object/array	Host prototype <b>custom interfaces</b> .
templates	object/array	<b>Templates</b> to be linked to the host prototype.
		The templates must have the <b>templateid</b> property defined.

#### Return values

(object) Returns an object containing the IDs of the created host prototypes under the `hostids` property. The order of the returned IDs matches the order of the passed host prototypes.

#### Examples

##### Creating a host prototype

Create a host prototype `"{#VM.NAME}"` on LLD rule `"23542"` with a group prototype `"{#HV.NAME}"`, tag pair `"Datacenter": "{#DATACENTER.NAME}"` and custom SNMPv2 interface `127.0.0.1:161` with community `{$SNMP_COMMUNITY}`. Link it to host group `"2"`.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.create",
  "params": {
    "host": "{#VM.NAME}",
    "ruleid": "23542",
    "custom_interfaces": "1",
    "groupLinks": [
      {
        "groupid": "2"
      }
    ],
    "groupPrototypes": [
      {
        "name": "{#HV.NAME}"
      }
    ],
    "tags": [
      {
```

```

        "tag": "Datacenter",
        "value": "#{DATACENTER.NAME}"
    }
],
"interfaces": [
    {
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
            "version": "2",
            "bulk": "1",
            "community": "{$SNMP_COMMUNITY}"
        }
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "hostids": [
            "10103"
        ]
    },
    "id": 1
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [Host prototype tag](#)
- [Custom interface](#)
- [User macro](#)

Source

CHostPrototype::create() in ui/include/classes/api/services/CHostPrototype.php.

### hostprototype.delete

Description

object hostprototype.delete(array hostPrototypeIds)

This method allows to delete host prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the host prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted host prototypes under the `hostids` property.

## Examples

### Deleting multiple host prototypes

Delete two host prototypes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.delete",
  "params": [
    "10103",
    "10105"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10103",
      "10105"
    ]
  },
  "id": 1
}
```

### Source

CHostPrototype::delete() in ui/include/classes/api/services/CHostPrototype.php.

## hostprototype.get

### Description

integer/array hostprototype.get(object parameters)

The method allows to retrieve host prototypes according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
hostids	string/array	Return only host prototypes with the given IDs.
discoveryids	string/array	Return only host prototype that belong to the given LLD rules.
inherited	boolean	If set to true return only items inherited from a template.

Parameter	Type	Description
selectDiscoveryRules	query	Return a <b>discoveryRule</b> property with the LLD rule that the host prototype belongs to.
selectInterfaces	query	Return an <b>interfaces</b> property with host prototype custom interfaces.
selectGroupLinks	query	Return a <b>groupLinks</b> property with the group links of the host prototype.
selectGroupPrototypes	query	Return a <b>groupPrototypes</b> property with the group prototypes of the host prototype.
selectMacros	query	Return a <b>macros</b> property with host prototype macros.
selectParentHost	query	Return a <b>parentHost</b> property with the host that the host prototype belongs to.
selectTags	query	Return a <b>tags</b> property with host prototype tags.
selectTemplates	query	Return a <b>templates</b> property with the templates linked to the host prototype.
sortfield	string/array	Supports count. Sort the result by the given properties.  Possible values are: <code>hostid</code> , <code>host</code> , <code>name</code> and <code>status</code> .
countOutput	boolean	These parameters being common for all get methods are described in detail on the <a href="#">Generic Zabbix API information page</a> .

Parameter	Type	Description
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving host prototypes from an LLD rule

Retrieve all host prototypes, their group links, group prototypes and tags from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.get",
  "params": {
    "output": "extend",
    "selectInterfaces": "extend",
    "selectGroupLinks": "extend",
    "selectGroupPrototypes": "extend",
    "selectTags": "extend",
    "discoveryids": "23554"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10092",
      "host": "#{HV.UUID}",
      "name": "#{HV.UUID}",
      "status": "0",
      "templateid": "0",
      "discover": "0",
      "custom_interfaces": "1",
      "inventory_mode": "-1",
      "groupLinks": [
        {
          "group_prototypeid": "4",
          "hostid": "10092",
          "groupid": "7",
          "templateid": "0"
        }
      ],
      "groupPrototypes": [

```

```

        {
            "group_prototypeid": "7",
            "hostid": "10092",
            "name": "#{CLUSTER.NAME}",
            "templateid": "0"
        }
    ],
    "tags": [
        {
            "tag": "Datacenter",
            "value": "#{DATACENTER.NAME}"
        },
        {
            "tag": "Instance type",
            "value": "#{INSTANCE_TYPE}"
        }
    ],
    "interfaces": [
        {
            "main": "1",
            "type": "2",
            "useip": "1",
            "ip": "127.0.0.1",
            "dns": "",
            "port": "161",
            "details": {
                "version": "2",
                "bulk": "1",
                "community": "{$SNMP_COMMUNITY}"
            }
        }
    ]
}
],
    "id": 1
}
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [User macro](#)

Source

CHostPrototype::get() in ui/include/classes/api/services/CHostPrototype.php.

## hostprototype.update

Description

object hostprototype.update(object/array hostPrototypes)

This method allows to update existing host prototypes.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host prototype properties to be updated.

The `hostid` property must be defined for each host prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.



Additionally to the **standard host prototype properties**, the method accepts the following parameters.

Parameter	Type	Description
groupLinks	array	Group <b>links</b> to replace the current group links on the host prototype.
groupPrototypes	array	Group <b>prototypes</b> to replace the existing group prototypes on the host prototype.
macros	object/array	<b>User macros</b> to replace the current user macros.  All macros that are not listed in the request will be removed.
tags	object/array	Host prototype <b>tags</b> to replace the current tags.  All tags that are not listed in the request will be removed.
interfaces	object/array	Host prototype <b>custom interfaces</b> to replace the current interfaces.  Custom interface object should contain all its parameters. All interfaces that are not listed in the request will be removed.
templates	object/array	<b>Templates</b> to replace the currently linked templates.  The templates must have the <b>templateid</b> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated host prototypes under the `hostids` property.

#### Examples

Disabling a host prototype

Disable a host prototype, that is, set its status to 1.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "status": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
  "id": 1
}
```

Updating host prototype tags

Replace host prototype tags with new ones.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "tags": [
      {
        "tag": "Datacenter",
        "value": "#{DATACENTER.NAME}"
      },
      {
        "tag": "Instance type",
        "value": "#{INSTANCE_TYPE}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
  "id": 1
}
```

Updating host prototype custom interfaces

Replace inherited interfaces with host prototype custom interfaces.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "custom_interfaces": "1",
    "interfaces": [
      {
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
          "version": "2",
          "bulk": "1",
          "community": "${SNMP_COMMUNITY}"
        }
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
  "id": 1
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [Host prototype tag](#)
- [Custom interface](#)
- [User macro](#)

Source

CHostPrototype::update() in ui/include/classes/api/services/CHostPrototype.php.

## Housekeeping

This class is designed to work with housekeeping.

Object references:

- [Housekeeping](#)

Available methods:

- [housekeeping.get](#) - retrieve housekeeping
- [housekeeping.update](#) - update housekeeping

> **Housekeeping object**

The following object are directly related to the housekeeping API.

Housekeeping

The settings object has the following properties.

Property	Type	Description
hk_events_mod	integer	Enable internal housekeeping for events and alerts.  Possible values: 0 - Disable; 1 - (default) Enable.
hk_events_trigger	string	Trigger data storage period. Accepts seconds and time unit with suffix.
hk_events_inter	string	Default: 365d. Internal data storage period. Accepts seconds and time unit with suffix.
hk_events_discover	string	Default: 1d. Network discovery data storage period. Accepts seconds and time unit with suffix.
hk_events_autoreg	string	Default: 1d. Autoregistration data storage period. Accepts seconds and time unit with suffix.
hk_services_mod	integer	Default: 1d. Enable internal housekeeping for services.  Possible values: 0 - Disable; 1 - (default) Enable.
hk_services	string	Services data storage period. Accepts seconds and time unit with suffix.  Default: 365d.

Property	Type	Description
hk_audit_mode	integer	<p>Enable internal housekeeping for audit.</p> <p>Possible values: 0 - Disable; 1 - (default) Enable.</p>
hk_audit	string	<p>Audit data storage period. Accepts seconds and time unit with suffix.</p> <p>Default: 365d.</p>
hk_sessions_mode	integer	<p>Enable internal housekeeping for sessions.</p> <p>Possible values: 0 - Disable; 1 - (default) Enable.</p>
hk_sessions	string	<p>Sessions data storage period. Accepts seconds and time unit with suffix.</p> <p>Default: 365d.</p>
hk_history_mode	integer	<p>Enable internal housekeeping for history.</p> <p>Possible values: 0 - Disable; 1 - (default) Enable.</p>
hk_history_global	integer	<p>Override item history period.</p> <p>Possible values: 0 - Do not override; 1 - (default) Override.</p>
hk_history	string	<p>History data storage period. Accepts seconds and time unit with suffix.</p> <p>Default: 90d.</p>
hk_trends_mode	integer	<p>Enable internal housekeeping for trends.</p> <p>Possible values: 0 - Disable; 1 - (default) Enable.</p>

Property	Type	Description
hk_trends_global	integer	Override item trend period.  Possible values: 0 - Do not override; 1 - (default) Override.
hk_trends	string	Trends data storage period. Accepts seconds and time unit with suffix.  Default: 365d. (readonly)
db_extension	string	Configuration flag DB extension. If this flag is set to "timescaledb" then the server changes its behavior for housekeeping and item deletion.
compression_state	integer	Enable TimescaleDB compression for history and trends.  Possible values: 0 - (default) Off; 1 - On.
compress_older	string	Compress history and trends records older than specified period. Accepts seconds and time unit with suffix.
compression_availability	integer	Compression availability.  Default: 7d. (readonly)  Possible values: 0 - Unavailable; 1 - Available.

## housekeeping.get

### Description

object housekeeping.get(object parameters)

The method allows to retrieve housekeeping object according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports only one parameter.

Parameter	Type	Description
output	query	This parameter being common for all get methods described in the <a href="#">reference commentary</a> .

**Return values**

(object) Returns housekeeping object.

**Examples****Request:**

```
{
  "jsonrpc": "2.0",
  "method": "housekeeping.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "hk_events_mode": "1",
    "hk_events_trigger": "365d",
    "hk_events_internal": "1d",
    "hk_events_discovery": "1d",
    "hk_events_autoreg": "1d",
    "hk_services_mode": "1",
    "hk_services": "3651d",
    "hk_audit_mode": "1",
    "hk_audit": "365d",
    "hk_sessions_mode": "1",
    "hk_sessions": "365d",
    "hk_history_mode": "1",
    "hk_history_global": "0",
    "hk_history": "90d",
    "hk_trends_mode": "1",
    "hk_trends_global": "0",
    "hk_trends": "365d",
    "db_extension": "",
    "compression_status": "0",
    "compress_older": "7d",
    "compression_availability": "0"
  },
  "id": 1
}
```

## Source

CHousekeeping ::get() in ui/include/classes/api/services/CHousekeeping.php.

## housekeeping.update

### Description

object housekeeping.update(object housekeeping)

This method allows to update existing housekeeping settings.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Housekeeping properties to be updated.

### Return values

(array) Returns array with the names of updated parameters.

### Examples

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "housekeeping.update",
  "params": {
    "hk_events_mode": "1",
    "hk_events_trigger": "200d",
    "hk_events_internal": "2d",
    "hk_events_discovery": "2d"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    "hk_events_mode",
    "hk_events_trigger",
    "hk_events_internal",
    "hk_events_discovery"
  ],
  "id": 1
}
```

## Source

CHousekeeping::update() in ui/include/classes/api/services/CHousekeeping.php.

## Icon map

This class is designed to work with icon maps.

### Object references:

- [Icon map](#)
- [Icon mapping](#)



Available methods:

- `iconmap.create` - create new icon maps
- `iconmap.delete` - delete icon maps
- `iconmap.get` - retrieve icon maps
- `iconmap.update` - update icon maps

### > Icon map object

The following objects are directly related to the `iconmap` API.

Icon map

The icon map object has the following properties.

Property	Type	Description
<code>iconmapid</code>	string	(readonly) ID of the icon map.
<b><code>default_iconid</code></b> (required)	string	ID of the default icon.
<b><code>name</code></b> (required)	string	Name of the icon map.

Icon mapping

The icon mapping object defines a specific icon to be used for hosts with a certain inventory field value. It has the following properties.

Property	Type	Description
<code>iconmappingid</code>	string	(readonly) ID of the icon map.
<b><code>iconid</code></b> (required)	string	ID of the icon used by the icon mapping.
<b><code>expression</code></b> (required)	string	Expression to match the inventory field against.
<b><code>inventory_link</code></b> (required)	integer	ID of the host inventory field.  Refer to the <a href="#">host inventory object</a> for a list of supported inventory fields.
<code>iconmapid</code>	string	(readonly) ID of the icon map that the icon mapping belongs to.
<code>sortorder</code>	integer	(readonly) Position of the icon mapping in the icon map.

### `iconmap.create`

Description

```
object iconmap.create(object/array iconMaps)
```

This method allows to create new icon maps.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Icon maps to create.

Additionally to the [standard icon map properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>mappings</b> (required)	array	Icon mappings to be created for the icon map.

**Return values**

(object) Returns an object containing the IDs of the created icon maps under the `iconmapids` property. The order of the returned IDs matches the order of the passed icon maps.

**Examples**

Create an icon map

Create an icon map to display hosts of different types.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.create",
  "params": {
    "name": "Type icons",
    "default_iconid": "2",
    "mappings": [
      {
        "inventory_link": 1,
        "expression": "server",
        "iconid": "3"
      },
      {
        "inventory_link": 1,
        "expression": "switch",
        "iconid": "4"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "2"
    ]
  },
  "id": 1
}
```

See also

- [Icon mapping](#)

## Source

ClconMap::create() in ui/include/classes/api/services/ClconMap.php.

## iconmap.delete

### Description

object iconmap.delete(array iconMapIds)

This method allows to delete icon maps.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of the icon maps to delete.

### Return values

(object) Returns an object containing the IDs of the deleted icon maps under the iconmapids property.

### Examples

Delete multiple icon maps

Delete two icon maps.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.delete",
  "params": [
    "2",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "2",
      "5"
    ]
  },
  "id": 1
}
```

## Source

ClconMap::delete() in ui/include/classes/api/services/ClconMap.php.

## iconmap.get

### Description

integer/array iconmap.get(object parameters)

The method allows to retrieve icon maps according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
iconmapids	string/array	Return only icon maps with the given IDs.
sysmapids	string/array	Return only icon maps that are used in the given maps.
selectMappings	query	Return a <b>mappings</b> property with the icon mappings used.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: <b>iconmapid</b> and <b>name</b> . These parameters being common for all <b>get</b> methods are described in detail in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

**Return values**

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

**Examples**

Retrieve an icon map

Retrieve all data about icon map "3".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "iconmap.get",
  "params": {
    "iconmapids": "3",
    "output": "extend",
    "selectMappings": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "mappings": [
        {
          "iconmappingid": "3",
          "iconmapid": "3",
          "iconid": "6",
          "inventory_link": "1",
          "expression": "server",
          "sortorder": "0"
        },
        {
          "iconmappingid": "4",
          "iconmapid": "3",
          "iconid": "10",
          "inventory_link": "1",
          "expression": "switch",
          "sortorder": "1"
        }
      ],
      "iconmapid": "3",
      "name": "Host type icons",
      "default_iconid": "2"
    }
  ],
  "id": 1
}

```

See also

- [Icon mapping](#)

Source

ClconMap::get() in ui/include/classes/api/services/ClconMap.php.

### iconmap.update

Description

object iconmap.update(object/array iconMaps)

This method allows to update existing icon maps.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Icon map properties to be updated.

The `iconmapid` property must be defined for each icon map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard icon map properties](#), the method accepts the following parameters.

Parameter	Type	Description
<code>mappings</code>	array	<a href="#">Icon mappings</a> to replace the existing icon mappings.

Return values

(object) Returns an object containing the IDs of the updated icon maps under the `iconmapids` property.

Examples

Rename icon map

Rename an icon map to "OS icons".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.update",
  "params": {
    "iconmapid": "1",
    "name": "OS icons"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "1"
    ]
  },
  "id": 1
}
```

See also

- [Icon mapping](#)

Source

`ClconMap::update()` in `ui/include/classes/api/services/ClconMap.php`.

## Image

This class is designed to work with images.

Object references:

- [Image](#)

Available methods:

- [image.create](#) - create new images
- [image.delete](#) - delete images
- [image.get](#) - retrieve images
- [image.update](#) - update images

## > Image object

The following objects are directly related to the `image` API.

Image

The image object has the following properties.

Property	Type	Description
<code>imageid</code>	string	(readonly) ID of the image.
<b>name</b> (required)	string	Name of the image.
<code>imagetype</code>	integer	Type of image.  Possible values: 1 - (default) icon; 2 - background image.

### **image.create**

Description

`object image.create(object/array images)`

This method allows to create new images.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Images to create.

Additionally to the [standard image properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>name</b> (required)	string	Name of the image.
<b>imagetype</b> (required)	integer	Type of image.  Possible values: 1 - (default) icon; 2 - background image.
<b>image</b> (required)	string	Base64 encoded image. The maximum size of the encoded image is 1 MB. Maximum size can be adjusted by changing <code>ZBX_MAX_IMAGE_SIZE</code> constant value. Supported image formats are: PNG, JPEG, GIF.

Return values

(object) Returns an object containing the IDs of the created images under the `imageids` property. The order of the returned IDs matches the order of the passed images.

#### Examples

Create an image

Create a cloud icon.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.create",
  "params": {
    "imagetype": 1,
    "name": "Cloud_(24)",
    "image": "iVBORwOKGgoAAAANSUhEUgAAABgAAAANCAYAAACzbK7QAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAACmAAAAPgE
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "188"
    ]
  },
  "id": 1
}
```

#### Source

`CImage::create()` in `ui/include/classes/api/services/CImage.php`.

### **image.delete**

#### Description

object `image.delete(array imageIds)`

This method allows to delete images.

#### **Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the images to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted images under the `imageids` property.

#### Examples

Delete multiple images

Delete two images.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.delete",
  "params": [
```



```
    "188",
    "192"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "188",
      "192"
    ]
  },
  "id": 1
}
```

Source

CImage::delete() in ui/include/classes/api/services/CImage.php.

## image.get

Description

integer/array image.get(object parameters)

The method allows to retrieve images according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
imageids	string/array	Return only images with the given IDs.
sysmapids	string/array	Return images that are used on the given maps.
select_image	flag	Return an image property with the Base64 encoded image.
sortfield	string/array	Sort the result by the given properties.

Possible values are: `imageid` and `name`.

Parameter	Type	Description
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve an image

Retrieve all data for image with ID "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.get",
  "params": {
    "output": "extend",
    "select_image": true,
    "imageids": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "imageid": "2",
      "imagetype": "1",
      "name": "Cloud_(24)",
      "image": "iVBORwOKGgoAAAANSUhEUgAAABgAAAANCAYAAACzbK7QAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAACMAAA"
    }
  ],
  "id": 1
}
```

Source

CIImage::get() in ui/include/classes/api/services/CIImage.php.

## image.update

### Description

object image.update(object/array images)

This method allows to update existing images.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Image properties to be updated.

The `imageid` property must be defined for each image, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard image properties](#), the method accepts the following parameters.

Parameter	Type	Description
image	string	Base64 encoded image. The maximum size of the encoded image is 1 MB. Maximum size can be adjusted by changing <code>ZBX_MAX_IMAGE_SIZE</code> constant value. Supported image formats are: PNG, JPEG, GIF.

### Return values

(object) Returns an object containing the IDs of the updated images under the `imageids` property.

### Examples

#### Rename image

Rename image to "Cloud icon".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.update",
  "params": {
    "imageid": "2",
    "name": "Cloud icon"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "2"
    ]
  }
}
```

```
},  
  "id": 1  
}
```

Source

CImage::update() in ui/include/classes/api/services/CImage.php.

## Item

This class is designed to work with items.

Object references:

- [Item](#)

Available methods:

- [item.create](#) - creating new items
- [item.delete](#) - deleting items
- [item.get](#) - retrieving items
- [item.update](#) - updating items

### > Item object

The following objects are directly related to the `item` API.

Item

**Note:**

Web items cannot be directly created, updated or deleted via the Zabbix API.

The item object has the following properties.

Property	Type	Description
itemid	string	(readonly) ID of the item.

Property	Type	Description
<b>delay</b> (required)	string	Update interval of the item. Accepts seconds or a time unit with suffix (30s,1m,2h,1d). Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling. Multiple intervals are separated by a semicolon. User macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported. Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{ \$FLEX_INTERVAL } / { \$FLEX_I</code>  Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key. ID of the host or template that the item belongs to.  For update operations this field is readonly. ID of the item's host interface.
<b>hostid</b> (required)	string	Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key. ID of the host or template that the item belongs to.
<b>interfaceid</b> (required)	string	For update operations this field is readonly. ID of the item's host interface.
		Used only for host items. Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, Zabbix aggregate, calculated, dependent, database monitor and script items.

Property	Type	Description
<b>key_</b> (required)	string	Item key.
<b>name</b> (required)	string	Name of the item.
<b>type</b> (required)	integer	Type of the item.  Possible values: 0 - Zabbix agent; 2 - Zabbix trapper; 3 - Simple check; 5 - Zabbix internal; 7 - Zabbix agent (active); 8 - Zabbix aggregate; 9 - Web item; 10 - External check; 11 - Database monitor; 12 - IPMI agent; 13 - SSH agent; 14 - Telnet agent; 15 - Calculated; 16 - JMX agent; 17 - SNMP trap; 18 - Dependent item; 19 - HTTP agent; 20 - SNMP agent; 21 - Script
<b>url</b> (required)	string	URL string, required only for HTTP agent item type. Supports user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.
<b>value_type</b> (required)	integer	Type of information of the item.  Possible values: 0 - numeric float; 1 - character; 2 - log; 3 - numeric unsigned; 4 - text.

Property	Type	Description
allow_traps	integer	<p>HTTP agent item field. Allow to populate value as in trapper item type also.</p> <p>0 - (default) Do not allow to accept incoming data. 1 - Allow to accept incoming data.</p>
authtype	integer	<p>Used only by SSH agent items or HTTP agent items.</p> <p>SSH agent authentication method possible values: 0 - (default) password; 1 - public key.</p> <p>HTTP agent authentication method possible values: 0 - (default) none 1 - basic 2 - NTLM 3 - Kerberos</p>
description	string	Description of the item.
error	string	(readonly) Error text if there are problems updating the item.
flags	integer	(readonly) Origin of the item.
follow_redirects	integer	<p>Possible values: 0 - a plain item; 4 - a discovered item.</p> <p>HTTP agent item field. Follow response redirects while pooling data.</p> <p>0 - Do not follow redirects. 1 - (default) Follow redirects.</p>

Property	Type	Description
headers	object	<p>HTTP agent item field. Object with HTTP(S) request headers, where header name is used as key and header value as value.</p> <p>Example:  <pre>{ "User-Agent": "Zabbix" }</pre> </p>
history	string	<p>A time unit of how long the history data should be stored. Also accepts user macro.</p> <p>Default: 90d.</p>
http_proxy	string	<p>HTTP agent item field. HTTP(S) proxy connection string.</p>
inventory_link	integer	<p>ID of the host inventory field that is populated by the item.</p> <p>Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs.</p>
ipmi_sensor	string	<p>Default: 0. IPMI sensor. Used only by IPMI items.</p>
jmx_endpoint	string	<p>JMX agent custom connection string.</p> <p>Default value:  <pre>service:jmx:rmi:///jndi/rmi://{HO</pre> </p>



Property	Type	Description
lastclock	timestamp	<p>(readonly) Time when the item was last updated.</p> <p>By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of Max history display period parameter in the <a href="#">Administration → General</a> menu section.</p>
lastns	integer	<p>(readonly) Nanoseconds when the item was last updated.</p> <p>By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of Max history display period parameter in the <a href="#">Administration → General</a> menu section.</p>
lastvalue	string	<p>(readonly) Last value of the item.</p> <p>By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of Max history display period parameter in the <a href="#">Administration → General</a> menu section.</p>
logtimefmt	string	<p>Format of the time in log entries. Used only by log items.</p>

Property	Type	Description
master_itemid	integer	Master item ID. Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed.
output_format	integer	Required by dependent items. HTTP agent item field. Should response be converted to JSON.
params	string	0 - (default) Store raw. 1 - Convert to JSON. Additional parameters depending on the type of the item: - executed script for SSH and Telnet items; - SQL query for database monitor items; - formula for calculated items; - the script for script item.
parameters	array	Additional parameters for script items. Array of objects with 'name' and 'value' properties, where name must be unique.
password	string	Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items. When used by JMX, username should also be specified together with password or both properties should be left blank.

Property	Type	Description
post_type	integer	HTTP agent item field. Type of post data body stored in posts property.
		0 - (default) Raw data. 2 - JSON data. 3 - XML data.
posts	string	HTTP agent item field. HTTP(S) request body data. Used with post_type.
prevvalue	string	(readonly) Previous value of the item.
		By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of Max history display period parameter in the <a href="#">Administration → General</a> menu section.
privatekey	string	Name of the private key file.
publickey	string	Name of the public key file.
query_fields	array	HTTP agent item field. Query parameters. Array of objects with 'key': 'value' pairs, where value can be empty string.
request_method	integer	HTTP agent item field. Type of request method.
		0 - (default) GET 1 - POST 2 - PUT 3 - HEAD

Property	Type	Description
retrieve_mode	integer	<p>HTTP agent item field. What part of response should be stored.</p> <p>0 - (default) Body. 1 - Headers. 2 - Both body and headers will be stored.</p> <p>For request_method HEAD only 1 is allowed value. SNMP OID.</p>
snmp_oid	string	HTTP agent item field. Public SSL
ssl_cert_file	string	Key file path.
ssl_key_file	string	HTTP agent item field. Private SSL Key file path.
ssl_key_password	string	HTTP agent item field. Password for SSL Key file.
state	integer	(readonly) State of the item.
status	integer	<p>Possible values: 0 - (default) normal; 1 - not supported. Status of the item.</p>
status_codes	string	<p>Possible values: 0 - (default) enabled item; 1 - disabled item. HTTP agent item field. Ranges of required HTTP status codes separated by commas. Also supports user macros as part of comma separated list.</p> <p>Example: 200,200- {M},{M},200-400</p>

Property	Type	Description
templateid	string	(readonly) ID of the parent template item.  Hint: Use the <code>hostid</code> property to specify the template that the item belongs to.
timeout	string	Item data polling request timeout. Used for HTTP agent and script items. Supports user macros.  default: 3s maximum value: 60s
trapper_hosts	string	Allowed hosts. Used by trapper items or HTTP agent items.
trends	string	A time unit of how long the trends data should be stored. Also accepts user macro.
units	string	Default: 365d. Value units.
username	string	Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.  Required by SSH and Telnet items. When used by JMX, password should also be specified together with username or both properties should be left blank.
valuemapid	string	ID of the associated value map.

Property	Type	Description
verify_host	integer	<p>HTTP agent item field. Validate host name in URL is in Common Name field or a Subject Alternate Name field of host certificate.</p> <p>0 - (default) Do not validate. 1 - Validate.</p>
verify_peer	integer	<p>HTTP agent item field. Validate is host certificate authentic.</p> <p>0 - (default) Do not validate. 1 - Validate.</p>

#### Item preprocessing

The item preprocessing object has the following properties.

Property	Type	Description
<b>type</b> (required)	integer	<p>The preprocessing option type.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check unsupported.</li> </ul> <p>Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.</p>
<b>params</b> (required)	string	

Property	Type	Description
<b>error_handler</b> (required)	integer	Action type used in case of preprocessing step failure.  Possible values: 0 - Error message is set by Zabbix server; 1 - Discard value; 2 - Set custom value; 3 - Set custom error message.
<b>error_handler_params</b> (required)	string	Error handler parameters. Used with <code>error_handler</code> .  Must be empty, if <code>error_handler</code> is 0 or 1. Can be empty if, <code>error_handler</code> is 2. Cannot be empty, if <code>error_handler</code> is 3.

The following parameters and error handlers are supported for each preprocessing type.

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
1	Custom number multiplier	list of characters <sup>1, 6</sup>			0, 1, 2, 3
2	Right trim	list of characters <sup>2</sup>			
3	Left trim	list of characters <sup>2</sup>			
4	Trim	list of characters <sup>2</sup>			
5	Regular expression	pattern <sup>3</sup>	output <sup>2</sup>		0, 1, 2, 3
6	Boolean to decimal				0, 1, 2, 3
7	Octal to decimal				0, 1, 2, 3
8	Hexadecimal to decimal				0, 1, 2, 3



Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
9	Simple change				0, 1, 2, 3
10	Change per second				0, 1, 2, 3
11	XML XPath	path <sup>4</sup>			0, 1, 2, 3
12	JSONPath	path <sup>4</sup>			0, 1, 2, 3
13	In range	min <sup>1, 6</sup>	max <sup>1, 6</sup>		0, 1, 2, 3
14	Matches regular expression	pattern <sup>3</sup>			0, 1, 2, 3
15	Does not match regular expression	pattern <sup>3</sup>			0, 1, 2, 3
16	Check for error in JSON	path <sup>4</sup>			0, 1, 2, 3
17	Check for error in XML	path <sup>4</sup>			0, 1, 2, 3
18	Check for error using regular expression	pattern <sup>3</sup>	output <sup>2</sup>		0, 1, 2, 3
19	Discard unchanged				
20	Discard unchanged with heartbeat	seconds <sup>5, 6</sup>			
21	JavaScript	script <sup>2</sup>			
22	Prometheus pattern	pattern <sup>6, 7</sup>	output <sup>6, 8</sup>		0, 1, 2, 3
23	Prometheus to JSON	pattern <sup>6, 7</sup>			0, 1, 2, 3

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
24	CSV to JSON	character <sup>2</sup>	character <sup>2</sup>	0,1	0, 1, 2, 3
25	Replace search string <sup>2</sup>		replacement <sup>2</sup>		
26	Check unsupported				0, 1, 2, 3

<sup>1</sup> integer or floating-point number

<sup>2</sup> string

<sup>3</sup> regular expression

<sup>4</sup> JSONPath or XML XPath

<sup>5</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>6</sup> user macro

<sup>7</sup> Prometheus pattern following the syntax: `<metric name>{<label name>=<label value>, ...} == <value>`. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro.

<sup>8</sup> Prometheus output following the syntax: `<label name>`.

## item.create

### Description

object `item.create(object/array items)`

This method allows to create new items.

#### Note:

Web items cannot be created via the Zabbix API.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Items to create.

Additionally to the [standard item properties](#), the method accepts the following parameters.

Parameter	Type	Description
applications	array	IDs of the applications to add the item to.
preprocessing	array	Item <a href="#">preprocessing</a> options.

### Return values

(object) Returns an object containing the IDs of the created items under the `itemids` property. The order of the returned IDs matches the order of the passed items.

### Examples

#### Creating an item

Create a numeric Zabbix agent item to monitor free disk space on host with ID "30074" and add it to two applications.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "Free disk space on /home/joe/",
    "key_": "vfs.fs.size[/home/joe/,free]",
  }
}
```

```

    "hostid": "30074",
    "type": 0,
    "value_type": 3,
    "interfaceid": "30084",
    "applications": [
        "609",
        "610"
    ],
    "delay": "30s"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "24758"
    ]
  },
  "id": 1
}

```

Creating a host inventory item

Create a Zabbix agent item to populate the host's "OS" inventory field.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "uname",
    "key_": "system.uname",
    "hostid": "30021",
    "type": 0,
    "interfaceid": "30007",
    "value_type": 1,
    "delay": "10s",
    "inventory_link": 5
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "24759"
    ]
  },
  "id": 1
}

```

Creating an item with preprocessing

Create an item using custom multiplier.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "Device uptime",
    "key_": "sysUpTime",
    "hostid": "11312",
    "type": 4,
    "snmp_oid": "SNMPv2-MIB::sysUpTime.0",
    "value_type": 1,
    "delay": "60s",
    "units": "uptime",
    "interfaceid": "1156",
    "preprocessing": [
      {
        "type": "1",
        "params": "0.01",
        "error_handler": "1",
        "error_handler_params": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44210"
    ]
  },
  "id": 1
}

```

Creating dependent item

Create a dependent item for the master item with ID 24759. Only dependencies on the same host are allowed, therefore master and the dependent item should have the same hostid.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "hostid": "30074",
    "name": "Dependent test item",
    "key_": "dependent.item",
    "type": "18",
    "master_itemid": "24759",
    "value_type": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [

```

```
        "44211"
    ]
},
"id": 1
}
```

Create HTTP agent item

Create POST request method item with JSON response preprocessing.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "url": "http://127.0.0.1/http.php",
    "query_fields": [
      {
        "mode": "json"
      },
      {
        "min": "10"
      },
      {
        "max": "100"
      }
    ],
    "interfaceid": "1",
    "type": "19",
    "hostid": "10254",
    "delay": "5s",
    "key_": "json",
    "name": "http agent example JSON",
    "value_type": "0",
    "output_format": "1",
    "preprocessing": [
      {
        "type": "12",
        "params": "$.random"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 3
}
```

Create script item

Create a simple data collection using a script item.

Request:

```
{
  "jsonrpc": "2.0",
```

```

"method": "item.create",
"params": {
  "name": "Script example",
  "key_": "custom.script.item",
  "hostid": "12345",
  "type": 21,
  "value_type": 4,
  "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
  "parameters": [{
    "name": "host",
    "value": "{HOST.CONN}"
  }],
  "timeout": "6s",
  "delay": "30s"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 2
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 3
}

```

Source

CItem::create() in ui/include/classes/api/services/CItem.php.

## item.delete

Description

object item.delete(array itemIds)

This method allows to delete items.

### Note:

Web items cannot be deleted via the Zabbix API.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the items to delete.

Return values

(object) Returns an object containing the IDs of the deleted items under the `itemids` property.

Examples

Deleting multiple items

Delete two items.

Dependent items and item prototypes are removed automatically if master item is deleted.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.delete",
  "params": [
    "22982",
    "22986"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22982",
      "22986"
    ]
  },
  "id": 1
}
```

Source

CItem::delete() in ui/include/classes/api/services/CItem.php.

## item.get

Description

integer/array item.get(object parameters)

The method allows to retrieve items according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
itemids	string/array	Return only items with the given IDs.
groupids	string/array	Return only items that belong to the hosts from the given groups.
templateids	string/array	Return only items that belong to the given templates.
hostids	string/array	Return only items that belong to the given hosts.
proxyids	string/array	Return only items that are monitored by the given proxies.

Parameter	Type	Description
interfaceids	string/array	Return only items that use the given host interfaces.
graphids	string/array	Return only items that are used in the given graphs.
triggerids	string/array	Return only items that are used in the given triggers.
applicationids	string/array	Return only items that belong to the given applications.
webitems	flag	Include web items in the result.
inherited	boolean	If set to true return only items inherited from a template.
templated	boolean	If set to true return only items that belong to templates.
monitored	boolean	If set to true return only enabled items that belong to monitored hosts.
group	string	Return only items that belong to a group with the given name.
host	string	Return only items that belong to a host with the given name.
application	string	Return only items that belong to an application with the given name.
with_triggers	boolean	If set to true return only items that are used in triggers.
selectHosts	query	Return a <b>hosts</b> property with an array of hosts that the item belongs to.
selectInterfaces	query	Return an <b>interfaces</b> property with an array of host interfaces used by the item.
selectTriggers	query	Return a <b>triggers</b> property with the triggers that the item is used in.

Supports count.



Parameter	Type	Description
selectGraphs	query	Return a <b>graphs</b> property with the graphs that contain the item.
selectApplications	query	Supports count. Return an <b>applications</b> property with the applications that the item belongs to.
selectDiscoveryRule	query	Return a <b>discoveryRule</b> property with the LLD rule that created the item.
selectItemDiscovery	query	Return an <b>itemDiscovery</b> property with the item discovery object. The item discovery object links the item to an item prototype from which it was created.  It has the following properties: <b>itemdiscoveryid</b> - (string) ID of the item discovery; <b>itemid</b> - (string) ID of the discovered item; <b>parent_itemid</b> - (string) ID of the item prototype from which the item has been created; <b>key_</b> - (string) key of the item prototype; <b>lastcheck</b> - (timestamp) time when the item was last discovered; <b>ts_delete</b> - (timestamp) time when an item that is no longer discovered will be deleted.

Parameter	Type	Description
selectPreprocessingquery		<p>Return a <b>preprocessing</b> property with item preprocessing options.</p> <p>It has the following properties:</p> <p>type - (string)</p> <p>The preprocessing option type:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace.</li> </ul> <p>params - (string)</p> <p>Additional</p>

Parameter	Type	Description
filter	object	<p>Return only those results that exactly match the given filter.</p> <p>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.</p> <p>Supports additional filters:  host - technical name of the host that the item belongs to.  Limits the number of records returned by subselects.</p>
limitSelects	integer	<p>Applies to the following subselects:  selectGraphs - results will be sorted by name;  selectTriggers - results will be sorted by description.  Sort the result by the given properties.</p>
sortfield	string/array	<p>Possible values are: itemid, name, key_, delay, history, trends, type and status.  These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.</p>
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	

Parameter	Type	Description
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Finding items by key

Retrieve all items from host with ID "10084" that have the word "system" in the key and sort them by name.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "output": "extend",
    "hostids": "10084",
    "search": {
      "key_": "system"
    },
    "sortfield": "name"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23298",
      "type": "0",
      "snmp_oid": "",
      "hostid": "10084",
      "name": "Context switches per second",
      "key_": "system.cpu.switches",
      "delay": "1m",
      "history": "7d",
      "trends": "365d",
      "lastvalue": "2552",
      "lastclock": "1351090998",
      "prevvalue": "2641",
      "state": "0",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "sps",
      "error": "",
      "logtimefmt": "",
      "templateid": "22680",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": ""
    }
  ]
}
```

```

    "publickey": "",
    "privatekey": "",
    "lastns": "564054253",
    "flags": "0",
    "interfaceid": "1",
    "description": "",
    "inventory_link": "0",
    "lifetime": "0s",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "parameters": []
  },
  {
    "itemid": "23299",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10084",
    "name": "CPU $2 time",
    "key_": "system.cpu.util[,idle]",
    "delay": "1m",
    "history": "7d",
    "trends": "365d",
    "lastvalue": "86.031879",
    "lastclock": "1351090999",
    "prevvalue": "85.306944",
    "state": "0",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "%",
    "error": "",
    "logtimefmt": "",
    "templateid": "17354",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "lastns": "564256864",
    "flags": "0",

```

```

    "interfaceid": "1",
    "description": "The time the CPU has spent doing nothing.",
    "inventory_link": "0",
    "lifetime": "0s",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "parameters": []
  },
  {
    "itemid": "23300",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10084",
    "name": "CPU $2 time",
    "key_": "system.cpu.util[,interrupt]",
    "history": "7d",
    "trends": "365d",
    "lastvalue": "0.008389",
    "lastclock": "1351091000",
    "prevvalue": "0.000000",
    "state": "0",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "%",
    "error": "",
    "logtimefmt": "",
    "templateid": "22671",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "lastns": "564661387",
    "flags": "0",
    "interfaceid": "1",
    "description": "The amount of time the CPU has been servicing hardware interrupts.",
    "inventory_link": "0",
    "lifetime": "0s",
    "evaltype": "0",

```

```

        "jmx_endpoint": "",
        "master_itemid": "0",
        "timeout": "3s",
        "url": "",
        "query_fields": [],
        "posts": "",
        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "parameters": []
    }
],
    "id": 1
}

```

Finding dependent items by key

Retrieve all dependent items from host with ID "10116" that have the word "apache" in the key.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "output": "extend",
    "hostids": "10116",
    "search": {
      "key_": "apache"
    },
    "filter": {
      "type": "18"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "25550",
      "type": "18",
      "snmp_oid": "",
      "hostid": "10116",
      "name": "Days",
      "key_": "apache.status.uptime.days",
      "delay": "",
      "history": "90d",
      "trends": "365d",
      "status": "0",

```

```

"value_type": "3",
"trapper_hosts": "",
"units": "",
"formula": "",
"error": "",
"logtimefmt": "",
"templateid": "0",
"valuemapid": "0",
"params": "",
"ipmi_sensor": "",
"authtype": "0",
"username": "",
"password": "",
"publickey": "",
"privatekey": "",
"flags": "0",
"interfaceid": "0",
"description": "",
"inventory_link": "0",
"lifetime": "30d",
"state": "0",
"evaltype": "0",
"master_itemid": "25545",
"jmx_endpoint": "",
"timeout": "3s",
"url": "",
"query_fields": [],
"posts": "",
"status_codes": "200",
"follow_redirects": "1",
"post_type": "0",
"http_proxy": "",
"headers": [],
"retrieve_mode": "0",
"request_method": "0",
"output_format": "0",
"ssl_cert_file": "",
"ssl_key_file": "",
"ssl_key_password": "",
"verify_peer": "0",
"verify_host": "0",
"allow_traps": "0",
"lastclock": "0",
"lastns": "0",
"lastvalue": "0",
"prevvalue": "0",
"parameters": []
},
{
"itemid": "25555",
"type": "18",
"snmp_oid": "",
"hostid": "10116",
"name": "Hours",
"key_": "apache.status.uptime.hours",
"delay": "0",
"history": "90d",
"trends": "365d",
"status": "0",
"value_type": "3",
"trapper_hosts": "",
"units": "",

```



```

    "formula": "",
    "error": "",
    "logtimefmt": "",
    "templateid": "0",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "0",
    "description": "",
    "inventory_link": "0",
    "lifetime": "30d",
    "state": "0",
    "evaltype": "0",
    "master_itemid": "25545",
    "jmx_endpoint": "",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0",
    "parameters": []
  }
],
  "id": 1
}

```

Find HTTP agent item

Find HTTP agent item with post body type XML for specific host id.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "hostids": "10255",
    "filter": {
      "type": "19",
      "post_type": "3"
    }
  }
}

```

```
},
  "id": 3,
  "auth": "d678e0b85688ce578ff061bd29a20d3b"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "28252",
      "type": "19",
      "snmp_oid": "",
      "hostid": "10255",
      "name": "template item",
      "key_": "ti",
      "delay": "30s",
      "history": "90d",
      "trends": "365d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "",
      "formula": "",
      "error": "",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "0",
      "interfaceid": "0",
      "description": "",
      "inventory_link": "0",
      "lifetime": "30d",
      "state": "0",
      "evaltype": "0",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "localhost",
      "query_fields": [
        {
          "mode": "xml"
        }
      ]
    },
    ],
  "posts": "<body>\r\n<![CDATA[{$MACRO}<foo></bar>]]>\r\n</body>",
  "status_codes": "200",
  "follow_redirects": "0",
  "post_type": "3",
  "http_proxy": "",
  "headers": [],
  "retrieve_mode": "1",
  "request_method": "3",
  "output_format": "0",
  "ssl_cert_file": "",
  "ssl_key_file": ""
}
```

```

        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "lastclock": "0",
        "lastns": "0",
        "lastvalue": "0",
        "prevvalue": "0",
        "parameters": []
    }
],
    "id": 3
}

```

Retrieving items with preprocessing rules

Retrieve all items and their preprocessing rules from host with ID "10254".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "item.get",
    "params": {
        "output": ["itemid", "name", "key_"],
        "selectPreprocessing": "extend",
        "hostids": "10254"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemid": "23865",
        "name": "http agent example JSON",
        "key_": "json",
        "preprocessing": [
            {
                "type": "12",
                "params": "$.random",
                "error_handler": "1",
                "error_handler_params": ""
            }
        ]
    },
    "id": 1
}

```

See also

- [Application](#)
- [Discovery rule](#)
- [Graph](#)
- [Host](#)
- [Host interface](#)
- [Trigger](#)

Source

CItem::get() in ui/include/classes/api/services/CItem.php.

**item.update**

## Description

object `item.update(object/array items)`

This method allows to update existing items.

### Note:

Web items cannot be updated via the Zabbix API.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object/array) Item properties to be updated.

The `itemid` property must be defined for each item, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard item properties](#), the method accepts the following parameters.

Parameter	Type	Description
<code>applications</code>	array	IDs of the applications to replace the current applications.
<code>preprocessing</code>	array	<a href="#">Item preprocessing</a> options to replace the current preprocessing options.

## Return values

(object) Returns an object containing the IDs of the updated items under the `itemids` property.

## Examples

### Enabling an item

Enable an item, that is, set its status to "0".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "10092",
    "status": 0
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "10092"
    ]
  },
}
```

```
    "id": 1
  }
```

#### Update dependent item

Update Dependent item name and Master item ID. Only dependencies on same host are allowed, therefore Master and Dependent item should have same hostid.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "name": "Dependent item updated name",
    "master_itemid": "25562",
    "itemid": "189019"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "189019"
    ]
  },
  "id": 1
}
```

#### Update HTTP agent item

Enable item value trapping.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23856",
    "allow_traps": "1"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23856"
    ]
  },
  "id": 1
}
```

#### Updating an item with preprocessing

Update an item with item preprocessing rule "In range".

#### Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23856",
    "preprocessing": [
      {
        "type": "13",
        "params": "\n100",
        "error_handler": "1",
        "error_handler_params": ""
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23856"
    ]
  },
  "id": 1
}

```

Updating a script item

Update a script item with a different script and remove unnecessary parameters that were used by previous script.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23865",
    "parameters": [],
    "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 1
}

```

Source

CItem::update() in ui/include/classes/api/services/CItem.php.

**Item prototype**

This class is designed to work with item prototypes.

Object references:

- [Item prototype](#)

Available methods:

- [itemprototype.create](#) - creating new item prototypes
- [itemprototype.delete](#) - deleting item prototypes
- [itemprototype.get](#) - retrieving item prototypes
- [itemprototype.update](#) - updating item prototypes

### > **Item prototype object**

The following objects are directly related to the `itemprototype` API.

Item prototype

The item prototype object has the following properties.

Property	Type	Description
itemid	string	(readonly) ID of the item prototype.

Property	Type	Description
<b>delay</b> (required)	string	<p>Update interval of the item prototype. Accepts seconds or a time unit with suffix (30s,1m,2h,1d). Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling. Multiple intervals are separated by a semicolon. User macros and LLD macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported. Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{\${FLEX_INTERVAL}},{\${FLEX_I</code></p> <p>Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key.</p> <p>ID of the host that the item prototype belongs to.</p> <p>For update operations this field is readonly.</p> <p>ID of the LLD rule that the item belongs to.</p> <p>For update operations this field is readonly.</p>
<b>hostid</b> (required)	string	<p>ID of the host that the item prototype belongs to.</p>
<b>ruleid</b> (required)	string	<p>For update operations this field is readonly.</p> <p>ID of the LLD rule that the item belongs to.</p> <p>For update operations this field is readonly.</p>



Property	Type	Description
<b>interfaceid</b> (required)	string	ID of the item prototype's host interface. Used only for host item prototypes.  Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, Zabbix aggregate, calculated, dependent, database monitor and script item prototypes.
<b>key_</b> (required)	string	Item prototype key.
<b>name</b> (required)	string	Name of the item prototype.
<b>type</b> (required)	integer	Type of the item prototype.  Possible values: 0 - Zabbix agent; 2 - Zabbix trapper; 3 - simple check; 5 - Zabbix internal; 7 - Zabbix agent (active); 8 - Zabbix aggregate; 10 - external check; 11 - database monitor; 12 - IPMI agent; 13 - SSH agent; 14 - TELNET agent; 15 - calculated; 16 - JMX agent; 17 - SNMP trap; 18 - Dependent item; 19 - HTTP agent; 20 - SNMP agent; 21 - Script.

Property	Type	Description
<b>url</b> (required)	string	URL string required only for HTTP agent item prototypes. Supports LLD macros, user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.
<b>value_type</b> (required)	integer	Type of information of the item prototype.  Possible values: 0 - numeric float; 1 - character; 2 - log; 3 - numeric unsigned; 4 - text.
allow_traps	integer	HTTP agent item prototype field. Allow to populate value as in trapper item type also.  0 - (default) Do not allow to accept incoming data. 1 - Allow to accept incoming data.
authtype	integer	Used only by SSH agent item prototypes or HTTP agent item prototypes.  SSH agent authentication method possible values: 0 - (default) password; 1 - public key.  HTTP agent authentication method possible values: 0 - (default) none 1 - basic 2 - NTLM 3 - Kerberos

Property	Type	Description
description	string	Description of the item prototype.
follow_redirects	integer	HTTP agent item prototype field. Follow response redirects while pooling data.  0 - Do not follow redirects. 1 - (default) Follow redirects.
headers	object	HTTP agent item prototype field. Object with HTTP(S) request headers, where header name is used as key and header value as value.  Example: { "User-Agent": "Zabbix" }
history	string	A time unit of how long the history data should be stored. Also accepts user macro and LLD macro.
http_proxy	string	Default: 90d. HTTP agent item prototype field. HTTP(S) proxy connection string.
ipmi_sensor	string	IPMI sensor. Used only by IPMI item prototypes.
jmx_endpoint	string	JMX agent custom connection string.
logtimefmt	string	Default value: service:jmx:rmi:///jndi/rmi://{HOSTNAME}:9090 Format of the time in log entries. Used only by log item prototypes.

Property	Type	Description
master_itemid	integer	Master item ID. Recursion up to 3 dependent items and item prototypes and maximum count of dependent items and item prototypes equal to 29999 are allowed.
output_format	integer	Required by Dependent items. HTTP agent item prototype field. Should response be converted to JSON.  0 - (default) Store raw. 1 - Convert to JSON.
params	string	Additional parameters depending on the type of the item prototype: - executed script for SSH and Telnet item prototypes; - SQL query for database monitor item prototypes; - formula for calculated item prototypes.
parameters	array	Additional parameters for script item prototypes. Array of objects with 'name' and 'value' properties, where name must be unique.
password	string	Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent item prototypes.

Property	Type	Description
post_type	integer	HTTP agent item prototype field. Type of post data body stored in posts property.  0 - (default) Raw data. 2 - JSON data. 3 - XML data.
posts	string	HTTP agent item prototype field. HTTP(S) request body data. Used with post_type.
privatekey	string	Name of the private key file.
publickey	string	Name of the public key file.
query_fields	array	HTTP agent item prototype field. Query parameters. Array of objects with 'key': 'value' pairs, where value can be empty string.
request_method	integer	HTTP agent item prototype field. Type of request method.  0 - (default) GET 1 - POST 2 - PUT 3 - HEAD
retrieve_mode	integer	HTTP agent item prototype field. What part of response should be stored.  0 - (default) Body. 1 - Headers. 2 - Both body and headers will be stored.
snmp_oid	string	For request_method HEAD only 1 is allowed value. SNMP OID.
ssl_cert_file	string	HTTP agent item prototype field. Public SSL Key file path.
ssl_key_file	string	HTTP agent item prototype field. Private SSL Key file path.

Property	Type	Description
ssl_key_password	string	HTTP agent item prototype field. Password for SSL Key file.
status	integer	Status of the item prototype.  Possible values: 0 - (default) enabled item prototype; 1 - disabled item prototype; 3 - unsupported item prototype.
status_codes	string	HTTP agent item prototype field. Ranges of required HTTP status codes separated by commas. Also supports user macros or LLD macros as part of comma separated list.  Example: 200,200-{\$M},{ \$M},200-400
templateid	string	(readonly) ID of the parent template item prototype.
timeout	string	Item data polling request timeout. Used for HTTP agent and script item prototypes. Supports user macros and LLD macros.  default: 3s maximum value: 60s
trapper_hosts	string	Allowed hosts. Used by trapper item prototypes or HTTP item prototypes.
trends	string	A time unit of how long the trends data should be stored. Also accepts user macro and LLD macro.  Default: 365d.

Property	Type	Description
units	string	Value units.
username	string	Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent item prototypes.
valuemapid	string	Required by SSH and Telnet item prototypes. ID of the associated value map.
verify_host	integer	HTTP agent item prototype field. Validate host name in URL is in Common Name field or a Subject Alternate Name field of host certificate.
verify_peer	integer	0 - (default) Do not validate. 1 - Validate. HTTP agent item prototype field. Validate is host certificate authentic.
discover	integer	0 - (default) Do not validate. 1 - Validate. Item prototype discovery status.  Possible values: 0 - (default) new items will be discovered; 1 - new items will not be discovered and existing items will be marked as lost.

#### Item prototype preprocessing

The item prototype preprocessing object has the following properties.

Property	Type	Description
<b>type</b> (required)	integer	<p>The preprocessing option type.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check unsupported.</li> </ul> <p>Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.</p>
<b>params</b> (required)	string	



Property	Type	Description
<b>error_handler</b> (required)	integer	Action type used in case of preprocessing step failure.  Possible values: 0 - Error message is set by Zabbix server; 1 - Discard value; 2 - Set custom value; 3 - Set custom error message.
<b>error_handler_params</b> (required)	string	Error handler parameters. Used with <code>error_handler</code> .  Must be empty, if <code>error_handler</code> is 0 or 1. Can be empty if, <code>error_handler</code> is 2. Cannot be empty, if <code>error_handler</code> is 3.

The following parameters and error handlers are supported for each preprocessing type.

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
1	Custom number multiplier	list of characters <sup>1, 6</sup>			0, 1, 2, 3
2	Right trim	list of characters <sup>2</sup>			
3	Left trim	list of characters <sup>2</sup>			
4	Trim	list of characters <sup>2</sup>			
5	Regular expression	pattern <sup>3</sup>	output <sup>2</sup>		0, 1, 2, 3
6	Boolean to decimal				0, 1, 2, 3
7	Octal to decimal				0, 1, 2, 3
8	Hexadecimal to decimal				0, 1, 2, 3

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
9	Simple change				0, 1, 2, 3
10	Change per sec- ond				0, 1, 2, 3
11	XML XPath	path <sup>4</sup>			0, 1, 2, 3
12	JSONPath	path <sup>4</sup>			0, 1, 2, 3
13	In range	min <sup>1, 6</sup>	max <sup>1, 6</sup>		0, 1, 2, 3
14	Matches regu- lar ex- pres- sion	pattern <sup>3</sup>			0, 1, 2, 3
15	Does not match regu- lar ex- pres- sion	pattern <sup>3</sup>			0, 1, 2, 3
16	Check for error in JSON	path <sup>4</sup>			0, 1, 2, 3
17	Check for error in XML	path <sup>4</sup>			0, 1, 2, 3
18	Check for error us- ing regu- lar ex- pres- sion	pattern <sup>3</sup>	output <sup>2</sup>		0, 1, 2, 3
19	Discard un- changed				
20	Discard un- changed with heart- beat	seconds <sup>5, 6</sup>			
21	JavaScript	script <sup>2</sup>			
22	Prometh- pat- tern	pattern <sup>6, 7</sup>	output <sup>6, 8</sup>		0, 1, 2, 3
23	Prometh- to JSON	pattern <sup>6, 7</sup>			0, 1, 2, 3

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
24	CSV to JSON	character <sup>2</sup>	character <sup>2</sup>	0,1	0, 1, 2, 3
25	Replace search string <sup>2</sup>		replacement <sup>2</sup>		
26	Check unsupported				0, 1, 2, 3

<sup>1</sup> integer or floating-point number

<sup>2</sup> string

<sup>3</sup> regular expression

<sup>4</sup> JSONPath or XML XPath

<sup>5</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>6</sup> user macro, LLD macro

<sup>7</sup> Prometheus pattern following the syntax: `<metric name>{<label name>=<label value>, ...} == <value>`. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro or LLD macro.

<sup>8</sup> Prometheus output following the syntax: `<label name>`.

## itemprototype.create

### Description

object itemprototype.create(object/array itemPrototypes)

This method allows to create new item prototypes.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Item prototype to create.

Additionally to the [standard item prototype properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>ruleid</b> (required)	string	ID of the LLD rule that the item belongs to.
applications	array	IDs of applications to be assigned to the discovered items.
applicationPrototypes	array	Names of application prototypes to be assigned to the item prototype.
preprocessing	array	Item prototype <a href="#">preprocessing options</a> .

### Return values

(object) Returns an object containing the IDs of the created item prototypes under the `itemids` property. The order of the returned IDs matches the order of the passed item prototypes.

### Examples

Creating an item prototype

Create an item prototype to monitor free disc space on a discovered file system. Discovered items should be numeric Zabbix agent items updated every 30 seconds.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "name": "Free disk space on {#FSNAME}",
    "key_": "vfs.fs.size[{#FSNAME},free]",
    "hostid": "10197",
    "ruleid": "27665",
    "type": 0,
    "value_type": 3,
    "interfaceid": "112",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27666"
    ]
  },
  "id": 1
}
```

Creating an item prototype with preprocessing

Create an item using change per second and a custom multiplier as a second step.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "name": "Incoming network traffic on {#IFNAME}",
    "key_": "net.if.in[{#IFNAME}]",
    "hostid": "10001",
    "ruleid": "27665",
    "type": 0,
    "value_type": 3,
    "delay": "60s",
    "units": "bps",
    "interfaceid": "1155",
    "preprocessing": [
      {
        "type": "10",
        "params": "",
        "error_handler": "0",
        "error_handler_params": ""
      },
      {
        "type": "1",
        "params": "8",
        "error_handler": "2",
        "error_handler_params": "10"
      }
    ]
  }
}
```

```
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}
```

Creating dependent item prototype

Create Dependent item prototype for Master item prototype with ID 44211. Only dependencies on same host (template/discovery rule) are allowed, therefore Master and Dependent item should have same hostid and ruleid.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "hostid": "10001",
    "ruleid": "27665",
    "name": "Dependent test item prototype",
    "key_": "dependent.prototype",
    "type": "18",
    "master_itemid": "44211",
    "value_type": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44212"
    ]
  },
  "id": 1
}
```

Create HTTP agent item prototype

Create item prototype with URL using user macro, query fields and custom headers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "type": "19",
    "hostid": "10254",
    "ruleid": "28256",
    "interfaceid": "2",
    "name": "api item prototype example",
    "key_": "api_http_item",
  }
}
```

```

    "value_type": "3",
    "url": "{$URL_PROTOTYPE}",
    "query_fields": [
      {
        "min": "10"
      },
      {
        "max": "100"
      }
    ],
    "headers": {
      "X-Source": "api"
    },
    "delay": "35"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28305"
    ]
  },
  "id": 1
}

```

Create script item prototype

Create a simple data collection using a script item prototype.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "name": "Script example",
    "key_": "custom.script.itemprototype",
    "hostid": "12345",
    "type": 21,
    "value_type": 4,
    "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
    "parameters": [{
      "name": "host",
      "value": "{HOST.CONN}"
    }],
    "timeout": "6s",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  }
}

```

```
  },  
  "id": 3  
}
```

Source

CItemPrototype::create() in ui/include/classes/api/services/CItemPrototype.php.

### itemprototype.delete

Description

object itemprototype.delete(array itemPrototypeIds)

This method allows to delete item prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the item prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted item prototypes under the `prototypeids` property.

Examples

Deleting multiple item prototypes

Delete two item prototypes.

Dependent item prototypes are removed automatically if master item or item prototype is deleted.

Request:

```
{  
  "jsonrpc": "2.0",  
  "method": "itemprototype.delete",  
  "params": [  
    "27352",  
    "27356"  
  ],  
  "auth": "3a57200802b24cda67c4e4010b50c065",  
  "id": 1  
}
```

Response:

```
{  
  "jsonrpc": "2.0",  
  "result": {  
    "prototypeids": [  
      "27352",  
      "27356"  
    ]  
  },  
  "id": 1  
}
```

Source

CItemPrototype::delete() in ui/include/classes/api/services/CItemPrototype.php.

### itemprototype.get

Description

integer/array itemprototype.get(object parameters)

The method allows to retrieve item prototypes according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
discoveryids	string/array	Return only item prototypes that belong to the given LLD rules.
graphids	string/array	Return only item prototypes that are used in the given graph prototypes.
hostids	string/array	Return only item prototypes that belong to the given hosts.
inherited	boolean	If set to true return only item prototypes inherited from a template.
itemids	string/array	Return only item prototypes with the given IDs.
monitored	boolean	If set to true return only enabled item prototypes that belong to monitored hosts.
templated	boolean	If set to true return only item prototypes that belong to templates.
templateids	string/array	Return only item prototypes that belong to the given templates.
triggerids	string/array	Return only item prototypes that are used in the given trigger prototypes.
selectApplications query		Return an <a href="#">applications</a> property with applications that the item prototype belongs to.



Parameter	Type	Description
selectApplicationPrototypes	query	Return applicationPrototypes property with application prototypes linked to item prototype.
selectDiscoveryRule	query	Return a discoveryRule property with the low-level discovery rule that the item prototype belongs to.
selectGraphs	query	Return a manual/api/reference/graphprototypes property with graph prototypes that the item prototype is used in.
selectHosts	query	Supports count. Return a hosts property with an array of hosts that the item prototype belongs to.
selectTriggers	query	Return a triggers property with trigger prototypes that the item prototype is used in.
		Supports count.

Parameter	Type	Description
selectPreprocessingquery		<p>Return a <b>preprocessing</b> property with item preprocessing options.</p> <p>It has the following properties:</p> <p>type - (string)</p> <p>The preprocessing option type:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace.</li> </ul> <p>params - (string)</p> <p>Additional</p>

Parameter	Type	Description
filter	object	Return only those results that exactly match the given filter.  Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.  Supports additional filters: host - technical name of the host that the item prototype belongs to.
limitSelects	integer	Limits the number of records returned by subselects.  Applies to the following subselects: selectGraphs - results will be sorted by name; selectTriggers - results will be sorted by description. Sort the result by the given properties.
sortfield	string/array	Possible values are: itemid, name, key_, delay, type and status.
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	

Parameter	Type	Description
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving item prototypes from an LLD rule

Retrieve all item prototypes from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.get",
  "params": {
    "output": "extend",
    "discoveryids": "27426"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23077",
      "type": "0",
      "snmp_oid": "",
      "hostid": "10079",
      "name": "Incoming network traffic on en0",
      "key_": "net.if.in[en0]",
      "delay": "1m",
      "history": "1w",
      "trends": "365d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "bps",
      "formula": "",
      "error": "",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "0",
      "interfaceid": "0",
      "description": "",
      "inventory_link": "0",
      "lifetime": "30d",
      "state": "0",
    }
  ]
}
```

```

    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0",
    "discover": "0",
    "parameters": []
  },
  {
    "itemid": "10010",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10001",
    "name": "Processor load (1 min average per core)",
    "key_": "system.cpu.load[percpu,avg1]",
    "delay": "1m",
    "history": "1w",
    "trends": "365d",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "",
    "formula": "",
    "error": "",
    "logtimefmt": "",
    "templateid": "0",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "0",
    "description": "The processor load is calculated as system CPU load divided by number of CPU c",
    "inventory_link": "0",
    "lifetime": "0",
    "state": "0",
    "evaltype": "0",
    "jmx_endpoint": "",

```

```

        "master_itemid": "0",
        "timeout": "3s",
        "url": "",
        "query_fields": [],
        "posts": "",
        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "lastclock": "0",
        "lastns": "0",
        "lastvalue": "0",
        "prevvalue": "0",
        "discover": "0",
        "parameters": []
    }
],
    "id": 1
}

```

Finding dependent item

Find one Dependent item for item with ID "25545".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "item.get",
    "params": {
        "output": "extend",
        "filter": {
            "type": "18",
            "master_itemid": "25545"
        },
        "limit": "1"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "itemid": "25547",
            "type": "18",
            "snmp_oid": "",
            "hostid": "10116",
            "name": "Seconds",
            "key_": "apache.status.uptime.seconds",
            "delay": "0",
            "history": "90d",

```

```

    "trends": "365d",
    "status": "0",
    "value_type": "3",
    "trapper_hosts": "",
    "units": "",
    "formula": "",
    "error": "",
    "logtimefmt": "",
    "templateid": "0",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "0",
    "description": "",
    "inventory_link": "0",
    "lifetime": "30d",
    "state": "0",
    "evaltype": "0",
    "master_itemid": "25545",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0",
    "discover": "0",
    "parameters": []
  }
],
  "id": 1
}

```

Find HTTP agent item prototype

Find HTTP agent item prototype with request method HEAD for specific host id.

Request:

```

{
  "jsonrpc": "2.0",

```

```
"method": "itemprototype.get",
"params": {
  "hostids": "10254",
  "filter": {
    "type": "19",
    "request_method": "3"
  }
},
"id": 17,
"auth": "d678e0b85688ce578ff061bd29a20d3b"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "28257",
      "type": "19",
      "snmp_oid": "",
      "hostid": "10254",
      "name": "discovered",
      "key_": "item[{-#INAME}]",
      "delay": "{#IUPDATE}",
      "history": "90d",
      "trends": "30d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "",
      "formula": "",
      "error": "",
      "logtimefmt": "",
      "templateid": "28255",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "2",
      "interfaceid": "2",
      "description": "",
      "inventory_link": "0",
      "lifetime": "30d",
      "state": "0",
      "evaltype": "0",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "{#IURL}",
      "query_fields": [],
      "posts": "",
      "status_codes": "",
      "follow_redirects": "0",
      "post_type": "0",
      "http_proxy": "",
      "headers": [],
      "retrieve_mode": "0",
      "request_method": "3",
    }
  ]
}
```



```

        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "discover": "0",
        "parameters": []
    }
],
    "id": 17
}

```

See also

- [Application](#)
- [Host](#)
- [Graph prototype](#)
- [Trigger prototype](#)

Source

CItemPrototype::get() in ui/include/classes/api/services/CItemPrototype.php.

### itemprototype.update

Description

object itemprototype.update(object/array itemPrototypes)

This method allows to update existing item prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Item prototype properties to be updated.

The `itemid` property must be defined for each item prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard item prototype properties](#), the method accepts the following parameters.

Parameter	Type	Description
applications	array	IDs of the applications to replace the current applications.
applicationPrototypes	array	Names of the application prototypes to replace the current application prototypes.
preprocessing	array	Item prototype <a href="#">preprocessing</a> options to replace the current preprocessing options.

## Return values

(object) Returns an object containing the IDs of the updated item prototypes under the `itemids` property.

## Examples

### Changing the interface of an item prototype

Change the host interface that will be used by discovered items.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "27428",
    "interfaceid": "132"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27428"
    ]
  },
  "id": 1
}
```

### Update dependent item prototype

Update Dependent item prototype with new Master item prototype ID. Only dependencies on same host (template/discovery rule) are allowed, therefore Master and Dependent item should have same `hostid` and `ruleid`.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "master_itemid": "25570",
    "itemid": "189030"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "189030"
    ]
  },
  "id": 1
}
```

### Update HTTP agent item prototype

Change query fields and remove all custom headers.

#### Request:

```

{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "28305",
    "query_fields": [
      {
        "random": "qwertyuiopasdfghjklzxcvbnm"
      }
    ],
    "headers": []
  }
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28305"
    ]
  },
  "id": 1
}

```

Updating item preprocessing options

Update an item prototype with item preprocessing rule "Custom multiplier".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "44211",
    "preprocessing": [
      {
        "type": "1",
        "params": "4",
        "error_handler": "2",
        "error_handler_params": "5"
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}

```

Updating a script item prototype

Update a script item prototype with a different script and remove unnecessary parameters that were used by previous script.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "23865",
    "parameters": [],
    "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 1
}
```

Source

CItemPrototype::update() in ui/include/classes/api/services/CItemPrototype.php.

## LLD rule

This class is designed to work with low level discovery rules.

Object references:

- [LLD rule](#)

Available methods:

- [discoveryrule.copy](#) - copying LLD rules
- [discoveryrule.create](#) - creating new LLD rules
- [discoveryrule.delete](#) - deleting LLD rules
- [discoveryrule.get](#) - retrieving LLD rules
- [discoveryrule.update](#) - updating LLD rules

## > LLD rule object

The following objects are directly related to the `discoveryrule` API.

LLD rule

The low-level discovery rule object has the following properties.

Property	Type	Description
itemid	string	(readonly) ID of the LLD rule.

Property	Type	Description
<b>delay</b> (required)	string	Update interval of the LLD rule. Accepts seconds or time unit with suffix and with or without one or more <b>custom intervals</b> that consist of either flexible intervals and scheduling intervals as serialized strings. Also accepts user macros. Flexible intervals could be written as two macros separated by a forward slash. Intervals are separated by a semicolon.
<b>hostid</b> (required)	string	Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key. ID of the host that the LLD rule belongs to.
<b>interfaceid</b> (required)	string	ID of the LLD rule's host interface. Used only for host LLD rules.
<b>key_</b> (required)	string	Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, dependent, database monitor and script LLD rules. LLD rule key.
<b>name</b> (required)	string	Name of the LLD rule.

Property	Type	Description
<b>type</b> (required)	integer	Type of the LLD rule.  Possible values: 0 - Zabbix agent; 2 - Zabbix trapper; 3 - simple check; 5 - Zabbix internal; 7 - Zabbix agent (active); 10 - external check; 11 - database monitor; 12 - IPMI agent; 13 - SSH agent; 14 - TELNET agent; 16 - JMX agent; 18 - Dependent item; 19 - HTTP agent; 20 - SNMP agent; 21 - Script.
<b>url</b> (required)	string	URL string, required for HTTP agent LLD rule. Supports user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.
<b>allow_traps</b>	integer	HTTP agent LLD rule field. Allow to populate value as in trapper item type also.  0 - (default) Do not allow to accept incoming data. 1 - Allow to accept incoming data.

Property	Type	Description
authtype	integer	Used only by SSH agent or HTTP agent LLD rules.  SSH agent authentication method possible values: 0 - (default) password; 1 - public key.  HTTP agent authentication method possible values: 0 - (default) none 1 - basic 2 - NTLM
description	string	Description of the LLD rule.
error	string	(readonly) Error text if there are problems updating the LLD rule.
follow_redirects	integer	HTTP agent LLD rule field. Follow response redirects while pooling data.  0 - Do not follow redirects. 1 - (default) Follow redirects.
headers	object	HTTP agent LLD rule field. Object with HTTP(S) request headers, where header name is used as key and header value as value.  Example: { "User-Agent": "Zabbix" }
http_proxy	string	HTTP agent LLD rule field. HTTP(S) proxy connection string.
ipmi_sensor	string	IPMI sensor. Used only by IPMI LLD rules.
jmx_endpoint	string	JMX agent custom connection string.  Default value: service:jmx:rmi:///jndi/rmi://{HOSTNAME}:

Property	Type	Description
lifetime	string	Time period after which items that are no longer discovered will be deleted. Accepts seconds, time unit with suffix and user macro.
master_itemid	integer	Default: 30d. Master item ID. Recursion up to 3 dependent items and maximum count of dependent items equal to 999 are allowed. Discovery rule cannot be master item for another discovery rule.
output_format	integer	Required for Dependent item. HTTP agent LLD rule field. Should response be converted to JSON.
params	string	0 - (default) Store raw. 1 - Convert to JSON. Additional parameters depending on the type of the LLD rule: - executed script for SSH and Telnet LLD rules; - SQL query for database monitor LLD rules; - formula for calculated LLD rules.
parameters	array	Additional parameters for script type LLD rule. Array of objects with 'name' and 'value' properties, where name must be unique.



Property	Type	Description
password	string	Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent LLD rules.
post_type	integer	HTTP agent LLD rule field. Type of post data body stored in posts property.  0 - (default) Raw data. 2 - JSON data. 3 - XML data.
posts	string	HTTP agent LLD rule field. HTTP(S) request body data. Used with post_type.
privatekey	string	Name of the private key file.
publickey	string	Name of the public key file.
query_fields	array	HTTP agent LLD rule field. Query parameters. Array of objects with 'key': 'value' pairs, where value can be empty string.
request_method	integer	HTTP agent LLD rule field. Type of request method.  0 - (default) GET 1 - POST 2 - PUT 3 - HEAD
retrieve_mode	integer	HTTP agent LLD rule field. What part of response should be stored.  0 - (default) Body. 1 - Headers. 2 - Both body and headers will be stored.
snmp_oid	string	For request_method HEAD only 1 is allowed value. SNMP OID.
ssl_cert_file	string	HTTP agent LLD rule field. Public SSL Key file path.

Property	Type	Description
ssl_key_file	string	HTTP agent LLD rule field. Private SSL Key file path.
ssl_key_password	string	HTTP agent LLD rule field. Password for SSL Key file.
state	integer	(readonly) State of the LLD rule.  Possible values: 0 - (default) normal; 1 - not supported.
status	integer	Status of the LLD rule.  Possible values: 0 - (default) enabled LLD rule; 1 - disabled LLD rule.
status_codes	string	HTTP agent LLD rule field. Ranges of required HTTP status codes separated by commas. Also supports user macros as part of comma separated list.
templateid	string	(readonly) ID of the parent template LLD rule.
timeout	string	Item data polling request timeout. Used for HTTP agent and script LLD rules. Supports user macros.
trapper_hosts	string	default: 3s maximum value: 60s Allowed hosts. Used by trapper LLD rules or HTTP agent LLD rules.

Property	Type	Description
username	string	Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent LLD rules.
verify_host	integer	Required by SSH and Telnet LLD rules. HTTP agent LLD rule field. Validate host name in URL is in Common Name field or a Subject Alternate Name field of host certificate.
verify_peer	integer	0 - (default) Do not validate. 1 - Validate. HTTP agent LLD rule field. Validate is host certificate authentic.  0 - (default) Do not validate. 1 - Validate.

#### LLD rule filter

The LLD rule filter object defines a set of conditions that can be used to filter discovered objects. It has the following properties:

Property	Type	Description
<b>conditions</b> (required)	array	Set of filter conditions to use for filtering results.
<b>evaltype</b> (required)	integer	Filter condition evaluation method.  Possible values: 0 - and/or; 1 - and; 2 - or; 3 - custom expression.

Property	Type	Description
eval_formula	string	(readonly) Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its formulaid. The value of eval_formula is equal to the value of formula for filters with a custom expression.
formula	string	User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its formulaid. The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.  Required for custom expression filters.

#### LLD rule filter condition

The LLD rule filter condition object defines a separate check to perform on the value of an LLD macro. It has the following properties:

Property	Type	Description
<b>macro</b> (required)	string	LLD macro to perform the check on.
<b>value</b> (required)	string	Value to compare with.

Property	Type	Description
formulaid	string	Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
operator	integer	Condition operator.  Possible values: 8 - (default) matches regular expression; 9 - does not match regular expression.

**Note:**

To better understand how to use filters with various types of expressions, see examples on the [discoveryrule.get](#) and [discoveryrule.create](#) method pages.

LLD macro path

The LLD macro path has the following properties:

Property	Type	Description
<b>lld_macro</b> (required)	string	LLD macro.
<b>path</b> (required)	string	Selector for value which will be assigned to corresponding macro.

LLD rule preprocessing

The LLD rule preprocessing object has the following properties.

Property	Type	Description
<b>type</b> (required)	integer	<p>The preprocessing option type.</p> <p>Possible values:            5 - Regular expression matching;            11 - XML XPath;            12 - JSONPath;            15 - Does not match regular expression;            16 - Check for error in JSON;            17 - Check for error in XML;            20 - Discard unchanged with heartbeat;            23 - Prometheus to JSON;            24 - CSV to JSON;            25 - Replace.</p>
<b>params</b> (required)	string	<p>Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.</p>
<b>error_handler</b> (required)	integer	<p>Action type used in case of preprocessing step failure.</p> <p>Possible values:            0 - Error message is set by Zabbix server;            1 - Discard value;            2 - Set custom value;            3 - Set custom error message.</p>
<b>error_handler_params</b> (required)	string	<p>Error handler parameters. Used with <code>error_handler</code>.</p> <p>Must be empty, if <code>error_handler</code> is 0 or 1.            Can be empty if, <code>error_handler</code> is 2.            Cannot be empty, if <code>error_handler</code> is 3.</p>

The following parameters and error handlers are supported for each preprocessing type.

Preprocessing type	Name	Parameter 1	Parameter 2	Parameter 3	Supported error handlers
5	Regular	pattern <sup>1</sup>	output <sup>2</sup>		0, 1, 2, 3
	ex-				
	pres-				
	sion				
11	XML	path <sup>3</sup>			0, 1, 2, 3
	XPath				
12	JSONPath	path <sup>3</sup>			0, 1, 2, 3
15	Does	pattern <sup>1</sup>			0, 1, 2, 3
	not				
	match				
	regu-				
	lar				
	ex-				
	pres-				
	sion				
16	Check	path <sup>3</sup>			0, 1, 2, 3
	for				
	error				
	in				
	JSON				
17	Check	path <sup>3</sup>			0, 1, 2, 3
	for				
	error				
	in				
	XML				
20	Discard	seconds <sup>4, 5, 6</sup>			
	un-				
	changed				
	with				
	heart-				
	beat				
23	Prometheus	pattern <sup>5, 7</sup>			0, 1, 2, 3
	to				
	JSON				
24	CSV	character <sup>2</sup>	character <sup>2</sup>	0,1	0, 1, 2, 3
	to				
	JSON				
25	Replace	search string <sup>2</sup>	replacement <sup>2</sup>		

<sup>1</sup> regular expression

<sup>2</sup> string

<sup>3</sup> JSONPath or XML XPath

<sup>4</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>5</sup> user macro

<sup>6</sup> LLD macro

<sup>7</sup> Prometheus pattern following the syntax: `<metric name>{<label name>=<label value>, ...} == <value>`. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro.

<sup>8</sup> Prometheus output following the syntax: `<label name>`.

#### LLD rule overrides

The LLD rule overrides object defines a set of rules (filters, conditions and operations) that are used to override properties of different prototype objects. It has the following properties:

Property	Type	Description
<b>name</b> (required)	string	Unique override name.

Property	Type	Description
<b>step</b> (required)	integer	Unique order number of the override.
stop	integer	Stop processing next overrides if matches.  Possible values: 0 - (default) don't stop processing overrides; 1 - stop processing overrides if filter matches.
filter	object	Override filter.
operations	array	Override operations.

#### LLD rule override filter

The LLD rule override filter object defines a set of conditions that if they match the discovered object the override is applied. It has the following properties:

Property	Type	Description
<b>evaltype</b> (required)	integer	Override filter condition evaluation method.  Possible values: 0 - and/or; 1 - and; 2 - or; 3 - custom expression.
<b>conditions</b> (required)	array	Set of override filter conditions to use for matching the discovered objects.



Property	Type	Description
eval_formula	string	(readonly) Generated expression that will be used for evaluating override filter conditions. The expression contains IDs that reference specific override filter conditions by its formulaid. The value of eval_formula is equal to the value of formula for filters with a custom expression.
formula	string	User-defined expression to be used for evaluating conditions of override filters with a custom expression. The expression must contain IDs that reference specific override filter conditions by its formulaid. The IDs used in the expression must exactly match the ones defined in the override filter conditions: no condition can remain unused or omitted.  Required for custom expression override filters.

#### LLD rule override filter condition

The LLD rule override filter condition object defines a separate check to perform on the value of an LLD macro. It has the following properties:

Property	Type	Description
<b>macro</b> (required)	string	LLD macro to perform the check on.
<b>value</b> (required)	string	Value to compare with.

Property	Type	Description
formulaid	string	Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.
operator	integer	Condition operator.  Possible values: 8 - (default) matches regular expression; 9 - does not match regular expression.

#### LLD rule override operation

The LLD rule override operation is combination of conditions and actions to perform on the prototype object. It has the following properties:

Property	Type	Description
<b>operationobject</b> (required)	integer	Type of discovered object to perform the action.  Possible values: 0 - Item prototype; 1 - Trigger prototype; 2 - Graph prototype; 3 - Host prototype.

Property	Type	Description
operator	integer	Override condition operator.  Possible values: 0 - (default) equals; 1 - does not equal; 2 - contains; 3 - does not contain; 8 - matches; 9 - does not match.
value	string	Pattern to match item, trigger, graph or host prototype name depending on selected object.
opstatus	object	Override operation status object for item, trigger and host prototype objects.
opdiscover	object	Override operation discover status object (all object types).
opperiod	object	Override operation period (update interval) object for item prototype object.
ophistory	object	Override operation history object for item prototype object.
optrends	object	Override operation trends object for item prototype object.
opseverity	object	Override operation severity object for trigger prototype object.
optag	array	Override operation tag object for trigger and host prototype objects.
optemplate	array	Override operation template object for host prototype object.

Property	Type	Description
opinVENTORY	object	Override operation inventory object for host prototype object.

LLD rule override operation status

LLD rule override operation status that is set to discovered object. It has the following properties:

Property	Type	Description
<b>status</b> (required)	integer	Override the status for selected object.  Possible values: 0 - Create enabled; 1 - Create disabled.

LLD rule override operation discover

LLD rule override operation discover status that is set to discovered object. It has the following properties:

Property	Type	Description
<b>discover</b> (required)	integer	Override the discover status for selected object.  Possible values: 0 - Yes, continue discovering the objects; 1 - No, new objects will not be discovered and existing ones will be marked as lost.

LLD rule override operation period

LLD rule override operation period is an update interval value (supports custom intervals) that is set to discovered item. It has the following properties:

Property	Type	Description
<b>delay</b> (required)	string	Override the update interval of the item prototype. Accepts seconds or a time unit with suffix (30s,1m,2h,1d) as well as flexible and scheduling intervals and user macros or LLD macros. Multiple intervals are separated by a semicolon.

#### LLD rule override operation history

LLD rule override operation history value that is set to discovered item. It has the following properties:

Property	Type	Description
<b>history</b> (required)	string	Override the history of item prototype which is a time unit of how long the history data should be stored. Also accepts user macro and LLD macro.

#### LLD rule override operation trends

LLD rule override operation trends value that is set to discovered item. It has the following properties:

Property	Type	Description
<b>trends</b> (required)	string	Override the trends of item prototype which is a time unit of how long the trends data should be stored. Also accepts user macro and LLD macro.

#### LLD rule override operation severity

LLD rule override operation severity value that is set to discovered trigger. It has the following properties:

Property	Type	Description
<b>severity</b> (required)	integer	Override the severity of trigger prototype.  Possible values are: 0 - (default) not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.

#### LLD rule override operation tag

LLD rule override operation tag object contains tag name and value that are set to discovered object. It has the following properties:

Property	Type	Description
<b>tag</b> (required)	string	New tag name.
value	string	New tag value.

#### LLD rule override operation template

LLD rule override operation template object that is linked to discovered host. It has the following properties:

Property	Type	Description
<b>templateid</b> (required)	string	Override the template of host prototype linked templates.

#### LLD rule override operation inventory

LLD rule override operation inventory mode value that is set to discovered host. It has the following properties:

Property	Type	Description
<b>inventory_mode</b> (required)	integer	Override the host prototype inventory mode.  Possible values are: -1 - disabled; 0 - (default) manual; 1 - automatic.

### discoveryrule.copy

#### Description

object `discoveryrule.copy(object parameters)`

This method allows to copy LLD rules with all of the prototypes to the given hosts.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters defining the LLD rules to copy and the target hosts.

Parameter	Type	Description
discoveryids	array	IDs of the LLD rules to be copied.
hostids	array	IDs of the hosts to copy the LLD rules to.

## Return values

(boolean) Returns true if the copying was successful.

## Examples

Copy an LLD rule to multiple hosts

Copy an LLD rule to two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.copy",
  "params": {
    "discoveryids": [
      "27426"
    ],
    "hostids": [
      "10196",
      "10197"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

## Source

CDiscoveryrule::copy() in ui/include/classes/api/services/CDiscoveryRule.php.

## discoveryrule.create

### Description

object discoveryrule.create(object/array lldRules)

This method allows to create new LLD rules.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object/array) LLD rules to create.

Additionally to the [standard LLD rule properties](#), the method accepts the following parameters.

Parameter	Type	Description
filter	object	LLD rule <b>filter</b> object for the LLD rule.
preprocessing	array	LLD rule <b>preprocessing</b> options.
lld_macro_paths	array	LLD rule <b>lld_macro_path</b> options.
overrides	array	LLD rule <b>overrides</b> options.

#### Return values

(object) Returns an object containing the IDs of the created LLD rules under the `itemids` property. The order of the returned IDs matches the order of the passed LLD rules.

#### Examples

##### Creating an LLD rule

Create a Zabbix agent LLD rule to discover mounted file systems. Discovered items will be updated every 30 seconds.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Mounted filesystem discovery",
    "key_": "vfs.fs.discovery",
    "hostid": "10197",
    "type": "0",
    "interfaceid": "112",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}
```

##### Using a filter

Create an LLD rule with a set of conditions to filter the results by. The conditions will be grouped together using the logical "and" operator.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Filtered LLD rule",
    "key_": "lld",
    "hostid": "10116",
    "type": "0",
    "interfaceid": "13",
    "delay": "30s",
    "filter": {
      "evaltype": 1,
      "conditions": [
        {

```



```

        "macro": "#{MACRO1}",
        "value": "@regex1"
    },
    {
        "macro": "#{MACRO2}",
        "value": "@regex2"
    },
    {
        "macro": "#{MACRO3}",
        "value": "@regex3"
    }
]
}
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}

```

Creating a LLD rule with macro paths

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "LLD rule with LLD macro paths",
    "key_": "lld",
    "hostid": "10116",
    "type": "0",
    "interfaceid": "13",
    "delay": "30s",
    "lld_macro_paths": [
      {
        "lld_macro": "#{MACRO1}",
        "path": "$.path.1"
      },
      {
        "lld_macro": "#{MACRO2}",
        "path": "$.path.2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [

```

```

    "27665"
  ]
},
"id": 1
}

```

#### Using a custom expression filter

Create an LLD rule with a filter that will use a custom expression to evaluate the conditions. The LLD rule must only discover objects the "{#MACRO1}" macro value of which matches both regular expression "regex1" and "regex2", and the value of "{#MACRO2}" matches either "regex3" or "regex4". The formula IDs "A", "B", "C" and "D" have been chosen arbitrarily.

#### Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Filtered LLD rule",
    "key_": "lld",
    "hostid": "10116",
    "type": "0",
    "interfaceid": "13",
    "delay": "30s",
    "filter": {
      "evaltype": 3,
      "formula": "(A and B) and (C or D)",
      "conditions": [
        {
          "macro": "{#MACRO1}",
          "value": "@regex1",
          "formulaid": "A"
        },
        {
          "macro": "{#MACRO1}",
          "value": "@regex2",
          "formulaid": "B"
        },
        {
          "macro": "{#MACRO2}",
          "value": "@regex3",
          "formulaid": "C"
        },
        {
          "macro": "{#MACRO2}",
          "value": "@regex4",
          "formulaid": "D"
        }
      ]
    }
  }
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

#### Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  }
},
"id": 1
}

```

```
}
```

Using custom query fields and headers

Create LLD rule with custom query fields and headers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "hostid": "10257",
    "interfaceid": "5",
    "type": "19",
    "name": "API HTTP agent",
    "key_": "api_discovery_rule",
    "value_type": "3",
    "delay": "5s",
    "url": "http://127.0.0.1?discoverer.php",
    "query_fields": [
      {
        "mode": "json"
      },
      {
        "elements": "2"
      }
    ],
    "headers": {
      "X-Type": "api",
      "Authorization": "Bearer mF_A.B5f-2.1JcM"
    },
    "allow_traps": "1",
    "trapper_hosts": "127.0.0.1",
    "id": 35,
    "auth": "d678e0b85688ce578ff061bd29a20d3b",
  }
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28336"
    ]
  },
  "id": 35
}
```

Creating a LLD rule with preprocessing

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Discovery rule with preprocessing",
    "key_": "lld.with.preprocessing",
    "hostid": "10001",
    "ruleid": "27665",
    "type": 0,
    "value_type": 3,
    "delay": "60s",
  }
}
```

```

    "interfaceid": "1155",
    "preprocessing": [
      {
        "type": "20",
        "params": "20",
        "error_handler": "0",
        "error_handler_params": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}

```

Creating a LLD rule with overrides

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Discover database host",
    "key_": "lld.with.overrides",
    "hostid": "10001",
    "type": 0,
    "value_type": 3,
    "delay": "60s",
    "interfaceid": "1155",
    "overrides": [
      {
        "name": "Discover MySQL host",
        "step": "1",
        "stop": "1",
        "filter": {
          "evaltype": "2",
          "conditions": [
            {
              "macro": "{#UNIT.NAME}",
              "operator": "8",
              "value": "~mysqld\\.service$"
            },
            {
              "macro": "{#UNIT.NAME}",
              "operator": "8",
              "value": "~mariadb\\.service$"
            }
          ]
        },
        "operations": [
          {
            "operationobject": "3",
            "operator": "2",

```

```

        "value": "Database host",
        "opstatus": {
            "status": "0"
        },
        "optemplate": [
            {
                "templateid": "10170"
            }
        ],
        "optag": [
            {
                "tag": "Database",
                "value": "MySQL"
            }
        ]
    }
],
{
    "name": "Discover PostgreSQL host",
    "step": "2",
    "stop": "1",
    "filter": {
        "evaltype": "0",
        "conditions": [
            {
                "macro": "#{UNIT.NAME}",
                "operator": "8",
                "value": "^postgresql\\.service$"
            }
        ]
    },
    "operations": [
        {
            "operationobject": "3",
            "operator": "2",
            "value": "Database host",
            "opstatus": {
                "status": "0"
            },
            "optemplate": [
                {
                    "templateid": "10263"
                }
            ],
            "optag": [
                {
                    "tag": "Database",
                    "value": "PostgreSQL"
                }
            ]
        }
    ]
}
],
{
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "30980"
    ]
  },
  "id": 1
}
```

Create script LLD rule

Create a simple data collection using a script LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Script example",
    "key_": "custom.script.lldrule",
    "hostid": "12345",
    "type": 21,
    "value_type": 4,
    "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
    "parameters": [{
      "name": "host",
      "value": "{HOST.CONN}"
    }],
    "timeout": "6s",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 3
}
```

See also

- [LLD rule filter](#)
- [LLD macro paths](#)
- [LLD rule preprocessing](#)

Source

CDiscoveryRule::create() in ui/include/classes/api/services/CDiscoveryRule.php.

### **discoveryrule.delete**

Description

object `discoveryrule.delete(array lldRuleIds)`

This method allows to delete LLD rules.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(array) IDs of the LLD rules to delete.

**Return values**

(object) Returns an object containing the IDs of the deleted LLD rules under the `itemids` property.

**Examples****Deleting multiple LLD rules**

Delete two LLD rules.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.delete",
  "params": [
    "27665",
    "27668"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "ruleids": [
      "27665",
      "27668"
    ]
  },
  "id": 1
}
```

**Source**

CDiscoveryRule::delete() in `ui/include/classes/api/services/CDiscoveryRule.php`.

**discoveryrule.get****Description**

`integer/array discoveryrule.get(object parameters)`

The method allows to retrieve LLD rules according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
itemids	string/array	Return only LLD rules with the given IDs.
groupids	string/array	Return only LLD rules that belong to the hosts from the given groups.
hostids	string/array	Return only LLD rules that belong to the given hosts.
inherited	boolean	If set to true return only LLD rules inherited from a template.
interfaceids	string/array	Return only LLD rules use the given host interfaces.
monitored	boolean	If set to true return only enabled LLD rules that belong to monitored hosts.
templated	boolean	If set to true return only LLD rules that belong to templates.
templateids	string/array	Return only LLD rules that belong to the given templates.
selectFilter	query	Return a <b>filter</b> property with data of the filter used by the LLD rule.
selectGraphs	query	Returns a <b>graphs</b> property with graph prototypes that belong to the LLD rule.
selectHostPrototypes	query	Supports count. Return a <b>hostPrototypes</b> property with host prototypes that belong to the LLD rule.
selectHosts	query	Supports count. Return a <b>hosts</b> property with an array of hosts that the LLD rule belongs to.



Parameter	Type	Description
selectItems	query	Return an <b>items</b> property with item prototypes that belong to the LLD rule.
selectTriggers	query	Supports count. Return a <b>triggers</b> property with trigger prototypes that belong to the LLD rule.
selectApplicationPrototypes	query	Supports count. Return an <b>applicationPrototypes</b> property with application prototypes that belong to all item prototypes that belong to this LLD rule.
selectLLDMacroPaths	query	Return an <b>lld_macro_paths</b> property with a list of LLD macros and paths to values assigned to each corresponding macro.

Parameter	Type	Description
selectPreprocessingquery		<p>Return a preprocessing property with LLD rule preprocessing options.</p> <p>It has the following properties:</p> <p>type - (string) The preprocessing option type: 5 - Regular expression matching; 11 - XML XPath; 12 - JSONPath; 15 - Does not match regular expression; 16 - Check for error in JSON; 17 - Check for error in XML; 20 - Discard unchanged with heartbeat; 23 - Prometheus to JSON; 24 - CSV to JSON; 25 - Replace.</p> <p>params - (string) Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.</p> <p>error_handler - (string) Action type used in case of preprocessing step failure: 0 - Error message is set by Zabbix server; 1 - Discard value; 2 - Set custom value; 3 - Set custom error message.</p> <p>error_handler_params - (string) Error handler parameters.</p>

Parameter	Type	Description
selectOverrides	query	Return an <code>lld_rule_overrides</code> property with a list of override filters, conditions and operations that are performed on prototype objects. Return only those results that exactly match the given filter.
filter	object	Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.
limitSelects	integer	Supports additional filters: <code>host</code> - technical name of the host that the LLD rule belongs to. Limits the number of records returned by subselects.
sortfield	string/array	Applies to the following subselects: <code>selectItems</code> ; <code>selectGraphs</code> ; <code>selectTriggers</code> . Sort the result by the given properties.
countOutput	boolean	Possible values are: <code>itemid</code> , <code>name</code> , <code>key_</code> , <code>delay</code> , <code>type</code> and <code>status</code> . These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	

Parameter	Type	Description
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving discovery rules from a host

Retrieve all discovery rules from host "10202".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.get",
  "params": {
    "output": "extend",
    "hostids": "10202"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "27425",
      "type": "0",
      "snmp_oid": "",
      "hostid": "10202",
      "name": "Network interface discovery",
      "key_": "net.if.discovery",
      "delay": "1h",
      "state": "0",
      "status": "0",
      "trapper_hosts": "",
      "error": "",
      "templateid": "22444",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "interfaceid": "119",
      "description": "Discovery of network interfaces as defined in global regular expression \\\"Netw",
      "lifetime": "30d",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "",
      "query_fields": [],
    }
  ]
}
```

```

    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "parameters": []
  },
  {
    "itemid": "27426",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10202",
    "name": "Mounted filesystem discovery",
    "key_": "vfs.fs.discovery",
    "delay": "1h",
    "state": "0",
    "status": "0",
    "trapper_hosts": "",
    "error": "",
    "templateid": "22450",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "interfaceid": "119",
    "description": "Discovery of file systems of different types as defined in global regular expr
    "lifetime": "30d",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "parameters": []
  }
],
"id": 1

```

```
}
```

### Retrieving filter conditions

Retrieve the name of the LLD rule "24681" and its filter conditions. The filter uses the "and" evaluation type, so the formula property is empty and eval\_formula is generated automatically.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.get",
  "params": {
    "output": [
      "name"
    ],
    "selectFilter": "extend",
    "itemids": ["24681"]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "24681",
      "name": "Filtered LLD rule",
      "filter": {
        "evaltype": "1",
        "formula": "",
        "conditions": [
          {
            "macro": "{#MACRO1}",
            "value": "@regex1",
            "operator": "8",
            "formulaid": "A"
          },
          {
            "macro": "{#MACRO2}",
            "value": "@regex2",
            "operator": "8",
            "formulaid": "B"
          },
          {
            "macro": "{#MACRO3}",
            "value": "@regex3",
            "operator": "8",
            "formulaid": "C"
          }
        ],
        "eval_formula": "A and B and C"
      }
    }
  ],
  "id": 1
}
```

### Retrieve LLD rule by URL

Retrieve LLD rule for host by rule URL field value. Only exact match of URL string defined for LLD rule is supported.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.get",
  "params": {
    "hostids": "10257",
    "filter": {
      "type": "19",
      "url": "http://127.0.0.1/discoverer.php"
    }
  },
  "id": 39,
  "auth": "d678e0b85688ce578ff061bd29a20d3b"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "28336",
      "type": "19",
      "snmp_oid": "",
      "hostid": "10257",
      "name": "API HTTP agent",
      "key_": "api_discovery_rule",
      "delay": "5s",
      "history": "90d",
      "trends": "0",
      "status": "0",
      "value_type": "4",
      "trapper_hosts": "",
      "units": "",
      "error": "",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "1",
      "interfaceid": "5",
      "description": "",
      "inventory_link": "0",
      "lifetime": "30d",
      "state": "0",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "http://127.0.0.1/discoverer.php",
      "query_fields": [
        {
          "mode": "json"
        },
        {
          "elements": "2"
        }
      ],
      "posts": ""
    }
  ]
}
```

```

        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": {
            "X-Type": "api",
            "Authorization": "Bearer mF_A.B5f-2.1JcM"
        },
        "retrieve_mode": "0",
        "request_method": "1",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "parameters": []
    }
],
    "id": 39
}

```

Retrieve LLD rule with overrides

Retrieve one LLD rule that has various override settings.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "discoveryrule.get",
    "params": {
        "output": ["name"],
        "itemids": "30980",
        "selectOverrides": ["name", "step", "stop", "filter", "operations"]
    },
    "id": 39,
    "auth": "d678e0b85688ce578ff061bd29a20d3b"
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "name": "Discover database host"
            "overrides": [
                {
                    "name": "Discover MySQL host",
                    "step": "1",
                    "stop": "1",
                    "filter": {
                        "evaltype": "2",
                        "formula": "",
                        "conditions": [
                            {
                                "macro": "{#UNIT.NAME}",
                                "operator": "8",
                                "value": "~mysqld\\.service$"
                                "formulaid": "A"
                            },
                            {
                                "macro": "{#UNIT.NAME}",
                                "operator": "8",

```



```

        "value": "^mariadb\\.service$"
        "formulaid": "B"
    }
    ],
    "eval_formula": "A or B"
},
"operations": [
    {
        "operationobject": "3",
        "operator": "2",
        "value": "Database host",
        "opstatus": {
            "status": "0"
        },
        "optag": [
            {
                "tag": "Database",
                "value": "MySQL"
            }
        ],
        "optemplate": [
            {
                "templateid": "10170"
            }
        ]
    }
]
},
{
    "name": "Discover PostgreSQL host",
    "step": "2",
    "stop": "1",
    "filter": {
        "evaltype": "0",
        "formula": "",
        "conditions": [
            {
                "macro": "{#UNIT.NAME}",
                "operator": "8",
                "value": "^postgresql\\.service$"
                "formulaid": "A"
            }
        ],
        "eval_formula": "A"
    },
    "operations": [
        {
            "operationobject": "3",
            "operator": "2",
            "value": "Database host",
            "opstatus": {
                "status": "0"
            },
            "optag": [
                {
                    "tag": "Database",
                    "value": "PostgreSQL"
                }
            ],
            "optemplate": [
                {
                    "templateid": "10263"
                }
            ]
        }
    ]
}

```

```

    ],
    "id": 39
  },
  ]
}

```

See also

- [Graph prototype](#)
- [Host](#)
- [Item prototype](#)
- [LLD rule filter](#)
- [Trigger prototype](#)

Source

CDiscoveryRule::get() in ui/include/classes/api/services/CDiscoveryRule.php.

### discoveryrule.update

Description

object discoveryrule.update(object/array lldRules)

This method allows to update existing LLD rules.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) LLD rule properties to be updated.

The `itemid` property must be defined for each LLD rule, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard LLD rule properties](#), the method accepts the following parameters.

Parameter	Type	Description
filter	object	LLD rule <a href="#">filter</a> object to replace the current filter.
preprocessing	array	LLD rule <a href="#">preprocessing</a> options to replace the current preprocessing options.
lld_macro_paths	array	LLD rule <a href="#">lld_macro_path</a> options.
overrides	array	LLD rule <a href="#">overrides</a> options.

Return values

(object) Returns an object containing the IDs of the updated LLD rules under the `itemids` property.

Examples

## Adding a filter to an LLD rule

Add a filter so that the contents of the `{#FSTYPE}` macro would match the `@File` systems for discovery regexp.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "22450",
    "filter": {
      "evaltype": 1,
      "conditions": [
        {
          "macro": "{#FSTYPE}",
          "value": "@File systems for discovery"
        }
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22450"
    ]
  },
  "id": 1
}
```

## Adding LLD macro paths

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "22450",
    "lld_macro_paths": [
      {
        "lld_macro": "{#MACRO1}",
        "path": "$.json.path"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22450"
    ]
  },
  "id": 1
}
```

```
}
```

#### Disable trapping

Disable LLD trapping for discovery rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "28336",
    "allow_traps": "0"
  },
  "id": 36,
  "auth": "d678e0b85688ce578ff061bd29a20d3b"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28336"
    ]
  },
  "id": 36
}
```

#### Updating LLD rule preprocessing options

Update an LLD rule with preprocessing rule "JSONPath".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "44211",
    "preprocessing": [
      {
        "type": "12",
        "params": "$.path.to.json",
        "error_handler": "2",
        "error_handler_params": "5"
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}
```

#### Updating LLD rule script

Update an LLD rule script with a different script and remove unnecessary parameters that were used by previous script.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "23865",
    "parameters": [],
    "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 1
}
```

Source

CDiscoveryRule::update() in ui/include/classes/api/services/CDiscoveryRule.php.

## Maintenance

This class is designed to work with maintenances.

Object references:

- [Maintenance](#)
- [Time period](#)

Available methods:

- [maintenance.create](#) - creating new maintenances
- [maintenance.delete](#) - deleting maintenances
- [maintenance.get](#) - retrieving maintenances
- [maintenance.update](#) - updating maintenances

### > Maintenance object

The following objects are directly related to the `maintenance` API.

Maintenance

The maintenance object has the following properties.

Property	Type	Description
<code>maintenanceid</code>	string	(readonly) ID of the maintenance.
<b>name</b> (required)	string	Name of the maintenance.
<b>active_since</b> (required)	timestamp	Time when the maintenance becomes active.

Property	Type	Description
<b>active_till</b> (required)	timestamp	Time when the maintenance stops being active.
description	string	Description of the maintenance.
maintenance_type	integer	Type of maintenance.  Possible values: 0 - (default) with data collection; 1 - without data collection.
tags_evaltype	integer	Problem tag evaluation method.  Possible values: 0 - (default) And/Or; 2 - Or.

#### Time period

The time period object is used to define periods when the maintenance must come into effect. It has the following properties.

Property	Type	Description
timeperiodid	string	(readonly) ID of the maintenance.
day	integer	Day of the month when the maintenance must come into effect.  Required only for monthly time periods.

Property	Type	Description
dayofweek	integer	<p>Days of the week when the maintenance must come into effect.</p> <p>Days are stored in binary form with each bit representing the corresponding day. For example, 4 equals 100 in binary and means, that maintenance will be enabled on Wednesday.</p>
every	integer	<p>Used for weekly and monthly time periods. Required only for weekly time periods. For daily and weekly periods every defines day or week intervals at which the maintenance must come into effect.</p> <p>For monthly periods every defines the week of the month when the maintenance must come into effect.</p> <p>Possible values:  1 - first week;  2 - second week;  3 - third week;  4 - fourth week;  5 - last week.</p>

Property	Type	Description
month	integer	Months when the maintenance must come into effect.  Months are stored in binary form with each bit representing the corresponding month. For example, 5 equals 101 in binary and means, that maintenance will be enabled in January and March.
period	integer	Required only for monthly time periods. Duration of the maintenance period in seconds.
start_date	timestamp	Default: 3600. Date when the maintenance period must come into effect.  Required only for one time periods.
start_time	integer	Default: current date. Time of day when the maintenance starts in seconds.
timeperiod_type	integer	Required for daily, weekly and monthly periods. Type of time period.  Possible values: 0 - (default) one time only; 2 - daily; 3 - weekly; 4 - monthly.

#### Problem tag

The problem tag object is used to define which problems must be suppressed when the maintenance comes into effect. It has the following properties.



Property	Type	Description
<b>tag</b> (required)	string	Problem tag name.
operator	integer	Condition operator.
value	string	Possible values: 0 - Equals; 2 - (default) Contains. Problem tag value.

## **maintenance.create**

### Description

object `maintenance.create(object/array maintenances)`

This method allows to create new maintenances.

#### **Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Maintenances to create.

Additionally to the [standard maintenance properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>groupids</b> (required)	array	IDs of the host groups that will undergo maintenance.
<b>hostids</b> (required)	array	IDs of the hosts that will undergo maintenance.
<b>timeperiods</b> (required)	array	Maintenance <a href="#">time periods</a> .
tags	array	<a href="#">Problem tags</a> .  Define what problems must be suppressed. If no tags are given, all active maintenance host problems will be suppressed.

#### **Attention:**

At least one host or host group must be defined for each maintenance.

### Return values

(object) Returns an object containing the IDs of the created maintenances under the `maintenanceids` property. The order of the returned IDs matches the order of the passed maintenances.

### Examples

## Creating a maintenance

Create a maintenance with data collection for host group "2" with problem tags **service:mysql** and **error**. It must be active from 22.01.2013 till 22.01.2014, come in effect each Sunday at 18:00 and last for one hour.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.create",
  "params": {
    "name": "Sunday maintenance",
    "active_since": 1358844540,
    "active_till": 1390466940,
    "tags_evaltype": 0,
    "groupids": [
      "2"
    ],
    "timeperiods": [
      {
        "timeperiod_type": 3,
        "every": 1,
        "dayofweek": 64,
        "start_time": 64800,
        "period": 3600
      }
    ],
    "tags": [
      {
        "tag": "service",
        "operator": "0",
        "value": "mysql"
      },
      {
        "tag": "error",
        "operator": "2",
        "value": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "maintenanceids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [Time period](#)

Source

CMaintenance::create() in ui/include/classes/api/services/CMaintenance.php.

## **maintenance.delete**

Description

`object maintenance.delete(array maintenanceIds)`

This method allows to delete maintenances.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the maintenances to delete.

Return values

(object) Returns an object containing the IDs of the deleted maintenances under the `maintenanceids` property.

Examples

Deleting multiple maintenances

Delete two maintenances.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.delete",
  "params": [
    "3",
    "1"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "maintenanceids": [
      "3",
      "1"
    ]
  },
  "id": 1
}
```

Source

`CMaintenance::delete()` in `ui/include/classes/api/services/CMaintenance.php`.

## **maintenance.get**

Description

`integer/array maintenance.get(object parameters)`

The method allows to retrieve maintenances according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
groupids	string/array	Return only maintenances that are assigned to the given host groups.
hostids	string/array	Return only maintenances that are assigned to the given hosts.
maintenanceids	string/array	Return only maintenances with the given IDs.
selectGroups	query	Return a <b>groups</b> property with host groups assigned to the maintenance.
selectHosts	query	Return a <b>hosts</b> property with hosts assigned to the maintenance.
selectTags	query	Return a <b>tags</b> property with problem tags of the maintenance.
selectTimeperiods	query	Return a <b>timeperiods</b> property with time periods of the maintenance.
sortfield	string/array	Sort the result by the given properties.  Possible values are: maintenanceid, name and maintenance_type.
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving maintenances

Retrieve all configured maintenances, and the data about the assigned host groups, defined time periods and problem tags.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.get",
  "params": {
    "output": "extend",
    "selectGroups": "extend",
    "selectTimeperiods": "extend",
    "selectTags": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "maintenanceid": "3",
      "name": "Sunday maintenance",
      "maintenance_type": "0",
      "description": "",
      "active_since": "1358844540",
      "active_till": "1390466940",
      "tags_evaltype": "0",
      "groups": [
        {
          "groupid": "4",
          "name": "Zabbix servers",
          "internal": "0"
        }
      ],
      "timeperiods": [
        {
          "timeperiodid": "4",
          "timeperiod_type": "3",
          "every": "1",
          "month": "0",
          "dayofweek": "1",
          "day": "0",
          "start_time": "64800",
          "period": "3600",
          "start_date": "2147483647"
        }
      ],
      "tags": [
        {
          "tag": "service",
          "operator": "0",
          "value": "mysqld",
        },
        {
          "tag": "error",

```

```

        "operator": "2",
        "value": ""
    }
    ]
}
],
"id": 1
}

```

See also

- [Host](#)
- [Host group](#)
- [Time period](#)

Source

CMaintenance::get() in ui/include/classes/api/services/CMaintenance.php.

## **maintenance.update**

Description

object maintenance.update(object/array maintenances)

This method allows to update existing maintenances.

### **Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Maintenance properties to be updated.

The `maintenanceid` property must be defined for each maintenance, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard maintenance properties](#), the method accepts the following parameters.

Parameter	Type	Description
groupids	array	IDs of the host groups to replace the current groups.
hostids	array	IDs of the hosts to replace the current hosts.
timeperiods	array	Maintenance <a href="#">time periods</a> to replace the current periods.
tags	array	<a href="#">Problem tags</a> .

### **Attention:**

At least one host or host group must be defined for each maintenance.

Return values

(object) Returns an object containing the IDs of the updated maintenances under the `maintenanceids` property.

Examples

Assigning different hosts

Replace the hosts currently assigned to maintenance "3" with two different ones.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "maintenance.update",
  "params": {
    "maintenanceid": "3",
    "hostids": [

```

```

        "10085",
        "10084"
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "maintenanceids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Time period](#)

Source

CMaintenance::update() in ui/include/classes/api/services/CMaintenance.php.

## Map

This class is designed to work with maps.

Object references:

- [Map](#)
- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shape](#)
- [Map line](#)

Available methods:

- [map.create](#) - create new maps
- [map.delete](#) - delete maps
- [map.get](#) - retrieve maps
- [map.update](#) - update maps

### > Map object

The following objects are directly related to the map API.

Map

The map object has the following properties.

Property	Type	Description
sysmapid	string	(readonly) ID of the map.
<b>height</b> (required)	integer	Height of the map in pixels.

Property	Type	Description
<b>name</b> (required)	string	Name of the map.
<b>width</b> (required)	integer	Width of the map in pixels.
backgroundid	string	ID of the image used as the background for the map.
expand_macros	integer	Whether to expand macros in labels when configuring the map.  Possible values: 0 - (default) do not expand macros; 1 - expand macros.
expandproblem	integer	Whether the the problem trigger will be displayed for elements with a single problem.  Possible values: 0 - always display the number of problems; 1 - (default) display the problem trigger if there's only one problem.
grid_align	integer	Whether to enable grid aligning.  Possible values: 0 - disable grid aligning; 1 - (default) enable grid aligning.
grid_show	integer	Whether to show the grid on the map.  Possible values: 0 - do not show the grid; 1 - (default) show the grid.
grid_size	integer	Size of the map grid in pixels.  Supported values: 20, 40, 50, 75 and 100.  Default: 50.



Property	Type	Description
highlight	integer	Whether icon highlighting is enabled.  Possible values: 0 - highlighting disabled; 1 - (default) highlighting enabled.
iconmapid	string	ID of the icon map used on the map.
label_format	integer	Whether to enable advanced labels.  Possible values: 0 - (default) disable advanced labels; 1 - enable advanced labels.
label_location	integer	Location of the map element label.  Possible values: 0 - (default) bottom; 1 - left; 2 - right; 3 - top.
label_string_host	string	Custom label for host elements.  Required for maps with custom host label type.
label_string_host_group	string	Custom label for host group elements.  Required for maps with custom host group label type.
label_string_image	string	Custom label for image elements.  Required for maps with custom image label type.
label_string_map	string	Custom label for map elements.  Required for maps with custom map label type.

Property	Type	Description
label_string_trigger	string	Custom label for trigger elements.
label_type	integer	Required for maps with custom trigger label type. Map element label type.  Possible values: 0 - label; 1 - IP address; 2 - (default) element name; 3 - status only; 4 - nothing.
label_type_host	integer	Label type for host elements.  Possible values: 0 - label; 1 - IP address; 2 - (default) element name; 3 - status only; 4 - nothing;
label_type_hostgroup	integer	5 - custom. Label type for host group elements.  Possible values: 0 - label; 2 - (default) element name; 3 - status only; 4 - nothing; 5 - custom.
label_type_image	integer	Label type for host group elements.  Possible values: 0 - label; 2 - (default) element name; 4 - nothing; 5 - custom.
label_type_map	integer	Label type for map elements.  Possible values: 0 - label; 2 - (default) element name; 3 - status only; 4 - nothing; 5 - custom.

Property	Type	Description
label_type_trigger	integer	Label type for trigger elements.  Possible values: 0 - label; 2 - (default) element name; 3 - status only; 4 - nothing; 5 - custom.
markelements	integer	Whether to highlight map elements that have recently changed their status.  Possible values: 0 - (default) do not highlight elements; 1 - highlight elements.
severity_min	integer	Minimum severity of the triggers that will be displayed on the map.  Refer to the <a href="#">trigger "severity" property</a> for a list of supported trigger severities.
show_unack	integer	How problems should be displayed.  Possible values: 0 - (default) display the count of all problems; 1 - display only the count of unacknowledged problems; 2 - display the count of acknowledged and unacknowledged problems separately.
userid	string	Map owner user ID.
private	integer	Type of map sharing.  Possible values: 0 - public map; 1 - (default) private map.

Property	Type	Description
show_suppressed	integer	Whether suppressed problems are shown.  Possible values: 0 - (default) hide suppressed problems; 1 - show suppressed problems.

## Map element

The map element object defines an object displayed on a map. It has the following properties.

Property	Type	Description
selementid	string	(readonly) ID of the map element.
<b>elements</b> (required)	array	Element data object. Required for host, host group, trigger and map type elements.
<b>elementtype</b> (required)	integer	Type of map element.  Possible values: 0 - host; 1 - map; 2 - trigger; 3 - host group; 4 - image.
<b>iconid_off</b> (required)	string	ID of the image used to display the element in default state.
areatype	integer	How separate host group hosts should be displayed.  Possible values: 0 - (default) the host group element will take up the whole map; 1 - the host group element will have a fixed size.
application	string	Name of the application to display problems from. Used only for host and host group map elements.

Property	Type	Description
elementsubtype	integer	How a host group element should be displayed on a map.  Possible values: 0 - (default) display the host group as a single element; 1 - display each host in the group separately.
height	integer	Height of the fixed size host group element in pixels.
iconid_disabled	string	Default: 200. ID of the image used to display disabled map elements. Unused for image elements.
iconid_maintenance	string	ID of the image used to display map elements in maintenance. Unused for image elements.
iconid_on	string	ID of the image used to display map elements with problems. Unused for image elements.
label	string	Label of the element.
label_location	integer	Location of the map element label.  Possible values: -1 - (default) default location; 0 - bottom; 1 - left; 2 - right; 3 - top.
permission	integer	Type of permission level.  Possible values: -1 - none; 2 - read only; 3 - read-write.
sysmapid	string	(readonly) ID of the map that the element belongs to.

Property	Type	Description
urls	array	Map element URLs.  The map element URL object is <a href="#">described in detail below</a> .
use_iconmap	integer	Whether icon mapping must be used for host elements.  Possible values: 0 - do not use icon mapping; 1 - (default) use icon mapping.
viewtype	integer	Host group element placing algorithm.  Possible values: 0 - (default) grid.
width	integer	Width of the fixed size host group element in pixels.
x	integer	Default: 200. X-coordinates of the element in pixels.
y	integer	Default: 0. Y-coordinates of the element in pixels.
		Default: 0.

#### Map element Host

The map element Host object defines one host element.

Property	Type	Description
hostid	string	Host ID

#### Map element Host group

The map element Host group object defines one host group element.

Property	Type	Description
groupid	string	Host group ID

#### Map element Map

The map element Map object defines one map element.

Property	Type	Description
sysmapid	string	Map ID

### Map element Trigger

The map element Trigger object defines one or more trigger elements.

Property	Type	Description
triggerid	string	Trigger ID

### Map element URL

The map element URL object defines a clickable link that will be available for a specific map element. It has the following properties:

Property	Type	Description
sysmapelementurlid	string	(readonly) ID of the map element URL.
<b>name</b> (required)	string	Link caption.
<b>url</b> (required)	string	Link URL.
selementid	string	ID of the map element that the URL belongs to.

### Map link

The map link object defines a link between two map elements. It has the following properties.

Property	Type	Description
linkid	string	(readonly) ID of the map link.
<b>selementid1</b> (required)	string	ID of the first map element linked on one end.
<b>selementid2</b> (required)	string	ID of the first map element linked on the other end.
color	string	Line color as a hexadecimal color code.  Default: 000000.
drawtype	integer	Link line draw style.  Possible values: 0 - (default) line; 2 - bold line; 3 - dotted line; 4 - dashed line.
label	string	Link label.
linktriggers	array	Map link triggers to use as link status indicators.  The map link trigger object is <a href="#">described in detail below</a> .

Property	Type	Description
permission	integer	Type of permission level.
sysmapid	string	Possible values: -1 - none; 2 - read only; 3 - read-write. ID of the map the link belongs to.

#### Map link trigger

The map link trigger object defines a map link status indicator based on the state of a trigger. It has the following properties:

Property	Type	Description
linktriggerid	string	(readonly) ID of the map link trigger.
<b>triggerid</b> (required)	string	ID of the trigger used as a link indicator.
color	string	Indicator color as a hexadecimal color code.
drawtype	integer	Default: DD0000. Indicator draw style.
linkid	string	Possible values: 0 - (default) line; 2 - bold line; 3 - dotted line; 4 - dashed line. ID of the map link that the link trigger belongs to.

#### Map URL

The map URL object defines a clickable link that will be available for all elements of a specific type on the map. It has the following properties:

Property	Type	Description
sysmapurlid	string	(readonly) ID of the map URL.
<b>name</b> (required)	string	Link caption.
<b>url</b> (required)	string	Link URL.



Property	Type	Description
elementtype	integer	Type of map element for which the URL will be available.
		Refer to the <a href="#">map element "type" property</a> for a list of supported types.
sysmapid	string	Default: 0. ID of the map that the URL belongs to.

### Map user

List of map permissions based on users. It has the following properties:

Property	Type	Description
sysmapuserid	string	(readonly) ID of the map user.
<b>userid</b> (required)	string	User ID.
<b>permission</b> (required)	integer	Type of permission level.
		Possible values: 2 - read only; 3 - read-write;

### Map user group

List of map permissions based on user groups. It has the following properties:

Property	Type	Description
sysmapusrgrpid	string	(readonly) ID of the map user group.
<b>usrgrpid</b> (required)	string	User group ID.
<b>permission</b> (required)	integer	Type of permission level.
		Possible values: 2 - read only; 3 - read-write;

### Map shapes

The map shape object defines an geometric shape (with or without text) displayed on a map. It has the following properties:

Property	Type	Description
sysmap_shapeid	string	(readonly) ID of the map shape element.

Property	Type	Description
<b>type</b> (required)	integer	Type of map shape element.  Possible values: 0 - rectangle; 1 - ellipse.  Property is required when new shapes are created.
x	integer	X-coordinates of the shape in pixels.
y	integer	Default: 0. Y-coordinates of the shape in pixels.
width	integer	Default: 0. Width of the shape in pixels.
height	integer	Default: 200. Height of the shape in pixels.
text	string	Default: 200. Text of the shape.

Property	Type	Description
font	integer	<p>Font of the text within shape.</p> <p>Possible values:  0 - Georgia, serif  1 - "Palatino Linotype", "Book Antiqua", Palatino, serif  2 - "Times New Roman", Times, serif  3 - Arial, Helvetica, sans-serif  4 - "Arial Black", Gadget, sans-serif  5 - "Comic Sans MS", cursive, sans-serif  6 - Impact, Charcoal, sans-serif  7 - "Lucida Sans Unicode", "Lucida Grande", sans-serif  8 - Tahoma, Geneva, sans-serif  9 - "Trebuchet MS", Helvetica, sans-serif  10 - Verdana, Geneva, sans-serif  11 - "Courier New", Courier, monospace  12 - "Lucida Console", Monaco, monospace</p>
font_size	integer	<p>Default: 9.  Font size in pixels.</p>
font_color	string	<p>Default: 11.  Font color.</p>
text_halign	integer	<p>Default: '000000'.  Horizontal alignment of text.</p> <p>Possible values:  0 - center;  1 - left;  2 - right.</p> <p>Default: 0.</p>

Property	Type	Description
text_valign	integer	Vertical alignment of text.  Possible values: 0 - middle; 1 - top; 2 - bottom.
border_type	integer	Default: 0. Type of the border.  Possible values: 0 - none; 1 - _____; 2 - - -; 3 - - - -.
border_width	integer	Default: 0. Width of the border in pixels.
border_color	string	Default: 0. Border color.
background_color	string	Default: '000000'. Background color (fill color).
zindex	integer	Default: (empty). Value used to order all shapes and lines (z-index).  Default: 0.

## Map lines

The map line object defines an line displayed on a map. It has the following properties:

Property	Type	Description
sysmap_shapeid	string	(readonly) ID of the map shape element.
x1	integer	X-coordinates of the line point 1 in pixels.
y1	integer	Default: 0. Y-coordinates of the line point 1 in pixels.
		Default: 0.

Property	Type	Description
x2	integer	X-coordinates of the line point 2 in pixels.
y2	integer	Default: 200. Y-coordinates of the line point 2 in pixels.
line_type	integer	Default: 200. Type of the line.  Possible values: 0 - none; 1 - _____; 2 - ---; 3 - - - -.
line_width	integer	Default: 0. Width of the line in pixels.
line_color	string	Default: 0. Line color.
zindex	integer	Default: '000000'. Value used to order all shapes and lines (z-index).  Default: 0.

## map.create

### Description

object `map.create(object/array maps)`

This method allows to create new maps.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Maps to create.

Additionally to the [standard map properties](#), the method accepts the following parameters.

Parameter	Type	Description
links	array	Map <a href="#">links</a> to be created on the map.
selements	array	Map <a href="#">elements</a> to be created on the map.
urls	array	Map <a href="#">URLs</a> to be created on the map.
users	array	Map <a href="#">user</a> shares to be created on the map.
userGroups	array	Map <a href="#">user group</a> shares to be created on the map.
shapes	array	Map <a href="#">shapes</a> to be created on the map.
lines	array	Map <a href="#">lines</a> to be created on the map.

**Note:**

To create map links you'll need to set a map element `selementid` to an arbitrary value and then use this value to reference this element in the links `selementid1` or `selementid2` properties. When the element is created, this value will be replaced with the correct ID generated by Zabbix. See [example](#).

**Return values**

(object) Returns an object containing the IDs of the created maps under the `sysmapids` property. The order of the returned IDs matches the order of the passed maps.

**Examples**

Create an empty map

Create a map with no elements.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map",
    "width": 600,
    "height": 600
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "8"
    ]
  },
  "id": 1
}
```

Create a host map

Create a map with two host elements and a link between them. Note the use of temporary `"selementid1"` and `"selementid2"` values in the map link object to refer to map elements.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Host map",
    "width": 600,
    "height": 600,
    "selements": [
      {
        "selementid": "1",
        "elements": [
          {"hostid": "1033"}
        ],
        "elementtype": 0,
        "iconid_off": "2"
      },
      {
        "selementid": "2",
```

```

        "elements": [
            {"hostid": "1037"}
        ],
        "elementtype": 0,
        "iconid_off": "2"
    }
],
"links": [
    {
        "selementid1": "1",
        "selementid2": "2"
    }
]
],
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "sysmapids": [
            "9"
        ]
    },
    "id": 1
}

```

Create a trigger map

Create a map with trigger element, which contains two triggers.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "map.create",
    "params": {
        "name": "Trigger map",
        "width": 600,
        "height": 600,
        "selements": [
            {
                "elements": [
                    {"triggerid": "12345"},
                    {"triggerid": "67890"}
                ],
                "elementtype": 2,
                "iconid_off": "2"
            }
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "sysmapids": [
            "10"
        ]
    }
}

```

```
  },
  "id": 1
}
```

### Map sharing

Create a map with two types of sharing (user and user group).

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map sharing",
    "width": 600,
    "height": 600,
    "users": [
      {
        "userid": "4",
        "permission": "3"
      }
    ],
    "userGroups": [
      {
        "usrgrpid": "7",
        "permission": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "9"
    ]
  },
  "id": 1
}
```

### Map shapes

Create a map with map name title.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Host map",
    "width": 600,
    "height": 600,
    "shapes": [
      {
        "type": 0,
        "x": 0,
        "y": 0,
        "width": 600,
        "height": 11,
        "text": "{MAP.NAME}"
      }
    ]
  }
}
```



```
    ]
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "10"
    ]
  },
  "id": 1
}
```

Map lines

Create a map line.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map API lines",
    "width": 500,
    "height": 500,
    "lines": [
      {
        "x1": 30,
        "y1": 10,
        "x2": 100,
        "y2": 50,
        "line_type": 1,
        "line_width": 10,
        "line_color": "009900"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "11"
    ]
  },
  "id": 1
}
```

See also

- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)

- [Map shape](#)
- [Map line](#)

Source

CMap::create() in ui/include/classes/api/services/CMap.php.

### map.delete

Description

object map.delete(array mapIds)

This method allows to delete maps.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the maps to delete.

Return values

(object) Returns an object containing the IDs of the deleted maps under the `sysmapids` property.

Examples

Delete multiple maps

Delete two maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.delete",
  "params": [
    "12",
    "34"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "12",
      "34"
    ]
  },
  "id": 1
}
```

Source

CMap::delete() in ui/include/classes/api/services/CMap.php.

### map.get

Description

integer/array map.get(object parameters)

The method allows to retrieve maps according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
sysmapids	string/array	Returns only maps with the given IDs.
userid	string/array	Returns only maps that belong to the given user IDs.
expandUrls	flag	Adds global map URLs to the corresponding map elements and expands macros in all map element URLs.
selectIconMap	query	Returns an <b>iconmap</b> property with the icon map used on the map.
selectLinks	query	Returns a <b>links</b> property with the map links between elements.
selectSelements	query	Returns a <b>selements</b> property with the map elements.
selectUrls	query	Returns a <b>urls</b> property with the map URLs.
selectUsers	query	Returns a <b>users</b> property with users that the map is shared with.
selectUserGroups	query	Returns a <b>userGroups</b> property with user groups that the map is shared with.
selectShapes	query	Returns a <b>shapes</b> property with the map shapes.
selectLines	query	Returns a <b>lines</b> property with the map lines.

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>name</code> , <code>width</code> and <code>height</code> . These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> .
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve a map

Retrieve all data about map "3".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.get",
  "params": {
    "output": "extend",
    "selectSelements": "extend",
    "selectLinks": "extend",
    "selectUsers": "extend",
    "selectUserGroups": "extend",
    "selectShapes": "extend",
    "selectLines": "extend",
    "sysmapids": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "selements": [
```

```

{
  "selementid": "10",
  "sysmapid": "3",
  "elementtype": "4",
  "iconid_off": "1",
  "iconid_on": "0",
  "label": "Zabbix server",
  "label_location": "3",
  "x": "11",
  "y": "141",
  "iconid_disabled": "0",
  "iconid_maintenance": "0",
  "elementsubtype": "0",
  "areatype": "0",
  "width": "200",
  "height": "200",
  "viewtype": "0",
  "use_iconmap": "1",
  "application": "",
  "urls": [],
  "elements": []
},
{
  "selementid": "11",
  "sysmapid": "3",
  "elementtype": "4",
  "iconid_off": "1",
  "iconid_on": "0",
  "label": "Web server",
  "label_location": "3",
  "x": "211",
  "y": "191",
  "iconid_disabled": "0",
  "iconid_maintenance": "0",
  "elementsubtype": "0",
  "areatype": "0",
  "width": "200",
  "height": "200",
  "viewtype": "0",
  "use_iconmap": "1",
  "application": "",
  "urls": [],
  "elements": []
},
{
  "selementid": "12",
  "sysmapid": "3",
  "elementtype": "0",
  "iconid_off": "185",
  "iconid_on": "0",
  "label": "{HOST.NAME}\r\n{HOST.CONN}",
  "label_location": "0",
  "x": "111",
  "y": "61",
  "iconid_disabled": "0",
  "iconid_maintenance": "0",
  "elementsubtype": "0",
  "areatype": "0",
  "width": "200",
  "height": "200",
  "viewtype": "0",
  "use_iconmap": "0",

```

```

        "application": "",
        "urls": [],
        "elements": [
            {
                "hostid": "10084"
            }
        ]
    },
],
"links": [
    {
        "linkid": "23",
        "sysmapid": "3",
        "selementid1": "10",
        "selementid2": "11",
        "drawtype": "0",
        "color": "00CC00",
        "label": "",
        "linktriggers": []
    }
],
"users": [
    {
        "sysmapuserid": "1",
        "userid": "2",
        "permission": "2"
    }
],
"userGroups": [
    {
        "sysmapusrgrpid": "1",
        "usrgrpid": "7",
        "permission": "2"
    }
],
"shapes": [
    {
        "sysmap_shapeid": "1",
        "type": "0",
        "x": "0",
        "y": "0",
        "width": "680",
        "height": "15",
        "text": "{MAP.NAME}",
        "font": "9",
        "font_size": "11",
        "font_color": "000000",
        "text_halign": "0",
        "text_valign": "0",
        "border_type": "0",
        "border_width": "0",
        "border_color": "000000",
        "background_color": "",
        "zindex": "0"
    }
],
"lines": [
    {
        "sysmap_shapeid": "2",
        "x1": 30,
        "y1": 10,
        "x2": 100,

```

```

        "y2": 50,
        "line_type": 1,
        "line_width": 10,
        "line_color": "009900",
        "zindex": "1"
    }
],
"sysmapid": "3",
"name": "Local nerwork",
"width": "400",
"height": "400",
"backgroundid": "0",
"label_type": "2",
"label_location": "3",
"highlight": "1",
"expandproblem": "1",
"markelements": "0",
"show_unack": "0",
"grid_size": "50",
"grid_show": "1",
"grid_align": "1",
"label_format": "0",
"label_type_host": "2",
"label_type_hostgroup": "2",
"label_type_trigger": "2",
"label_type_map": "2",
"label_type_image": "2",
"label_string_host": "",
"label_string_hostgroup": "",
"label_string_trigger": "",
"label_string_map": "",
"label_string_image": "",
"iconmapid": "0",
"expand_macros": "0",
"severity_min": "0",
"userid": "1",
"private": "1",
"show_suppressed": "1"
}
],
"id": 1
}

```

See also

- [Icon map](#)
- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shapes](#)
- [Map lines](#)

Source

CMap::get() in ui/include/classes/api/services/CMap.php.

## map.update

Description

object map.update(object/array maps)

This method allows to update existing maps.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Map properties to be updated.

The `mapid` property must be defined for each map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard map properties](#), the method accepts the following parameters.

Parameter	Type	Description
links	array	Map <a href="#">links</a> to replace the existing links.
selements	array	Map <a href="#">elements</a> to replace the existing elements.
urls	array	Map <a href="#">URLs</a> to replace the existing URLs.
users	array	Map <a href="#">user</a> shares to replace the existing elements.
userGroups	array	Map <a href="#">user group</a> shares to replace the existing elements.
shapes	array	Map <a href="#">shapes</a> to replace the existing shapes.
lines	array	Map <a href="#">lines</a> to replace the existing lines.

**Note:**

To create map links between new map elements you'll need to set an element's `selementid` to an arbitrary value and then use this value to reference this element in the links `selementid1` or `selementid2` properties. When the element is created, this value will be replaced with the correct ID generated by Zabbix. See [example for map.create](#).

**Return values**

(object) Returns an object containing the IDs of the updated maps under the `sysmapids` property.

**Examples****Resize a map**

Change the size of the map to 1200x1200 pixels.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "map.update",
  "params": {
    "sysmapid": "8",
    "width": 1200,
    "height": 1200
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "8"
    ]
  },
  "id": 1
}
```

**Change map owner**

Available only for admins and super admins.



Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.update",
  "params": {
    "sysmapid": "9",
    "userid": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "9"
    ]
  },
  "id": 2
}
```

See also

- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shapes](#)
- [Map lines](#)

Source

CMap::update() in ui/include/classes/api/services/CMap.php.

## Media type

This class is designed to work with media types.

Object references:

- [Media type](#)

Available methods:

- [mediatype.create](#) - creating new media types
- [mediatype.delete](#) - deleting media types
- [mediatype.get](#) - retrieving media types
- [mediatype.update](#) - updating media types

## > Media type object

The following objects are directly related to the mediatype API.

Media type

The media type object has the following properties.

Property	Type	Description
mediatypeid	string	(readonly) ID of the media type.

Property	Type	Description
<b>name</b> (required)	string	Name of the media type.
<b>type</b> (required)	integer	Transport used by the media type.  Possible values: 0 - email; 1 - script; 2 - SMS; 4 - Webhook.
exec_path	string	For script media types <code>exec_path</code> contains the name of the executed script.  Required for script media types.
gsm_modem	string	Serial device name of the GSM modem.  Required for SMS media types.
passwd	string	Authentication password.
smtp_email	string	Used for email media types. Email address from which notifications will be sent.
smtp_helo	string	Required for email media types. SMTP HELO.
smtp_server	string	Required for email media types. SMTP server.
smtp_port	integer	Required for email media types. SMTP server port to connect to.
smtp_security	integer	SMTP connection security level to use.  Possible values: 0 - None; 1 - STARTTLS; 2 - SSL/TLS.

Property	Type	Description
smtp_verify_host	integer	SSL verify host for SMTP.  Possible values: 0 - No; 1 - Yes.
smtp_verify_peer	integer	SSL verify peer for SMTP.  Possible values: 0 - No; 1 - Yes.
smtp_authentication	integer	SMTP authentication method to use.  Possible values: 0 - None; 1 - Normal password.
status	integer	Whether the media type is enabled.  Possible values: 0 - (default) enabled; 1 - disabled.
username	string	User name.
exec_params	string	Used for email media types. Script parameters.
maxsessions	integer	Each parameter ends with a new line feed. The maximum number of alerts that can be processed in parallel.  Possible values for SMS: 1 - (default)
maxattempts	integer	Possible values for other media types: 0-100 The maximum number of attempts to send an alert.  Possible values: 1-10  Default value: 3

Property	Type	Description
attempt_interval	string	The interval between retry attempts. Accepts seconds and time unit with suffix.  Possible values: 0-60s  Default value: 10s
content_type	integer	Message format.  Possible values: 0 - plain text; 1 - (default) html.
script	string	Media type webhook script javascript body.
timeout	string	Media type webhook script timeout. Accepts seconds and time unit with suffix.  Possible values: 1-60s  Default value: 30s
process_tags	integer	Defines should the webhook script response to be interpreted as tags and these tags should be added to associated event.  Possible values: 0 - (default) Ignore webhook script response. 1 - Process webhook script response as tags.
show_event_urls	integer	Show media type entry in <code>problem.get</code> and <code>event.get</code> property urls.  Possible values: 0 - (default) Do not add urls entry. 1 - Add media type to urls property.

Property	Type	Description
event_menu_urlstring		Define url property of media type entry in urls property of problem.get and event.get.
event_menu_namestring		Define name property of media type entry in urls property of problem.get and event.get.
parameters	array	Array of <a href="#">webhook input parameters</a> .
description	string	Media type description.

### Webhook parameters

Parameters passed to webhook script when it is called, have the following properties.

Property	Type	Description
<b>name</b> (required)	string	Parameter name.
value	string	Parameter value, support macros. Supported macros described on <a href="#">page</a> .

### Message template

The message template object defines a template that will be used as a default message for action operations to send a notification. It has the following properties.

Property	Type	Description
<b>eventsourcesource</b> (required)	integer	Event source.  Possible values: 0 - triggers; 1 - discovery; 2 - autoregistration; 3 - internal.
<b>recovery</b> (required)	integer	Operation mode.  Possible values: 0 - operations; 1 - recovery operations; 2 - update operations.
subject	string	Message subject.
message	string	Message text.

### mediatype.create

Description

`object mediatype.create(object/array mediaTypes)`

This method allows to create new media types.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Media types to create.

Additionally to the [standard media type properties](#), the method accepts the following parameters.

Parameter	Type	Description
parameters	array	<a href="#">Webhook parameters</a> to be created for the media type.
message_templates	array	<a href="#">Message templates</a> to be created for the media type.

Return values

(object) Returns an object containing the IDs of the created media types under the `mediatypeids` property. The order of the returned IDs matches the order of the passed media types.

Examples

Creating an e-mail media type

Create a new e-mail media type with a custom SMTP port and message templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "0",
    "name": "E-mail",
    "smtp_server": "mail.example.com",
    "smtp_helo": "example.com",
    "smtp_email": "zabbix@example.com",
    "smtp_port": "587",
    "content_type": "1",
    "message_templates": [
      {
        "eventsourcing": "0",
        "recovery": "0",
        "subject": "Problem: {EVENT.NAME}",
        "message": "Problem \"{EVENT.NAME}\" on host \"{HOST.NAME}\" started at {EVENT.TIME}."
      },
      {
        "eventsourcing": "0",
        "recovery": "1",
        "subject": "Resolved in {EVENT.DURATION}: {EVENT.NAME}",
        "message": "Problem \"{EVENT.NAME}\" on host \"{HOST.NAME}\" has been resolved at {EVENT.R}."
      },
      {
        "eventsourcing": "0",
        "recovery": "2",
        "subject": "Updated problem in {EVENT.AGE}: {EVENT.NAME}",
        "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem \"{EVENT.NAME}\" on host \"{HOST"
      }
    ]
  }
}
```

```

    ]
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "7"
    ]
  },
  "id": 1
}

```

Creating a script media type

Create a new script media type with a custom value for the number of attempts and the interval between them.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "1",
    "name": "Push notifications",
    "exec_path": "push-notification.sh",
    "exec_params": "{ALERT.SENDTO}\n{ALERT.SUBJECT}\n{ALERT.MESSAGE}\n",
    "maxattempts": "5",
    "attempt_interval": "11s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "8"
    ]
  },
  "id": 1
}

```

Creating a webhook media type

Create a new webhook media type.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "4",
    "name": "Webhook",
    "script": "var Webhook = {\r\n  token: null,\r\n  to: null,\r\n  subject: null,\r\n  messa
    "parameters": [
      {
        "name": "Message",

```

```

        "value": "{ALERT.MESSAGE}"
    },
    {
        "name": "Subject",
        "value": "{ALERT.SUBJECT}"
    },
    {
        "name": "To",
        "value": "{ALERT.SENDTO}"
    },
    {
        "name": "Token",
        "value": "<Token>"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "mediatypeids": [
            "9"
        ]
    },
    "id": 1
}

```

Source

CMediaType::create() in ui/include/classes/api/services/CMediaType.php.

## mediatype.delete

Description

object mediatype.delete(array mediaTypeIds)

This method allows to delete media types.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the media types to delete.

Return values

(object) Returns an object containing the IDs of the deleted media types under the `mediatypeids` property.

Examples

Deleting multiple media types

Delete two media types.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "mediatype.delete",
    "params": [

```



```

    "3",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "3",
      "5"
    ]
  },
  "id": 1
}

```

Source

CMediaType::delete() in ui/include/classes/api/services/CMediaType.php.

## mediatype.get

Description

integer/array mediatype.get(object parameters)

The method allows to retrieve media types according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
mediatypeids	string/array	Return only media types with the given IDs.
mediaids	string/array	Return only media types used by the given media.
userids	string/array	Return only media types used by the given users.
selectMessageTemplates	boolean	Return a <a href="#">message_templates</a> property with an array of media type messages.
selectUsers	query	Return a <a href="#">users</a> property with the users that use the media type.

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: mediatypeid. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving media types

Retrieve all configured media types.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.get",
  "params": {
    "output": "extend",
    "selectMessageTemplates": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "mediatypeid": "1",
      "type": "0",
      "name": "Email",
      "smtp_server": "mail.example.com",
      "smtp_helo": "example.com",
      "smtp_email": "zabbix@example.com",
      "exec_path": ""
    }
  ]
}
```

```

    "gsm_modem": "",
    "username": "",
    "passwd": "",
    "status": "0",
    "smtp_port": "25",
    "smtp_security": "0",
    "smtp_verify_peer": "0",
    "smtp_verify_host": "0",
    "smtp_authentication": "0",
    "exec_params": "",
    "maxsessions": "1",
    "maxattempts": "3",
    "attempt_interval": "10s",
    "content_type": "0",
    "script": "",
    "timeout": "30s",
    "process_tags": "0",
    "show_event_menu": "1",
    "event_menu_url": "",
    "event_menu_name": "",
    "description": "",
    "message_templates": [
      {
        "eventsourc": "0",
        "recovery": "0",
        "subject": "Problem: {EVENT.NAME}",
        "message": "Problem started at {EVENT.TIME} on {EVENT.DATE}\r\nProblem name: {EVENT.NAME}"
      },
      {
        "eventsourc": "0",
        "recovery": "1",
        "subject": "Resolved: {EVENT.NAME}",
        "message": "Problem has been resolved at {EVENT.RECOVERY.TIME} on {EVENT.RECOVERY.DATE}"
      },
      {
        "eventsourc": "0",
        "recovery": "2",
        "subject": "Updated problem: {EVENT.NAME}",
        "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}"
      },
      {
        "eventsourc": "1",
        "recovery": "0",
        "subject": "Discovery: {DISCOVERY.DEVICE.STATUS} {DISCOVERY.DEVICE.IPADDRESS}",
        "message": "Discovery rule: {DISCOVERY.RULE.NAME}\r\n\r\nDevice IP: {DISCOVERY.DEVICE.IP}"
      },
      {
        "eventsourc": "2",
        "recovery": "0",
        "subject": "Autoregistration: {HOST.HOST}",
        "message": "Host name: {HOST.HOST}\r\nHost IP: {HOST.IP}\r\nAgent port: {HOST.PORT}"
      }
    ],
    "parameters": []
  },
  {
    "mediatypeid": "3",
    "type": "2",
    "name": "SMS",
    "smtp_server": "",
    "smtp_helo": "",
    "smtp_email": "",

```

```

    "exec_path": "",
    "gsm_modem": "/dev/ttyS0",
    "username": "",
    "passwd": "",
    "status": "0",
    "smtp_port": "25",
    "smtp_security": "0",
    "smtp_verify_peer": "0",
    "smtp_verify_host": "0",
    "smtp_authentication": "0",
    "exec_params": "",
    "maxsessions": "1",
    "maxattempts": "3",
    "attempt_interval": "10s",
    "content_type": "1",
    "script": "",
    "timeout": "30s",
    "process_tags": "0",
    "show_event_menu": "1",
    "event_menu_url": "",
    "event_menu_name": "",
    "description": "",
    "message_templates": [
      {
        "eventsourcing": "0",
        "recovery": "0",
        "subject": "",
        "message": "{EVENT.SEVERITY}: {EVENT.NAME}\r\nHost: {HOST.NAME}\r\n{EVENT.DATE} {EVENT.TIME}"
      },
      {
        "eventsourcing": "0",
        "recovery": "1",
        "subject": "",
        "message": "RESOLVED: {EVENT.NAME}\r\nHost: {HOST.NAME}\r\n{EVENT.DATE} {EVENT.TIME}"
      },
      {
        "eventsourcing": "0",
        "recovery": "2",
        "subject": "",
        "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}"
      },
      {
        "eventsourcing": "1",
        "recovery": "0",
        "subject": "",
        "message": "Discovery: {DISCOVERY.DEVICE.STATUS} {DISCOVERY.DEVICE.IPADDRESS}"
      },
      {
        "eventsourcing": "2",
        "recovery": "0",
        "subject": "",
        "message": "Autoregistration: {HOST.HOST}\r\nHost IP: {HOST.IP}\r\nAgent port: {HOST.PORT}"
      }
    ],
    "parameters": []
  },
  {
    "id": 1
  }
}

```

See also

- [User](#)

Source

CMediaType::get() in ui/include/classes/api/services/CMediaType.php.

## mediatype.update

Description

object mediatype.update(object/array mediaTypes)

This method allows to update existing media types.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Media type properties to be updated.

The `mediatypeid` property must be defined for each media type, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard media type properties](#), the method accepts the following parameters.

Parameter	Type	Description
parameters	array	<a href="#">Webhook parameters</a> to replace the current webhook parameters.
message_templates	array	<a href="#">Message templates</a> to replace the current message templates.

Return values

(object) Returns an object containing the IDs of the updated media types under the `mediatypeids` property.

Examples

Enabling a media type

Enable a media type, that is, set its status to "0".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.update",
  "params": {
    "mediatypeid": "6",
    "status": "0"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "6"
    ]
  }
}
```

```

    },
    "id": 1
}

```

Source

CMediaType::update() in ui/include/classes/api/services/CMediaType.php.

## Problem

This class is designed to work with problems.

Object references:

- [Problem](#)

Available methods:

- [problem.get](#) - retrieving problems

### > Problem object

#### Note:

problems are created by the Zabbix server and cannot be modified via the API.

The problem object has the following properties.

Property	Type	Description
eventid	string	ID of the problem event.
source	integer	Type of the problem event.  Possible values: 0 - event created by a trigger; 3 - internal event.
object	integer	Type of object that is related to the problem event.  Possible values for trigger events: 0 - trigger.  Possible values for internal events: 0 - trigger; 4 - item; 5 - LLD rule.
objectid	string	ID of the related object.
clock	timestamp	Time when the problem event was created.
ns	integer	Nanoseconds when the problem event was created.

Property	Type	Description
r_eventid	string	Recovery event ID.
r_clock	timestamp	Time when the recovery event was created.
r_ns	integer	Nanoseconds when the recovery event was created.
correlationid	string	Correlation rule ID if this event was recovered by global correlation rule.
userid	string	User ID if the problem was manually closed.
name	string	Resolved problem name.
acknowledged	integer	Acknowledge state for problem.  Possible values: 0 - not acknowledged; 1 - acknowledged.
severity	integer	Problem current severity.  Possible values: 0 - not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.
suppressed	integer	Whether the problem is suppressed.  Possible values: 0 - problem is in normal state; 1 - problem is suppressed.
opdata	string	Operational data with expanded macros.
urls	array of <b>Media type URLs</b>	Active media types URLs.

#### Problem tag

The problem tag object has the following properties.

Property	Type	Description
tag	string	Problem tag name.
value	string	Problem tag value.

#### Media type URLs

Object with media type url have the following properties.

Property	Type	Description
name	string	Media type defined URL name.
url	string	Media type defined URL value.

Results will contain entries only for active media types with enabled event menu entry. Macro used in properties will be expanded, but if one of properties contain non expanded macro both properties will be excluded from results. Supported macros described on [page](#).

### problem.get

Description

integer/array `problem.get(object parameters)`

The method allows to retrieve problems according to the given parameters.

This method is for retrieving unresolved problems. It is also possible, if specified, to additionally retrieve recently resolved problems. The period that determines how old is "recently" is defined in Administration → **General**. Problems that were resolved prior to that period are not kept in the problem table. To retrieve problems that were resolved further back in the past, use the `event.get` method.

#### Attention:

This method may return problems of a deleted entity if these problems have not been removed by the housekeeper yet.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
eventids	string/array	Return only problems with the given IDs.
groupids	string/array	Return only problems created by objects that belong to the given host groups.
hostids	string/array	Return only problems created by objects that belong to the given hosts.
objectids	string/array	Return only problems created by the given objects.



Parameter	Type	Description
applicationids	string/array	Return only problems created by objects that belong to the given applications. Applies only if object is trigger or item.
source	integer	Return only problems with the given type.  Refer to the <a href="#">problem event object page</a> for a list of supported event types.
object	integer	Default: 0 - problem created by a trigger. Return only problems created by objects of the given type.  Refer to the <a href="#">problem event object page</a> for a list of supported object types.
acknowledged	boolean	Default: 0 - trigger. <code>true</code> - return acknowledged problems only; <code>false</code> - unacknowledged only.
suppressed	boolean	<code>true</code> - return only suppressed problems; <code>false</code> - return problems in the normal state.
severities	integer/array	Return only problems with given event severities. Applies only if object is trigger.
evaltype	integer	Rules for tag searching.  Possible values: 0 - (default) And/Or; 2 - Or.

Parameter	Type	Description
tags	array of objects	<p>Return only problems with given tags. Exact match by tag and case-insensitive search by value and operator.</p> <p>Format:  <pre>[{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].</pre> </p> <p>An empty array returns all problems.</p> <p>Possible operator types:  0 - (default) Like;  1 - Equal.  true - return PROBLEM and recently RESOLVED problems (depends on Display OK triggers for N seconds)  Default: false - UNRESOLVED problems only</p>
recent	boolean	<p>Return only problems with IDs greater or equal to the given ID.</p>
eventid_from	string	<p>Return only problems with IDs less or equal to the given ID.</p>
eventid_till	string	<p>Return only problems that have been created after or at the given time.</p>
time_from	timestamp	<p>Return only problems that have been created before or at the given time.</p>
time_till	timestamp	<p>Return only problems that have been created before or at the given time.</p>

Parameter	Type	Description
selectAcknowledges	query	<p>Return an <code>acknowledges</code> property with the problem updates. Problem updates are sorted in reverse chronological order.</p> <p>The problem update object has the following properties:</p> <ul style="list-style-type: none"> <li><code>acknowledgeid</code> - (string) update's ID;</li> <li><code>userid</code> - (string) ID of the user that updated the event;</li> <li><code>eventid</code> - (string) ID of the updated event;</li> <li><code>clock</code> - (timestamp) time when the event was updated;</li> <li><code>message</code> - (string) text of the message;</li> <li><code>action</code> - (integer) type of update action (see <code>event.acknowledge</code>);</li> <li><code>old_severity</code> - (integer) event severity before this update action;</li> <li><code>new_severity</code> - (integer) event severity after this update action;</li> </ul>
selectTags	query	<p>Supports count. Return a <code>tags</code> property with the problem tags. Output format:</p> <pre>[{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;"}, ...].</pre>

Parameter	Type	Description
selectSuppressionData	query	Return a <code>suppression_data</code> property with the list of maintenances: <code>maintenanceid</code> - (string) ID of the maintenance; <code>suppress_until</code> - (integer) time until the problem is suppressed.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>eventid</code> . These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> page.
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving trigger problem events

Retrieve recent events from trigger "15112."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "problem.get",
  "params": {
    "output": "extend",
    "selectAcknowledges": "extend",
    "selectTags": "extend",
    "selectSuppressionData": "extend",
    "objectids": "15112",
    "recent": "true",
    "sortfield": ["eventid"],
```

```
    "sortorder": "DESC"
  },
  "auth": "67f45d3eb1173338e1b1647c4bdc1916",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "1245463",
      "source": "0",
      "object": "0",
      "objectid": "15112",
      "clock": "1472457242",
      "ns": "209442442",
      "r_eventid": "1245468",
      "r_clock": "1472457285",
      "r_ns": "125644870",
      "correlationid": "0",
      "userid": "1",
      "name": "Zabbix agent on localhost is unreachable for 5 minutes",
      "acknowledged": "1",
      "severity": "3",
      "opdata": "",
      "acknowledges": [
        {
          "acknowledgeid": "14443",
          "userid": "1",
          "eventid": "1245463",
          "clock": "1472457281",
          "message": "problem solved",
          "action": "6",
          "old_severity": "0",
          "new_severity": "0"
        }
      ],
      "suppression_data": [
        {
          "maintenanceid": "15",
          "suppress_until": "1472511600"
        }
      ],
      "suppressed": "1",
      "tags": [
        {
          "tag": "test tag",
          "value": "test value"
        }
      ]
    }
  ],
  "id": 1
}
```

See also

- [Alert](#)
- [Item](#)
- [Host](#)
- [LLD rule](#)
- [Trigger](#)

Source

CEvent::get() in ui/include/classes/api/services/CProblem.php.

## Proxy

This class is designed to work with proxies.

Object references:

- [Proxy](#)
- [Proxy interface](#)

Available methods:

- [proxy.create](#) - create new proxies
- [proxy.delete](#) - delete proxies
- [proxy.get](#) - retrieve proxies
- [proxy.update](#) - update proxies

### > Proxy object

The following objects are directly related to the proxy API.

Proxy

The proxy object has the following properties.

Property	Type	Description
proxyid	string	(readonly) ID of the proxy.
<b>host</b> (required)	string	Name of the proxy.
<b>status</b> (required)	integer	Type of proxy.  Possible values: 5 - active proxy; 6 - passive proxy.
description	text	Description of the proxy.
lastaccess	timestamp	(readonly) Time when the proxy last connected to the server.
tls_connect	integer	Connections to host.  Possible values are: 1 - (default) No encryption; 2 - PSK; 4 - certificate.
tls_accept	integer	Connections from host.  Possible bitmap values are: 1 - (default) No encryption; 2 - PSK; 4 - certificate.
tls_issuer	string	Certificate issuer.

Property	Type	Description
tls_subject	string	Certificate subject.
tls_psk_identity	string	PSK identity. Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled. Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.
tls_psk	string	The preshared key, at least 32 hex digits. Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled.
proxy_address	string	Comma-delimited IP addresses or DNS names of active Zabbix proxy.
auto_compress	integer	(readonly) Indicates if communication between Zabbix server and proxy is compressed.  Possible values are: 0 - No compression; 1 - Compression enabled;

## Proxy interface

The proxy interface object defines the interface used to connect to a passive proxy. It has the following properties.

Property	Type	Description
interfaceid	string	(readonly) ID of the interface.
<b>dns</b> (required)	string	DNS name to connect to.  Can be empty if connections are made via IP address.

Property	Type	Description
<b>ip</b> (required)	string	IP address to connect to.
<b>port</b> (required)	string	Can be empty if connections are made via DNS names. Port number to connect to.
<b>useip</b> (required)	integer	Whether the connection should be made via IP address.  Possible values are: 0 - connect using DNS name; 1 - connect using IP address.
hostid	string	(readonly) ID of the proxy the interface belongs to.

## proxy.create

### Description

object proxy.create(object/array proxies)

This method allows to create new proxies.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Proxies to create.

Additionally to the [standard proxy properties](#), the method accepts the following parameters.

Parameter	Type	Description
hosts	array	<b>Hosts</b> to be monitored by the proxy. If a host is already monitored by a different proxy, it will be reassigned to the current proxy.  The hosts must have the <code>hostid</code> property defined.



Parameter	Type	Description
interface	object	Host <b>interface</b> to be created for the passive proxy.  Required for passive proxies.

#### Return values

(object) Returns an object containing the IDs of the created proxies under the `proxyids` property. The order of the returned IDs matches the order of the passed proxies.

#### Examples

Create an active proxy

Create an action proxy "Active proxy" and assign a host to be monitored by it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.create",
  "params": {
    "host": "Active proxy",
    "status": "5",
    "hosts": [
      {
        "hostid": "10279"
      }
    ]
  },
  "auth": "ab9638041ec6922cb14b07982b268f47",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10280"
    ]
  },
  "id": 1
}
```

Create a passive proxy

Create a passive proxy "Passive proxy" and assign two hosts to be monitored by it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.create",
  "params": {
    "host": "Passive proxy",
    "status": "6",
    "interface": {
      "ip": "127.0.0.1",
      "dns": "",
      "useip": "1",
      "port": "10051"
    }
  },
  "auth": "ab9638041ec6922cb14b07982b268f47",
  "id": 1
}
```

```
    "hosts": [
      {
        "hostid": "10192"
      },
      {
        "hostid": "10139"
      }
    ]
  },
  "auth": "ab9638041ec6922cb14b07982b268f47",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10284"
    ]
  },
  "id": 1
}
```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::create() in ui/include/classes/api/services/CProxy.php.

## proxy.delete

Description

object proxy.delete(array proxies)

This method allows to delete proxies.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of proxies to delete.

Return values

(object) Returns an object containing the IDs of the deleted proxies under the proxyids property.

Examples

Delete multiple proxies

Delete two proxies.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.delete",
  "params": [
    "10286",
    "10285"
  ],
}
```

```
"auth": "3a57200802b24cda67c4e4010b50c065",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10286",
      "10285"
    ]
  },
  "id": 1
}
```

Source

CProxy::delete() in ui/include/classes/api/services/CProxy.php.

### proxy.get

Description

integer/array proxy.get(object parameters)

The method allows to retrieve proxies according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
proxyids	string/array	Return only proxies with the given IDs.
selectHosts	query	Return a <b>hosts</b> property with the hosts monitored by the proxy.
selectInterface	query	Return an <b>interface</b> property with the proxy interface used by a passive proxy.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>hostid</code> , <code>host</code> and <code>status</code> .

Parameter	Type	Description
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve all proxies

Retrieve all configured proxies and their interfaces.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.get",
  "params": {
    "output": "extend",
    "selectInterface": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "host": "Active proxy",
      "status": "5",
      "lastaccess": "0",
      "description": "",
      "tls_connect": "1",
      "tls_accept": "1",
      "tls_issuer": "",
      "tls_subject": "",
      "tls_psk_identity": "",
      "tls_psk": "",
      "proxy_address": "",
      "auto_compress": "0",
      "proxyid": "30091",
      "interface": []
    }
  ]
}
```

```

    },
    {
        "host": "Passive proxy",
        "status": "6",
        "lastaccess": "0",
        "description": "",
        "tls_connect": "1",
        "tls_accept": "1",
        "tls_issuer": "",
        "tls_subject": "",
        "tls_psk_identity": "",
        "tls_psk": "",
        "proxy_address": "",
        "auto_compress": "0",
        "proxyid": "30092",
        "interface": {
            "interfaceid": "30109",
            "hostid": "30092",
            "useip": "1",
            "ip": "127.0.0.1",
            "dns": "",
            "port": "10051"
        }
    }
],
    "id": 1
}

```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::get() in ui/include/classes/api/services/CProxy.php.

## proxy.update

Description

object proxy.update(object/array proxies)

This method allows to update existing proxies.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Proxy properties to be updated.

The proxyid property must be defined for each proxy, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard proxy properties](#), the method accepts the following parameters.

Parameter	Type	Description
hosts	array	<p><b>Hosts</b> to be monitored by the proxy. If a host is already monitored by a different proxy, it will be reassigned to the current proxy.</p> <p>The hosts must have the <code>hostid</code> property defined. Host <b>interface</b> to replace the existing interface for the passive proxy.</p>
interface	object	

#### Return values

(object) Returns an object containing the IDs of the updated proxies under the `proxyids` property.

#### Examples

Change hosts monitored by a proxy

Update the proxy to monitor the two given hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.update",
  "params": {
    "proxyid": "10293",
    "hosts": [
      "10294",
      "10295"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10293"
    ]
  },
  "id": 1
}
```

Change proxy status

Change the proxy to an active proxy and rename it to "Active proxy".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.update",
```

```
"params": {
  "proxyid": "10293",
  "host": "Active proxy",
  "status": "5"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10293"
    ]
  },
  "id": 1
}
```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::update() in ui/include/classes/api/services/CProxy.php.

## Role

This class is designed to work with user roles.

Object references:

- [Role](#)
- [Role rules](#)
- [UI element](#)
- [Module](#)
- [Action](#)

Available methods:

- [role.create](#) - create new user roles
- [role.delete](#) - delete user roles
- [role.get](#) - retrieve user roles
- [role.update](#) - update user roles

### > Role object

The following objects are directly related to the role API.

Role

The role object has the following properties:

Property	Type	Description
roleid	string	(readonly) ID of the role.
<b>name</b> (required)	string	Name of the role.

Property	Type	Description
<b>type</b> (required)	integer	User type.  Possible values: 1 - (default) User; 2 - Admin; 3 - Super admin.
readonly	integer	(readonly) Whether the role is readonly.  Possible values: 0 - (default) No; 1 - Yes.

## Role rules

The role rules object has the following properties:

Property	Type	Description
ui	array	Array of the <b>UI element</b> objects.
ui.default_access	integer	Whether access to new UI elements is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.
modules	array	Array of the <b>module</b> objects.
modules.default_access	integer	Whether access to new modules is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.
api.access	integer	Whether access to API is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.
api.mode	integer	Mode for treating API methods listed in the <code>api</code> property.  Possible values: 0 - (default) Deny list; 1 - Allow list.
api	array	Array of API methods.
actions	array	Array of the <b>action</b> objects.



---

Property	Type	Description
actions.default_	integer	Whether access to new actions is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.

---

#### UI element

The UI element object has the following properties:

Property	Type	Description
<b>name</b> (required)	string	<p>Name of the UI element.</p> <p>Possible values for users of any type:</p> <ul style="list-style-type: none"> <li><code>monitoring.dashboard</code> - Monitoring → Dashboard;</li> <li><code>monitoring.problems</code> - Monitoring → Problems;</li> <li><code>monitoring.hosts</code> - Monitoring → Hosts;</li> <li><code>monitoring.overview</code> - Monitoring → Overview;</li> <li><code>monitoring.latest_data</code> - Monitoring → Latest data;</li> <li><code>monitoring.screens</code> - Monitoring → Screens;</li> <li><code>monitoring.maps</code> - Monitoring → Maps;</li> <li><code>monitoring.services</code> - Monitoring → Services;</li> <li><code>inventory.overview</code> - Inventory → Overview;</li> <li><code>inventory.hosts</code> - Inventory → Hosts;</li> <li><code>reports.availability_reports</code> - Reports → Availability report;</li> <li><code>reports.top_triggers</code> - Reports → Triggers top 100.</li> </ul> <p>Possible values only for users of Admin and Super admin user types:</p> <ul style="list-style-type: none"> <li><code>monitoring.discovery</code> - Monitoring → Discovery;</li> <li><code>reports.notifications</code> - Reports → Notifications;</li> <li><code>configuration.host_groups</code> - Configuration → Host groups;</li> <li><code>configuration.templates</code> - Configuration → Templates;</li> <li><code>configuration.hosts</code> - Configuration → Hosts;</li> <li><code>configuration.maintenance</code> - Configuration → Maintenance;</li> </ul>

Property	Type	Description
status	integer	Whether access to the UI element is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.

#### Module

The module object has the following properties:

Property	Type	Description
<b>moduleid</b> (required)	string	ID of the module.
status	integer	Whether access to the module is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.

#### Action

The action object has the following properties:

Property	Type	Description
<b>name</b> (required)	string	Name of the action.  Possible values for users of any type: edit_dashboards - Create and edit dashboards and screens; edit_maps - Create and edit maps; add_problem_comments - Add problem comments; change_severity - Change problem severity; acknowledge_problems - Acknowledge problems; close_problems - Close problems; execute_scripts - Execute scripts.  Possible values only for users of Admin and Super admin user types: edit_maintenance - Create and edit maintenances. Whether access to perform the action is enabled.  Possible values: 0 - Disabled; 1 - (default) Enabled.
status	integer	

## role.create

### Description

object role.create(object/array roles)

This method allows to create new roles.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Roles to create.

Additionally to the [standard role properties](#), the method accepts the following parameters.

Parameter	Type	Description
rules	array	Role <b>rules</b> to be created for the role.

#### Return values

(object) Returns an object containing the IDs of the created roles under the `roleids` property. The order of the returned IDs matches the order of the passed roles.

#### Examples

##### Creating a role

Create a role with type "User" and denied access to two UI elements.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.create",
  "params": {
    "name": "Operator",
    "type": "1",
    "rules": {
      "ui": [
        {
          "name": "monitoring.screens",
          "status": "0"
        },
        {
          "name": "monitoring.maps",
          "status": "0"
        }
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "5"
    ]
  },
  "id": 1
}
```

#### See also

- [Role rules](#)
- [UI element](#)
- [Module](#)
- [Action](#)

#### Source

`CRole::create()` in `ui/include/classes/api/services/CRole.php`.

#### **role.delete**

#### Description

object `role.delete(array roleids)`

This method allows to delete roles.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the roles to delete.

Return values

(object) Returns an object containing the IDs of the deleted roles under the `roleids` property.

Examples

Deleting multiple user roles

Delete two user roles.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.delete",
  "params": [
    "4",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "4",
      "5"
    ]
  },
  "id": 1
}
```

Source

`CRole::delete()` in `ui/include/classes/api/services/CRole.php`.

## role.get

Description

integer/array `role.get(object parameters)`

The method allows to retrieve roles according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
roleids	string/array	Return only roles with the given IDs.
selectRules	query	Return role rules in the <code>rules</code> property.
selectUsers	query	Select <code>users</code> this role is assigned to.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: <code>roleid</code> , <code>name</code> . These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving role data

Retrieve "Super admin role" role data and its access rules.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.get",
  "params": [
    "output": "extend",
    "selectRules": "extend",
    "roleids": "3"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "roleid": "3",
      "name": "Super Admin role",
      "type": "3",
      "readonly": "1",
      "rules": {
        "ui": [
          {
            "name": "monitoring.dashboard",
            "status": "1"
          },
          {
            "name": "monitoring.problems",
            "status": "1"
          },
          {
            "name": "monitoring.hosts",
            "status": "1"
          },
          {
            "name": "monitoring.overview",
            "status": "1"
          },
          {
            "name": "monitoring.latest_data",
            "status": "1"
          },
          {
            "name": "monitoring.screens",
            "status": "1"
          },
          {
            "name": "monitoring.maps",
            "status": "1"
          },
          {
            "name": "monitoring.services",
            "status": "1"
          },
          {
            "name": "inventory.overview",
            "status": "1"
          },
          {
            "name": "inventory.hosts",
            "status": "1"
          },
          {
            "name": "reports.availability_report",
            "status": "1"
          },
          {
            "name": "reports.top_triggers",
            "status": "1"
          },
          {
            "name": "monitoring.discovery",
            "status": "1"
          }
        ]
      }
    }
  ]
}

```



```
{
  "name": "reports.notifications",
  "status": "1"
},
{
  "name": "configuration.host_groups",
  "status": "1"
},
{
  "name": "configuration.templates",
  "status": "1"
},
{
  "name": "configuration.hosts",
  "status": "1"
},
{
  "name": "configuration.maintenance",
  "status": "1"
},
{
  "name": "configuration.actions",
  "status": "1"
},
{
  "name": "configuration.discovery",
  "status": "1"
},
{
  "name": "configuration.services",
  "status": "1"
},
{
  "name": "reports.system_info",
  "status": "1"
},
{
  "name": "reports.audit",
  "status": "1"
},
{
  "name": "reports.action_log",
  "status": "1"
},
{
  "name": "configuration.event_correlation",
  "status": "1"
},
{
  "name": "administration.general",
  "status": "1"
},
{
  "name": "administration.proxies",
  "status": "1"
},
{
  "name": "administration.authentication",
  "status": "1"
},
{
  "name": "administration.user_groups",
```

```

        "status": "1"
    },
    {
        "name": "administration.user_roles",
        "status": "1"
    },
    {
        "name": "administration.users",
        "status": "1"
    },
    {
        "name": "administration.media_types",
        "status": "1"
    },
    {
        "name": "administration.scripts",
        "status": "1"
    },
    {
        "name": "administration.queue",
        "status": "1"
    }
],
"ui.default_access": "1",
"modules": [],
"modules.default_access": "1",
"api.access": "1",
"api.mode": "0",
"api": [],
"actions": [
    {
        "name": "edit_dashboards",
        "status": "1"
    },
    {
        "name": "edit_maps",
        "status": "1"
    },
    {
        "name": "acknowledge_problems",
        "status": "1"
    },
    {
        "name": "close_problems",
        "status": "1"
    },
    {
        "name": "change_severity",
        "status": "1"
    },
    {
        "name": "add_problem_comments",
        "status": "1"
    },
    {
        "name": "execute_scripts",
        "status": "1"
    },
    {
        "name": "edit_maintenance",
        "status": "1"
    }
]

```

```

        ],
        "actions.default_access": "1"
    }
}
],
"id": 1
}

```

See also

- [Role rules](#)
- [User](#)

Source

CRole::get() in ui/include/classes/api/services/CRole.php.

## role.update

Description

object role.update(object/array roles)

This method allows to update existing roles.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Role properties to be updated.

The `roleid` property must be defined for each role, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard role properties](#) the method accepts the following parameters.

Parameter	Type	Description
rules	array	Access <a href="#">rules</a> to replace the current access rules assigned to the role.

Return values

(object) Returns an object containing the IDs of the updated roles under the `roleids` property.

Examples

Disabling ability to execute scripts

Update role with ID "5", disable ability to execute scripts.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "role.update",
  "params": [
    {
      "roleid": "5",
      "rules": {
        "actions": [
          {
            "name": "execute_scripts",
            "status": "0"
          }
        ]
      }
    }
  ]
}

```

```

    }
  ]
}
},
"auth": "3a57200802b24cda67c4e4010b50c065",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "5"
    ]
  },
  "id": 1
}

```

Limiting access to API

Update role with ID "5", deny to call any "create", "update" or "delete" methods.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "role.update",
  "params": [
    {
      "roleid": "5",
      "rules": {
        "api.access": "1",
        "api.mode": "0",
        "api": ["*.create", "*.update", "*.delete"]
      }
    }
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "5"
    ]
  },
  "id": 1
}

```

Source

CRole::update() in ui/include/classes/api/services/CRole.php.

### Screen

This class is designed to work with screen.

Object references:

- [Screen](#)
- [Screen user](#)
- [Screen user group](#)

Available methods:

- [screen.create](#) - creating new screen
- [screen.delete](#) - deleting screens
- [screen.get](#) - retrieving screens
- [screen.update](#) - updating screens

## > Screen object

The following objects are directly related to the `screen` API.

Screen

The screen object has the following properties.

Property	Type	Description
<code>screenid</code>	string	(readonly) ID of the screen.
<b>name</b> (required)	string	Name of the screen.
<code>hsize</code>	integer	Width of the screen.
<code>vsize</code>	integer	Default: 1 Height of the screen.
<code>userid</code>	string	Default: 1 Screen owner user ID.
<code>private</code>	integer	Type of screen sharing.  Possible values: 0 - public screen; 1 - (default) private screen.

Screen user

List of screen permissions based on users. It has the following properties:

Property	Type	Description
<code>screenuserid</code>	string	(readonly) ID of the screen user.
<b>userid</b> (required)	string	User ID.
<b>permission</b> (required)	integer	Type of permission level.  Possible values: 2 - read only; 3 - read-write;

Screen user group

List of screen permissions based on user groups. It has the following properties:

Property	Type	Description
screenusrgrpId	string	(readonly) ID of the screen user group.
<b>usrgrpId</b> (required)	string	User group ID.
<b>permission</b> (required)	integer	Type of permission level.
		Possible values: 2 - read only; 3 - read-write;

## screen.create

### Description

object screen.create(object/array screens)

This method allows to create new screens.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Screens to create.

Additionally to the [standard screen properties](#), the method accepts the following parameters.

Parameter	Type	Description
screenitems	array	Screen <b>items</b> to be created for the screen.
users	array	Screen <b>user</b> shares to be created on the screen.
userGroups	array	Screen <b>user group</b> shares to be created on the screen.

### Return values

(object) Returns an object containing the IDs of the created screens under the `screenids` property. The order of the returned IDs matches the order of the passed screens.

### Examples

#### Creating a screen

Create a screen named "Graphs" with 2 rows and 3 columns and add a graph to the upper-left cell.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.create",
  "params": {
    "name": "Graphs",
    "hsize": 3,
    "vsize": 2,
    "screenitems": [
      {
        "resourcetype": 0,
        "resourceid": "612",
        "rowspan": 1,
        "colspan": 1,
        "x": 0,
        "y": 0
      }
    ]
  }
}
```

```
    ]
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenids": [
      "26"
    ]
  },
  "id": 1
}
```

Screen sharing

Create a screen with two types of sharing (user and user group).

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.create",
  "params": {
    "name": "Screen sharing",
    "hsize": 3,
    "vsize": 2,
    "users": [
      {
        "userid": "4",
        "permission": "3"
      }
    ],
    "userGroups": [
      {
        "usrgrpId": "7",
        "permission": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenids": [
      "83"
    ]
  },
  "id": 1
}
```

See also

- [Screen item](#)
- [Screen user](#)
- [Screen user group](#)

Source

CScreen::create() in ui/include/classes/api/services/CScreen.php.

## screen.delete

Description

object screen.delete(array screenIds)

This method allows to delete screens.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the screens to delete.

Return values

(object) Returns an object containing the IDs of the deleted screens under the `screenids` property.

Examples

Deleting multiple screens

Delete two screens.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.delete",
  "params": [
    "25",
    "26"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenids": [
      "25",
      "26"
    ]
  },
  "id": 1
}
```

Source

CScreen::delete() in ui/include/classes/api/services/CScreen.php.

## screen.get

Description

integer/array screen.get(object parameters)

The method allows to retrieve screens according to the given parameters.



**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
screenids	string/array	Return only screens with the given IDs.
userids	string/array	Return only screens that belong to the given user IDs.
screenitemids	string/array	Return only screens that contain the given screen items.
selectScreenItemsquery		Return a <a href="#">screenitems</a> property with the elements that are used in the screen.
selectUsers	query	Return a <a href="#">users</a> property with users that the screen is shared with.
selectUserGroups	query	Return a <a href="#">userGroups</a> property with user groups that the screen is shared with.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: <a href="#">screenid</a> and <a href="#">name</a> . These parameters being common for all <a href="#">get</a> methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	

Parameter	Type	Description
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving a screen by ID

Retrieve all data about screen "26" and its screen items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.get",
  "params": {
    "output": "extend",
    "selectScreenItems": "extend",
    "selectUsers": "extend",
    "selectUserGroups": "extend",
    "screenids": "26"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "screenitems": [
        {
          "screenitemid": "67",
          "screenid": "26",
          "resourcetype": "0",
          "resourceid": "612",
          "width": "320",
          "height": "200",
          "x": "0",
          "y": "0",
          "colspan": "0",
          "rowspan": "0",
          "elements": "25",
          "valign": "0",
          "halign": "0",
          "style": "0",
          "url": "",
          "dynamic": "0",
          "sort_triggers": "0"
        }
      ],
      "users": [
        {
          "sysmapuserid": "1",
          "userid": "2",
          "permission": "2"
        }
      ]
    }
  ]
}
```

```

    ],
    "userGroups": [
        {
            "screenusrgrpid": "1",
            "usrgrpid": "7",
            "permission": "3"
        }
    ],
    "screenid": "26",
    "name": "CPU Graphs",
    "hsize": "3",
    "vsize": "2",
    "userid": "1",
    "private": "1"
}
],
"id": 1
}

```

See also

- [Screen item](#)
- [Screen user](#)
- [Screen user group](#)

Source

CScreen::get() in ui/include/classes/api/services/CScreen.php.

## screen.update

Description

object screen.update(object/array screens)

This method allows to update existing screens.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Screen properties to be updated.

The `screenid` property must be defined for each screen, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard screen properties](#), the method accepts the following parameters.

Parameter	Type	Description
screenitems	array	Screen <b>items</b> to replace existing screen items.  Screen items are updated by coordinates, so each screen item must have the x and y properties defined.
users	array	Screen <b>user</b> shares to replace the existing elements.

Parameter	Type	Description
userGroups	array	Screen <b>user group</b> shares to replace the existing elements.

#### Return values

(object) Returns an object containing the IDs of the updated screens under the `screenids` property.

#### Examples

##### Renaming a screen

Rename a screen to "CPU Graphs".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.update",
  "params": {
    "screenid": "26",
    "name": "CPU Graphs"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenids": [
      "26"
    ]
  },
  "id": 1
}
```

##### Change screen owner

Available only for admins and super admins.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "screen.update",
  "params": {
    "screenid": "83",
    "userid": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenids": [
      "83"
    ]
  },
  "id": 2
}
```

```
"id": 2  
}
```

See also

- [Screen item](#)
- [screenitem.create](#)
- [screenitem.update](#)
- [screenitem.updatebyposition](#)
- [Screen user](#)
- [Screen user group](#)

Source

CScreen::update() in ui/include/classes/api/services/CScreen.php.

## Screen item

This class is designed to work with screen items.

Object references:

- [Screen item](#)

Available methods:

- [screenitem.create](#) - creating new screen items
- [screenitem.delete](#) - deleting screen items
- [screenitem.get](#) - retrieving screen items
- [screenitem.update](#) - updating screen items
- [screenitem.updatebyposition](#) - updating screen items in a specific screen cell

## > Screen item object

The following objects are directly related to the `screenitem` API.

Screen item

The screen item object defines an element displayed on a screen. It has the following properties.

Property	Type	Description
screenitemid	string	(readonly) ID of the screen item.

Property	Type	Description
<b>resourcetype</b> (required)	integer	Type of screen item.  Possible values: 0 - graph; 1 - simple graph; 2 - map; 3 - plain text; 4 - hosts info; 5 - triggers info; 6 - system information; 7 - clock; 9 - triggers overview; 10 - data overview; 11 - URL; 12 - history of actions; 13 - history of events; 14 - latest host group issues; 15 - problems by severity; 16 - latest host issues; 19 - simple graph prototype; 20 - graph prototype.
<b>screenid</b> (required)	string	ID of the screen that the item belongs to.
application	string	Application or part of application name by which data in screen item can be filtered. Applies to resource types: "Data overview" and "Triggers overview".
colspan	integer	Number of columns the screen item will span across.
dynamic	integer	Default: 1. Whether the screen item is dynamic.  Possible values: 0 - (default) not dynamic; 1 - dynamic.

Property	Type	Description
elements	integer	Number of lines to display on the screen item.
halign	integer	Default: 25. Specifies how the screen item must be aligned horizontally in the cell.  Possible values: 0 - (default) center; 1 - left; 2 - right.
height	integer	Height of the screen item in pixels.
max_columns	integer	Default: 200. Specifies the maximum amount of columns a graph prototype or simple graph prototype screen element can have.
resourceid	string	Default: 3. ID of the object displayed on the screen item. Depending on the type of a screen item, the <code>resourceid</code> property can reference different objects.  Required for data overview, graph, map, plain text, simple graph and trigger overview screen items. Unused by local and server time clocks, history of actions, history of events, hosts info, system information, problems by severity and URL screen items.

Property	Type	Description
rowspan	integer	Number of rows the screen item will span across.
sort_triggers	integer	<p>Default: 1. Order in which actions or triggers must be sorted.</p> <p>Possible values for history of actions screen elements:  3 - time, ascending;  4 - time, descending;  5 - type, ascending;  6 - type, descending;  7 - status, ascending;  8 - status, descending;  9 - retries left, ascending;  10 - retries left, descending;  11 - recipient, ascending;  12 - recipient, descending.</p> <p>Possible values for latest host group issues and latest host issues screen items:  0 - (default) last change, descending;  1 - severity, descending;  2 - host, ascending.</p>



Property	Type	Description
style	integer	<p>Screen item display option.</p> <p>Possible values for data overview and triggers overview screen items:  0 - (default) display hosts on the left side;  1 - display hosts on the top.</p> <p>Possible values for hosts info and triggers info screen elements:  0 - (default) horizontal layout;  1 - vertical layout.</p> <p>Possible values for clock screen items:  0 - (default) local time;  1 - server time;  2 - host time.</p> <p>Possible values for plain text screen items:  0 - (default) display values as plain text;  1 - display values as HTML.</p>
url	string	<p>URL of the webpage to be displayed in the screen item.  Used by URL screen items.</p>
valign	integer	<p>Specifies how the screen item must be aligned vertically in the cell.</p> <p>Possible values:  0 - (default) middle;  1 - top;  2 - bottom.</p>
width	integer	<p>Width of the screen item in pixels.</p> <p>Default: 320.</p>

Property	Type	Description
x	integer	X-coordinates of the screen item on the screen, from left to right.
y	integer	Default: 0. Y-coordinates of the screen item on the screen, from top to bottom.  Default: 0.

## screenitem.create

### Description

`object screenitem.create(object/array screenItems)`

This method allows to create new screen items.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Screen items to create.

The method accepts screen items with the [standard screen item properties](#).

### Return values

(object) Returns an object containing the IDs of the created screen items under the `screenitemids` property. The order of the returned IDs matches the order of the passed screen items.

### Examples

#### Creating a screen item

Create a screen item displaying a graph in the left-upper cell of the screen.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "screenitem.create",
  "params": {
    "screenid": 16,
    "resourcetype": 0,
    "resourceid": 612,
    "x": 0,
    "y": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenitemids": [
      "65"
    ]
  }
}
```

```
    ]
  },
  "id": 1
}
```

See also

- [screen.update](#)

Source

CScreenItem::create() in ui/include/classes/api/services/CScreenItem.php.

## screenitem.delete

Description

object screenitem.delete(array screenItemIds)

This method allows to delete screen items.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the screen items to delete.

Return values

(object) Returns an object containing the IDs of the deleted screen items under the `screenitemids` property.

Examples

Deleting multiple screen items

Delete two screen items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screenitem.delete",
  "params": [
    "65",
    "63"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenitemids": [
      "65",
      "63"
    ]
  },
  "id": 1
}
```

See also

- [screen.update](#)

Source

CScreenItem::delete() in ui/include/classes/api/services/CScreenItem.php.

## screenitem.get

Description

integer/array screenitem.get(object parameters)

The method allows to retrieve screen items according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
screenitemids	string/array	Return only screen items with the given IDs.
screenids	string/array	Return only screen items that belong to the given screen.
sortfield	string/array	Sort the result by the given properties.
countOutput	boolean	Possible values are: screenitemid and screenid. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary page</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

## Examples

Retrieving screen items from screen

Retrieve all screen items from the given screen.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screenitem.get",
  "params": {
    "output": "extend",
    "screenids": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "screenitemid": "20",
      "screenid": "3",
      "resourcetype": "0",
      "resourceid": "433",
      "width": "500",
      "height": "120",
      "x": "0",
      "y": "0",
      "colspan": "1",
      "rowspan": "1",
      "elements": "0",
      "valign": "1",
      "halign": "0",
      "style": "0",
      "url": "",
      "dynamic": "0",
      "sort_triggers": "0",
      "application": "",
      "max_columns": "3"
    },
    {
      "screenitemid": "21",
      "screenid": "3",
      "resourcetype": "0",
      "resourceid": "387",
      "width": "500",
      "height": "100",
      "x": "0",
      "y": "1",
      "colspan": "1",
      "rowspan": "1",
      "elements": "0",
      "valign": "1",
      "halign": "0",
      "style": "0",
      "url": "",
      "dynamic": "0",
      "sort_triggers": "0",
      "application": "",
      "max_columns": "3"
    }
  ],
}
```

```

    {
        "screenitemid": "22",
        "screenid": "3",
        "resourcetype": "1",
        "resourceid": "10013",
        "width": "500",
        "height": "148",
        "x": "1",
        "y": "0",
        "colspan": "1",
        "rowspan": "1",
        "elements": "0",
        "valign": "1",
        "halign": "0",
        "style": "0",
        "url": "",
        "dynamic": "0",
        "sort_triggers": "0",
        "application": "",
        "max_columns": "3"
    },
    {
        "screenitemid": "23",
        "screenid": "3",
        "resourcetype": "1",
        "resourceid": "22181",
        "width": "500",
        "height": "184",
        "x": "1",
        "y": "1",
        "colspan": "1",
        "rowspan": "1",
        "elements": "0",
        "valign": "1",
        "halign": "0",
        "style": "0",
        "url": "",
        "dynamic": "0",
        "sort_triggers": "0",
        "application": "",
        "max_columns": "3"
    }
],
    "id": 1
}

```

Source

CScreenItem::get() in ui/include/classes/api/services/CScreenItem.php.

### screenitem.update

Description

object screenitem.update(object/array screenItems)

This method allows to update existing screen items.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Screen item properties** to be updated.

The `screenitemid` property must be defined for each screen item, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated screen items under the `screenitemids` property.

Examples

Setting the size of the screen item

Set the width of the screen item to 500px and height to 300px.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screenitem.update",
  "params": {
    "screenitemid": "20",
    "width": 500,
    "height": 300
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenitemids": [
      "20"
    ]
  },
  "id": 1
}
```

See also

- [screenitem.updatebyposition](#)

Source

`CScreenItem::update()` in `ui/include/classes/api/services/CScreenItem.php`.

### **screenitem.updatebyposition**

Description

object `screenitem.updatebyposition(array screenItems)`

This method allows to update screen items in the given screen cells. If a cell is empty, a new screen item will be created.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) **Screen item properties** to be updated.

The `x`, `y` and `screenid` properties must be defined for each screen item, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated and created screen items under the `screenitemids` property.

## Examples

### Changing a screen items resource ID

Change the resource ID for the screen element located in the upper-left cell of the screen.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "screenitem.updatebyposition",
  "params": [
    {
      "screenid": "16",
      "x": 0,
      "y": 0,
      "resourceid": "644"
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "screenitemids": [
      "66"
    ]
  },
  "id": 1
}
```

See also

- [screenitem.update](#)

Source

CScreenItem::update() in ui/include/classes/api/services/CScreenItem.php.

## Script

This class is designed to work with scripts.

Object references:

- [Script](#)

Available methods:

- [script.create](#) - create new scripts
- [script.delete](#) - delete scripts
- [script.execute](#) - run scripts
- [script.get](#) - retrieve scripts
- [script.getscriptsbyhosts](#) - retrieve scripts for hosts
- [script.update](#) - update scripts

### > Script object

The following objects are directly related to the script API.

Script

The script object has the following properties.



Property	Type	Description
scriptid	string	(readonly) ID of the script.
<b>command</b> (required)	string	Command to run.
<b>name</b> (required)	string	Name of the script.
confirmation	string	Confirmation pop up text. The pop up will appear when trying to run the script from the Zabbix frontend.
description	string	Description of the script.
execute_on	integer	Where to run the script.  Possible values: 0 - run on Zabbix agent; 1 - run on Zabbix server. 2 - (default) run on Zabbix server (proxy).
groupid	string	ID of the host group that the script can be run on. If set to 0, the script will be available on all host groups.
host_access	integer	Default: 0. Host permissions needed to run the script.  Possible values: 2 - (default) read; 3 - write.
type	integer	Script type.  Possible values: 0 - (default) script; 1 - IPMI.
usrgrp	string	ID of the user group that will be allowed to run the script. If set to 0, the script will be available for all user groups.  Default: 0.

## script.create

## Description

object `script.create(object/array scripts)`

This method allows to create new scripts.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object/array) Scripts to create.

The method accepts scripts with the [standard script properties](#).

## Return values

(object) Returns an object containing the IDs of the created scripts under the `scriptids` property. The order of the returned IDs matches the order of the passed scripts.

## Examples

### Create a script

Create a script that will reboot a server. The script will require write access to the host and will display a configuration message before running in the frontend.

### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.create",
  "params": {
    "name": "Reboot server",
    "command": "reboot server 1",
    "host_access": 3,
    "confirmation": "Are you sure you would like to reboot the server?"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "3"
    ]
  },
  "id": 1
}
```

## Source

CScript::create() in `ui/include/classes/api/services/CScript.php`.

## **script.delete**

## Description

object `script.delete(array scriptIds)`

This method allows to delete scripts.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(array) IDs of the scripts to delete.

## Return values

(object) Returns an object containing the IDs of the deleted scripts under the `scriptids` property.

## Examples

### Delete multiple scripts

Delete two scripts.

### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.delete",
  "params": [
    "3",
    "4"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "3",
      "4"
    ]
  },
  "id": 1
}
```

## Source

CScript::delete() in ui/include/classes/api/services/CScript.php.

## script.execute

### Description

object script.execute(object parameters)

This method allows to run a script on a host.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters containing the ID of the script to run and the ID of the host.

Parameter	Type	Description
<b>hostid</b> (required)	string	ID of the host to run the script on.
<b>scriptid</b> (required)	string	ID of the script to run.

## Return values

(object) Returns the result of script execution.

Property	Type	Description
response	string	Whether the script was run successfully.  Possible values: success or failed.
value	string	Script output.

#### Examples

Run a script

Run a "ping" script on a host.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.execute",
  "params": {
    "scriptid": "1",
    "hostid": "30079"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "response": "success",
    "value": "PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.\n64 bytes from 127.0.0.1: icmp_req=1 tt"
  },
  "id": 1
}
```

Source

CScript::execute() in ui/include/classes/api/services/CScript.php.

#### script.get

Description

integer/array script.get(object parameters)

The method allows to retrieve scripts according to the given parameters.

##### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
groupids	string/array	Return only scripts that can be run on the given host groups.
hostids	string/array	Return only scripts that can be run on the given hosts.
scriptids	string/array	Return only scripts with the given IDs.
usrgrpids	string/array	Return only scripts that can be run by users in the given user groups.
selectGroups	query	Return a <b>groups</b> property with host groups that the script can be run on.
selectHosts	query	Return a <b>hosts</b> property with hosts that the script can be run on.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <b>scriptid</b> and <b>name</b> .
countOutput	boolean	These parameters being common for all <b>get</b> methods are described in detail in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve all scripts

Retrieve all configured scripts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "scriptid": "1",
      "name": "Ping",
      "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
      "host_access": "2",
      "usrgrpid": "0",
      "groupid": "0",
      "description": "",
      "confirmation": "",
      "type": "0",
      "execute_on": "1"
    },
    {
      "scriptid": "2",
      "name": "Traceroute",
      "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
      "host_access": "2",
      "usrgrpid": "0",
      "groupid": "0",
      "description": "",
      "confirmation": "",
      "type": "0",
      "execute_on": "1"
    },
    {
      "scriptid": "3",
      "name": "Detect operating system",
      "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
      "host_access": "2",
      "usrgrpid": "7",
      "groupid": "0",
      "description": "",
      "confirmation": "",
      "type": "0",
      "execute_on": "1"
    }
  ],
  "id": 1
}
```

See also

- [Host](#)
- [Host group](#)

Source

CScript::get() in ui/include/classes/api/services/CScript.php.

## script.getscriptsbyhosts

### Description

object script.getscriptsbyhosts(array hostIds)

This method allows to retrieve scripts available on the given hosts.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(string/array) IDs of hosts to return scripts for.

### Return values

(object) Returns an object with host IDs as properties and arrays of available scripts as values.

#### Note:

The method will automatically expand macros in the confirmation text.

### Examples

Retrieve scripts by host IDs

Retrieve all scripts available on hosts "30079" and "30073".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.getscriptsbyhosts",
  "params": [
    "30079",
    "30073"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "30079": [
      {
        "scriptid": "3",
        "name": "Detect operating system",
        "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "7",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
      },
      {
        "scriptid": "1",
        "name": "Ping",
        "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "0",

```

```

    "groupid": "0",
    "description": "",
    "confirmation": "",
    "type": "0",
    "execute_on": "1",
    "hostid": "10001"
  },
  {
    "scriptid": "2",
    "name": "Traceroute",
    "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
    "host_access": "2",
    "usrgrp": "0",
    "groupid": "0",
    "description": "",
    "confirmation": "",
    "type": "0",
    "execute_on": "1",
    "hostid": "10001"
  }
],
"30073": [
  {
    "scriptid": "3",
    "name": "Detect operating system",
    "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
    "host_access": "2",
    "usrgrp": "7",
    "groupid": "0",
    "description": "",
    "confirmation": "",
    "type": "0",
    "execute_on": "1",
    "hostid": "10001"
  },
  {
    "scriptid": "1",
    "name": "Ping",
    "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
    "host_access": "2",
    "usrgrp": "0",
    "groupid": "0",
    "description": "",
    "confirmation": "",
    "type": "0",
    "execute_on": "1",
    "hostid": "10001"
  },
  {
    "scriptid": "2",
    "name": "Traceroute",
    "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
    "host_access": "2",
    "usrgrp": "0",
    "groupid": "0",
    "description": "",
    "confirmation": "",
    "type": "0",
    "execute_on": "1",
    "hostid": "10001"
  }
]

```



```
  },
  "id": 1
}
```

#### Source

CScript::getScriptsByHosts() in ui/include/classes/api/services/CScript.php.

### script.update

#### Description

object script.update(object/array scripts)

This method allows to update existing scripts.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) **Script properties** to be updated.

The `scriptid` property must be defined for each script, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

#### Return values

(object) Returns an object containing the IDs of the updated scripts under the `scriptids` property.

#### Examples

##### Change script command

Change the command of the script to `"/bin/ping -c 10 {HOST.CONN} 2>&1"`.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.update",
  "params": {
    "scriptid": "1",
    "command": "/bin/ping -c 10 {HOST.CONN} 2>&1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "1"
    ]
  },
  "id": 1
}
```

#### Source

CScript::update() in ui/include/classes/api/services/CScript.php.

### Service

This class is designed to work with services.

Object references:

- [Service](#)
- [Service time](#)
- [Service dependency](#)
- [Service alarm](#)

Available methods:

- [service.adddependencies](#) - adding dependencies between IT services
- [service.addtimes](#) - adding service times
- [service.create](#) - creating new IT services
- [service.delete](#) - deleting IT services
- [service.deletedependencies](#) - deleting dependencies between IT services
- [service.deletetimes](#) - deleting service times
- [service.get](#) - retrieving IT services
- [service.getsla](#) - retrieving availability information about IT services
- [service.update](#) - updating IT services

### > Service object

The following objects are directly related to the `service` API.

Service

The service object has the following properties.

Property	Type	Description
<code>serviceid</code>	string	(readonly) ID of the service.
<b>algorithm</b> (required)	integer	Algorithm used to calculate the state of the service.  Possible values: 0 - do not calculate; 1 - problem, if at least one child has a problem; 2 - problem, if all children have problems.
<b>name</b> (required)	string	Name of the service.
<b>showsla</b> (required)	integer	Whether SLA should be calculated.  Possible values: 0 - do not calculate; 1 - calculate.
<b>sortorder</b> (required)	integer	Position of the service used for sorting.

Property	Type	Description
goodsla	float	Minimum acceptable SLA value. If the SLA drops lower, the service is considered to be in problem state.
status	integer	<p>Default: 99.9. (readonly) Whether the service is in OK or problem state.</p> <p>If the service is in problem state, status is equal either to: - the priority of the linked trigger if it is set to 2, "Warning" or higher (priorities 0, "Not classified" and 1, "Information" are ignored); - the highest status of a child service in problem state.</p> <p>If the service is in OK state, status is equal to 0.</p>
triggerid	string	<p>Trigger associated with the service. Can only be set for services that don't have children.</p> <p>Default: 0</p>

### Service time

The service time object defines periods, when an service is scheduled to be up or down. It has the following properties.

Property	Type	Description
timeid	string	(readonly) ID of the service time.
<b>serviceid</b> (required)	string	ID of the service.  Cannot be updated.

Property	Type	Description
<b>ts_from</b> (required)	integer	Time when the service time comes into effect.  For onetime downtimes <b>ts_from</b> must be set as a Unix timestamp, for other types - as a specific time in a week, in seconds, for example, 90000 for Mon, 1:00 AM.
<b>ts_to</b> (required)	integer	Time when the service time ends.  For onetime uptimes <b>ts_to</b> must be set as a Unix timestamp, for other types - as a specific time in a week, in seconds, for example, 90000 for Mon, 1:00 AM.
<b>type</b> (required)	integer	Service time type.  Possible values: 0 - planned uptime, repeated every week; 1 - planned downtime, repeated every week; 2 - one-time downtime.
note	string	Additional information about the service time.

#### Service dependency

The service dependency object represents a dependency between services. It has the following properties.

Property	Type	Description
linkid	string	(readonly) ID of the service dependency.
<b>servicedownid</b> (required)	string	ID of the service, that a service depends on, that is, the child service. A service can have multiple children.

Property	Type	Description
<b>serviceupid</b> (required)	string	ID of the service, that is dependent on a service, that is, the parent service. A service can have multiple parents forming a directed graph.
<b>soft</b> (required)	integer	Type of dependency between services.  Possible values: 0 - hard dependency; 1 - soft dependency.  A service can have only one hard-dependent parent. This attribute has no effect on status or SLA calculation and is only used to create a core service tree. Additional parents can be added as soft dependencies forming a graph.  A service can not be deleted if it has hard-dependent children.

#### Service alarm

**Note:**

Service alarms cannot be directly created, updated or deleted via the Zabbix API.

The service alarm objects represents an service's state change. It has the following properties.

Property	Type	Description
servicealarmid	string	ID of the service alarm.
serviceid	string	ID of the service.
clock	timestamp	Time when the service state change has happened.

Property	Type	Description
value	integer	Status of the service.  Refer the the <b>service status property</b> for a list of possible values.

## service.adddependencies

### Description

object service.adddependencies(object/array serviceDependencies)

This method allows to create dependencies between services.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

### Parameters

(object/array) Service dependencies to create.

Each service dependency has the following parameters.

Parameter	Type	Description
serviceid	string	ID of the service that depends on a service, that is, the parent service.
dependsOnServiceid	string	ID of the service that a service depends on, that is, the child service.
soft	string	Type of dependency.  Refer to the <b>service dependency object page</b> for more information on dependency types.

### Return values

(object) Returns an object containing the IDs of the affected parent services under the **serviceids** property.

### Examples

#### Creating a hard dependency

Make service "2" a hard-dependent child of service "3".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.adddependencies",
  "params": {
    "serviceid": "3",
    "dependsOnServiceid": "2",
    "soft": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [service.update](#)

Source

CService::addDependencies() in ui/include/classes/api/services/CService.php.

## service.addtimes

Description

object service.addtimes(object/array serviceTimes)

This method allows to create new service times.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Service times to create.

The method accepts service times with the [standard service time properties](#).

Return values

(object) Returns an object containing the IDs of the affected services under the `serviceids` property.

Examples

Adding a scheduled downtime

Add a downtime for service with ID "4" scheduled weekly from Monday 22:00 till Tuesday 10:00.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.addtimes",
  "params": {
    "serviceid": "4",
    "type": 1,
    "ts_from": 165600,
    "ts_to": 201600
  }
}
```

```
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "4"
    ]
  },
  "id": 1
}
```

See also

- [service.update](#)

Source

CService::addTimes() in ui/include/classes/api/services/CService.php.

## service.create

Description

object service.create(object/array services)

This method allows to create new services.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) services to create.

Additionally to the [standard service properties](#), the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	Service <a href="#">dependencies</a> .  Each service dependency has the following parameters: - - dependsOnServiceid - (string) ID of an service the service depends on, that is, the child service. - soft - (integer) type of service dependency. ID of a hard-linked parent service.
parentid	string	



Parameter	Type	Description
times	array	Service <b>times</b> to be created for the service.

#### Return values

(object) Returns an object containing the IDs of the created services under the `serviceids` property. The order of the returned IDs matches the order of the passed services.

#### Examples

##### Creating an service

Create an service that will be switched to problem state, if at least one child has a problem. SLA calculation will be on and the minimum acceptable SLA is 99.99%.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.create",
  "params": {
    "name": "Server 1",
    "algorithm": 1,
    "showsla": 1,
    "goodsla": 99.99,
    "sortorder": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "5"
    ]
  },
  "id": 1
}
```

#### Source

CService::create() in ui/include/classes/api/services/CService.php.

### service.delete

#### Description

object `service.delete(array serviceIds)`

This method allows to delete services.

Services with hard-dependent child services cannot be deleted.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the services to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted services under the `serviceids` property.

Examples

Deleting multiple services

Delete two services.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.delete",
  "params": [
    "4",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "4",
      "5"
    ]
  },
  "id": 1
}
```

Source

CService::delete() in ui/include/classes/api/services/CService.php.

### **service.deletedependencies**

Description

object `service.deletedependencies(string/array serviceIds)`

This method allows to delete all dependencies from services.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(string/array) IDs of the services to delete all dependencies from.

Return values

(object) Returns an object containing the IDs of the affected services under the `serviceids` property.

Examples

Deleting dependencies from an service

Delete all dependencies from service "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.deletedependencies",
  "params": [
    "2"
  ]
}
```

```
],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "2"
    ]
  },
  "id": 1
}
```

See also

- [service.update](#)

Source

CService::delete() in ui/include/classes/api/services/CService.php.

### service.deletetimes

Description

object service.deletetimes(string/array serviceIds)

This method allows to delete all service times from services.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(string/array) IDs of the services to delete all service times from.

Return values

(object) Returns an object containing the IDs of the affected services under the `serviceids` property.

Examples

Deleting service times from an service

Delete all service times from service "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.deletetimes",
  "params": [
    "2"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "2"
    ]
  }
}
```

```

    ]
  },
  "id": 1
}

```

See also

- [service.update](#)

Source

CService::delete() in ui/include/classes/api/services/CService.php.

## service.get

Description

integer/array service.get(object parameters)

The method allows to retrieve services according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
serviceids	string/array	Return only services with the given IDs.
parentids	string/array	Return only services with the given hard-dependent parent services.
childids	string/array	Return only services that are hard-dependent on the given child services.
selectParent	query	Return a <b>parent</b> property with the hard-dependent parent service.
selectDependencies	query	Return a <b>dependencies</b> property with child service dependencies.
selectParentDependencies	query	Return a <b>parent-Dependencies</b> property with parent service dependencies.
selectTimes	query	Return a <b>times</b> property with service times.
selectAlarms	query	Return an <b>alarms</b> property with service alarms.

Parameter	Type	Description
selectTrigger	query	Return a <b>trigger</b> property with the associated trigger.
sortfield	string/array	Sort the result by the given properties.  Possible values are: <b>name</b> and <b>sortorder</b> .
countOutput	boolean	These parameters being common for all <b>get</b> methods are described in detail in the <b>reference commentary</b> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving all services

Retrieve all data about all services and their dependencies.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.get",
  "params": {
    "output": "extend",
    "selectDependencies": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "serviceid": "2",
      "name": "Server 1",
      "status": "0",

```

```

        "algorithm": "1",
        "triggerid": "0",
        "showsla": "1",
        "goodsla": "99.9000",
        "sortorder": "0",
        "dependencies": []
    },
    {
        "serviceid": "3",
        "name": "Data center 1",
        "status": "0",
        "algorithm": "1",
        "triggerid": "0",
        "showsla": "1",
        "goodsla": "99.9000",
        "sortorder": "0",
        "dependencies": [
            {
                "linkid": "11",
                "serviceupid": "3",
                "servicedownid": "2",
                "soft": "0",
                "sortorder": "0",
                "serviceid": "2"
            },
            {
                "linkid": "10",
                "serviceupid": "3",
                "servicedownid": "5",
                "soft": "0",
                "sortorder": "1",
                "serviceid": "5"
            }
        ]
    },
    {
        "serviceid": "5",
        "name": "Server 2",
        "status": "0",
        "algorithm": "1",
        "triggerid": "0",
        "showsla": "1",
        "goodsla": "99.9900",
        "sortorder": "1",
        "dependencies": []
    }
],
    "id": 1
}

```

Source

CService::get() in ui/include/classes/api/services/CService.php.

### **service.getsla**

Description

object service.getsla(object parameters)

This method allows to calculate availability information about services.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters containing the IDs of the services and time intervals to calculate SLA.

Parameter	Type	Description
serviceids	string/array	IDs of services to return availability information for.
intervals	array	Time intervals to return service layer availability information about.  Each time interval must have the following parameters: - from - (timestamp) interval start time; - to - (timestamp) interval end time.

**Return values**

(object) Returns the following availability information about each service under the corresponding service ID.

Property	Type	Description
status	integer	Current status of the service.
problems	array	Refer to the <a href="#">service object page</a> for more information on service statuses. <b>Triggers</b> that are currently in problem state and are linked either to the service or one of its descendants.

Property	Type	Description
sla	array	<p>SLA data about each time period.</p> <p>Each SLA object has the following properties:</p> <ul style="list-style-type: none"> <li>- from - (timestamp) interval start time;</li> <li>- to - (timestamp) interval end time;</li> <li>- sla - (float) SLA for the given time interval;</li> <li>- okTime - (integer) time the service was in OK state, in seconds;</li> <li>- problemTime - (integer) time the service was in problem state, in seconds;</li> <li>- downtimeTime - (integer) time the service was in scheduled downtime, in seconds.</li> </ul>

## Examples

Retrieving availability information for an service

Retrieve availability information about a service during a week.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.getsla",
  "params": {
    "serviceids": "2",
    "intervals": [
      {
        "from": 1352452201,
        "to": 1353057001
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "2": {
      "status": "3",
      "problems": {
```



```

        "13904": {
            "triggerid": "13904",
            "expression": "{13359}=0",
            "description": "Service unavailable",
            "url": "",
            "status": "0",
            "value": "1",
            "priority": "3",
            "lastchange": "1352967420",
            "comments": "",
            "error": "",
            "templateid": "0",
            "type": "0",
            "value_flags": "0",
            "flags": "0"
        }
    },
    "sla": [
        {
            "from": 1352452201,
            "to": 1353057001,
            "sla": 97.046296296296,
            "okTime": 586936,
            "problemTime": 17864,
            "downtimeTime": 0
        }
    ]
}
},
"id": 1
}

```

See also

- [Trigger](#)

Source

CService::getSla() in ui/include/classes/api/services/CService.php.

## service.update

Description

object service.update(object/array services)

This method allows to update existing services.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) service properties to be updated.

The `serviceid` property must be defined for each service, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard service properties](#), the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	<p>Service dependencies to replace the current service dependencies.</p> <p>Each service dependency has the following parameters:</p> <ul style="list-style-type: none"> <li>- dependsOnServiceid</li> <li>- (string) ID of an service the service depends on, that is, the child service.</li> <li>- soft - (integer) type of service dependency; refer to the <a href="#">service dependency object page</a> for more information on dependency types.</li> </ul>
parentid	string	ID of a hard-linked parent service.
times	array	Service <b>times</b> to replace the current service times.

#### Return values

(object) Returns an object containing the IDs of the updated services under the `serviceids` property.

#### Examples

##### Setting the parent of an service

Make service "3" the hard-linked parent of service "5".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.update",
  "params": {
    "serviceid": "5",
    "parentid": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
```

```

        "5"
    ]
},
"id": 1
}

```

See also

- [service.adddependencies](#)
- [service.addtimes](#)
- [service.deletedependencies](#)
- [service.deletetimes](#)

Source

CService::update() in ui/include/classes/api/services/CService.php.

## Settings

This class is designed to work with common administration settings.

Object references:

- [Settings](#)

Available methods:

- [settings.get](#) - retrieve settings
- [settings.getglobal](#) - retrieve global settings (this method has been removed in Zabbix 5.2.3)
- [settings.update](#) - update settings

### > Settings object

The following object are directly related to the `settings` API.

Settings

The settings object has the following properties.

Property	Type	Description
<code>default_lang</code>	string	System language by default.
<code>default_timezone</code>	string	Default: <code>en_GB</code> . System time zone by default.
		Default: <code>system - system default</code> .
		For the full list of supported time zones please refer to <a href="#">PHP documentation</a> .

Property	Type	Description
default_theme	string	Default theme.  Possible values: blue-theme - (default) Blue; dark-theme - Dark; hc-light - High-contrast light; hc-dark - High-contrast dark.
search_limit	integer	Limit for search and filter results.
max_overview_table_size	integer	Default: 1000. Max number of columns and rows in overview tables.
max_in_table	integer	Default: 50. Max count of elements to show inside table cell.
server_check_interval	integer	Default: 50. Show warning if Zabbix server is down.
work_period	string	Possible values: 0 - Do not show warning; 10 - (default) Show warning. Working time.
show_technical_errors	integer	Default: 1-5,09:00-18:00. Show technical errors (PHP/SQL) to non-Super admin users and to users that are not part of user groups with debug mode enabled.  Possible values: 0 - (default) Do not technical errors; 1 - Show technical errors.

Property	Type	Description
history_period	string	Max period to display history data in Latest data, Web, Overview pages and Data overview screen. Accepts seconds and time unit with suffix.
period_default	string	Default: 24h. Time filter default period. Accepts seconds and time unit with suffix with month and year support (30s,1m,2h,1d,1M,1y).
max_period	string	Default: 1h. Max period for time filter. Accepts seconds and time unit with suffix with month and year support (30s,1m,2h,1d,1M,1y).
severity_color_0	string	Default: 2y. Color for "Not classified" severity as a hexadecimal color code.
severity_color_1	string	Default: 97AAB3. Color for "Information" severity as a hexadecimal color code.
severity_color_2	string	Default: 7499FF. Color for "Warning" severity as a hexadecimal color code.
severity_color_3	string	Default: FFC859. Color for "Average" severity as a hexadecimal color code.
		Default: FFA059.

Property	Type	Description
severity_color_4string		Color for "High" severity as a hexadecimal color code.  Default: E97659.
severity_color_5string		Color for "Disaster" severity as a hexadecimal color code.  Default: E45959.
severity_name_0string		Name for "Not classified" severity.  Default: Not classified.
severity_name_1string		Name for "Information" severity.  Default: Information.
severity_name_2string		Name for "Warning" severity.  Default: Warning.
severity_name_3string		Name for "Average" severity.  Default: Average.
severity_name_4string		Name for "High" severity.  Default: High.
severity_name_5string		Name for "Disaster" severity.  Default: Disaster.
custom_color	integer	Use custom event status colors.  Possible values: 0 - (default) Do not use custom event status colors; 1 - Use custom event status colors.
ok_period	string	Display OK triggers period. Accepts seconds and time unit with suffix.  Default: 5m.

Property	Type	Description
blink_period	string	On status change triggers blink period. Accepts seconds and time unit with suffix.  Default: 2m.
problem_unack_color	string	Color for unacknowledged PROBLEM events as a hexadecimal color code.  Default: CC0000.
problem_ack_color	string	Color for acknowledged PROBLEM events as a hexadecimal color code.  Default: CC0000.
ok_unack_color	string	Color for unacknowledged RESOLVED events as a hexadecimal color code.  Default: CC0000.
ok_ack_color	string	Color for acknowledged RESOLVED events as a hexadecimal color code.  Default: 009900.
problem_unack_style	integer	Blinking for unacknowledged PROBLEM events.  Possible values: 0 - Do not show blinking; 1 - (default) Show blinking.
problem_ack_style	integer	Blinking for acknowledged PROBLEM events.  Possible values: 0 - Do not show blinking; 1 - (default) Show blinking.

Property	Type	Description
ok_unack_style	integer	Blinking for unacknowledged RESOLVED events.  Possible values: 0 - Do not show blinking; 1 - (default) Show blinking.
ok_ack_style	integer	Blinking for acknowledged RESOLVED events.  Possible values: 0 - Do not show blinking; 1 - (default) Show blinking.
discovery_group	integer	ID of the host group to which will be automatically placed discovered hosts.
default_inventory	integer	Default host inventory mode.  Possible values: -1 - (default) Disabled; 0 - Manual; 1 - Automatic.
alert_usrgrp	integer	ID of the user group to which will be sending database down alarm message. If set to empty, the alarm message will not sent.
snmptrap_logging	integer	Log unmatched SNMP traps.  Possible values: 0 - Do not log unmatched SNMP traps; 1 - (default) Log unmatched SNMP traps.
login_attempts	integer	Number of failed login attempts after which login form will be blocked.  Default: 5.



Property	Type	Description
login_block	string	Time interval during which login form will be blocked if number of failed login attempts exceeds defined in login_attempts field. Accepts seconds and time unit with suffix.
validate_uri_schemes	integer	Default: 30s. Validate URI schemes.
uri_valid_schemes	string	Possible values: 0 - Do not validate; 1 - (default) Validate. Valid URI schemes.
x_frame_options	string	Default: http,https,ftp,file,mailto,tel,ssh. X-Frame-Options HTTP header.
iframe_sandboxing	integer	Default: SAMEORIGIN. Use iframe sandboxing.
iframe_sandboxing_exceptions	string	Possible values: 0 - Do not use; 1 - (default) Use. Iframe sandboxing exceptions.
connect_timeout	string	Connection timeout with Zabbix server.
socket_timeout	string	Default: 3s. Network default timeout.
media_type_test_timeout	string	Default: 3s. Network timeout for media type test.
item_test_timeout	string	Default: 65s. Network timeout for item tests.
		Default: 60s.

Property	Type	Description
script_timeout	string	Network timeout for script execution.
session_key	string	Default: 60s. Secret key to sign session data.  Default: ".  Note: This property has been removed since Zabbix <b>5.2.3</b> .

## settings.get

### Description

object settings.get(object parameters)

The method allows to retrieve settings object according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

Parameter	Type	Description
output	query	This parameter being common for all get methods described in the <a href="#">reference commentary</a> .

### Return values

(object) Returns settings object.

### Examples

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "settings.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "default_theme": "blue-theme",
    "search_limit": "1000",
    "max_in_table": "50",
    "server_check_interval": "10",
    "work_period": "1-5,09:00-18:00",
    "show_technical_errors": "0",
    "history_period": "24h",
    "period_default": "1h",
    "max_period": "2y",
    "severity_color_0": "97AAB3",
    "severity_color_1": "7499FF",
    "severity_color_2": "FFC859",
    "severity_color_3": "FFA059",
    "severity_color_4": "E97659",
    "severity_color_5": "E45959",
    "severity_name_0": "Not classified",
    "severity_name_1": "Information",
    "severity_name_2": "Warning",
    "severity_name_3": "Average",
    "severity_name_4": "High",
    "severity_name_5": "Disaster",
    "custom_color": "0",
    "ok_period": "5m",
    "blink_period": "2m",
    "problem_unack_color": "CC0000",
    "problem_ack_color": "CC0000",
    "ok_unack_color": "009900",
    "ok_ack_color": "009900",
    "problem_unack_style": "1",
    "problem_ack_style": "1",
    "ok_unack_style": "1",
    "ok_ack_style": "1",
    "discovery_groupid": "5",
    "default_inventory_mode": "-1",
    "alert_usrgrpid": "7",
    "snmptrap_logging": "1",
    "default_lang": "en_GB",
    "default_timezone": "system",
    "login_attempts": "5",
    "login_block": "30s",
    "validate_uri_schemes": "1",
    "uri_valid_schemes": "http,https,ftp,file,mailto,tel,ssh",
    "x_frame_options": "SAMEORIGIN",
    "iframe_sandboxing_enabled": "1",
    "iframe_sandboxing_exceptions": "",
    "max_overview_table_size": "50",
    "connect_timeout": "3s",
    "socket_timeout": "3s",
    "media_type_test_timeout": "65s",
    "script_timeout": "60s",
    "item_test_timeout": "60s",
  },
  "id": 1
}

```

Source

CSettings::get() in ui/include/classes/api/services/CSettings.php.

## settings.getglobal

### Attention:

This method has been removed in Zabbix 5.2.3.

### Description

object settings.getglobal(object parameters)

The method allows to retrieve the global parameters of settings object according to the given parameters.

Property	Type	Description
default_theme	string	Default theme.
default_timezone	string	System time zone by default.
show_technical_errors	integer	Show technical errors (PHP/SQL) to non-Super admin users and to users that are not part of user groups with debug mode enabled.
severity_color_0	string	Color for "Not classified" severity as a hexadecimal color code.
severity_color_1	string	Color for "Information" severity as a hexadecimal color code.
severity_color_2	string	Color for "Warning" severity as a hexadecimal color code.
severity_color_3	string	Color for "Average" severity as a hexadecimal color code.
severity_color_4	string	Color for "High" severity as a hexadecimal color code.
severity_color_5	string	Color for "Disaster" severity as a hexadecimal color code.
custom_color	integer	Use custom event status colors.
problem_unack_color	string	Color for unacknowledged PROBLEM events as a hexadecimal color code.

Property	Type	Description
problem_ack_color	string	Color for acknowledged PROBLEM events as a hexadecimal color code.
ok_unack_color	string	Color for unacknowledged RESOLVED events as a hexadecimal color code.
ok_ack_color	string	Color for acknowledged RESOLVED events as a hexadecimal color code.
default_lang	string	System language by default.
x_frame_options	string	X-Frame-Options HTTP header.
session_key	string	Secret key to sign session data.

**Attention:**

This method is available to unauthenticated users and must be called without the `auth` parameter in the JSON-RPC request.

Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

Parameter	Type	Description
output	query	This parameter being common for all get methods described in the <a href="#">reference commentary</a> .

Return values

(object) Returns settings object contained only global parameters.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "settings.getglobal",
  "params": {
    "output": "extend"
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "default_theme": "blue-theme",
    "show_technical_errors": "0",
    "severity_color_0": "97AAB3",
    "severity_color_1": "7499FF",
    "severity_color_2": "FFC859",
  }
}
```

```

        "severity_color_3": "FFA059",
        "severity_color_4": "E97659",
        "severity_color_5": "E45959",
        "custom_color": "0",
        "problem_unack_color": "CC0000",
        "problem_ack_color": "CC0000",
        "ok_unack_color": "009900",
        "ok_ack_color": "009900",
        "default_lang": "en_GB",
        "x_frame_options": "SAMEORIGIN",
        "session_key": "7c1f57f581c75116f358a5a6becf0f5f"
    },
    "id": 1
}

```

Source

CSettings::getGlobal() in ui/include/classes/api/services/CSettings.php.

### settings.update

Description

object settings.update(object settings)

This method allows to update existing common settings.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Settings properties to be updated.

Return values

(array) Returns array with the names of updated parameters.

Examples

Request:

```

{
    "jsonrpc": "2.0",
    "method": "settings.update",
    "params": {
        "login_attempts": "1",
        "login_block": "1m"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        "login_attempts",
        "login_block"
    ],
    "id": 1
}

```

Source

CSettings::update() in ui/include/classes/api/services/CSettings.php.

## Task

This class is designed to work with tasks (such as checking items or low-level discovery rules without config reload).

Object references:

- [Task](#)
- ['Check now' request object](#)
- ['Diagnostic information' request object](#)
- [Statistic request object](#)
- [Statistic result object](#)

Available methods:

- [task.create](#) - creating new tasks
- [task.get](#) - retrieving tasks

### > Task object

The following objects are directly related to the task API.

The task object has the following properties:

Property	Type	Description
taskid	string	(readonly) ID of the task.
<b>type</b> (required)	integer	Type of the task.  Possible values: 1 - Diagnostic information; 6 - Check now.
status	integer	(readonly) Status of the task.  Possible values: 1 - new task; 2 - task in progress; 3 - task is completed; 4 - task is expired.
clock	timestamp	(readonly) Time when the task was created.
ttl	integer	(readonly) The time in seconds after which task expires.
proxy_hostid	string	ID of the proxy about which diagnostic information statistic is collected. Ignored for 'Check now' tasks.

Property	Type	Description
<b>request</b> (required)	object	Task request object according to the task type: Object of 'Check now' task is <a href="#">described in detail below</a> ; Object of 'Diagnostic information' task is <a href="#">described in detail below</a> .
result	object	(readonly) Result object of the diagnostic information task. May contain NULL if result is not yet ready. Result object is <a href="#">described in detail below</a> .

#### 'Check now' request object

The 'Check now' task request object has the following properties.

Property	Type	Description
itemid	string	ID of item and low-level discovery rules.

#### 'Diagnostic information' request object

The diagnostic information task request object has the following properties. Statistic request object for all types of properties is [described in detail below](#).

Property	Type	Description
historycache	object	History cache statistic request. Available on server and proxy.
valuecache	object	Items cache statistic request. Available on server.
preprocessing	object	Preprocessing manager statistic request. Available on server and proxy.
alerting	object	Alert manager statistic request. Available on server.
lld	object	LLD manager statistic request. Available on server.

#### Statistic request object



Statistic request object is used to define what type of information should be collected about server/proxy internal processes. It has the following properties.

Property	Type	Description
stats	query	Statistic object properties to be returned. The list of available fields for each type of diagnostic information statistic are <a href="#">described in detail below</a> .
top	object	Default: extend will return all available statistic fields. Object to sort and limit returned statistic values. The list of available fields for each type of diagnostic information statistic are <a href="#">described in detail below</a> .  Example: { "source.alerts": 10 }

List of statistic fields available for each type of diagnostic information request

Following statistic fields can be requested for each type of diagnostic information request property.

Diagnostic type	Available fields	Description
historycache	items	Number of cached items.
	values	Number of cached values.
	memory	Shared memory statistics (free space, number of used chunks, number of free chunks, max size of free chunk).
	memory.data	History data cache shared memory statistics.
valuecache	memory.index	History index cache shared memory statistics.
	items	Number of cached items.
	values	Number of cached values.
preprocessing	memory	Shared memory statistics (free space, number of used chunks, number of free chunks, max size of free chunk).
	mode	Value cache mode.
	values	Number of queued values.
alerting	preproc.values	Number of queued values with preprocessing steps.
	alerts	Number of queued alerts.

Diagnostic type	Available fields	Description
lld	rules values	Number of queued rules. Number of queued values.

List of sorting fields available for each type of diagnostic information request

Following statistic fields can be used to sort and limit requested information.

Diagnostic type	Available fields	Type
historycache	values	integer
valuecache	values	integer
	request.values	integer
preprocessing	values	integer
alerting	media.alerts	integer
	source.alerts	integer
lld	values	integer

Statistic result object

Statistic result object is retrieved in `result` field of task object.

Property	Type	Description
status	integer	(readonly) Status of the task result.  Possible values: -1 - error occurred during performing task; 0 - task result is created.
data	string/object	Results according the statistic request object of particular diagnostic information task. Contains error message string if error occurred during performing task.

## task.create

Description

object `task.create(object/array tasks)`

This method allows to create a new task (such as collect diagnostic data or check items or low-level discovery rules without config reload).

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) A task to create.

The method accepts the following parameters.

Parameter	Type	Description
<b>type</b> (required)	integer	Task type.  Possible values: 1 - Diagnostic information; 6 - Check now.
<b>request</b> (required)	object	Task request object according to the task type. Correct format of request object is described in <b>Task object</b> section.
proxy_hostid	integer	Proxy about which Diagnostic information task will collect data.  Ignored for 'Check now' tasks.

Note that 'Check now' tasks can be created only for the following types of items/discovery rules:

- Zabbix agent
- SNMPv1/v2/v3 agent
- Simple check
- Internal check
- Aggregate check
- External check
- Database monitor
- HTTP agent
- IPMI agent
- SSH agent
- TELNET agent
- Calculated check
- JMX agent

#### Return values

(object) Returns an object containing the IDs of the created tasks under the `taskids` property. One task is created for each item and low-level discovery rule. The order of the returned IDs matches the order of the passed `itemids`.

#### Examples

##### Creating a task

Create a task `check now` for two items. One is an item, the other is a low-level discovery rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "task.create",
  "params": [
    {
      "type": "6",
      "request": {
        "itemid": "10092"
      }
    },
    {
      "type": "6",
      "request": {
```

```

        "itemid": "10093"
      }
    ],
    "auth": "700ca65537074ec963db7efabda78259",
    "id": 1
  }
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "taskids": [
      "1",
      "2"
    ]
  },
  "id": 1
}

```

Create a task diagnostic information task. Request:

```

{
  "jsonrpc": "2.0",
  "method": "task.create",
  "params": [
    {
      "type": "1",
      "request": {
        "alerting": {
          "stats": [
            "alerts"
          ],
          "top": {
            "media.alerts": 10
          }
        },
        "lld": {
          "stats": "extend",
          "top": {
            "values": 5
          }
        }
      },
      "proxy_hostid": 0
    }
  ],
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 2
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "taskids": [
      "3"
    ]
  },
  "id": 2
}

```

See also

- Task
- 'Check now' request object
- 'Diagnostic information' request object
- Statistic request object

Source

CTask::create() in ui/include/classes/api/services/CTask.php.

## task.get

Description

integer/array task.get(object parameters)

The method allows to retrieve tasks according to the given parameters. Method returns details only about 'diagnostic information' tasks.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
taskids	string/array	Return only tasks with the given IDs.
output	query	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
preservekeys	boolean	

Return values

(integer/array) Returns an array of objects.

Examples

Retrieve task by ID

Retrieve all data about task "1".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "task.get",
  "params": {
    "output": "extend",
    "taskids": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "taskid": "1",
      "type": "7",
      "status": "3",
      "clock": "1601039076",
      "ttl": "3600",
      "proxy_hostid": null,
      "request": {
        "alerting": {
          "stats": [
            "alerts"
          ],
          "top": {
            "media.alerts": 10
          }
        },
        "lld": {
          "stats": "extend",
          "top": {
            "values": 5
          }
        }
      },
      "result": {
        "data": {
          "alerting": {
            "alerts": 0,
            "top": {
              "media.alerts": []
            }
          },
          "time": 0.000663
        },
        "lld": {
          "rules": 0,
          "values": 0,
          "top": {
            "values": []
          }
        },
        "time": 0.000442
      },
      "status": "0"
    }
  ],
  "id": 1
}

```

See also

- [Task](#)
- [Statistic result object](#)

Source

CTask::get() in ui/include/classes/api/services/CTask.php.

### Template

This class is designed to work with templates.

Object references:

- [Template](#)

Available methods:

- [template.create](#) - creating new templates
- [template.delete](#) - deleting templates
- [template.get](#) - retrieving templates
- [template.massadd](#) - adding related objects to templates
- [template.massremove](#) - removing related objects from templates
- [template.massupdate](#) - replacing or removing related objects from templates
- [template.update](#) - updating templates

## > Template object

The following objects are directly related to the `template` API.

Template

The template object has the following properties.

Property	Type	Description
<code>templateid</code>	string	(readonly) ID of the template.
<b>host</b> (required)	string	Technical name of the template.
<code>description</code>	text	Description of the template.
<code>name</code>	string	Visible name of the template.
		Default: <code>host</code> property value.

Template tag

The template tag object has the following properties.

Property	Type	Description
<b>tag</b> (required)	string	Template tag name.
<code>value</code>	string	Template tag value.

## **template.create**

Description

object `template.create(object/array templates)`

This method allows to create new templates.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Templates to create.

Additionally to the [standard template properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>groups</b> (required)	object/array	Host <b>groups</b> to add the template to.  The host groups must have the <b>groupid</b> property defined.
tags	object/array	Template <b>tags</b> .
templates	object/array	<b>Templates</b> to be linked to the template.  The templates must have the <b>templateid</b> property defined.
macros	object/array	<b>User macros</b> to be created for the template.
hosts	object/array	<b>Hosts</b> to link the template to.  The hosts must have the <b>hostid</b> property defined.

#### Return values

(object) Returns an object containing the IDs of the created templates under the `templateids` property. The order of the returned IDs matches the order of the passed templates.

#### Examples

##### Creating a template

Create a template with tags and link it to two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.create",
  "params": {
    "host": "Linux template",
    "groups": {
      "groupid": 1
    },
    "hosts": [
      {
        "hostid": "10084"
      },
      {
        "hostid": "10090"
      }
    ],
    "tags": [
      {
        "tag": "Host name",
        "value": "{HOST.NAME}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
```



```
    "id": 1
  }
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10086"
    ]
  },
  "id": 1
}
```

Source

CTemplate::create() in ui/include/classes/api/services/CTemplate.php.

## template.delete

Description

object template.delete(array templateIds)

This method allows to delete templates.

Deleting a template will cause deletion of all template entities (items, triggers, graphs, etc.). To leave template entities with the hosts, but delete the template itself, first unlink the template from required hosts using one of these methods: [template.update](#), [template.massupdate](#), [host.update](#), [host.massupdate](#).

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the templates to delete.

Return values

(object) Returns an object containing the IDs of the deleted templates under the `templateids` property.

Examples

Deleting multiple templates

Delete two templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.delete",
  "params": [
    "13",
    "32"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "13",
      "32"
    ]
  }
}
```

```

    ]
  },
  "id": 1
}

```

Source

CTemplate::delete() in ui/include/classes/api/services/CTemplate.php.

## template.get

Description

integer/array template.get(object parameters)

The method allows to retrieve templates according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
templateids	string/array	Return only templates with the given template IDs.
groupids	string/array	Return only templates that belong to the given host groups.
parentTemplateids	string/array	Return only templates that are children of the given templates.
hostids	string/array	Return only templates that are linked to the given hosts/templates.
graphids	string/array	Return only templates that contain the given graphs.
itemids	string/array	Return only templates that contain the given items.
triggerids	string/array	Return only templates that contain the given triggers.
with_items	flag	Return only templates that have items.
with_triggers	flag	Return only templates that have triggers.

Parameter	Type	Description
with_graphs	flag	Return only templates that have graphs.
with_httpstests	flag	Return only templates that have web scenarios.
evaltype	integer	Rules for tag searching.  Possible values: 0 - (default) And/Or; 2 - Or.
tags	array/object	Return only templates with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value. Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...]. An empty array returns all templates.  Possible operator values: 0 - (default) Contains; 1 - Equals.
selectGroups	query	Return the host groups that the template belongs to in the <b>groups</b> property.
selectTags	query	Return template tags in the <b>tags</b> property.
selectHosts	query	Return the hosts that are linked to the template in the <b>hosts</b> property.
selectTemplates	query	Supports count. Return the child templates in the <b>templates</b> property.  Supports count.

Parameter	Type	Description
selectParentTemplates	query	Return the parent templates in the <code>parentTemplates</code> property.
selectHttpTests	query	Supports count. Return the web scenarios from the template in the <code>httpTests</code> property.
selectItems	query	Supports count. Return items from the template in the <code>items</code> property.
selectDiscoveries	query	Supports count. Return low-level discoveries from the template in the <code>discoveries</code> property.
selectTriggers	query	Supports count. Return triggers from the template in the <code>triggers</code> property.
selectGraphs	query	Supports count. Return graphs from the template in the <code>graphs</code> property.
selectApplications	query	Supports count. Return applications from the template in the <code>applications</code> property.
selectMacros	query	Supports count. Return the macros from the template in the <code>macros</code> property..
selectDashboards	query	Return dashboards from the template in the <code>dashboards</code> property.
		Supports count.

Parameter	Type	Description
limitSelects	integer	Limits the number of records returned by subselects.  Applies to the following subselects: selectTemplates - results will be sorted by name; selectHosts - sorted by host; selectParentTemplates - sorted by host; selectItems - sorted by name; selectDiscoveries - sorted by name; selectTriggers - sorted by description; selectGraphs - sorted by name; selectApplications - sorted by name; selectDashboards - sorted by name. Sort the result by the given properties.  Possible values are: <code>hostid</code> , <code>host</code> , <code>name</code> , <code>status</code> .
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>hostid</code> , <code>host</code> , <code>name</code> , <code>status</code> .
countOutput	boolean	These parameters being common for all <code>get</code> methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

## Examples

### Retrieving templates by name

Retrieve all data about two templates named "Linux" and "Windows".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.get",
  "params": {
    "output": "extend",
    "filter": {
      "host": [
        "Linux",
        "Windows"
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "proxy_hostid": "0",
      "host": "Linux",
      "status": "3",
      "disable_until": "0",
      "error": "",
      "available": "0",
      "errors_from": "0",
      "lastaccess": "0",
      "ipmi_authtype": "0",
      "ipmi_privilege": "2",
      "ipmi_username": "",
      "ipmi_password": "",
      "ipmi_disable_until": "0",
      "ipmi_available": "0",
      "snmp_disable_until": "0",
      "snmp_available": "0",
      "maintenanceid": "0",
      "maintenance_status": "0",
      "maintenance_type": "0",
      "maintenance_from": "0",
      "ipmi_errors_from": "0",
      "snmp_errors_from": "0",
      "ipmi_error": "",
      "snmp_error": "",
      "jmx_disable_until": "0",
      "jmx_available": "0",
      "jmx_errors_from": "0",
      "jmx_error": "",
      "name": "Linux",
      "flags": "0",
      "templateid": "10001",
      "description": "",
      "tls_connect": "1",
      "tls_accept": "1",
      "tls_issuer": "",
      "tls_subject": ""
    }
  ]
}
```

```

        "tls_psk_identity": "",
        "tls_psk": ""
    },
    {
        "proxy_hostid": "0",
        "host": "Windows",
        "status": "3",
        "disable_until": "0",
        "error": "",
        "available": "0",
        "errors_from": "0",
        "lastaccess": "0",
        "ipmi_authtype": "0",
        "ipmi_privilege": "2",
        "ipmi_username": "",
        "ipmi_password": "",
        "ipmi_disable_until": "0",
        "ipmi_available": "0",
        "snmp_disable_until": "0",
        "snmp_available": "0",
        "maintenanceid": "0",
        "maintenance_status": "0",
        "maintenance_type": "0",
        "maintenance_from": "0",
        "ipmi_errors_from": "0",
        "snmp_errors_from": "0",
        "ipmi_error": "",
        "snmp_error": "",
        "jmx_disable_until": "0",
        "jmx_available": "0",
        "jmx_errors_from": "0",
        "jmx_error": "",
        "name": "Windows",
        "flags": "0",
        "templateid": "10081",
        "description": "",
        "tls_connect": "1",
        "tls_accept": "1",
        "tls_issuer": "",
        "tls_subject": "",
        "tls_psk_identity": "",
        "tls_psk": ""
    }
],
    "id": 1
}

```

Searching by template tags

Retrieve templates that have tag "Host name" equal to "{HOST.NAME}".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "template.get",
    "params": {
        "output": ["hostid"],
        "selectTags": "extend",
        "evaltype": 0,
        "tags": [
            {
                "tag": "Host name",
                "value": "{HOST.NAME}",
            }
        ]
    }
}

```

```

        "operator": 1
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10402",
      "tags": [
        {
          "tag": "Host name",
          "value": "{HOST.NAME}"
        }
      ]
    }
  ],
  "id": 1
}

```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

CTemplate::get() in ui/include/classes/api/services/CTemplate.php.

## template.massadd

Description

object template.massadd(object parameters)

This method allows to simultaneously add multiple related objects to the given templates.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the objects to add to the templates.

The method accepts the following parameters.

Parameter	Type	Description
<b>templates</b> (required)	object/array	Templates to be updated.  The templates must have the <code>templateid</code> property defined.



Parameter	Type	Description
groups	object/array	Host groups to add the given templates to.  The host groups must have the <code>groupid</code> property defined.
hosts	object/array	Hosts and templates to link the given templates to.  The hosts must have the <code>hostid</code> property defined.
macros	object/array	User macros to be created for the given templates.
templates_link	object/array	Templates to link to the given templates.  The templates must have the <code>templateid</code> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

#### Examples

##### Adding templates to a group

Add two templates to the host group "2".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massadd",
  "params": {
    "templates": [
      {
        "templateid": "10085"
      },
      {
        "templateid": "10086"
      }
    ],
    "groups": [
      {
        "groupid": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10085",
      "10086"
    ]
  },
  "id": 1
}
```

Linking a template to hosts

Link template "10073" to two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massadd",
  "params": {
    "templates": [
      {
        "templateid": "10073"
      }
    ],
    "hosts": [
      {
        "hostid": "10106"
      },
      {
        "hostid": "10104"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10073"
    ]
  },
  "id": 1
}
```

See also

- [template.update](#)
- [Host](#)
- [Host group](#)
- [User macro](#)

Source

CTemplate::massAdd() in ui/include/classes/api/services/CTemplate.php.

### **template.massremove**

Description

object template.massremove(object parameters)

This method allows to remove related objects from multiple templates.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the objects that should be removed.

Parameter	Type	Description
<b>templateids</b> (required)	string/array	IDs of the templates to be updated.
groupids	string/array	Host groups to remove the given templates from.
hostids	string/array	Hosts or templates to unlink the given templates from (downstream).
macros	string/array	User macros to delete from the given templates.
templateids_clear	string/array	Templates to unlink and clear from the given templates (upstream).
templateids_link	string/array	Templates to unlink from the given templates (upstream).

Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

Examples

Removing templates from a group

Remove two templates from group "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massremove",
  "params": {
    "templateids": [
      "10085",
      "10086"
    ],
    "groupids": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
```

```
        "templateids": [
            "10085",
            "10086"
        ]
    },
    "id": 1
}
```

Unlinking templates from a host

Unlink template "10085" from two hosts.

Request:

```
{
    "jsonrpc": "2.0",
    "method": "template.massremove",
    "params": {
        "templateids": "10085",
        "hostids": [
            "10106",
            "10104"
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}
```

Response:

```
{
    "jsonrpc": "2.0",
    "result": {
        "templateids": [
            "10085"
        ]
    },
    "id": 1
}
```

See also

- [template.update](#)
- [User macro](#)

Source

CTemplate::massRemove() in ui/include/classes/api/services/CTemplate.php.

## template.massupdate

Description

object template.massupdate(object parameters)

This method allows to simultaneously replace or remove related objects and update properties on multiple templates.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the properties that should be updated.

Additionally to the [standard template properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>templates</b> (required)	object/array	Templates to be updated.
groups	object/array	The templates must have the <code>templateid</code> property defined. Host groups to replace the current host groups the templates belong to.
hosts	object/array	The host groups must have the <code>groupid</code> property defined. Hosts and templates to replace the ones the templates are currently linked to.
macros	object/array	Both hosts and templates must use the <code>hostid</code> property to pass an ID. User macros to replace the current user macros on the given templates.
templates_clear	object/array	Templates to unlink and clear from the given templates.
templates_link	object/array	The templates must have the <code>templateid</code> property defined. Templates to replace the currently linked templates.
		The templates must have the <code>templateid</code> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

#### Examples

##### Replacing host groups

Unlink and clear template "10091" from the given templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massupdate",
  "params": {
    "templates": [
      {
        "templateid": "10085"
      },
      {
        "templateid": "10086"
      }
    ],
    "templates_clear": [
      {
        "templateid": "10091"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10085",
      "10086"
    ]
  },
  "id": 1
}
```

See also

- [template.update](#)
- [template.massadd](#)
- [Host group](#)
- [User macro](#)

Source

CTemplate::massUpdate() in ui/include/classes/api/services/CTemplate.php.

## template.update

Description

object `template.update(object/array templates)`

This method allows to update existing templates.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Template properties to be updated.

The `templateid` property must be defined for each template, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Additionally to the [standard template properties](#), the method accepts the following parameters.

Parameter	Type	Description
groups	object/array	Host <b>groups</b> to replace the current host groups the templates belong to.  The host groups must have the <b>groupid</b> property defined.
tags	object/array	Template <b>tags</b> to replace the current template tags.
hosts	object/array	<b>Hosts</b> and <b>templates</b> to replace the ones the templates are currently linked to.  Both hosts and templates must use the <b>hostid</b> property to pass an ID.
macros	object/array	<b>User macros</b> to replace the current user macros on the given templates.
templates	object/array	<b>Templates</b> to replace the currently linked templates. Templates that are not passed are only unlinked.  The templates must have the <b>templateid</b> property defined.
templates_clear	object/array	<b>Templates</b> to unlink and clear from the given templates.  The templates must have the <b>templateid</b> property defined.

#### Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

#### Examples

##### Renaming a template

Rename the template to "Template OS Linux".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "name": "Template OS Linux"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10086"
    ]
  },
  "id": 1
}
```

Updating template tags

Replace all template tags with a new one.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "tags": [
      {
        "tag": "Host name",
        "value": "{HOST.NAME}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10086"
    ]
  },
  "id": 1
}
```

Source

CTemplate::update() in ui/include/classes/api/services/CTemplate.php.

## Template dashboard

This class is designed to work with template dashboards.



Object references:

- [Template dashboard](#)
- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Available methods:

- [templatedashboard.create](#) - creating new template dashboards
- [templatedashboard.delete](#) - deleting template dashboards
- [templatedashboard.get](#) - retrieving template dashboards
- [templatedashboard.update](#) - updating template dashboards

### > **Template dashboard object**

The following objects are directly related to the `templatedashboard` API.

Template dashboard

The template dashboard object has the following properties:

Property	Type	Description
<code>dashboardid</code>	string	(readonly) ID of the template dashboard.
<b>name</b> (required)	string	Name of the template dashboard.
<b>templateid</b> (required)	string	ID of the template the dashboard belongs to.

Template dashboard widget

The template dashboard widget object has the following properties:

Property	Type	Description
<code>widgetid</code>	string	(readonly) ID of the dashboard widget.
<b>type</b> (required)	string	Type of the dashboard widget.  Possible values: clock - Clock; graph - Graph (classic); graphprototype - Graph prototype; plaintext - Plain text; url - URL;
<code>name</code>	string	Custom widget name.

Property	Type	Description
x	integer	A horizontal position from the left side of the dashboard.  Valid values range from 0 to 23.
y	integer	A vertical position from the top of the dashboard.  Valid values range from 0 to 62.
width	integer	The widget width.  Valid values range from 1 to 24.
height	integer	The widget height.  Valid values range from 2 to 32.
view_mode	integer	The widget view mode.  Possible values: 0 - (default) default widget view; 1 - with hidden header;
fields	array	Array of the <b>template dashboard widget field</b> objects.

#### Template dashboard widget field

The template dashboard widget field object has the following properties:

Property	Type	Description
<b>type</b> (required)	integer	Type of the widget field.  Possible values: 0 - Integer; 1 - String; 4 - Item; 5 - Item prototype; 6 - Graph; 7 - Graph prototype.
name	string	Widget field name.
<b>value</b> (required)	mixed	Widget field value depending of type.

## templatedashboard.create

### Description

object templatedashboard.create(object/array templateDashboards)

This method allows to create new template dashboards.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Template dashboards to create.

Additionally to the [standard template dashboard properties](#), the method accepts the following parameters.

Parameter	Type	Description
widgets	object/array	Template dashboard widgets to be created for the dashboard.

### Return values

(object) Returns an object containing the IDs of the created template dashboards under the dashboardids property. The order of the returned IDs matches the order of the passed template dashboards.

### Examples

#### Creating a template dashboard

Create a template dashboard named "Graphs" with one Graph widget.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.create",
  "params": {
    "templateid": "10318",
    "name": "Graphs",
    "widgets": [
      {
        "type": "graph",
        "x": 0,
        "y": 0,
        "width": 12,
        "height": 5,
        "view_mode": 0,
        "fields": [
          {
            "type": 6,
            "name": "graphid",
            "value": "1123"
          }
        ]
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "32"
    ]
  },
  "id": 1
}
```

Source

CTemplateDashboard::create() in ui/include/classes/api/services/CTemplateDashboard.php.

### templatedashboard.delete

Description

object templatedashboard.delete(array templateDashboardIds)

This method allows to delete template dashboards.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the template dashboards to delete.

Return values

(object) Returns an object containing the IDs of the deleted template dashboards under the dashboardids property.

Examples

Deleting multiple template dashboards

Delete two template dashboards.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.delete",
  "params": [
    "45",
    "46"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "45",
      "46"
    ]
  },
  "id": 1
}
```

Source

CTemplateDashboard::delete() in ui/include/classes/api/services/CTemplateDashboard.php.

### templatedashboard.get

Description

integer/array templatedashboard.get(object parameters)

The method allows to retrieve template dashboards according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
dashboardids	string/array	Return only template dashboards with the given IDs.
templateids	string/array	Return only template dashboards that belong to the given templates.
selectWidgets	query	Return a <a href="#">widgets</a> property containing template dashboard widgets.
sortfield	string/array	Sort the result by the given properties.  Possible values are: dashboardid and name. These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

## Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

## Examples

### Retrieving template dashboards

Retrieve all template dashboards with widgets for a specified template.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.get",
  "params": {
    "output": "extend",
    "selectWidgets": "extend",
    "templateids": "10001"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dashboardid": "23",
      "name": "Docker overview",
      "templateid": "10001",
      "widgets": [
        {
          "widgetid": "220",
          "type": "graph",
          "name": "",
          "x": "0",
          "y": "0",
          "width": "12",
          "height": "5",
          "view_mode": "0",
          "fields": [
            {
              "type": "6",
              "name": "graphid",
              "value": "1125"
            }
          ]
        },
        {
          "widgetid": "221",
          "type": "graph",
          "name": "",
          "x": "12",
          "y": "0",
          "width": "12",
          "height": "5",
          "view_mode": "0",
          "fields": [
            {
              "type": "6",
              "name": "graphid",
            }
          ]
        }
      ]
    }
  ]
}
```

```

        "value": "1129"
    }
]
},
{
    "widgetid": "222",
    "type": "graph",
    "name": "",
    "x": "0",
    "y": "5",
    "width": "12",
    "height": "5",
    "view_mode": "0",
    "fields": [
        {
            "type": "6",
            "name": "graphid",
            "value": "1128"
        }
    ]
},
{
    "widgetid": "223",
    "type": "graph",
    "name": "",
    "x": "12",
    "y": "5",
    "width": "12",
    "height": "5",
    "view_mode": "0",
    "fields": [
        {
            "type": "6",
            "name": "graphid",
            "value": "1126"
        }
    ]
},
{
    "widgetid": "224",
    "type": "graph",
    "name": "",
    "x": "0",
    "y": "10",
    "width": "12",
    "height": "5",
    "view_mode": "0",
    "fields": [
        {
            "type": "6",
            "name": "graphid",
            "value": "1127"
        }
    ]
}
]
}
],
    "id": 1
}

```

Source

CTemplateDashboard::get() in ui/include/classes/api/services/CTemplateDashboard.php.

## templatedashboard.update

### Description

object templatedashboard.update(object/array templateDashboards)

This method allows to update existing template dashboards.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Template dashboard properties to be updated.

The dashboardid property must be defined for each dashboard, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard template dashboard properties](#), the method accepts the following parameters.

Parameter	Type	Description
widgets	object/array	<p><b>Template dashboard widgets</b> to replace existing widgets.</p> <p>Widgets are updated by widgetid property. Widgets without widgetid property will be created.</p>

### Return values

(object) Returns an object containing the IDs of the updated template dashboards under the dashboardids property.

### Examples

#### Renaming a template dashboard

Rename a template dashboard to "Performance graphs".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.update",
  "params": {
    "dashboardid": "23",
    "name": "Performance graphs"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
```



```

        "dashboardids": [
            "23"
        ]
    },
    "id": 1
}

```

See also

- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Source

CTemplateDashboard::update() in ui/include/classes/api/services/CTemplateDashboard.php.

## Trend

This class is designed to work with trend data.

Object references:

- [Trend](#)

Available methods:

- [trend.get](#) - retrieving trends

### > Trend object

The following objects are directly related to the trend API.

#### Note:

Trend objects differ depending on the item's type of information. They are created by the Zabbix server and cannot be modified via the API.

Float trend

The float trend object has the following properties.

Property	Type	Description
clock	timestamp	Timestamp of an hour for which the value was calculated. E. g. timestamp of 04:00:00 means values calculated for period 04:00:00-04:59:59.
itemid	integer	ID of the related item.
num	integer	Number of values that were available for the hour.
value_min	float	Hourly minimum value.
value_avg	float	Hourly average value.

Property	Type	Description
value_max	float	Hourly maximum value.

### Integer trend

The integer trend object has the following properties.

Property	Type	Description
clock	timestamp	Timestamp of an hour for which the value was calculated. E. g. timestamp of 04:00:00 means values calculated for period 04:00:00-04:59:59.
itemid	integer	ID of the related item.
num	integer	Number of values that were available for the hour.
value_min	integer	Hourly minimum value.
value_avg	integer	Hourly average value.
value_max	integer	Hourly maximum value.

### trend.get

#### Description

`integer/array trend.get(object parameters)`

The method allows to retrieve trend data according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
itemids	string/array	Return only trends with the given item IDs.
time_from	timestamp	Return only values that have been collected after or at the given time.

Parameter	Type	Description
time_till	timestamp	Return only values that have been collected before or at the given time.
countOutput	boolean	Count the number of retrieved objects.
limit	integer	Limit the amount of retrieved objects.
output	query	Set fields to output.

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving item trend data

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trend.get",
  "params": {
    "output": [
      "itemid",
      "clock",
      "num",
      "value_min",
      "value_avg",
      "value_max",
    ],
    "itemids": [
      "23715"
    ],
    "limit": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23715",
      "clock": "1446199200",
      "num": "60",
      "value_min": "0.165",
      "value_avg": "0.2168",
      "value_max": "0.35",
    }
  ],
  "id": 1
}
```

Source

CTrend::get() in ui/include/classes/api/services/CTrend.php.

## Trigger

This class is designed to work with triggers.

Object references:

- [Trigger](#)

Available methods:

- [trigger.adddependencies](#) - adding new trigger dependencies
- [trigger.create](#) - creating new triggers
- [trigger.delete](#) - deleting triggers
- [trigger.deletedependencies](#) - deleting trigger dependencies
- [trigger.get](#) - retrieving triggers
- [trigger.update](#) - updating triggers

### > Trigger object

The following objects are directly related to the `trigger` API.

Trigger

The trigger object has the following properties.

Property	Type	Description
triggerid	string	(readonly) ID of the trigger.
<b>description</b> (required)	string	Name of the trigger.
<b>expression</b> (required)	string	Reduced trigger expression.
event_name	string	Event name generated by the trigger.
opdata	string	Operational data.
comments	string	Additional description of the trigger.
error	string	(readonly) Error text if there have been any problems when updating the state of the trigger.
flags	integer	(readonly) Origin of the trigger.  Possible values are: 0 - (default) a plain trigger; 4 - a discovered trigger.
lastchange	timestamp	(readonly) Time when the trigger last changed its state.

Property	Type	Description
priority	integer	Severity of the trigger.  Possible values are: 0 - (default) not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.
state	integer	(readonly) State of the trigger.  Possible values: 0 - (default) trigger state is up to date; 1 - current trigger state is unknown.
status	integer	Whether the trigger is enabled or disabled.  Possible values are: 0 - (default) enabled; 1 - disabled.
templateid	string	(readonly) ID of the parent template trigger.
type	integer	Whether the trigger can generate multiple problem events.  Possible values are: 0 - (default) do not generate multiple events; 1 - generate multiple events.
url	string	URL associated with the trigger.
value	integer	(readonly) Whether the trigger is in OK or problem state.  Possible values are: 0 - (default) OK; 1 - problem.

Property	Type	Description
recovery_mode	integer	OK event generation mode.  Possible values are: 0 - (default) Expression; 1 - Recovery expression; 2 - None.
recovery_expression	string	Reduced trigger recovery expression.
correlation_mode	integer	OK event closes.  Possible values are: 0 - (default) All problems; 1 - All problems if tag values match.
correlation_tag	string	Tag for matching.
manual_close	integer	Allow manual close.  Possible values are: 0 - (default) No; 1 - Yes.

### Trigger tag

The trigger tag object has the following properties.

Property	Type	Description
<b>tag</b> (required)	string	Trigger tag name.
value	string	Trigger tag value.

### trigger.adddependencies

#### Description

object trigger.adddependencies(object/array triggerDependencies)

This method allows to create new trigger dependencies.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) Trigger dependencies to create.

Each trigger dependency has the following parameters:

Parameter	Type	Description
<b>triggerid</b> (required)	string	ID of the dependent trigger.
<b>dependsOnTriggerid</b> (required)	string	ID of the trigger that the trigger depends on.

#### Return values

(object) Returns an object containing the IDs of the dependent triggers under the `triggerids` property.

#### Examples

Add a trigger dependency

Make trigger "14092" dependent on trigger "13565."

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.adddependencies",
  "params": {
    "triggerid": "14092",
    "dependsOnTriggerid": "13565"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "14092"
    ]
  },
  "id": 1
}
```

#### See also

- [trigger.update](#)
- [Trigger dependencies](#)

#### Source

`CTrigger::addDependencies()` in `ui/include/classes/api/services/CTrigger.php`.

## trigger.create

#### Description

object `trigger.create(object/array triggers)`

This method allows to create new triggers.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) Triggers to create.

Additionally to the [standard trigger properties](#) the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	Triggers that the trigger is dependent on.  The triggers must have the <code>triggerid</code> property defined. Trigger <a href="#">tags</a> .
tags	array	

**Attention:**

The trigger expression has to be given in its expanded form.

Return values

(object) Returns an object containing the IDs of the created triggers under the `triggerids` property. The order of the returned IDs matches the order of the passed triggers.

Examples

Creating a trigger

Create a trigger with a single trigger dependency.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.create",
  "params": [
    {
      "description": "Processor load is too high on {HOST.NAME}",
      "expression": "{Linux server:system.cpu.load[percpu,avg1].last()}>5",
      "dependencies": [
        {
          "triggerid": "17367"
        }
      ]
    },
    {
      "description": "Service status",
      "expression": "{Linux server:log[/var/log/system,Service .* has stopped].strlen()}<>0",
      "dependencies": [
        {
          "triggerid": "17368"
        }
      ],
      "tags": [
        {
          "tag": "service",
          "value": "{ITEM.VALUE}.regsub(\"Service (.*) has stopped\", \"\\1\")"
        },
        {
          "tag": "error",
          "value": ""
        }
      ]
    }
  ]
},
{
  "auth": "038e1d7b1735c6a5436ee9eae095879e",

```



```
    "id": 1
  }
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "17369",
      "17370"
    ]
  },
  "id": 1
}
```

Source

CTrigger::create() in ui/include/classes/api/services/CTrigger.php.

### trigger.delete

Description

object trigger.delete(array triggerIds)

This method allows to delete triggers.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the triggers to delete.

Return values

(object) Returns an object containing the IDs of the deleted triggers under the `triggerids` property.

Examples

Delete multiple triggers

Delete two triggers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.delete",
  "params": [
    "12002",
    "12003"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "12002",
      "12003"
    ]
  },
}
```

```
    "id": 1
}
```

Source

CTrigger::delete() in ui/include/classes/api/services/CTrigger.php.

### trigger.deletedependencies

Description

object trigger.deletedependencies(string/array triggers)

This method allows to delete all trigger dependencies from the given triggers.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(string/array) Triggers to delete the trigger dependencies from.

Return values

(object) Returns an object containing the IDs of the affected triggers under the `triggerids` property.

Examples

Deleting dependencies from multiple triggers

Delete all dependencies from two triggers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.deleteDependencies",
  "params": [
    {
      "triggerid": "14544"
    },
    {
      "triggerid": "14545"
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "14544",
      "14545"
    ]
  },
  "id": 1
}
```

See also

- [trigger.update](#)

Source

CTrigger::deleteDependencies() in ui/include/classes/api/services/CTrigger.php.

## trigger.get

### Description

integer/array trigger.get(object parameters)

The method allows to retrieve triggers according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
triggerids	string/array	Return only triggers with the given IDs.
groupids	string/array	Return only triggers that belong to hosts from the given host groups.
templateids	string/array	Return only triggers that belong to the given templates.
hostids	string/array	Return only triggers that belong to the given hosts.
itemids	string/array	Return only triggers that contain the given items.
applicationids	string/array	Return only triggers that contain items from the given applications.
functions	string/array	Return only triggers that use the given functions.  Refer to the <a href="#">supported trigger functions</a> page for a list of supported functions.
group	string	Return only triggers that belong to hosts from the host group with the given name.

Parameter	Type	Description
host	string	Return only triggers that belong to host with the given name.
inherited	boolean	If set to true return only triggers inherited from a template.
templated	boolean	If set to true return only triggers that belong to templates.
dependent	boolean	If set to true return only triggers that have dependencies. If set to false return only triggers that do not have dependencies.
monitored	flag	Return only enabled triggers that belong to monitored hosts and contain only enabled items.
active	flag	Return only enabled triggers that belong to monitored hosts.
maintenance	boolean	If set to true return only enabled triggers that belong to hosts in maintenance.
withUnacknowledgedEvents	flag	Return only triggers that have unacknowledged events.
withAcknowledgedEvents	flag	Return only triggers with all events acknowledged.
withLastEventUnacknowledged	flag	Return only triggers with the last event unacknowledged.

Parameter	Type	Description
skipDependent	flag	Skip triggers in a problem state that are dependent on other triggers. Note that the other triggers are ignored if disabled, have disabled items or disabled item hosts.
lastChangeSince	timestamp	Return only triggers that have changed their state after the given time.
lastChangeTill	timestamp	Return only triggers that have changed their state before the given time.
only_true	flag	Return only triggers that have recently been in a problem state.
min_severity	integer	Return only triggers with severity greater or equal than the given severity.
evaltype	integer	Rules for tag searching.  Possible values: 0 - (default) And/Or; 2 - Or.

Parameter	Type	Description
tags	array of objects	<p>Return only triggers with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.</p> <p>Format:  <pre>[{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].</pre> </p> <p>An empty array returns all triggers.</p> <p>Possible operator types:  0 - (default) Like;  1 - Equal.</p>
expandComment	flag	Expand macros in the trigger description.
expandDescription	flag	Expand macros in the name of the trigger.
expandExpression	flag	Expand functions and macros in the trigger expression.
selectGroups	query	Return the host groups that the trigger belongs to in the <b>groups</b> property.
selectHosts	query	Return the hosts that the trigger belongs to in the <b>hosts</b> property.
selectItems	query	Return items contained by the trigger in the <b>items</b> property.

Parameter	Type	Description
selectFunctions	query	<p>Return functions used in the trigger in the <code>functions</code> property.</p> <p>The function objects represents the functions used in the trigger expression and has the following properties:</p> <ul style="list-style-type: none"> <li><code>functionid</code> - (string) ID of the function;</li> <li><code>itemid</code> - (string) ID of the item used in the function;</li> <li><code>function</code> - (string) name of the function;</li> <li><code>parameter</code> - (string) parameter passed to the function.</li> </ul>
selectDependencies	query	Return triggers that the trigger depends on in the <code>dependencies</code> property.
selectDiscoveryRule	query	Return the <b>low-level discovery rule</b> that created the trigger.
selectLastEvent	query	Return the last significant trigger event in the <code>lastEvent</code> property.
selectTags	query	Return the trigger tags in <code>tags</code> property.

Parameter	Type	Description
selectTriggerDiscovery	array	<p>Return the trigger discovery object in the <code>triggerDiscovery</code> property. The trigger discovery objects links the trigger to a trigger prototype from which it was created.</p> <p>It has the following properties:  <code>parent_triggerid</code> - (string) ID of the trigger prototype from which the trigger has been created.  Return only those results that exactly match the given filter.</p> <p>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.</p> <p>Supports additional filters:  <code>host</code> - technical name of the host that the trigger belongs to;  <code>hostid</code> - ID of the host that the trigger belongs to.</p>
filter	object	<p>Limits the number of records returned by subselects.</p> <p>Applies to the following subselects:  <code>selectHosts</code> - results will be sorted by host.</p>
limitSelects	integer	



Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.  Possible values are: triggerid, description, status, priority, lastchange and hostname.
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving data by trigger ID

Retrieve all data and the functions used in trigger "14062".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.get",
  "params": {
    "triggerids": "14062",
    "output": "extend",
    "selectFunctions": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "14062",
      "expression": "{13513}>0",

```

```

        "description": "/etc/passwd has been changed on {HOST.NAME}",
        "url": "",
        "status": "0",
        "value": "0",
        "priority": "2",
        "lastchange": "0",
        "comments": "",
        "error": "",
        "templateid": "10016",
        "type": "0",
        "state": "0",
        "flags": "0",
        "recovery_mode": "0",
        "recovery_expression": "",
        "correlation_mode": "0",
        "correlation_tag": "",
        "manual_close": "0",
        "opdata": "",
        "functions": [
            {
                "functionid": "13513",
                "itemid": "24350",
                "triggerid": "14062",
                "parameter": "0",
                "function": "diff"
            }
        ]
    },
    "id": 1
}

```

Retrieving triggers in problem state

Retrieve the ID, name and severity of all triggers in problem state and sort them by severity in descending order.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "trigger.get",
  "params": {
    "output": [
      "triggerid",
      "description",
      "priority"
    ],
    "filter": {
      "value": 1
    },
    "sortfield": "priority",
    "sortorder": "DESC"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "13907",
      "description": "Zabbix self-monitoring processes < 100% busy",

```

```

        "priority": "4"
    },
    {
        "triggerid": "13824",
        "description": "Zabbix discoverer processes more than 75% busy",
        "priority": "3"
    }
],
"id": 1
}

```

Retrieving a specific trigger with tags

Retrieve a specific trigger with tags.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "trigger.get",
    "params": {
        "output": [
            "triggerid",
            "description"
        ],
        "selectTags": "extend",
        "triggerids": [
            "17578"
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "triggerid": "17370",
            "description": "Service status",
            "tags": [
                {
                    "tag": "service",
                    "value": "{{ITEM.VALUE}}.regexsub(\"Service (.*) has stopped\", \"\\1\")"
                },
                {
                    "tag": "error",
                    "value": ""
                }
            ]
        }
    ],
    "id": 1
}

```

See also

- [Discovery rule](#)
- [Item](#)
- [Host](#)
- [Host group](#)

Source

CTrigger::get() in ui/include/classes/api/services/CTrigger.php.

## trigger.update

### Description

object trigger.update(object/array triggers)

This method allows to update existing triggers.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Trigger properties to be updated.

The `triggerid` property must be defined for each trigger, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard trigger properties](#) the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	Triggers that the trigger is dependent on.  The triggers must have the <code>triggerid</code> property defined. Trigger <a href="#">tags</a> .
tags	array	

#### Attention:

The trigger expression has to be given in its expanded form.

### Return values

(object) Returns an object containing the IDs of the updated triggers under the `triggerids` property.

### Examples

#### Enabling a trigger

Enable a trigger, that is, set its status to 0.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": {
    "triggerid": "13938",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  }
}
```

```
    },
    "id": 1
}
```

Replacing triggers tags

Replace tags for trigger.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": {
    "triggerid": "13938",
    "tags": [
      {
        "tag": "service",
        "value": "{{ITEM.VALUE}}.regex(\"Service (.*) has stopped\", \"\\1\")"
      },
      {
        "tag": "error",
        "value": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  },
  "id": 1
}
```

See also

- [trigger.adddependencies](#)
- [trigger.deletedependencies](#)

Source

CTrigger::update() in ui/include/classes/api/services/CTrigger.php.

## Trigger prototype

This class is designed to work with trigger prototypes.

Object references:

- [Trigger prototype](#)

Available methods:

- [triggerprototype.create](#) - creating new trigger prototypes
- [triggerprototype.delete](#) - deleting trigger prototypes
- [triggerprototype.get](#) - retrieving trigger prototypes
- [triggerprototype.update](#) - updating trigger prototypes

## > Trigger prototype object

The following objects are directly related to the `triggerprototype` API.

Trigger prototype

The trigger prototype object has the following properties.

Property	Type	Description
<code>triggerid</code>	string	(readonly) ID of the trigger prototype.
<b>description</b> (required)	string	Name of the trigger prototype.
<b>expression</b> (required)	string	Reduced trigger expression.
<code>event_name</code>	string	Event name generated by the trigger.
<code>opdata</code>	string	Operational data.
<code>comments</code>	string	Additional comments to the trigger prototype.
<code>priority</code>	integer	Severity of the trigger prototype.  Possible values: 0 - (default) not classified; 1 - information; 2 - warning; 3 - average; 4 - high; 5 - disaster.
<code>status</code>	integer	Whether the trigger prototype is enabled or disabled.  Possible values: 0 - (default) enabled; 1 - disabled.
<code>templateid</code>	string	(readonly) ID of the parent template trigger prototype.
<code>type</code>	integer	Whether the trigger prototype can generate multiple problem events.  Possible values: 0 - (default) do not generate multiple events; 1 - generate multiple events.
<code>url</code>	string	URL associated with the trigger prototype.

Property	Type	Description
recovery_mode	integer	OK event generation mode.  Possible values are: 0 - (default) Expression; 1 - Recovery expression; 2 - None.
recovery_expression	string	Reduced trigger recovery expression.
correlation_mode	integer	OK event closes.  Possible values are: 0 - (default) All problems; 1 - All problems if tag values match.
correlation_tag	string	Tag for matching.
manual_close	integer	Allow manual close.
discover	integer	Possible values are: 0 - (default) No; 1 - Yes. Trigger prototype discovery status.  Possible values: 0 - (default) new triggers will be discovered; 1 - new triggers will not be discovered and existing triggers will be marked as lost.

#### Trigger prototype tag

The trigger prototype tag object has the following properties.

Property	Type	Description
<b>tag</b> (required)	string	Trigger prototype tag name.
value	string	Trigger prototype tag value.

#### **triggerprototype.create**

##### Description

object triggerprototype.create(object/array triggerPrototypes)

This method allows to create new trigger prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Trigger prototypes to create.

Additionally to the [standard trigger prototype properties](#) the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	Triggers and trigger prototypes that the trigger prototype is dependent on.  The triggers must have the <code>triggerid</code> property defined.
tags	array	Trigger prototype <a href="#">tags</a> .

**Attention:**

The trigger expression has to be given in its expanded form and must contain at least one item prototype.

**Return values**

(object) Returns an object containing the IDs of the created trigger prototypes under the `triggerids` property. The order of the returned IDs matches the order of the passed trigger prototypes.

**Examples****Creating a trigger prototype**

Create a trigger prototype to detect when a file system has less than 20% free disk space.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.create",
  "params": {
    "description": "Free disk space is less than 20% on volume {#FSNAME}",
    "expression": "{Zabbix server:vfs.fs.size[{#FSNAME},pfree].last()}<20",
    "tags": [
      {
        "tag": "volume",
        "value": "{#FSNAME}"
      },
      {
        "tag": "type",
        "value": "{#FSTYPE}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```



```
    "result": {
      "triggerids": [
        "17372"
      ]
    },
    "id": 1
  }
}
```

Source

CTriggerPrototype::create() in ui/include/classes/api/services/CTriggerPrototype.php.

## triggerprototype.delete

Description

object triggerprototype.delete(array triggerPrototypeIds)

This method allows to delete trigger prototypes.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the trigger prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted trigger prototypes under the `triggerids` property.

Examples

Deleting multiple trigger prototypes

Delete two trigger prototypes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.delete",
  "params": [
    "12002",
    "12003"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "12002",
      "12003"
    ]
  },
  "id": 1
}
```

Source

CTriggerPrototype::delete() in ui/include/classes/api/services/CTriggerPrototype.php.

## triggerprototype.get

### Description

integer/array triggerprototype.get(object parameters)

The method allows to retrieve trigger prototypes according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
active	flag	Return only enabled trigger prototypes that belong to monitored hosts.
applicationids	string/array	Return only trigger prototypes that contain items from the given applications.
discoveryids	string/array	Return only trigger prototypes that belong to the given LLD rules.
functions	string/array	Return only triggers that use the given functions.  Refer to the <a href="#">supported trigger functions</a> page for a list of supported functions.
group	string	Return only trigger prototypes that belong to hosts from the host groups with the given name.
groupids	string/array	Return only trigger prototypes that belong to hosts from the given host groups.
host	string	Return only trigger prototypes that belong to hosts with the given name.
hostids	string/array	Return only trigger prototypes that belong to the given hosts.

Parameter	Type	Description
inherited	boolean	If set to true return only trigger prototypes inherited from a template.
maintenance	boolean	If set to true return only enabled trigger prototypes that belong to hosts in maintenance.
min_severity	integer	Return only trigger prototypes with severity greater or equal than the given severity.
monitored	flag	Return only enabled trigger prototypes that belong to monitored hosts and contain only enabled items.
templated	boolean	If set to true return only trigger prototypes that belong to templates.
templateids	string/array	Return only trigger prototypes that belong to the given templates.
triggerids	string/array	Return only trigger prototypes with the given IDs.
expandExpression	flag	Expand functions and macros in the trigger expression.
selectDependencies	query	Return trigger prototypes and triggers that the trigger prototype depends on in the dependencies property.
selectDiscoveryRule	query	Return the <b>LLD rule</b> that the trigger prototype belongs to.

Parameter	Type	Description
selectFunctions	query	<p>Return functions used in the trigger prototype in the <code>functions</code> property.</p> <p>The function objects represents the functions used in the trigger expression and has the following properties:</p> <ul style="list-style-type: none"> <li><code>functionid</code> - (string) ID of the function;</li> <li><code>itemid</code> - (string) ID of the item used in the function;</li> <li><code>function</code> - (string) name of the function;</li> <li><code>parameter</code> - (string) parameter passed to the function.</li> </ul>
selectGroups	query	Return the host groups that the trigger prototype belongs to in the <code>groups</code> property.
selectHosts	query	Return the hosts that the trigger prototype belongs to in the <code>hosts</code> property.
selectItems	query	Return items and item prototypes used the trigger prototype in the <code>items</code> property.
selectTags	query	Return the trigger prototype tags in <code>tags</code> property.

Parameter	Type	Description
filter	object	<p>Return only those results that exactly match the given filter.</p> <p>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.</p> <p>Supports additional filters:  <b>host</b> - technical name of the host that the trigger prototype belongs to;  <b>hostid</b> - ID of the host that the trigger prototype belongs to.</p>
limitSelects	integer	<p>Limits the number of records returned by subselects.</p>
sortfield	string/array	<p>Applies to the following subselects:  <b>selectHosts</b> - results will be sorted by <b>host</b>.  Sort the result by the given properties.</p> <p>Possible values are: <b>triggerid</b>, <b>description</b>, <b>status</b> and <b>priority</b>.  These parameters being common for all <b>get</b> methods are described in detail in the <a href="#">reference commentary</a>.</p>
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	

Parameter	Type	Description
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve trigger prototypes from an LLD rule

Retrieve all trigger prototypes and their functions from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.get",
  "params": {
    "output": "extend",
    "selectFunctions": "extend",
    "discoveryids": "22450"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "13272",
      "expression": "{12598}<20",
      "description": "Free inodes is less than 20% on volume {#FSNAME}",
      "url": "",
      "status": "0",
      "priority": "2",
      "comments": "",
      "templateid": "0",
      "type": "0",
      "flags": "2",
      "recovery_mode": "0",
      "recovery_expression": "",
      "correlation_mode": "0",
      "correlation_tag": "",
      "manual_close": "0",
      "opdata": "",
      "discover": "0",
      "functions": [
        {
          "functionid": "12598",
          "itemid": "22454",
          "triggerid": "13272",
          "parameter": "0",
          "function": "last"
        }
      ]
    },
    {
      "triggerid": "13266",
      "expression": "{13500}<201",

```

```

        "description": "Free disk space is less than 20% on volume {#FSNAME}",
        "url": "",
        "status": "0",
        "priority": "2",
        "comments": "",
        "templateid": "0",
        "type": "0",
        "flags": "2",
        "recovery_mode": "0",
        "recovery_expression": "",
        "correlation_mode": "0",
        "correlation_tag": "",
        "manual_close": "0",
        "opdata": "",
        "discover": "0",
        "functions": [
            {
                "functionid": "13500",
                "itemid": "22686",
                "triggerid": "13266",
                "parameter": "0",
                "function": "last"
            }
        ]
    },
    "id": 1
}

```

Retrieving a specific trigger prototype with tags

Request:

```

{
  "jsonrpc": "2.0",
  "method": "triggerprototype.get",
  "params": {
    "output": [
      "triggerid",
      "description"
    ],
    "selectTags": "extend",
    "triggerids": [
      "17373"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "17373",
      "description": "Free disk space is less than 20% on volume {#FSNAME}",
      "tags": [
        {
          "tag": "volume",
          "value": "{#FSNAME}"
        },
        {
          "tag": "type",

```

```

        "value": "{#FSTYPE}"
    }
    ]
}

```

See also

- [Discovery rule](#)
- [Item](#)
- [Host](#)
- [Host group](#)

Source

CTriggerPrototype::get() in ui/include/classes/api/services/CTriggerPrototype.php.

### triggerprototype.update

Description

object triggerprototype.update(object/array triggerPrototypes)

This method allows to update existing trigger prototypes.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) [Trigger prototype properties](#) to be updated.

The `triggerid` property must be defined for each trigger prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard trigger prototype properties](#) the method accepts the following parameters.

Parameter	Type	Description
dependencies	array	Triggers and trigger prototypes that the trigger prototype is dependent on.
tags	array	The triggers must have the <code>triggerid</code> property defined. Trigger prototype <a href="#">tags</a> .

**Attention:**

The trigger expression has to be given in its expanded form and must contain at least one item prototype.

Return values

(object) Returns an object containing the IDs of the updated trigger prototypes under the `triggerids` property.

Examples

Enabling a trigger prototype

Enable a trigger prototype, that is, set its status to 0.



Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.update",
  "params": {
    "triggerid": "13938",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  },
  "id": 1
}
```

Replacing trigger prototype tags

Replace tags for one trigger prototype.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.update",
  "params": {
    "triggerid": "17373",
    "tags": [
      {
        "tag": "volume",
        "value": "#{FSNAME}"
      },
      {
        "tag": "type",
        "value": "#{FSTYPE}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "17373"
    ]
  },
  "id": 1
}
```

Source

CTriggerPrototype::update() in ui/include/classes/api/services/CTriggerPrototype.php.

## User

This class is designed to work with users.

Object references:

- [User](#)

Available methods:

- [user.create](#) - creating new users
- [user.delete](#) - deleting users
- [user.get](#) - retrieving users
- [user.login](#) - logging in to the API
- [user.logout](#) - logging out of the API
- [user.update](#) - updating users

### > User object

The following objects are directly related to the `user` API.

User

The user object has the following properties.

Property	Type	Description
<code>userid</code>	string	(readonly) ID of the user.
<b><code>alias</code></b> (required)	string	User alias.
<code>attempt_clock</code>	timestamp	(readonly) Time of the last unsuccessful login attempt.
<code>attempt_failed</code>	integer	(readonly) Recent failed login attempt count.
<code>attempt_ip</code>	string	(readonly) IP address from where the last unsuccessful login attempt came from.
<code>autologin</code>	integer	Whether to enable auto-login.  Possible values: 0 - (default) auto-login disabled; 1 - auto-login enabled.
<code>autologout</code>	string	User session life time. Accepts seconds and time unit with suffix. If set to 0s, the session will never expire.  Default: 15m.

Property	Type	Description
lang	string	Language code of the user's language, for example, en_GB.  Default: default - system default.
name	string	Name of the user.
refresh	string	Automatic refresh period. Accepts seconds and time unit with suffix.  Default: 30s.
rows_per_page	integer	Amount of object rows to show per page.  Default: 50.
surname	string	Surname of the user.
theme	string	User's theme.  Possible values: default - (default) system default; blue-theme - Blue; dark-theme - Dark.
url	string	URL of the page to redirect the user to after logging in.
timezone	string	User's time zone, for example, Europe/London, UTC.  Default: default - system default.
<b>roleid</b> (required)	string	For the full list of supported time zones please refer to <a href="#">PHP documentation</a> . Role ID of the user.

## Media

The media object has the following properties.

Property	Type	Description
<b>mediatypeid</b> (required)	string	ID of the media type used by the media.

Property	Type	Description
<b>sendto</b> (required)	string/array	Address, user name or other identifier of the recipient.  If type of <b>Media type</b> is e-mail, values are represented as array. For other types of <b>Media types</b> , value is represented as a string.
<b>active</b>	integer	Whether the media is enabled.  Possible values: 0 - (default) enabled; 1 - disabled.
<b>severity</b>	integer	Trigger severities to send notifications about.  Severities are stored in binary form with each bit representing the corresponding severity. For example, 12 equals 1100 in binary and means, that notifications will be sent from triggers with severities warning and average.  Refer to the <a href="#">trigger object page</a> for a list of supported trigger severities.
<b>period</b>	string	Default: 63 Time when the notifications can be sent as a <b>time period</b> or user macros separated by a semicolon.  Default: 1-7,00:00-24:00

## user.checkAuthentication

### Description

object `user.checkAuthentication`

This method checks and prolongs user session.

#### Attention:

Calling **user.checkAuthentication** method prolongs user session by default.

### Parameters

The method accepts the following parameters.

Parameter	Type	Description
extend	boolean	Default value: "true". Setting it's value to "false" allows to check session without extending it's lifetime. Supported since Zabbix 4.0.
sessionid	string	User session id.

### Return values

(object) Returns an object containing information about user.

### Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.checkAuthentication",
  "params": {
    "sessionid": "673b8ba11562a35da902c66cf5c23fa2"
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userid": "1",
    "alias": "Admin",
    "name": "Zabbix",
    "surname": "Administrator",
    "url": "",
    "autologin": "1",
    "autologout": "0",
    "lang": "ru_RU",
    "refresh": "0",
    "theme": "default",
    "attempt_failed": "0",
    "attempt_ip": "127.0.0.1",
    "attempt_clock": "1355919038",
    "rows_per_page": "50",
    "timezone": "Europe/Riga",
    "roleid": "3",
    "type": 3,
    "sessionid": "673b8ba11562a35da902c66cf5c23fa2"
    "debug_mode": 0,
    "userip": "127.0.0.1",
    "gui_access": 0
  },
  "id": 1
}
```

**Note:**

Response is similar to [User.login](#) call response with "userData" parameter set to true (the difference is that user data is retrieved by session id and not by username / password).

Source

CUser::checkAuthentication() in ui/include/classes/api/services/CUser.php.

**user.create**

Description

object user.create(object/array users)

This method allows to create new users.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Users to create.

Additionally to the [standard user properties](#), the method accepts the following parameters.

Parameter	Type	Description
<b>passwd</b> (required)	string	User's password.  Can be omitted if user is added only to groups that have LDAP access.
<b>usrgrps</b> (required)	array	User <b>groups</b> to add the user to.  The user groups must have the <b>usrgrp</b> id property defined.
<b>medias</b>	array	User <b>media</b> to be created.

#### Return values

(object) Returns an object containing the IDs of the created users under the `userids` property. The order of the returned IDs matches the order of the passed users.

#### Examples

##### Creating a user

Create a new user, add him to a user group and create a new media for him.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.create",
  "params": {
    "alias": "John",
    "passwd": "Doe123",
    "roleid": "5",
    "usrgrps": [
      {
        "usrgrp": "7"
      }
    ],
    "medias": [
      {
        "mediatypeid": "1",
        "sendto": [
          "support@company.com"
        ],
        "active": 0,
        "severity": 63,
        "period": "1-7,00:00-24:00"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
```

```
        "12"  
    ]  
  },  
  "id": 1  
}
```

See also

- [Media](#)
- [User group](#)
- [Role](#)

Source

CUser::create() in ui/include/classes/api/services/CUser.php.

## user.delete

Description

object user.delete(array users)

This method allows to delete users.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of users to delete.

Return values

(object) Returns an object containing the IDs of the deleted users under the `userids` property.

Examples

Deleting multiple users

Delete two users.

Request:

```
{  
  "jsonrpc": "2.0",  
  "method": "user.delete",  
  "params": [  
    "1",  
    "5"  
  ],  
  "auth": "3a57200802b24cda67c4e4010b50c065",  
  "id": 1  
}
```

Response:

```
{  
  "jsonrpc": "2.0",  
  "result": {  
    "userids": [  
      "1",  
      "5"  
    ]  
  },  
  "id": 1  
}
```

Source

CUser::delete() in ui/include/classes/api/services/CUser.php.

## user.get

Description

integer/array user.get(object parameters)

The method allows to retrieve users according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
mediaids	string/array	Return only users that use the given media.
mediatypeids	string/array	Return only users that use the given media types.
userids	string/array	Return only users with the given IDs.
usrgrpids	string/array	Return only users that belong to the given user groups.



Parameter	Type	Description
getAccess	flag	<p>Adds additional information about user permissions.</p> <p>Adds the following properties for each user:</p> <ul style="list-style-type: none"> <li><code>gui_access</code> - (integer) user's frontend authentication method. Refer to the <code>gui_access</code> property of the <b>user group object</b> for a list of possible values.</li> <li><code>debug_mode</code> - (integer) indicates whether debug is enabled for the user. Possible values: 0 - debug disabled, 1 - debug enabled.</li> <li><code>users_status</code> - (integer) indicates whether the user is disabled. Possible values: 0 - user enabled, 1 - user disabled.</li> </ul>
selectMedias	query	Return media used by the user in the <b>medias</b> property.
selectMediatypes	query	Return media types used by the user in the <b>mediatypes</b> property.
selectUsrgrps	query	Return user groups that the user belongs to in the <b>usrgrps</b> property.
selectRole	query	Return user role in the <b>role</b> property.
sortfield	string/array	Sort the result by the given properties.
		Possible values are: <code>userid</code> and <code>alias</code> .

Parameter	Type	Description
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving users

Retrieve all of the configured users.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "userid": "1",
      "alias": "Admin",
      "name": "Zabbix",
      "surname": "Administrator",
      "url": "",
      "autologin": "1",
      "autologout": "0",
      "lang": "en_GB",
      "refresh": "0s",
      "theme": "default",
      "attempt_failed": "0",
      "attempt_ip": "",
      "attempt_clock": "0",
      "rows_per_page": "50",
      "timezone": "default",
    }
  ]
}
```

```

    "roleid": "3"
  },
  {
    "userid": "2",
    "alias": "guest",
    "name": "",
    "surname": "",
    "url": "",
    "autologin": "0",
    "autologout": "15m",
    "lang": "default",
    "refresh": "30s",
    "theme": "default",
    "attempt_failed": "0",
    "attempt_ip": "",
    "attempt_clock": "0",
    "rows_per_page": "50",
    "timezone": "default",
    "roleid": "4"
  },
  {
    "userid": "3",
    "alias": "user",
    "name": "Zabbix",
    "surname": "User",
    "url": "",
    "autologin": "0",
    "autologout": "0",
    "lang": "ru_RU",
    "refresh": "15s",
    "theme": "dark-theme",
    "attempt_failed": "0",
    "attempt_ip": "",
    "attempt_clock": "0",
    "rows_per_page": "100",
    "timezone": "default",
    "roleid": "1"
  }
],
"id": 1
}

```

Retrieving user data

Retrieve data of a user with ID "12".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "user.get",
  "params": {
    "output": ["userid", "alias"],
    "selectRole": "extend",
    "userids": "12"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [

```

```

    {
      "userid": "12",
      "alias": "John",
      "role": {
        "roleid": "5",
        "name": "Operator",
        "type": "1",
        "readonly": "0"
      }
    }
  ],
  "id": 1
}

```

See also

- [Media](#)
- [Media type](#)
- [User group](#)
- [Role](#)

Source

CUser::get() in ui/include/classes/api/services/CUser.php.

## user.login

Description

string/object user.login(object parameters)

This method allows to log in to the API and generate an authentication token.

### Warning:

When using this method, you also need to do [user.logout](#) to prevent the generation of a large number of open session records.

### Attention:

This method is available to unauthenticated users and must be called without the `auth` parameter in the JSON-RPC request.

Parameters

(object) Parameters containing the user name and password.

The method accepts the following parameters.

Parameter	Type	Description
<b>password</b> (required)	string	User password.
<b>user</b> (required)	string	User name.
userData	flag	Return information about the authenticated user.

Return values

(string/object) If the `userData` parameter is used, returns an object containing information about the authenticated user.

Additionally to the [standard user properties](#), the following information is returned:

Property	Type	Description
debug_mode	boolean	Whether debug mode is enabled for the user.

Property	Type	Description
gui_access	integer	User's authentication method to the frontend.
sessionid	string	Refer to the <code>gui_access</code> property of the <code>user group object</code> for a list of possible values. Authentication token, which must be used in the following API requests.
userip	string	IP address of the user.

**Note:**

If a user has been successfully authenticated after one or more failed attempts, the method will return the current values for the `attempt_clock`, `attempt_failed` and `attempt_ip` properties and then reset them.

If the `userData` parameter is not used, the method returns an authentication token.

**Note:**

The generated authentication token should be remembered and used in the `auth` parameter of the following JSON-RPC requests. It is also required when using HTTP authentication.

Examples

Authenticating a user

Authenticate a user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "user": "Admin",
    "password": "zabbix"
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "0424bd59b807674191e7d77572075f33",
  "id": 1
}
```

Requesting authenticated user's information

Authenticate and return additional information about the user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
```

```
"params": {
  "user": "Admin",
  "password": "zabbix",
  "userData": true
},
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userid": "1",
    "alias": "Admin",
    "name": "Zabbix",
    "surname": "Administrator",
    "url": "",
    "autologin": "1",
    "autologout": "0",
    "lang": "ru_RU",
    "refresh": "0",
    "theme": "default",
    "attempt_failed": "0",
    "attempt_ip": "127.0.0.1",
    "attempt_clock": "1355919038",
    "rows_per_page": "50",
    "timezone": "Europe/Riga",
    "roleid": "3",
    "type": 3,
    "debug_mode": 0,
    "userip": "127.0.0.1",
    "gui_access": "0",
    "sessionid": "5b56eee8be445e98f0bd42b435736e42"
  },
  "id": 1
}
```

See also

- [user.logout](#)

Source

CUser::login() in ui/include/classes/api/services/CUser.php.

## user.logout

Description

string/object user.logout(array)

This method allows to log out of the API and invalidates the current authentication token.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) The method accepts an empty array.

Return values

(boolean) Returns true if the user has been logged out successfully.

Examples

Logging out

Log out from the API.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.logout",
  "params": [],
  "id": 1,
  "auth": "16a46baf181ef9602e1687f3110abf8a"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

See also

- [user.login](#)

Source

CUser::login() in ui/include/classes/api/services/CUser.php.

## user.update

Description

object user.update(object/array users)

This method allows to update existing users.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) User properties to be updated.

The `userid` property must be defined for each user, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard user properties](#), the method accepts the following parameters.

Parameter	Type	Description
passwd	string	User's password.  Can be empty string if user belongs to or is moved only to groups that have LDAP access.
usrgrps	array	User <a href="#">groups</a> to replace existing user groups.  The user groups must have the <code>usrgrp_id</code> property defined.

Parameter	Type	Description
medias	array	User media to replace existing media.

#### Return values

(object) Returns an object containing the IDs of the updated users under the `userids` property.

#### Examples

##### Renaming a user

Rename a user to John Doe.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.update",
  "params": {
    "userid": "1",
    "name": "John",
    "surname": "Doe"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "1"
    ]
  },
  "id": 1
}
```

##### Changing user role

Change a role of a user.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.update",
  "params": {
    "userid": "12",
    "roleid": "6"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "12"
    ]
  },
  "id": 1
}
```



```
"id": 1  
}
```

Source

CUser::update() in ui/include/classes/api/services/CUser.php.

## User group

This class is designed to work with user groups.

Object references:

- [User group](#)

Available methods:

- [usergroup.create](#) - creating new user groups
- [usergroup.delete](#) - deleting user groups
- [usergroup.get](#) - retrieving user groups
- [usergroup.update](#) - updating user groups

### > User group object

The following objects are directly related to the usergroup API.

User group

The user group object has the following properties.

Property	Type	Description
usrgrpId	string	(readonly) ID of the user group.
<b>name</b> (required)	string	Name of the user group.
debug_mode	integer	Whether debug mode is enabled or disabled.  Possible values are: 0 - (default) disabled; 1 - enabled.
gui_access	integer	Frontend authentication method of the users in the group.  Possible values: 0 - (default) use the system default authentication method; 1 - use internal authentication; 2 - use LDAP authentication; 3 - disable access to the frontend.

Property	Type	Description
users_status	integer	Whether the user group is enabled or disabled.  Possible values are: 0 - (default) enabled; 1 - disabled.

#### Permission

The permission object has the following properties.

Property	Type	Description
<b>id</b> (required)	string	ID of the host group to add permission to.
<b>permission</b> (required)	integer	Access level to the host group.  Possible values: 0 - access denied; 2 - read-only access; 3 - read-write access.

#### Tag based permission

The tag based permission object has the following properties.

Property	Type	Description
<b>groupid</b> (required)	string	ID of the host group to add permission to.
<b>tag</b>	string	Tag name.
<b>value</b>	string	Tag value.

#### usergroup.create

##### Description

object usergroup.create(object/array userGroups)

This method allows to create new user groups.

##### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

##### Parameters

(object/array) User groups to create.

Additionally to the [standard user group properties](#), the method accepts the following parameters.

Parameter	Type	Description
rights	object/array	<a href="#">Permissions</a> to assign to the group
tag_filters	array	<a href="#">Tag based permissions</a> to assign to the group

Parameter	Type	Description
userids	string/array	IDs of users to add to the user group.

#### Return values

(object) Returns an object containing the IDs of the created user groups under the `usrgrpids` property. The order of the returned IDs matches the order of the passed user groups.

#### Examples

##### Creating a user group

Create a user group, which denies access to host group "2", and add a user to it.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.create",
  "params": {
    "name": "Operation managers",
    "rights": {
      "permission": 0,
      "id": "2"
    },
    "userids": "12"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "20"
    ]
  },
  "id": 1
}
```

#### See also

- [Permission](#)

#### Source

CUserGroup::create() in `ui/include/classes/api/services/CUserGroup.php`.

### **usergroup.delete**

#### Description

object `usergroup.delete(array userGroupIds)`

This method allows to delete user groups.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the user groups to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted user groups under the `usrgrpids` property.

#### Examples

Deleting multiple user groups

Delete two user groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.delete",
  "params": [
    "20",
    "21"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "20",
      "21"
    ]
  },
  "id": 1
}
```

#### Source

CUserGroup::delete() in `ui/include/classes/api/services/CUserGroup.php`.

### usergroup.get

#### Description

integer/array usergroup.get(object parameters)

The method allows to retrieve user groups according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
status	integer	Return only user groups with the given status.  Refer to the <a href="#">user group page</a> for a list of supported statuses.

Parameter	Type	Description
userids	string/array	Return only user groups that contain the given users.
usrgrpids	string/array	Return only user groups with the given IDs.
with_gui_access	integer	Return only user groups with the given frontend authentication method.
selectTagFilters	query	<p>Refer to the <a href="#">user group page</a> for a list of supported methods.</p> <p>Return user group tag based permissions in the <a href="#">tag_filters</a> property.</p> <p>It has the following properties:  groupid - (string) ID of the host group;  tag - (string) tag name;  value - (string) tag value.</p>
selectUsers	query	Return the users from the user group in the <a href="#">users</a> property.
selectRights	query	Return user group rights in the <a href="#">rights</a> property.
limitSelects	integer	<p>It has the following properties:  permission - (integer) access level to the host group;  id - (string) ID of the host group.</p> <p>Refer to the <a href="#">user group page</a> for a list of access levels to host groups.</p> <p>Limits the number of records returned by subselects.</p>

Parameter	Type	Description
sortfield	string/array	Sort the result by the given properties.  Possible values are: <code>usrgrpid</code> , <code>name</code> . These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
countOutput	boolean	
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving enabled user groups

Retrieve all enabled user groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.get",
  "params": {
    "output": "extend",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "usrgrpid": "7",
      "name": "Zabbix administrators",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "1"
    },
    {
```

```

        "usrgrp_id": "8",
        "name": "Guests",
        "gui_access": "0",
        "users_status": "0",
        "debug_mode": "0"
    },
    {
        "usrgrp_id": "11",
        "name": "Enabled debug mode",
        "gui_access": "0",
        "users_status": "0",
        "debug_mode": "1"
    },
    {
        "usrgrp_id": "12",
        "name": "No access to the frontend",
        "gui_access": "2",
        "users_status": "0",
        "debug_mode": "0"
    },
    {
        "usrgrp_id": "14",
        "name": "Read only",
        "gui_access": "0",
        "users_status": "0",
        "debug_mode": "0"
    },
    {
        "usrgrp_id": "18",
        "name": "Deny",
        "gui_access": "0",
        "users_status": "0",
        "debug_mode": "0"
    }
],
"id": 1
}

```

See also

- [User](#)

Source

CUserGroup::get() in ui/include/classes/api/services/CUserGroup.php.

## usergroup.update

Description

object usergroup.update(object/array userGroups)

This method allows to update existing user groups.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) User group properties to be updated.

The `usrgrp_id` property must be defined for each user group, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard user group properties](#), the method accepts the following parameters.

Parameter	Type	Description
rights	object/array	Permissions to replace the current permissions assigned to the user group.
tag_filters	array	Tag based permissions to assign to the group.
userids	string/array	IDs of the users to replace the users in the group.

#### Return values

(object) Returns an object containing the IDs of the updated user groups under the `usrgrpids` property.

#### Examples

##### Disabling a user group

Disable a user group.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.update",
  "params": {
    "usrgrp_id": "17",
    "users_status": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "17"
    ]
  },
  "id": 1
}
```

#### See also

- [Permission](#)

#### Source

`CUserGroup::update()` in `ui/include/classes/api/services/CUserGroup.php`.

#### User macro

This class is designed to work with host and global macros.

#### Object references:

- [Global macro](#)
- [Host macro](#)



Available methods:

- **usermacro.create** - creating new host macros
- **usermacro.createglobal** - creating new global macros
- **usermacro.delete** - deleting host macros
- **usermacro.deleteglobal** - deleting global macros
- **usermacro.get** - retrieving host and global macros
- **usermacro.update** - updating host macros
- **usermacro.updateglobal** - updating global macros

## > User macro object

The following objects are directly related to the `usermacro` API.

Global macro

The global macro object has the following properties.

Property	Type	Description
<code>globalmacroid</code>	string	(readonly) ID of the global macro.
<b>macro</b> (required)	string	Macro string.
<b>value</b> (required)	string	Value of the macro.
<code>type</code>	integer	Type of macro.  Possible values: 0 - (default) Text macro; 1 - Secret macro; 2 - Vault secret.
<code>description</code>	string	Description of the macro.

Host macro

The host macro object defines a macro available on a host, host prototype or template. It has the following properties.

Property	Type	Description
<code>hostmacroid</code>	string	(readonly) ID of the host macro.
<b>hostid</b> (required)	string	ID of the host that the macro belongs to.
<b>macro</b> (required)	string	Macro string.
<b>value</b> (required)	string	Value of the macro.
<code>type</code>	integer	Type of macro.  Possible values: 0 - (default) Text macro; 1 - Secret macro; 2 - Vault secret.
<code>description</code>	string	Description of the macro.

## usermacro.create

### Description

object usermacro.create(object/array hostMacros)

This method allows to create new host macros.

#### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Host macros to create.

The method accepts host macros with the [standard host macro properties](#).

### Return values

(object) Returns an object containing the IDs of the created host macros under the `hostmacroids` property. The order of the returned IDs matches the order of the passed host macros.

### Examples

#### Creating a host macro

Create a host macro "{`SNMP_COMMUNITY`}" with the value "public" on host "10198".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.create",
  "params": {
    "hostid": "10198",
    "macro": "{SNMP_COMMUNITY}",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "11"
    ]
  },
  "id": 1
}
```

### Source

CUserMacro::create() in ui/include/classes/api/services/CUserMacro.php.

## usermacro.createglobal

### Description

object usermacro.createglobal(object/array globalMacros)

This method allows to create new global macros.

**Note:**

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Global macros to create.

The method accepts global macros with the [standard global macro properties](#).

**Return values**

(object) Returns an object containing the IDs of the created global macros under the `globalmacroids` property. The order of the returned IDs matches the order of the passed global macros.

**Examples****Creating a global macro**

Create a global macro "{\$SNMP\_COMMUNITY}" with value "public".

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.createglobal",
  "params": {
    "macro": "{$SNMP_COMMUNITY}",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "6"
    ]
  },
  "id": 1
}
```

**Source**

CUserMacro::createGlobal() in ui/include/classes/api/services/CUserMacro.php.

**usermacro.delete****Description**

object usermacro.delete(array hostMacroIds)

This method allows to delete host macros.

**Note:**

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(array) IDs of the host macros to delete.

**Return values**

(object) Returns an object containing the IDs of the deleted host macros under the `hostmacroids` property.

**Examples**

## Deleting multiple host macros

Delete two host macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.delete",
  "params": [
    "32",
    "11"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "32",
      "11"
    ]
  },
  "id": 1
}
```

Source

CUserMacro::delete() in ui/include/classes/api/services/CUserMacro.php.

## usermacro.deleteglobal

Description

object usermacro.deleteglobal(array globalMacroIds)

This method allows to delete global macros.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the global macros to delete.

Return values

(object) Returns an object containing the IDs of the deleted global macros under the `globalmacroids` property.

Examples

Deleting multiple global macros

Delete two global macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.deleteglobal",
  "params": [
    "32",
    "11"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
}
```

```
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "32",
      "11"
    ]
  },
  "id": 1
}
```

Source

CUserMacro::deleteGlobal() in ui/include/classes/api/services/CUserMacro.php.

## usermacro.get

Description

integer/array usermacro.get(object parameters)

The method allows to retrieve host and global macros according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
globalmacro	flag	Return global macros instead of host macros.
globalmacroids	string/array	Return only global macros with the given IDs.
groupids	string/array	Return only host macros that belong to hosts or templates from the given host groups.
hostids	string/array	Return only macros that belong to the given hosts or templates.
hostmacroids	string/array	Return only host macros with the given IDs.

Parameter	Type	Description
selectGroups	query	Return host groups that the host macro belongs to in the <a href="#">groups</a> property.
		Used only when retrieving host macros.
selectHosts	query	Return hosts that the host macro belongs to in the <a href="#">hosts</a> property.
		Used only when retrieving host macros.
selectTemplates	query	Return templates that the host macro belongs to in the <a href="#">templates</a> property.
		Used only when retrieving host macros.
sortfield	string/array	Sort the result by the given properties.
		Possible value: <a href="#">macro</a> .
countOutput	boolean	These parameters being common for all <a href="#">get</a> methods are described in detail in the <a href="#">reference commentary</a> page.
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving host macros for a host

Retrieve all host macros defined for host "10198".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.get",
  "params": {
    "output": "extend",
    "hostids": "10198"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostmacroid": "9",
      "hostid": "10198",
      "macro": "{$INTERFACE}",
      "value": "eth0",
      "description": "",
      "type": "0"
    },
    {
      "hostmacroid": "11",
      "hostid": "10198",
      "macro": "{$SNMP_COMMUNITY}",
      "value": "public",
      "description": "",
      "type": "0"
    }
  ],
  "id": 1
}
```

Retrieving global macros

Retrieve all global macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.get",
  "params": {
    "output": "extend",
    "globalmacro": true
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "globalmacroid": "6",
      "macro": "{$SNMP_COMMUNITY}",
      "value": "public",
      "description": ""
    }
  ]
}
```

```
        "type": "0"
    }
  ],
  "id": 1
}
```

Source

CUserMacro::get() in ui/include/classes/api/services/CUserMacro.php.

## usermacro.update

Description

object usermacro.update(object/array hostMacros)

This method allows to update existing host macros.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Host macro properties** to be updated.

The `hostmacroid` property must be defined for each host macro, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host macros under the `hostmacroids` property.

Examples

Changing the value of a host macro

Change the value of a host macro to "public".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.update",
  "params": {
    "hostmacroid": "1",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "1"
    ]
  },
  "id": 1
}
```

Source

CUserMacro::update() in ui/include/classes/api/services/CUserMacro.php.



## usermacro.updateglobal

### Description

object usermacro.updateglobal(object/array globalMacros)

This method allows to update existing global macros.

#### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) [Global macro properties](#) to be updated.

The `globalmacroid` property must be defined for each global macro, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

### Return values

(object) Returns an object containing the IDs of the updated global macros under the `globalmacroids` property.

### Examples

Changing the value of a global macro

Change the value of a global macro to "public".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.updateglobal",
  "params": {
    "globalmacroid": "1",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "1"
    ]
  },
  "id": 1
}
```

### Source

CUserMacro::updateGlobal() in ui/include/classes/api/services/CUserMacro.php.

### Value map

This class is designed to work with value maps.

Object references:

- [Value map](#)

Available methods:

- [valuemap.create](#) - creating new value maps

- [valuemap.delete](#) - deleting value maps
- [valuemap.get](#) - retrieving value maps
- [valuemap.update](#) - updating value maps

## > Value map object

The following objects are directly related to the `valuemap` API.

Value map

The value map object has the following properties.

Property	Type	Description
<code>valuemapid</code>	string	(readonly) ID of the value map.
<b>name</b> (required)	string	Name of the value map.
<b>mappings</b> (required)	array	Value mappings for current value map. The mapping object is <a href="#">described in detail below</a> .

Value mappings

The value mappings object defines value mappings of the value map. It has the following properties.

Property	Type	Description
<b>value</b> (required)	string	Original value.
<b>newvalue</b> (required)	string	Value to which the original value is mapped to.

## **valuemap.create**

Description

`object valuemap.create(object/array valuemaps)`

This method allows to create new value maps.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Value maps to create.

The method accepts value maps with the [standard value map properties](#).

Return values

(object) Returns an object containing the IDs of the created value maps the `valuemapids` property. The order of the returned IDs matches the order of the passed value maps.

Examples

Creating a value map

Create one value map with two mappings.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "valuemap.create",
  "params": {
    "name": "Service state",
    "mappings": [
      {
        "value": "0",
        "newvalue": "Down"
      },
      {
        "value": "1",
        "newvalue": "Up"
      }
    ]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "1"
    ]
  },
  "id": 1
}

```

Source

CValueMap::create() in ui/include/classes/api/services/CValueMap.php.

## valuemap.delete

Description

object valuemap.delete(array valuemapids)

This method allows to delete value maps.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the value maps to delete.

Return values

(object) Returns an object containing the IDs of the deleted value maps under the `valuemapids` property.

Examples

Deleting multiple value maps

Delete two value maps.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "valuemap.delete",
  "params": [

```

```

    "1",
    "2"
  ],
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "1",
      "2"
    ]
  },
  "id": 1
}

```

Source

CValueMap::delete() in ui/include/classes/api/services/CValueMap.php.

## valuemap.get

Description

integer/array valuemap.get(object parameters)

The method allows to retrieve value maps according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
valuemapids	string/array	Return only value maps with the given IDs.
selectMappings	query	Return the value mappings for current value map in the <b>mappings</b> property.
sortfield	string/array	Supports count. Sort the result by the given properties.
		Possible values are: valuemapid, name.

Parameter	Type	Description
countOutput	boolean	These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving value maps

Retrieve all configured value maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.get",
  "params": {
    "output": "extend"
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "valuemapid": "4",
      "name": "APC Battery Replacement Status"
    },
    {
      "valuemapid": "5",
      "name": "APC Battery Status"
    },
    {
      "valuemapid": "7",
      "name": "Dell Open Manage System Status"
    }
  ],
  "id": 1
}
```

Retrieve one value map with its mappings.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.get",
  "params": {
    "output": "extend",
    "selectMappings": "extend",
    "valuemapids": ["4"]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "valuemapid": "4",
      "name": "APC Battery Replacement Status",
      "mappings": [
        {
          "value": "1",
          "newvalue": "unknown"
        },
        {
          "value": "2",
          "newvalue": "notInstalled"
        },
        {
          "value": "3",
          "newvalue": "ok"
        },
        {
          "value": "4",
          "newvalue": "failed"
        },
        {
          "value": "5",
          "newvalue": "highTemperature"
        },
        {
          "value": "6",
          "newvalue": "replaceImmediately"
        },
        {
          "value": "7",
          "newvalue": "lowCapacity"
        }
      ]
    }
  ],
  "id": 1
}
```

Source

CValueMap::get() in ui/include/classes/api/services/CValueMap.php.

**valuemap.update**

## Description

object `valuemap.update(object/array valuemaps)`

This method allows to update existing value maps.

### Note:

This method is only available to Super admin user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object/array) **Value map properties** to be updated.

The `valuemapid` property must be defined for each value map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

## Return values

(object) Returns an object containing the IDs of the updated value maps under the `valuemapids` property.

## Examples

### Changing value map name

Change value map name to "Device status".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.update",
  "params": {
    "valuemapid": "2",
    "name": "Device status"
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "2"
    ]
  },
  "id": 1
}
```

### Changing mappings for one value map.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.update",
  "params": {
    "valuemapid": "2",
    "mappings": [
      {
        "value": "0",
        "newvalue": "Online"
      },
      {
        "value": "1",
        "newvalue": "Offline"
      }
    ]
  }
}
```

```

    ]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "2"
    ]
  },
  "id": 1
}

```

Source

CValueMap::update() in ui/include/classes/api/services/CValueMap.php.

## Web scenario

This class is designed to work with web scenarios.

Object references:

- [Web scenario](#)
- [Scenario step](#)

Available methods:

- [httpstest.create](#) - creating new web scenarios
- [httpstest.delete](#) - deleting web scenarios
- [httpstest.get](#) - retrieving web scenarios
- [httpstest.update](#) - updating web scenarios

## > Web scenario object

The following objects are directly related to the webcheck API.

Web scenario

The web scenario object has the following properties.

Property	Type	Description
httpstestid	string	(readonly) ID of the web scenario.
<b>hostid</b> (required)	string	ID of the host that the web scenario belongs to.
<b>name</b> (required)	string	Name of the web scenario.
agent	string	User agent string that will be used by the web scenario.

Default: Zabbix



Property	Type	Description
applicationid	string	ID of the application that the web scenario belongs to.
authentication	integer	Authentication method that will be used by the web scenario.  Possible values: 0 - (default) none; 1 - basic HTTP authentication; 2 - NTLM authentication.
delay	string	Execution interval of the web scenario. Accepts seconds, time unit with suffix and user macro.
headers	array of HTTP fields	Default: 1m. HTTP headers that will be sent when performing a request.
http_password	string	Password used for basic HTTP or NTLM authentication.
http_proxy	string	Proxy that will be used by the web scenario given as http://[username[:password]@]p
http_user	string	User name used for basic HTTP or NTLM authentication.
nextcheck	timestamp	(readonly) Time of the next web scenario execution.
retries	integer	Number of times a web scenario will try to execute each step before failing.
ssl_cert_file	string	Default: 1. Name of the SSL certificate file used for client authentication (must be in PEM format).
ssl_key_file	string	Name of the SSL private key file used for client authentication (must be in PEM format).

Property	Type	Description
ssl_key_password	string	SSL private key password.
status	integer	Whether the web scenario is enabled.  Possible values are: 0 - (default) enabled; 1 - disabled.
templateid	string	(readonly) ID of the parent template web scenario.
variables	array of HTTP fields	Web scenario variables.
verify_host	integer	Whether to verify that the host name specified in the SSL certificate matches the one used in the scenario.  Possible values are: 0 - (default) skip host verification; 1 - verify host.
verify_peer	integer	Whether to verify the SSL certificate of the web server.  Possible values are: 0 - (default) skip peer verification; 1 - verify peer.

### Scenario step

The scenario step object defines a specific web scenario check. It has the following properties.

Property	Type	Description
httpstepid	string	(readonly) ID of the scenario step.
<b>name</b> (required)	string	Name of the scenario step.
<b>no</b> (required)	integer	Sequence number of the step in a web scenario.
<b>url</b> (required)	string	URL to be checked.

Property	Type	Description
follow_redirects	integer	Whether to follow HTTP redirects.  Possible values are: 0 - don't follow redirects; 1 - (default) follow redirects.
headers	array of HTTP fields	HTTP headers that will be sent when performing a request. Scenario step headers will overwrite headers specified for the web scenario.
httpptestid	string	(readonly) ID of the web scenario that the step belongs to.
posts	string array of HTTP fields	HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).
required	string	Text that must be present in the response.
retrieve_mode	integer	Part of the HTTP response that the scenario step must retrieve.  Possible values are: 0 - (default) only body; 1 - only headers; 2 - headers and body.
status_codes	string	Ranges of required HTTP status codes separated by commas.
timeout	string	Request timeout in seconds. Accepts seconds, time unit with suffix and user macro.  Default: 15s. Maximum: 1h. Minimum: 1s.
variables	array of HTTP fields	Scenario step variables.

Property	Type	Description
query_fields	array of <b>HTTP fields</b>	Query fields - array of <b>HTTP fields</b> that will be added to URL when performing a request

#### HTTP field

The HTTP field object defines a name and value that is used to specify variable, HTTP header, POST form field data of query field data. It has the following properties.

Property	Type	Description
<b>name</b> (required)	string	Name of header / variable / POST or GET field.
<b>value</b> (required)	string	Value of header / variable / POST or GET field.

#### httpstest.create

##### Description

object httpstest.create(object/array webScenarios)

This method allows to create new web scenarios.

##### Note:

Creating a web scenario will automatically create a set of **web monitoring items**.

##### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

##### Parameters

(object/array) Web scenarios to create.

Additionally to the **standard web scenario properties**, the method accepts the following parameters.

Parameter	Type	Description
<b>steps</b> (required)	array	Web scenario <b>steps</b> .

##### Return values

(object) Returns an object containing the IDs of the created web scenarios under the `httpstestids` property. The order of the returned IDs matches the order of the passed web scenarios.

##### Examples

###### Creating a web scenario

Create a web scenario to monitor the company home page. The scenario will have two steps, to check the home page and the "About" page and make sure they return the HTTP status code 200.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "httpstest.create",
  "params": {
    "name": "Homepage check",
```

```

    "hostid": "10085",
    "steps": [
      {
        "name": "Homepage",
        "url": "http://example.com",
        "status_codes": "200",
        "no": 1
      },
      {
        "name": "Homepage / About",
        "url": "http://example.com/about",
        "status_codes": "200",
        "no": 2
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "httptestids": [
      "5"
    ]
  },
  "id": 1
}

```

See also

- [Scenario step](#)

Source

CHttpTest::create() in ui/include/classes/api/services/CHttpTest.php.

## httptest.delete

Description

object `httptest.delete(array webScenarioIds)`

This method allows to delete web scenarios.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the web scenarios to delete.

Return values

(object) Returns an object containing the IDs of the deleted web scenarios under the `httptestids` property.

Examples

Deleting multiple web scenarios

Delete two web scenarios.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "httpptest.delete",
  "params": [
    "2",
    "3"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "httpptestids": [
      "2",
      "3"
    ]
  },
  "id": 1
}
```

Source

CHttpTest::delete() in ui/include/classes/api/services/CHttpTest.php.

## httpptest.get

Description

integer/array httpptest.get(object parameters)

The method allows to retrieve web scenarios according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

Parameter	Type	Description
applicationids	string/array	Return only web scenarios that belong to the given applications.
groupids	string/array	Return only web scenarios that belong to the given host groups.
hostids	string/array	Return only web scenarios that belong to the given hosts.
httpptestids	string/array	Return only web scenarios with the given IDs.

Parameter	Type	Description
inherited	boolean	If set to true return only web scenarios inherited from a template.
monitored	boolean	If set to true return only enabled web scenarios that belong to monitored hosts.
templated	boolean	If set to true return only web scenarios that belong to templates.
templateids	string/array	Return only web scenarios that belong to the given templates.
expandName	flag	Expand macros in the name of the web scenario.
expandStepName	flag	Expand macros in the names of scenario steps.
selectHosts	query	Return the hosts that the web scenario belongs to as an array in the <b>hosts</b> property.
selectSteps	query	Return web scenario steps in the <b>steps</b> property.
sortfield	string/array	Supports count. Sort the result by the given properties.
countOutput	boolean	Possible values are: <b>httpstid</b> and <b>name</b> . These parameters being common for all get methods are described in detail in the <a href="#">reference commentary</a> .
editable	boolean	
excludeSearch	boolean	
filter	object	
limit	integer	
output	query	
preservekeys	boolean	
search	object	
searchByAny	boolean	
searchWildcardsEnabled	boolean	

Parameter	Type	Description
sortorder	string/array	
startSearch	boolean	

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving a web scenario

Retrieve all data about web scenario "4".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "httptest.get",
  "params": {
    "output": "extend",
    "selectSteps": "extend",
    "httptestids": "9"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "httptestid": "9",
      "name": "Homepage check",
      "applicationid": "0",
      "nextcheck": "0",
      "delay": "1m",
      "status": "0",
      "variables": [],
      "agent": "Zabbix",
      "authentication": "0",
      "http_user": "",
      "http_password": "",
      "hostid": "10084",
      "templateid": "0",
      "http_proxy": "",
      "retries": "1",
      "ssl_cert_file": "",
      "ssl_key_file": "",
      "ssl_key_password": "",
      "verify_peer": "0",
      "verify_host": "0",
      "headers": [],
      "steps": [
        {
          "httpstepid": "36",
          "httptestid": "9",
          "name": "Homepage",
          "no": "1",
          "url": "http://example.com",
          "timeout": "15s",

```



```

        "posts": "",
        "required": "",
        "status_codes": "200",
        "variables": [
            {
                "name": "{var}",
                "value": "12"
            }
        ],
        "follow_redirects": "1",
        "retrieve_mode": "0",
        "headers": [],
        "query_fields": []
    },
    {
        "httpstepid": "37",
        "httptestid": "9",
        "name": "Homepage / About",
        "no": "2",
        "url": "http://example.com/about",
        "timeout": "15s",
        "posts": "",
        "required": "",
        "status_codes": "200",
        "variables": [],
        "follow_redirects": "1",
        "retrieve_mode": "0",
        "headers": [],
        "query_fields": []
    }
]
},
{id": 1
}

```

See also

- [Host](#)
- [Scenario step](#)

Source

CHttpTest::get() in ui/include/classes/api/services/CHttpTest.php.

## httptest.update

Description

object httptest.update(object/array webScenarios)

This method allows to update existing web scenarios.

### Note:

This method is only available to Admin and Super admin user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Web scenario properties to be updated.

The httptestid property must be defined for each web scenario, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard web scenario properties](#), the method accepts the following parameters.

Parameter	Type	Description
steps	array	Scenario <b>steps</b> to replace existing steps.

#### Return values

(object) Returns an object containing the IDs of the updated web scenarios under the `httptestid` property.

#### Examples

##### Enabling a web scenario

Enable a web scenario, that is, set its status to "0".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "httptest.update",
  "params": {
    "httptestid": "5",
    "status": 0
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "httptestids": [
      "5"
    ]
  },
  "id": 1
}
```

#### See also

- [Scenario step](#)

#### Source

`CHttpTest::update()` in `ui/include/classes/api/services/CHttpTest.php`.

## Appendix 1. Reference commentary

### Notation Data types

The Zabbix API supports the following data types as input:

Type	Description
boolean	A boolean value, accepts either <code>true</code> or <code>false</code> .
flag	The value is considered to be <code>true</code> if it is passed and not equal to <code>null</code> and <code>false</code> otherwise.
integer	A whole number.
float	A floating point number.
string	A text string.
text	A longer text string.
timestamp	A Unix timestamp.
array	An ordered sequence of values, that is, a plain array.
object	An associative array.

Type	Description
query	A value which defines, what data should be returned.  Can be defined as an array of property names to return only specific properties, or as one of the predefined values: extend - returns all object properties; count - returns the number of retrieved records, supported only by certain subselects.

**Attention:**

Zabbix API always returns values as strings or arrays only.

Property labels

Some of the objects properties are marked with short labels to describe their behavior. The following labels are used:

- readonly - the value of the property is set automatically and cannot be defined or changed by the client;
- constant - the value of the property can be set when creating an object, but cannot be changed after.

**Reserved ID value "0"** Reserved ID value "0" can be used to filter elements and to remove referenced objects. For example, to remove a referenced proxy from a host, proxy\_hostid should be set to 0 ("proxy\_hostid": "0") or to filter hosts monitored by server option proxyids should be set to 0 ("proxyids": "0").

**Common "get" method parameters** The following parameters are supported by all get methods:

Parameter	Type	Description
countOutput	boolean	Return the number of records in the result instead of the actual data.
editable	boolean	If set to true return only objects that the user has write permissions to.
excludeSearch	boolean	Default: false. Return results that do not match the criteria given in the search parameter.
filter	object	Return only those results that exactly match the given filter.
		Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.
limit	integer	Doesn't work for text fields. Limit the number of records returned.
output	query	Object properties to be returned.
preservekeys	boolean	Default: extend. Use IDs as keys in the resulting array.

Parameter	Type	Description
search	object	<p>Return results that match the given wildcard search (case-insensitive).</p> <p>Accepts an array, where the keys are property names, and the values are strings to search for. If no additional options are given, this will perform a LIKE "%...%" search.</p> <p>Works only for string and text fields.</p>
searchByAny	boolean	<p>If set to true return results that match any of the criteria given in the filter or search parameter instead of all of them.</p>
searchWildcardsEnabled	boolean	<p>Default: false.</p> <p>If set to true enables the use of "*" as a wildcard character in the search parameter.</p>
sortfield	string/array	<p>Default: false.</p> <p>Sort the result by the given properties. Refer to a specific API get method description for a list of properties that can be used for sorting. Macros are not expanded before sorting.</p>
sortorder	string/array	<p>If no value is specified, data will be returned unsorted.</p> <p>Order of sorting. If an array is passed, each value will be matched to the corresponding property given in the sortfield parameter.</p>
startSearch	boolean	<p>Possible values are: ASC - (default) ascending; DESC - descending.</p> <p>The search parameter will compare the beginning of fields, that is, perform a LIKE "...%" search instead.</p> <p>Ignored if searchWildcardsEnabled is set to true.</p>

**Examples** User permission check

Does the user have permission to write to hosts whose names begin with "MySQL" or "Linux" ?

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "countOutput": true,

```

```
    "search": {
      "host": ["MySQL", "Linux"]
    },
    "editable": true,
    "startSearch": true,
    "searchByAny": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "0",
  "id": 1
}
```

**Note:**

Zero result means no hosts with read/write permissions.

Mismatch counting

Count the number of hosts whose names do not contain the substring "ubuntu"

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "countOutput": true,
    "search": {
      "host": "ubuntu"
    },
    "excludeSearch": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "44",
  "id": 1
}
```

Searching for hosts using wildcards

Find hosts whose name contains word "server" and have interface ports "10050" or "10071". Sort the result by host name in descending order and limit it to 5 hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid", "host"],
    "selectInterfaces": ["port"],
    "filter": {
      "port": ["10050", "10071"]
    },
    "search": {
```

```
    "host": "*server*"
  },
  "searchWildcardsEnabled": true,
  "searchByAny": true,
  "sortfield": "host",
  "sortorder": "DESC",
  "limit": 5
},
"auth": "766b71ee543230a1182ca5c44d353e36",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "50003",
      "host": "WebServer-Tomcat02",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "50005",
      "host": "WebServer-Tomcat01",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "50004",
      "host": "WebServer-Nginx",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "99032",
      "host": "MySQL server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    },
    {
      "hostid": "99061",
      "host": "Linux server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    }
  ],
}
```

```
    "id": 1
  }
}
```

Searching for hosts using wildcards with "preservekeys"

If you add the parameter "preservekeys" to the previous request, the result is returned as an associative array, where the keys are the id of the objects.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid", "host"],
    "selectInterfaces": ["port"],
    "filter": {
      "port": ["10050", "10071"]
    },
    "search": {
      "host": "*server*"
    },
    "searchWildcardsEnabled": true,
    "searchByAny": true,
    "sortfield": "host",
    "sortorder": "DESC",
    "limit": 5,
    "preservekeys": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "50003": {
      "hostid": "50003",
      "host": "WebServer-Tomcat02",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    "50005": {
      "hostid": "50005",
      "host": "WebServer-Tomcat01",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    "50004": {
      "hostid": "50004",
      "host": "WebServer-Nginx",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    }
  },
}
```

```

    "99032": {
      "hostid": "99032",
      "host": "MySQL server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    },
    "99061": {
      "hostid": "99061",
      "host": "Linux server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    }
  ],
  "id": 1
}

```

## Appendix 2. Changes from 5.0 to 5.2

### Backward incompatible changes General

configuration

Changes:

[ZBXNEXT-6270](#) configuration.import, configuration.export changed the storage format of preprocessing parameters in export files

user

Changes:

[ZBXNEXT-6148](#) user.create, user.update, user.get: dropped support of type property.

### Other changes and bug fixes General

Changes:

[ZBXNEXT-82](#) added a new authentication API introducing new methods authentication.get and authentication.update

[ZBXNEXT-82](#) added a new housekeeping API introducing new methods housekeeping.get and housekeeping.update

[ZBXNEXT-82](#) added a new settings API introducing new methods settings.get, settings.getglobal and settings.update

configuration

Changes:

[ZBXNEXT-2754](#) configuration.export added YAML support and new property prettyprint for XML and JSON formats.

[ZBXNEXT-2754](#) configuration.import added YAML support.

discoveryrule

Changes:

[ZBXNEXT-5969](#) added new discovery rule type with value 21 (script) and support of timeout and params for that type.

[ZBXNEXT-5969](#) discoveryrule.create, discoveryrule.update, discoveryrule.get: added new property parameters.

[ZBXNEXT-6085](#) discoveryrule.create, discoveryrule.update: added support of optag property for override operations with operationobject value "3".

host



Changes:

[ZBXNEXT-2156](#) `host.create`: parameter `interfaces` is no longer a mandatory field.

[ZBXNEXT-2156](#) `host.update`: parameter `interfaces` can be empty.

hostprototype

Changes:

[ZBXNEXT-6085](#) `hostprototype.create`, `hostprototype.update`: added new property `tags`.

[ZBXNEXT-6085](#) `hostprototype.get`: added new query option `selectTags` that returns host prototype tags in the `tags` property.

[ZBXNEXT-2072](#) `hostprototype.get`, `hostprototype.create`, `hostprototype.update`: added new property `custom_interfaces` to select source of interfaces for discovered hosts.

[ZBXNEXT-2072](#) `hostprototype.create`, `hostprototype.update`: added new property `interfaces`.

[ZBXNEXT-2072](#) `hostprototype.get`: added new query option `selectInterfaces` that returns host prototype custom interfaces in the `interfaces` property.

item

Changes:

[ZBXNEXT-5969](#) added new item type with value 21 (script) and support of `timeout` and `params` for that type.

[ZBXNEXT-5969](#) `item.create`, `item.update`, `item.get`: added new property parameters.

itemprototype

Changes:

[ZBXNEXT-5969](#) added new item prototype type with value 21 (script) and support of `timeout` and `params` for that type.

[ZBXNEXT-5969](#) `itemprototype.create`, `itemprototype.update`, `itemprototype.get`: added new property parameters.

role

Changes:

[ZBXNEXT-6148](#) added a new role API introducing new methods `role.create`, `role.update`, `role.get` and `role.delete`.

task

Changes:

[ZBXNEXT-6167](#) added a new method `task.get`.

[ZBXNEXT-6167](#) added a new type of task for `task.get` method.

[ZBXNEXT-6167](#) Changed format of `task.create` request.

trigger

Changes:

[ZBXNEXT-6140](#) `trigger.create`, `trigger.update`, `trigger.get`: added new property `event_name`.

triggerprototype

Changes:

[ZBXNEXT-6140](#) `triggerprototype.create`, `triggerprototype.update`, `triggerprototype.get`: added new property `event_name`.

user

Changes:

[ZBXNEXT-6148](#) `user.get`: added new option `selectRole` which returns user role data in the `role` property.

[ZBXNEXT-6148](#) `user.create`, `user.update`, `user.get`: added new property `roleid`.

[ZBXNEXT-3362](#) changed default for `lang` in user object from `en_GB` to default.

[ZBX-17955](#) `user.create`, `user.update`: renamed parameter `user_medias` to `medias`. `user_medias` parameter is now deprecated.

[ZBXNEXT-250](#) added new optional `timezone` property in user object.

usermacro

Changes:

[ZBXNEXT-1660](#) added new type of macro with type value "2".

## Zabbix API changes in 5.2

### 5.2.7 trigger

Bug fixes:

[ZBX-19424](#) `trigger.create`: fixed trigger creation on PostgreSQL with host name consisting of only numbers

### 5.2.3 settings

Changes:

[ZBXNEXT-6387](#) removed the `session_key` property from the settings object.

[ZBXNEXT-6387](#) removed the `settings.getglobal` method.

## 20. Modules

**Overview** It is possible to enhance Zabbix frontend functionality by adding 3rd party modules or by developing your own modules without the need to change the source code of Zabbix.

Note that the module code will run with the same privileges as Zabbix source code. This means:

- 3rd party modules can be harmful. You must trust the modules you are installing;
- Errors in a 3rd party module code may crash the frontend. If this happens, just remove the module code from the frontend. As soon as you reload Zabbix frontend, you'll see a note saying that some modules are absent. Go to **Module administration** (in Administration → General → Modules) and click Scan directory again to remove non-existent modules from the database.

**Installation** Please always read the installation manual for a particular module. It is recommended to install new modules one by one to catch failures easily.

Just before you install a module:

- Make sure you have downloaded the module from a trusted source. Installation of harmful code may lead to consequences, such as data loss
- Different versions of the same module (same ID) can be installed in parallel, but only a single version can be enabled at once

Steps to install a module:

- Unpack your module within its own folder in the `modules` folder of the Zabbix frontend
- Ensure that your module folder contains at least the `manifest.json` file
- Navigate to **Module administration** and click the Scan directory button
- New module will appear in the list along with its version, author, description and status
- Enable module by clicking on its status

Troubleshooting:

Problem	Solution
Module did not appear in the list	Make sure that the <code>manifest.json</code> file exists in <code>modules/your-module/</code> folder of the Zabbix frontend. If it does that means the module does not suit the current Zabbix version. If <code>manifest.json</code> file does not exist, you have probably unpacked in the wrong directory.
Frontend crashed	The module code is not compatible with the current Zabbix version or server configuration. Please delete module files and reload the frontend. You'll see a notice that some modules are absent. Go to <b>Module administration</b> and click Scan directory again to remove non-existent modules from the database.

Problem	Solution
Error message about identical namespace, ID or actions appears	New module tried to register a namespace, ID or actions which are already registered by other enabled modules. Disable the conflicting module (mentioned in error message) prior to enabling the new one.
Technical error messages appear	Report errors to the developer of the module.

**Developing modules** Modules are written in PHP language. Model-view-controller (MVC) software pattern design is preferred, as it is also used in Zabbix frontend and will ease the development. PHP strict typing is also welcome but not mandatory.

Please note that with modules you can easily add new menu items and respective views and actions to Zabbix frontend. Currently it is not possible to register new API or create new database tables through modules.

#### Module structure

Each module is a directory (placed within the `modules` directory) with sub-directories containing controllers, views and any other code:

<code>example_module_directory/</code>	(required)	
<code>  manifest.json</code>	(required)	Metadata and action definition.
<code>  Module.php</code>		Module initialization and event handling.
<code>  actions/</code>		Action controller files.
<code>  SomethingView.php</code>		
<code>  SomethingCreate.php</code>		
<code>  SomethingDelete.php</code>		
<code>  data_export/</code>		
<code>    ExportAsXml.php</code>		
<code>    ExportAsExcel.php</code>		
<code>  views/</code>		View files.
<code>    example.something.view.php</code>		
<code>    example.something.delete.php</code>		
<code>  js/</code>		JavaScript files used in views.
<code>    example.something.view.js.php</code>		
<code>  partials/</code>		View partial files.
<code>    example.something.reusable.php</code>		
<code>  js/</code>		JavaScript files used in partials.
<code>    example.something.reusable.js.php</code>		

As you can see, the only mandatory file within the custom module directory is `manifest.json`. The module will not register without this file. `Module.php` is responsible for registering menu items and processing events such as 'onBeforeAction' and 'onTerminate'. The actions, views and partials directories contain PHP and JavaScript code needed for module actions.

#### Naming convention

Before you create a module, it is important to agree on the naming convention for different module items such as directories and files so that we could keep things well organized. You can also find examples above, in the [Module structure](#) section.

Item	Naming rules	Example
Module directory	Lowercase [a-z], underscore and decimal digits	<code>example_v2</code>
Action subdirectories	Lowercase [a-z] and underscore character	<code>data_export</code>
Action files	CamelCase, ending with action type	<code>SomethingView.php</code>
View and partial files	Lowercase [a-z] Words separated with dot Prefixed by <code>module.</code> followed by module name Ending with action type and <code>.php</code> file extension	<code>module.example.something.view.php</code>
Javascript files	The same rules apply as for view and partial files, except the <code>.js.php</code> file extension.	<code>module.example.something.view.js.php</code>

Note that the 'module' prefix and name inclusion is mandatory for view and partial file names, unless you need to override Zabbix core views or partials. This rule, however, does not apply to action file names.

#### Manifest preparation

Each module is expected to have a `manifest.json` file with the following fields in JSON format:

Parameter	Required	Type	Default	Description
manifest_version	Yes	Double	-	Manifest version of the module. Currently supported version is <b>1</b> .
id	Yes	String	-	Module ID. Only one module with given ID can be enabled at the same time.
name	Yes	String	-	Module name as displayed in the Administration section.
version	Yes	String	-	Module version as displayed in the Administration section.
namespace	Yes	String	-	PHP namespace for Module.php and action classes.
author	No	String	""	Module author as displayed in the Administration section.
url	No	String	""	Module URL as displayed in the Administration section.
description	No	String	""	Module description as displayed in the Administration section.
actions	No	Object	{}	Actions to register with this module. See Actions.
config	No	Object	{}	Module configuration.

For reference, please see an example of manifest.json in the [Reference](#) section.

#### Actions

The module will have control over frontend actions defined within the actions object in the manifest.json file. This way new actions are defined. In the same way you may redefine existing actions. Each key of actions should represent the action name and the corresponding value should contain class and optionally layout and view keys.

One action is defined by four counterparts: name, controller, view and layout. Data validation and preparation is typically done in the controller, output formatting is done in the view or partials, and the layout is responsible for decorating the page with elements such as menu, header, footer and others.

Module actions must be defined in the manifest.json file as actions object:

Parameter	Required	Type	Default	Description
*key*	Yes	String	-	Action name, in lowercase [a-z], separating words with dot.
class	Yes	String	-	Action class name, including subdirectory path (if used) within the actions directory.
layout	No	String	"layout.htmlpage"	Action layout.
view	No	String	null	Action view.

There are several predefined layouts, like layout.json or layout.xml. These are intended for actions which produce different result than an HTML. You may explore predefined layouts in the app/views/ directory or even create your own.

Sometimes it is necessary to only redefine the view part of some action leaving the controller intact. In such case just place the necessary view and/or partial files inside the views directory of the module.

For reference, please see an example action controller file in the [Reference](#) section. Please do not hesitate to explore current actions of Zabbix source code, located in the app/ directory.

#### Module.php

This optional PHP file is responsible for module initialization as well as event handling. Class 'Module' is expected to be defined in this file, extending base class \Core\Module. The Module class must be defined within the namespace specified in the manifest.json file.

```

<?php

namespace Modules\Example;
use Core\CModule as BaseModule;

class Module extends BaseModule {
    ...
}

```

For reference, please see an example of Module.php in the [Reference](#) section.

**Reference** This section contains basic versions of different module elements introduced in the previous sections.

#### manifest.json

```

{
    "manifest_version": 1.0,
    "id": "example_module",
    "name": "Example module",
    "version": "1.0",
    "namespace": "Example",
    "author": "John Smith",
    "url": "http://module.example.com",
    "description": "Short description of the module.",
    "actions": {
        "example.something.view": {
            "class": "SomethingView",
            "view": "module.example.something.view"
        },
        "example.something.create": {
            "class": "SomethingCreate",
            "layout": null
        },
        "example.something.delete": {
            "class": "SomethingDelete",
            "layout": null
        },
        "example.something.export.xml": {
            "class": "data_export/ExportAsXml",
            "layout": null
        },
        "example.something.export.excel": {
            "class": "data_export/ExportAsExcel",
            "layout": null
        }
    },
    "config": {
        "username": "john_smith"
    }
}

```

#### Module.php

```

<?php declare(strict_types = 1);

namespace Modules\Example;

use APP;
use CController as CAction;

/**
 * Please see Core\CModule class for additional reference.
 */
class Module extends \Core\CModule {

```

```

/**
 * Initialize module.
 */
public function init(): void {
    // Initialize main menu (CMenu class instance).
    APP::Component()->get('menu.main')
        ->findOrAdd(_('Reports'))
            ->getSubmenu()
                ->add((new \CMenuItem(_('Example wide report'))))
                    ->setAction('example.report.wide.php')
                )
            ->add((new \CMenuItem(_('Example narrow report'))))
                ->setAction('example.report.narrow.php')
            );
}

/**
 * Event handler, triggered before executing the action.
 *
 * @param CAction $action Action instance responsible for current request.
 */
public function onBeforeAction(CAction $action): void {
}

/**
 * Event handler, triggered on application exit.
 *
 * @param CAction $action Action instance responsible for current request.
 */
public function onTerminate(CAction $action): void {
}
}

```

## Action controller

```

<?php declare(strict_types = 1);

namespace Modules\Example\Actions;

use CControllerResponseData;
use CControllerResponseFatal;
use CController as CAction;

/**
 * Example module action.
 */
class SomethingView extends CAction {

    /**
     * Initialize action. Method called by Zabbix core.
     *
     * @return void
     */
    public function init(): void {
        /**
         * Disable SID (Session ID) validation. Session ID validation should only be used for actions which
         * modification, such as update or delete actions. In such case Session ID must be presented in the
         * the URL would expire as soon as the session expired.
         */
        $this->disableSIDvalidation();
    }

    /**

```

```

    * Check and sanitize user input parameters. Method called by Zabbix core. Execution stops if false is
    *
    * @return bool true on success, false on error.
    */
protected function checkInput(): bool {
    $fields = [
        'name' => 'required|string',
        'email' => 'required|string',
        'phone' => 'string'
    ];

    // Only validated data will further be available using $this->hasInput() and $this->getInput().
    $ret = $this->validateInput($fields);

    if (!$ret) {
        $this->setResponse(new CControllerResponseFatal());
    }

    return $ret;
}

/**
 * Check if the user has permission to execute this action. Method called by Zabbix core.
 * Execution stops if false is returned.
 *
 * @return bool
 */
protected function checkPermissions(): bool {
    $permit_user_types = [USER_TYPE_ZABBIX_ADMIN, USER_TYPE_SUPER_ADMIN];

    return in_array($this->getUserType(), $permit_user_types);
}

/**
 * Prepare the response object for the view. Method called by Zabbix core.
 *
 * @return void
 */
protected function doAction(): void {
    $contacts = $this->getInput('email');

    if ($this->hasInput('phone')) {
        $contacts .= ', ' . $this->getInput('phone');
    }

    $data = [
        'name' => $this->getInput('name'),
        'contacts' => $contacts
    ];

    $response = new CControllerResponseData($data);

    $this->setResponse($response);
}
}

```

#### Action view

```

<?php declare(strict_types = 1);

/**
 * @var CView $this
 */

```

```

$this->includeJsFile('example.something.view.js.php');

(new CWidget())
  ->setTitle(_('Something view'))
  ->addItem(new CDiv($data['name']))
  ->addItem(new CPartial('module.example.something.reusable', [
    'contacts' => $data['contacts']
  ]))
  ->show();

```

## 21. Appendixes

Please use the sidebar to access content in the Appendixes section.

### 1 Frequently asked questions / Troubleshooting

Frequently asked questions or FAQ.

1. Q: Can I flush/clear the queue (as depicted in Administration → Queue)?  
A: No.
2. Q: How do I migrate from one database to another?  
A: Dump data only (for MySQL, use flag -t or --no-create-info), create the new database using schema files from Zabbix and import the data.
3. Q: I would like to replace all spaces with underscores in my item keys because they worked in older versions but space is not a valid symbol for an item key in 3.0 (or any other reason to mass-modify item keys). How should I do it and what should I beware of?  
A: You may use a database query to replace all occurrences of spaces in item keys with underscores:  
update items set key\_=replace(key\_,' ','\_');  
Triggers will be able to use these items without any additional modifications, but you might have to change any item references in these locations:
  - \* Notifications (actions)
  - \* Map element and link labels
  - \* Calculated item formulas
4. Q: My graphs have dots instead of lines or empty areas. Why so?  
A: Data is missing. This can happen for a variety of reasons - performance problems on Zabbix database, Zabbix server, network, monitored devices...
5. Q: Zabbix daemons fail to start up with a message Listener failed with error: socket() for [[:]:10050] failed with error 22: Invalid argument.  
A: This error arises at attempt to run Zabbix agent compiled on version 2.6.27 or above on a platform with a kernel 2.6.26 and lower. Note that static linking will not help in this case because it is the socket() system call that does not support SOCK\_CLOEXEC flag on earlier kernels. [ZBX-3395](#)
6. Q: I try to set up a flexible user parameter (one that accepts parameters) with a command that uses a positional parameter like \$1, but it doesn't work (uses item parameter instead). How to solve this?  
A: Use a double dollar sign like **\$\$1**
7. Q: All dropdowns have a scrollbar and look ugly in Opera 11. Why so?  
A: It's a known bug in Opera 11.00 and 11.01; see [Zabbix issue tracker](#) for more information.
8. Q: How can I change graph background color in a custom theme?  
A: See graph\_theme table in the database and [theming guide](#).
9. Q: With DebugLevel 4 I'm seeing messages "Trapper got [] len 0" in server/proxy log - what's that?  
A: Most likely that is frontend, connecting and checking whether server is still running.
10. Q: My system had the time set in the future and now no data is coming in. How could this be solved?  
A: Clear values of database fields hosts.disable\_until\*, drules.nextcheck, httpstest.nextcheck and restart the server/proxy.
11. Q: Text item values in frontend (when using {ITEM.VALUE} macro and in other cases) are cut/trimmed to 20 symbols. Is that normal?  
A: Yes, there is a hardcoded limit in include/items.inc.php currently.

See also

- [Troubleshooting page on zabbix.org](#)



- If you haven't found answer to your question try [Zabbix forum](#)

## 2 Installation and setup

### 1 Database creation

#### Overview

A Zabbix database must be created during the installation of Zabbix server or proxy.

This section provides instructions for creating a Zabbix database. A separate set of instructions is available for each supported database.

UTF-8 is the only encoding supported by Zabbix. It is known to work without any security flaws. Users should be aware that there are known security issues if using some of the other encodings.

#### Note:

If installing from [Zabbix Git repository](#), you need to run:

```
$ make dbschema  
prior to proceeding to the next steps.
```

#### MySQL

Character set utf8 and utf8\_bin collation is required for Zabbix server/proxy to work properly with MySQL database.

```
shell> mysql -uroot -p<password>  
mysql> create database zabbix character set utf8 collate utf8_bin;  
mysql> create user 'zabbix'@'localhost' identified by '<password>';  
mysql> grant all privileges on zabbix.* to 'zabbix'@'localhost';  
mysql> quit;
```

#### Warning:

If you are installing from Zabbix **packages**, stop here and continue with instructions for [RHEL/CentOS](#) or [Debian/Ubuntu](#) to import the data into the database.

If you are installing Zabbix from sources, proceed to import the data into the database. For a Zabbix proxy database, only `schema.sql` should be imported (no `images.sql` nor `data.sql`):

```
shell> cd database/mysql  
shell> mysql -uzabbix -p<password> zabbix < schema.sql  
# stop here if you are creating database for Zabbix proxy  
shell> mysql -uzabbix -p<password> zabbix < images.sql  
shell> mysql -uzabbix -p<password> zabbix < data.sql
```

#### PostgreSQL

You need to have database user with permissions to create database objects. The following shell command will create user zabbix. Specify password when prompted and repeat password (note, you may first be asked for sudo password):

```
shell> sudo -u postgres createuser --pwprompt zabbix
```

Now we will set up the database zabbix (last parameter) with the previously created user as the owner (-O zabbix).

```
shell> sudo -u postgres createdb -O zabbix -E Unicode -T template0 zabbix
```

#### Warning:

If you are installing from Zabbix **packages**, stop here and continue with instructions for [RHEL/CentOS](#) or [Debian/Ubuntu](#) to import the initial schema and data into the database.

If you are installing Zabbix from sources, proceed to import the initial schema and data (assuming you are in the root directory of Zabbix sources). For a Zabbix proxy database, only `schema.sql` should be imported (no `images.sql` nor `data.sql`).

```
shell> cd database/postgresql  
shell> cat schema.sql | sudo -u zabbix psql zabbix  
# stop here if you are creating database for Zabbix proxy
```

```
shell> cat images.sql | sudo -u zabbix psql zabbix
shell> cat data.sql | sudo -u zabbix psql zabbix
```

**Attention:**

The above commands are provided as an example that will work in most of GNU/Linux installations. You can use different commands, e. g. "psql -U <username>" depending on how your system/database are configured. If you have troubles setting up the database please consult your Database administrator.

TimescaleDB

Instructions for creating and configuring TimescaleDB are provided in a separate [section](#).

Oracle

We assume that a zabbix database user with password password exists and has permissions to create database objects in ORCL service located on the host Oracle database server with a user shell user having write access to /tmp directory. Zabbix requires a Unicode database character set and a UTF8 national character set. Check current settings:

```
sqlplus> select parameter,value from v$nls_parameters where parameter='NLS_CHARACTERSET' or parameter='NLS
```

If you are creating a database for Zabbix server you need to have images from Zabbix sources on the host where Oracle is running. Copy them to a directory /tmp/zabbix\_images on the Oracle host:

```
shell> cd /path/to/zabbix-sources
shell> ssh user@oracle_host "mkdir /tmp/zabbix_images"
shell> scp -r misc/images/png_modern user@oracle_host:/tmp/zabbix_images/
```

Now prepare the database:

```
shell> cd /path/to/zabbix-sources/database/oracle
shell> sqlplus zabbix/password@oracle_host/ORCL
sqlplus> @schema.sql
# stop here if you are creating database for Zabbix proxy
sqlplus> @images.sql
sqlplus> @data.sql
```

**Note:**

Please set the initialization parameter CURSOR\_SHARING=FORCE for best performance.

Now the temporary directory can be removed:

```
shell> ssh user@oracle_host "rm -rf /tmp/zabbix_images"
```

SQLite

Using SQLite is supported for **Zabbix proxy** only!

**Note:**

If using SQLite with Zabbix proxy, database will be automatically created if it does not exist.

```
shell> cd database/sqlite3
shell> sqlite3 /var/lib/sqlite/zabbix.db < schema.sql
```

Return to the [installation section](#).

## 2 Repairing Zabbix database character set and collation

MySQL/MariaDB

**1.** Check the database character set and collation.

For example:

```
mysql> SELECT @@character_set_database, @@collation_database;
+-----+-----+
| @@character_set_database | @@collation_database |
+-----+-----+
| utf8mb4                  | utf8mb4_general_ci   |
+-----+-----+
```

As we see, the character set here is not 'utf8' and collation is not 'utf8\_bin', so we need to fix them.

2. Stop Zabbix.

3. Create a backup copy of the database!

4. Fix the character set and collation on database level:

```
alter database <your DB name> character set utf8 collate utf8_bin;
```

Fixed values:

```
mysql> SELECT @@character_set_database, @@collation_database;
+-----+-----+
| @@character_set_database | @@collation_database |
+-----+-----+
| utf8                    | utf8_bin              |
+-----+-----+
```

5. Load the [script](#) to fix character set and collation on table and column level:

```
mysql <your DB name> < utf8_convert.sql
```

6. Execute the script:

```
SET @ZABBIX_DATABASE = '<your DB name>';
If MariaDB → set innodb_strict_mode = OFF;
              CALL zbx_convert_utf8();
If MariaDB → set innodb_strict_mode = ON;
              drop procedure zbx_convert_utf8;
```

Note that data encoding will be changed on disk. For example, when converting characters like Æ, Ñ, Ö from 'latin1' to 'utf8' they will go from 1 byte to 2 bytes. Thus the repaired database may require more space than before.

7. If no errors - you may want to create a database backup copy with the fixed database.

8. Start Zabbix.

### 3 Secure connection to the database

#### Overview

This section provides Zabbix setup steps and configuration examples for secure TLS connections between:

Database	Zabbix components
MySQL	Zabbix frontend, Zabbix server, Zabbix proxy
PostgreSQL	Zabbix frontend, Zabbix server, Zabbix proxy

To set up connection encryption within the DBMS, see official vendor documentation for details:

- [MySQL](#): source and replica replication database servers.
- [MySQL](#): group replication, etc. database servers.
- [PostgreSQL](#) encryption options.

All examples are based on the GA releases of MySQL CE (8.0) and PostgreSQL (13) available through official repositories using CentOS 8.

#### Requirements

The following is required to set up encryption:

- Developer-supported operating system with OpenSSL >=1.1.X or alternative.

#### Note:

It is recommended to avoid OS in the end-of-life status, especially in the case of new installations

- Database engine (RDBMS) installed and maintained from the official repository provided by developer. Operating systems often shipped with outdated database software versions for which encryption support is not implemented, for example RHEL 7 based systems and PostgreSQL 9.2, MariaDB 5.5 without encryption support.

## Terminology

Setting this option enforces to use TLS connection to database from Zabbix server/proxy and frontend to database:

- required - connect using TLS as transport mode without identity checks;
- verify\_ca - connect using TLS and verify certificate;
- verify\_full - connect using TLS, verify certificate and verify that database identity (CN) specified by DBHost matches its certificate;

## Zabbix configuration

### Frontend to the database

A secure connection to the database can be configured during frontend installation:

- Mark the Database TLS encryption checkbox in the **Configure DB connection** step to enable transport encryption.
- Mark the Verify database certificate checkbox that appears when TLS encryption field is checked to enable encryption with certificates.

#### Note:

For MySQL, the Database TLS encryption checkbox is disabled, if Database host is set to localhost, because connection that uses a socket file (on Unix) or shared memory (on Windows) cannot be encrypted.

For PostgreSQL, the TLS encryption checkbox is disabled, if the value of the Database host field begins with a slash or the field is empty.

The following parameters become available in the TLS encryption in certificates mode (if both checkboxes are marked):

Parameter	Description
Database TLS CA file	Specify the full path to a valid TLS certificate authority (CA) file.
Database TLS key file	Specify the full path to a valid TLS key file.
Database TLS certificate file	Specify the full path to a valid TLS certificate file.
Database host verification	Mark this checkbox to activate host verification. Disabled for MYSQL, because PHP MySQL library does not allow to skip the peer certificate validation step.
Database TLS cipher list	Specify a custom list of valid ciphers. The format of the cipher list must conform to the OpenSSL standard. Available for MySQL only.

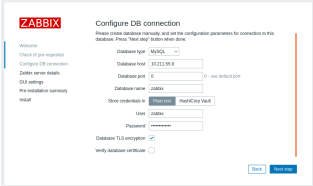
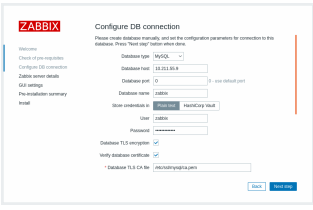
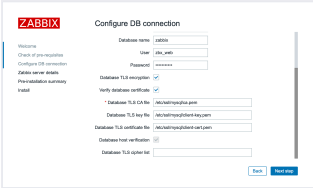
#### Attention:


TLS parameters must point to valid files. If they point to non-existent or invalid files, it will lead to the authorization error. If certificate files are writable, the frontend generates a warning in the **System information** report that "TLS certificate files must be read-only." (displayed only if the PHP user is the owner of the certificate).

Certificates protected by passwords are not supported.

## Use cases

Zabbix frontend uses GUI interface to define possible options: required, verify\_ca, verify\_full. Specify required options in the installation wizard step Configure DB connections. These options are mapped to the configuration file (zabbix.conf.php) in the following manner:

GUI settings	Configuration file	Description	Result
	<p>...</p> <pre>// Used for TLS connection. \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = ""; \$DB['CERT_FILE'] = ""; \$DB['CA_FILE'] = ""; \$DB['VERIFY_HOST'] = false; \$DB['CIPHER_LIST'] = "";</pre> <p>...</p>	<p>Check Database TLS encryption Leave Verify database certificate unchecked</p>	<p>Enable 'required' mode.</p>
	<p>...</p> <pre>\$DB['ENCRYPTION'] = true;\n\$DB['KEY_FILE'] = "";\n\$DB['CERT_FILE'] = "";\n\$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem';\n\$DB['VERIFY_HOST'] = false;\n\$DB['CIPHER_LIST'] = "";</pre> <p>...</p>	<ol style="list-style-type: none"> <li>1. Check Database TLS encryption and Verify database certificate</li> <li>2. Specify path to Database TLS CA file</li> </ol>	<p>Enable 'verify_ca' mode.</p>
	<p>...</p> <pre>// Used for TLS connection with strictly defined Cipher list. \$DB['ENCRYPTION'] = true;\n\$DB['KEY_FILE'] = '&lt;key_file_path&gt;';\n\$DB['CERT_FILE'] = '&lt;key_file_path&gt;';\n\$DB['CA_FILE'] = '&lt;key_file_path&gt;';\n\$DB['VERIFY_HOST'] = true;\n\$DB['CIPHER_LIST'] = '&lt;cipher_list&gt;';</pre> <p>...</p>	<ol style="list-style-type: none"> <li>1. Check Database TLS encryption and Verify database certificate</li> <li>2. Specify path to Database TLS key file</li> <li>3. Specify path to Database TLS CA file</li> <li>4. Specify path to Database TLS certificate file</li> <li>6. Specify TLS cipher list (optional)</li> </ol>	<p>Enable 'verify_full' mode for MySQL.</p>
	<p>Or:</p>		
	<p>...</p> <pre>// Used for TLS connection without Cipher list defined - selected by MySQL server \$DB['ENCRYPTION'] = true;\n\$DB['KEY_FILE'] = '&lt;key_file_path&gt;';\n\$DB['CERT_FILE'] = '&lt;key_file_path&gt;';\n\$DB['CA_FILE'] = '&lt;key_file_path&gt;';\n\$DB['VERIFY_HOST'] = true;\n\$DB['CIPHER_LIST'] = "";</pre> <p>...</p>		

GUI settings	Configuration file	Description	Result
	<pre> ... \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = '&lt;key_file_path&gt;'; \$DB['CERT_FILE'] = '&lt;key_file_path&gt;'; \$DB['CA_FILE'] = '&lt;key_file_path&gt;'; \$DB['VERIFY_HOST'] = true; \$DB['CIPHER_LIST'] = ' '; ... </pre>	<ol style="list-style-type: none"> <li>1. Check Database TLS encryption and Verify database certificate</li> <li>2. Specify path to Database TLS key file</li> <li>3. Specify path to Database TLS CA file</li> <li>4. Specify path to Database TLS certificate file</li> <li>6. Check Database host verification</li> </ol>	<p>Enable 'verify_full' mode for PostgreSQL.</p>

**See also:** [Encryption configuration examples for MySQL](#), [Encryption configuration examples for PostgreSQL](#).

### Zabbix server/proxy configuration

Secure connections to the database can be configured with the respective parameters in the Zabbix **server** and/or **proxy** configuration file.

Configuration	Result
None	Connection to the database without encryption.
1. Set DBTLSConnect=required	Server/proxy make a TLS connection to the database. An unencrypted connection is not allowed.
1. Set DBTLSConnect=verify_ca 2. Set DBTLSCAFile - specify the TLS certificate authority file	Server/proxy make a TLS connection to the database after verifying the database certificate.
1. Set DBTLSConnect=verify_full 2. Set DBTLSCAFile - specify TLS certificate authority file	Server/proxy make a TLS connection to the database after verifying the database certificate and the database host identity.
1. Set DBTLSCAFile - specify TLS certificate authority file 2. Set DBTLSCertFile - specify the client public key certificate file 3. Set DBTLSCipher - specify the client private key file	Server/proxy provide a client certificate while connecting to the database.
1. Set DBTLSCipher - the list of encryption ciphers that the client permits for connections using TLS protocols up to TLS 1.2	(MySQL) TLS connection is made using a cipher from the provided list.
or DBTLSCipher13 - the list of encryption ciphers that the client permits for connections using TLS 1.3 protocol	(PostgreSQL) Setting this option will be considered as an error.

## 1 MySQL encryption configuration

### Overview

This section provides several encryption configuration examples for CentOS 8.2 and MySQL 8.0.21 and can be used as a quickstart guide for encrypting the connection to the database.

#### Attention:

If MySQL host is set to localhost, encryption options will not be available. In this case a connection between Zabbix frontend and the database uses a socket file (on Unix) or shared memory (on Windows) and cannot be encrypted.

**Note:**

List of encryption combinations is not limited to the ones listed on this page. There are a lot more combinations available.

## Pre-requisites

Install MySQL database from the [official repository](#).

See [MySQL documentation](#) for details on how to use MySQL repo.

MySQL server is ready to accept secure connections using a self-signed certificate.

To see, which users are using an encrypted connection, run the following query (Performance Schema should be turned ON):

```
mysql> SELECT sbt.variable_value AS tls_version, t2.variable_value AS cipher, processlist_user AS user, pr
FROM performance_schema.status_by_thread AS sbt
JOIN performance_schema.threads AS t ON t.thread_id = sbt.thread_id
JOIN performance_schema.status_by_thread AS t2 ON t2.thread_id = t.thread_id
WHERE sbt.variable_name = 'Ssl_version' and t2.variable_name = 'Ssl_cipher'
ORDER BY tls_version;
```

## Required mode

## MySQL configuration

Modern versions of the database are ready out-of-the-box for 'required' **encryption mode**. A server-side certificate will be created after initial setup and launch.

Create users and roles for the main components:

```
mysql> CREATE USER
'zbx_srv'@%' IDENTIFIED WITH mysql_native_password BY '<strong_password>',
'zbx_web'@%' IDENTIFIED WITH mysql_native_password BY '<strong_password>'
REQUIRE SSL
PASSWORD HISTORY 5;
```

```
mysql> CREATE ROLE 'zbx_srv_role', 'zbx_web_role';
```

```
mysql> GRANT SELECT, UPDATE, DELETE, INSERT, CREATE, DROP, ALTER, INDEX, REFERENCES ON zabbix.* TO 'zbx_srv_role';
mysql> GRANT SELECT, UPDATE, DELETE, INSERT ON zabbix.* TO 'zbx_web_role';
```

```
mysql> GRANT 'zbx_srv_role' TO 'zbx_srv'@%';
mysql> GRANT 'zbx_web_role' TO 'zbx_web'@%';
```

```
mysql> SET DEFAULT ROLE 'zbx_srv_role' TO 'zbx_srv'@%';
mysql> SET DEFAULT ROLE 'zbx_web_role' TO 'zbx_web'@%';
```

Note, that the X.509 protocol is not used to check identity, but the user is configured to use only encrypted connections. See [MySQL documentation](#) for more details about configuring users.

Run to check connection (socket connection cannot be used to test secure connections):

```
$ mysql -u zbx_srv -p -h 10.211.55.9 --ssl-mode=REQUIRED
```

Check current status and available cipher suites:

```
mysql> status
```

```
-----
mysql Ver 8.0.21 for Linux on x86_64 (MySQL Community Server - GPL)
```

```
Connection id: 62
```

```
Current database:
```

```
Current user: zbx_srv@bfdb.local
```

```
SSL: Cipher in use is TLS_AES_256_GCM_SHA384
```

```
mysql> SHOW SESSION STATUS LIKE 'Ssl_cipher_list'\G;
```

```
***** 1. row *****
```

```
Variable_name: Ssl_cipher_list
```

```
Value: TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256:TLS_AES_128_CCM_SHA256:...
```

```
1 row in set (0.00 sec)
```

ERROR:

No query specified

Frontend

To enable transport-only encryption for connections between Zabbix frontend and the database:

- Check Database TLS encryption
- Leave Verify database certificate unchecked

**ZABBIX**

### Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database type: MySQL

Database host: 10.211.55.9

Database port: 0 (0 - use default port)

Database name: zabbix

Store credentials in: Plain text (selected), HashiCorp Vault

User: zabbix

Password: .....

Database TLS encryption:

Verify database certificate:

Back Next step

Server

To enable transport-only encryption for connections between server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=required
...
```

Verify CA mode

Copy required MySQL CA to the Zabbix frontend server, assign proper permissions to allow the webserver to read this file.

Frontend

To enable encryption with certificate verification for connections between Zabbix frontend and the database:

- Check Database TLS encryption and Verify database certificate
- Specify path to Database TLS CA file



Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
...
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem';
$DB['VERIFY_HOST'] = false;
$DB['CIPHER_LIST'] = '';
...
```

Troubleshoot user using command-line tool to check if connection is possible for required user:

```
$ mysql -u zbx_web -p -h 10.211.55.9 --ssl-mode=REQUIRED --ssl-ca=/var/lib/mysql/ca.pem
```

Server

To enable encryption with certificate verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_ca
DBTLSCAFile=/etc/ssl/mysql/ca.pem
...
```

Verify Full mode

MySQL configuration

Set MySQL CE server configuration option (`/etc/my.cnf.d/server-tls.cnf`) to:

```
[mysqld]
...
# in this examples keys are located in the MySQL CE datadir directory
ssl_ca=ca.pem
ssl_cert=server-cert.pem
ssl_key=server-key.pem

require_secure_transport=ON
```

```
tls_version=TLSv1.3
```

...

Keys for the MySQL CE server and client (Zabbix frontend) should be created manually according to the MySQL CE documentation: [Creating SSL and RSA certificates and keys using MySQL](#) or [Creating SSL certificates and keys using openssl](#)

**Attention:**

MySQL server certificate should contain the Common Name field set to the FQDN name as Zabbix frontend will use the DNS name to communicate with the database or IP address of the database host.

Create MySQL user:

```
mysql> CREATE USER
'zbx_srv'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>',
'zbx_web'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>'
REQUIRE X509
PASSWORD HISTORY 5;
```

Check if it is possible to log in with that user:

```
$ mysql -u zbx_web -p -h 10.211.55.9 --ssl-mode=VERIFY_IDENTITY --ssl-ca=/var/lib/mysql/ca.pem --ssl-cert=
```

Frontend

To enable encryption with full verification for connections between Zabbix frontend and the database:

- Check Database TLS encryption and Verify database certificate
- Specify path to Database TLS key file
- Specify path to Database TLS CA file
- Specify path to Database TLS certificate file

Note, that Database host verification is checked and grayed out - this step cannot be skipped for MySQL.

**Warning:**

Cipher list should be empty, so that frontend and server can negotiate required one from the supported by both ends.

**ZABBIX**

### Configure DB connection

Database name:

User:

Password:

Database TLS encryption:

Verify database certificate:

\* Database TLS CA file:

Database TLS key file:

Database TLS certificate file:

Database host verification:

Database TLS cipher list:

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
...
// Used for TLS connection with strictly defined Cipher list.
$DB['ENCRYPTION'] = true;
```

```

$DB['KEY_FILE'] = '/etc/ssl/mysql/client-key.pem';
$DB['CERT_FILE'] = '/etc/ssl/mysql/client-cert.pem';
$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem';
$DB['VERIFY_HOST'] = true;
$DB['CIPHER_LIST'] = 'TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256:TLS_AES_1
...
// or
...
// Used for TLS connection without Cipher list defined - selected by MySQL server
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '/etc/ssl/mysql/client-key.pem';
$DB['CERT_FILE'] = '/etc/ssl/mysql/client-cert.pem';
$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem';
$DB['VERIFY_HOST'] = true;
$DB['CIPHER_LIST'] = '';
...
Server

```

To enable encryption with full verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```

...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_full
DBTLSCAFile=/etc/ssl/mysql/ca.pem
DBTLSCertFile=/etc/ssl/mysql/client-cert.pem
DBTLSKeyFile=/etc/ssl/mysql/client-key.pem
...

```

## 2 PostgreSQL encryption configuration

### Overview

This section provides several encryption configuration examples for CentOS 8.2 and PostgreSQL 13.

#### Note:

Connection between Zabbix frontend and PostgreSQL cannot be encrypted (parameters in GUI are disabled), if the value of Database host field begins with a slash or the field is empty.

### Pre-requisites

Install the PostgreSQL database using the [official repository](#).

PostgreSQL is not configured to accept TLS connections out-of-the-box. Please follow instructions from PostgreSQL documentation for [certificate preparation with postgresql.conf](#) and also for [user access control](#) through `pg_hba.conf`.

By default, the PostgreSQL socket is binded to the localhost, for the network remote connections allow to listen on the real network interface.

PostgreSQL settings for all `modes` can look like this:

#### **`/var/lib/pgsql/13/data/postgresql.conf`:**

```

...
ssl = on
ssl_ca_file = 'root.crt'
ssl_cert_file = 'server.crt'
ssl_key_file = 'server.key'
ssl_ciphers = 'HIGH:MEDIUM:+3DES:!aNULL'
ssl_prefer_server_ciphers = on
ssl_min_protocol_version = 'TLSv1.3'
...

```

For access control adjust `/var/lib/pgsql/13/data/pg_hba.conf`:

```

...
### require
hostssl all all 0.0.0.0/0 md5

### verify CA
hostssl all all 0.0.0.0/0 md5 clientcert=verify-ca

### verify full
hostssl all all 0.0.0.0/0 md5 clientcert=verify-full
...

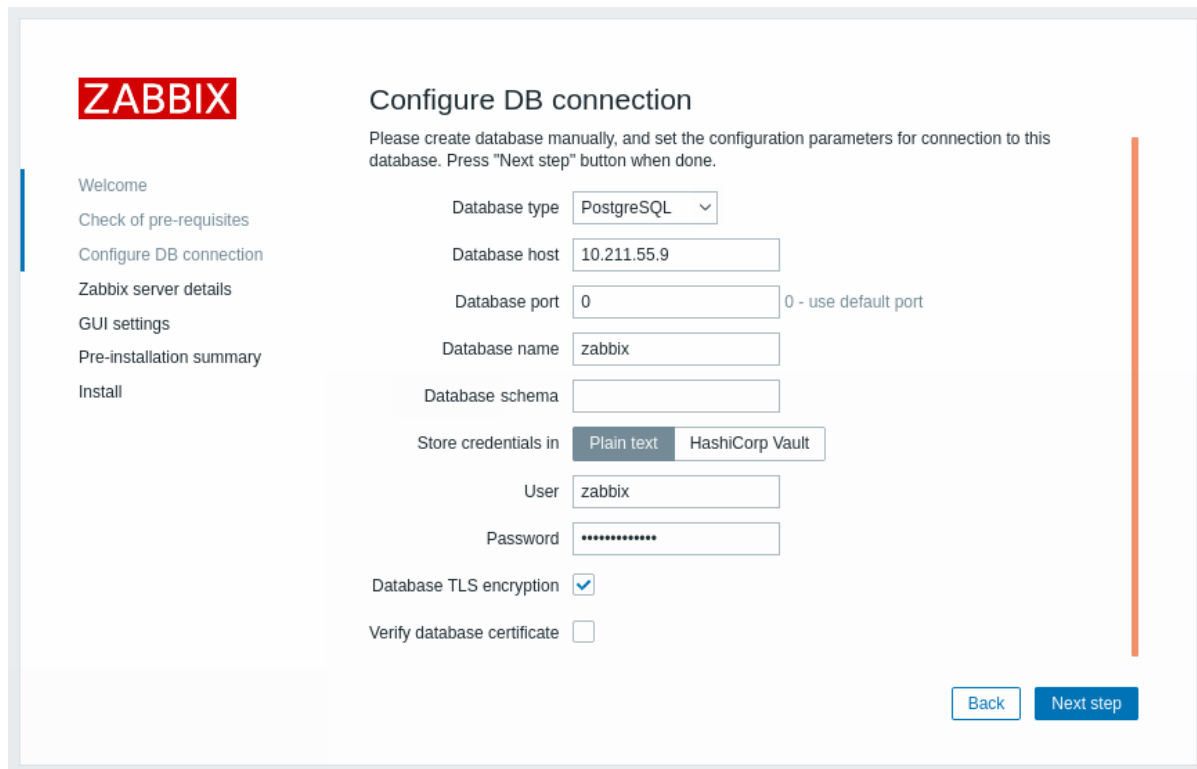
```

Required mode

Frontend

To enable transport-only encryption for connections between Zabbix frontend and the database:

- Check Database TLS encryption
- Leave Verify database certificate unchecked



Server

To enable transport-only encryption for connections between server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```

...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=required
...

```

Verify CA mode

Frontend

To enable encryption with certificate authority verification for connections between Zabbix frontend and the database:

- Check Database TLS encryption and Verify database certificate
- Specify path to Database TLS key file
- Specify path to Database TLS CA file
- Specify path to Database TLS certificate file

**ZABBIX** Configure DB connection

Welcome  
 Check of pre-requisites  
 Configure DB connection  
 Zabbix server details  
 Pre-installation summary  
 Install

Database name:   
 Database schema:   
 User:   
 Password:   
 Database TLS encryption:   
 Verify database certificate:   
 \* Database TLS CA file:   
 Database TLS key file:   
 Database TLS certificate file:   
 Database host verification:

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```

...
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/pgsql/root.crt';
$DB['VERIFY_HOST'] = false;
$DB['CIPHER_LIST'] = '';
...

```

Server

To enable encryption with certificate verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```

...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_ca
DBTLSCAFile=/etc/ssl/pgsql/root.crt
...

```

Verify full mode

Frontend

To enable encryption with certificate and database host identity verification for connections between Zabbix frontend and the database:

- Check Database TLS encryption and Verify database certificate
- Specify path to Database TLS key file
- Specify path to Database TLS CA file
- Specify path to Database TLS certificate file
- Check Database host verification

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/pgsql/root.crt';
$DB['VERIFY_HOST'] = true;
$DB['CIPHER_LIST'] = '';
...
```

#### Server

To enable encryption with certificate and database host identity verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_full
DBTLSCAFile=/etc/ssl/pgsql/root.crt
DBTLSCertFile=/etc/ssl/pgsql/client.crt
DBTLSKeyFile=/etc/ssl/pgsql/client.key
...
```

## 4 TimescaleDB setup

### Overview

Zabbix supports TimescaleDB, a PostgreSQL-based database solution of automatically partitioning data into time-based chunks to support faster performance at scale.

**Warning:**  
Currently TimescaleDB is not supported by Zabbix proxy.

Instructions on this page can be used for creating TimescaleDB database or migrating from existing PostgreSQL tables to TimescaleDB.

### Configuration

We assume that TimescaleDB extension has been already installed on the database server (see [installation instructions](#)).

TimescaleDB extension must also be enabled for the specific DB by executing:

```
echo "CREATE EXTENSION IF NOT EXISTS timescaledb CASCADE;" | sudo -u postgres psql zabbix
```

Running this command requires database administrator privileges.

**Note:**

If you use a database schema other than 'public' you need to add a SCHEMA clause to the command above. E.g.:

```
echo "CREATE EXTENSION IF NOT EXISTS timescaledb SCHEMA yourschema CASCADE;" | sudo -u postgres psql zabbix
```

Then run the `timescaledb.sql` script located in `database/postgresql`. For new installations the script must be run after the regular PostgreSQL database has been created with initial schema/data (see [database creation](#)):

```
cat timescaledb.sql | sudo -u zabbix psql zabbix
```

The migration of existing history and trend data may take a lot of time. Zabbix server and frontend must be down for the period of migration.

The `timescaledb.sql` script sets the following housekeeping parameters:

- Override item history period
- Override item trend period

In order to use partitioned housekeeping for history and trends, both these options must be on. It's possible to use TimescaleDB partitioning only for trends (by setting Override item trend period) or only for history (Override item history period).

For PostgreSQL version 10.2 or higher and TimescaleDB version 1.5 or higher, the `timescaledb.sql` script sets two additional parameters:

- Enable compression
- Compress records older than 7 days

All of these parameters can be changed in Administration → General → Housekeeping after the installation.

**Note:**

You may want to run the `timescaledb-tune` tool provided by TimescaleDB to optimize PostgreSQL configuration parameters in your `postgresql.conf`.

### TimescaleDB compression

Native TimescaleDB compression is supported starting from Zabbix 5.0 for PostgreSQL version 10.2 or higher and TimescaleDB version 1.5 or higher for all Zabbix tables that are managed by TimescaleDB. During the upgrade or migration to TimescaleDB, initial compression of the large tables may take a lot of time.

**Note:**

Users are encouraged to get familiar with [TimescaleDB](#) compression documentation before using compression.

Note, that there are certain limitations imposed by compression, specifically:

- Compressed chunk modifications (inserts, deletes, updates) are not allowed
- Schema changes for compressed tables are not allowed.

Compression settings can be changed in the History and trends compression block in Administration → General → Housekeeping section of Zabbix frontend.

Parameter	Default	Comments
Enable compression	Enabled	<p>Checking or unchecking the checkbox does not activate/deactivate compression immediately. Because compression is handled by the Housekeeper, the changes will take effect in up to 2 times <code>HousekeepingFrequency</code> hours (set in <code>zabbix_server.conf</code>)</p> <p>After disabling compression, new chunks that fall into the compression period will not be compressed. However, all previously compressed data will stay compressed. To uncompress previously compressed chunks, follow instructions in <a href="#">TimescaleDB</a> documentation.</p> <p>When upgrading from older versions of Zabbix with TimescaleDB support, compression will not be enabled by default.</p>
Compress records older than	7d	<p>This parameter cannot be less than 7 days.</p> <p>Due to immutability of compressed chunks all late data (e.g. data delayed by a proxy) that is older than this value will be discarded.</p>

## 5 Elasticsearch setup

### Attention:

Elasticsearch support is experimental!

Zabbix supports the storage of historical data by means of Elasticsearch instead of a database. Users can choose the storage place for historical data between a compatible database and Elasticsearch. The setup procedure described in this section is applicable to Elasticsearch version 7.X. In case an earlier or later version of Elasticsearch is used, some functionality may not work as intended.

### Warning:

If all history data is stored in Elasticsearch, trends are **not** calculated nor stored in the database. With no trends calculated and stored, the history storage period may need to be extended.

### Configuration

To ensure proper communication between all elements involved make sure server configuration file and frontend configuration file parameters are properly configured.

#### Zabbix server and frontend

Zabbix server configuration file draft with parameters to be updated:

```
### Option: HistoryStorageURL
# History storage HTTP[S] URL.
#
# Mandatory: no
# Default:
# HistoryStorageURL=
### Option: HistoryStorageTypes
# Comma separated list of value types to be sent to the history storage.
#
```



```
# Mandatory: no
# Default:
# HistoryStorageTypes=uint,dbl,str,log,text
```

Example parameter values to fill the Zabbix server configuration file with:

```
HistoryStorageURL=http://test.elasticsearch.lan:9200
HistoryStorageTypes=str,log,text
```

This configuration forces Zabbix Server to store history values of numeric types in the corresponding database and textual history data in Elasticsearch.

Elasticsearch supports the following item types:

```
uint,dbl,str,log,text
```

Supported item type explanation:

Item value type	Database table	Elasticsearch type
Numeric (unsigned)	history_uint	uint
Numeric (float)	history	dbl
Character	history_str	str
Log	history_log	log
Text	history_text	text

Zabbix frontend configuration file (`conf/zabbix.conf.php`) draft with parameters to be updated:

```
// Elasticsearch url (can be string if same url is used for all types).
$HISTORY['url'] = [
    'uint' => 'http://localhost:9200',
    'text' => 'http://localhost:9200'
];
// Value types stored in Elasticsearch.
$HISTORY['types'] = ['uint', 'text'];
```

Example parameter values to fill the Zabbix frontend configuration file with:

```
$HISTORY['url'] = 'http://test.elasticsearch.lan:9200';
$HISTORY['types'] = ['str', 'text', 'log'];
```

This configuration forces to store Text, Character and Log history values in Elasticsearch.

It is also required to make `$HISTORY` global in `conf/zabbix.conf.php` to ensure everything is working properly (see `conf/zabbix.conf.php.example` for how to do it):

```
// Zabbix GUI configuration file.
global $DB, $HISTORY;
```

Installing Elasticsearch and creating mapping

Final two steps of making things work are installing Elasticsearch itself and creating mapping process.

To install Elasticsearch please refer to [Elasticsearch installation guide](#).

**Note:**

Mapping is a data structure in Elasticsearch (similar to a table in a database). Mapping for all history data types is available here: `database/elasticsearch/elasticsearch.map`.

**Warning:**

Creating mapping is mandatory. Some functionality will be broken if mapping is not created according to the instruction.

To create mapping for text type send the following request to Elasticsearch:

```
curl -X PUT \
  http://your-elasticsearch.here:9200/text \
  -H 'content-type:application/json' \
  -d '{
    "settings": {
      "index": {
```

```

        "number_of_replicas": 1,
        "number_of_shards": 5
    }
},
"mappings": {
  "properties": {
    "itemid": {
      "type": "long"
    },
    "clock": {
      "format": "epoch_second",
      "type": "date"
    },
    "value": {
      "fields": {
        "analyzed": {
          "index": true,
          "type": "text",
          "analyzer": "standard"
        }
      },
      "index": false,
      "type": "text"
    }
  }
}
}'

```

Similar request is required to be executed for Character and Log history values mapping creation with corresponding type correction.

**Note:**

To work with Elasticsearch please refer to [Requirement page](#) for additional information.

**Note:**

**Housekeeper** is not deleting any data from Elasticsearch.

### Storing history data in multiple date-based indices

This section describes additional steps required to work with pipelines and ingest nodes.

To begin with, you must create templates for indices.

The following example shows a request for creating uint template:

```

curl -X PUT \
  http://your-elasticsearch.here:9200/_template/uint_template \
  -H 'content-type:application/json' \
  -d '{
    "index_patterns": [
      "uint*"
    ],
    "settings": {
      "index": {
        "number_of_replicas": 1,
        "number_of_shards": 5
      }
    },
    "mappings": {
      "properties": {
        "itemid": {
          "type": "long"
        },
        "clock": {

```

```

        "format": "epoch_second",
        "type": "date"
    },
    "value": {
        "type": "long"
    }
}
}'

```

To create other templates, user should change the URL (last part is the name of template), change "index\_patterns" field to match index name and to set valid mapping, which can be taken from database/elasticsearch/elasticsearch.map.

For example, the following command can be used to create a template for text index:

```

curl -X PUT \
  http://your-elasticsearch.here:9200/_template/text_template \
  -H 'content-type:application/json' \
  -d '{
    "index_patterns": [
      "text*"
    ],
    "settings": {
      "index": {
        "number_of_replicas": 1,
        "number_of_shards": 5
      }
    },
    "mappings": {
      "properties": {
        "itemid": {
          "type": "long"
        },
        "clock": {
          "format": "epoch_second",
          "type": "date"
        },
        "value": {
          "fields": {
            "analyzed": {
              "index": true,
              "type": "text",
              "analyzer": "standard"
            }
          },
          "index": false,
          "type": "text"
        }
      }
    }
  }
}'

```

This is required to allow Elasticsearch to set valid mapping for indices created automatically. Then it is required to create the pipeline definition. Pipeline is some sort of preprocessing of data before putting data in indices. The following command can be used to create pipeline for uint index:

```

curl -X PUT \
  http://your-elasticsearch.here:9200/_ingest/pipeline/uint-pipeline \
  -H 'content-type:application/json' \
  -d '{
    "description": "daily uint index naming",
    "processors": [
      {
        "date_index_name": {
          "field": "clock",

```

```

        "date_formats": [
            "UNIX"
        ],
        "index_name_prefix": "uint-",
        "date_rounding": "d"
    }
}
]
}'

```

User can change the rounding parameter ("date\_rounding") to set a specific index rotation period. To create other pipelines, user should change the URL (last part is the name of pipeline) and change "index\_name\_prefix" field to match index name.

See also [Elasticsearch documentation](#).

Additionally, storing history data in multiple date-based indices should also be enabled in the new parameter in Zabbix server configuration:

```

### Option: HistoryStorageDateIndex
# Enable preprocessing of history values in history storage to store values in different indices based on
# 0 - disable
# 1 - enable
#
# Mandatory: no
# Default:
# HistoryStorageDateIndex=0

```

#### Troubleshooting

The following steps may help you troubleshoot problems with Elasticsearch setup:

1. Check if the mapping is correct (GET request to required index URL like `http://localhost:9200/uint`).
2. Check if shards are not in failed state (restart of Elasticsearch should help).
3. Check the configuration of Elasticsearch. Configuration should allow access from the Zabbix frontend host and the Zabbix server host.
4. Check Elasticsearch logs.

If you are still experiencing problems with your installation then please create a bug report with all the information from this list (mapping, error logs, configuration, version, etc.)

## 6 Real-time export of events, item values, trends

### Overview

It is possible to configure real-time exporting of trigger events, item values and trends in a newline-delimited JSON format.

Exporting is done into files, where each line of the export file is a JSON object. Value mappings are not applied.

In case of errors (data cannot be written to the export file or the export file cannot be renamed or a new one cannot be created after renaming it), the data item is dropped and never written to the export file. It is written only in the Zabbix database. Writing data to the export file is resumed when the writing problem is resolved.

For precise details on what information is exported, see the [export protocol](#) page.

Note that host/item can have no metadata (host groups, host name, item name) if the host/item was removed after the data was received, but before server exported data.

### Configuration

Real-time export of trigger events, item values and trends is configured by specifying a directory for the export files - see the `ExportDir` parameter in server [configuration](#).

Two other parameters are available:

- `ExportFileSize` may be used to set the maximum allowed size of an individual export file. When a process needs to write to a file it checks the size of the file first. If it exceeds the configured size limit, the file is renamed by appending `.old` to its name and a new file with the original name is created.

**Attention:**

A file will be created per each process that will write data (i.e. approximately 4-30 files). As the default size per export file is 1G, keeping large export files may drain the disk space fast.

- ExportType allows to specify which entity types (events, history, trends) will be exported. This parameter is supported since Zabbix 5.2.6.

## 7 Distribution-specific notes on setting up Nginx for Zabbix

RHEL

Nginx is available only in EPEL:

```
# yum -y install epel-release
```

SLES 12

In SUSE Linux Enterprise Server 12 you need to add the Nginx repository, before installing Nginx:

```
zypper addrepo -G -t yum -c 'http://nginx.org/packages/sles/12' nginx
```

You also need to configure php-fpm:

```
cp /etc/php5/fpm/php-fpm.conf{.default,}
sed -i 's/user = nobody/user = wwwrun; s/group = nobody/group = www/' /etc/php5/fpm/php-fpm.conf
```

SLES 15

In SUSE Linux Enterprise Server 15 you need to configure php-fpm:

```
cp /etc/php7/fpm/php-fpm.conf{.default,}
cp /etc/php7/fpm/php-fpm.d/www.conf{.default,}
sed -i 's/user = nobody/user = wwwrun; s/group = nobody/group = www/' /etc/php7/fpm/php-fpm.d/www.conf
```

## 8 Running agent as root

Starting with version **5.0.0** the systemd service file for Zabbix agent in [official packages](#) was updated to explicitly include directives for User and Group. Both are set to zabbix.

This means that the old functionality of configuring which user Zabbix agent runs as via `zabbix_agentd.conf` file is bypassed and agent will always run as the user specified in the systemd service file.

To override this new behavior create a `/etc/systemd/system/zabbix-agent.service.d/override.conf` file with the following content:

```
[Service]
User=root
Group=root
```

Reload daemons and restart the zabbix-agent service:

```
systemctl daemon-reload
systemctl restart zabbix-agent
```

For **Zabbix agent2** this completely determines the user that it runs as.

For old **agent** this only re-enables the functionality of configuring user in the `zabbix_agentd.conf` file. Therefore in order to run zabbix agent as root you still have to edit the agent [configuration file](#) and specify `User=root` as well as `AllowRoot=1` options.

## 9 Zabbix agent on Microsoft Windows

Configuring agent

Zabbix agent runs as a Windows service.

You can run a single instance of Zabbix agent or multiple instances of the agent on a Microsoft Windows host. A single instance can use the default configuration file `C:\zabbix_agentd.conf` or a configuration file specified in the command line. In case of multiple instances each agent instance must have its own configuration file (one of the instances can use the default configuration file).

An example configuration file is available in Zabbix source archive as `conf/zabbix_agentd.win.conf`.

See the [configuration file](#) options for details on configuring Zabbix Windows agent.

**Warning:**

**Zabbix agent for Windows does not support non-standard Windows configurations where CPUs are distributed non-uniformly across NUMA nodes.** If logical CPUs are distributed non-uniformly, then CPU performance metrics may not be available for some CPUs. For example, if there are 72 logical CPUs with 2 NUMA nodes, both nodes must have 36 CPUs each.

Hostname parameter

To perform [active checks](#) on a host Zabbix agent needs to have the hostname defined. Moreover, the hostname value set on the agent side should exactly match the "Host name" configured for the host in the frontend.

The hostname value on the agent side can be defined by either the **Hostname** or **Hostnameltem** parameter in the agent [configuration file](#) - or the default values are used if any of these parameters are not specified.

The default value for **Hostnameltem** parameter is the value returned by the "system.hostname" agent key and for Windows platform it returns the NetBIOS host name.

The default value for **Hostname** is the value returned by the **Hostnameltem** parameter. So, in effect, if both these parameters are unspecified the actual hostname will be the host NetBIOS name; Zabbix agent will use NetBIOS host name to retrieve the list of active checks from Zabbix server and send results to it.

**Attention:**

The **system.hostname** key always returns the NetBIOS host name which is limited to 15 symbols and in UPPERCASE only - regardless of the length and lowercase/uppercase characters in the real host name.

Starting from Zabbix agent 1.8.6 version for Windows the "system.hostname" key supports an optional parameter - type of the name. The default value of this parameter is "netbios" (for backward compatibility) and the other possible value is "host".

**Attention:**

The **system.hostname[host]** key always returns the full, real (case sensitive) Windows host name.

So, to simplify the configuration of `zabbix_agentd.conf` file and make it unified, two different approaches could be used.

1. leave **Hostname** or **Hostnameltem** parameters undefined and Zabbix agent will use NetBIOS host name as the hostname;
2. leave **Hostname** parameter undefined and define **Hostnameltem** like this:

**Hostnameltem=system.hostname[host]**

and Zabbix agent will use the full, real (case sensitive) Windows host name as the hostname.

Host name is also used as part of Windows service name which is used for installing, starting, stopping and uninstalling the Windows service. For example, if Zabbix agent configuration file specifies `Hostname=Windows_db_server`, then the agent will be installed as a Windows service "Zabbix Agent [Windows\_db\_server]". Therefore, to have a different Windows service name for each Zabbix agent instance, each instance must use a different host name.

Installing agent as Windows service

To install a single instance of Zabbix agent with the default configuration file `c:\zabbix_agentd.conf`:

```
zabbix_agentd.exe --install
```

**Attention:**

On a 64-bit system, a 64-bit Zabbix agent version is required for all checks related to running 64-bit processes to work correctly.

If you wish to use a configuration file other than `c:\zabbix_agentd.conf`, you should use the following command for service installation:

```
zabbix_agentd.exe --config <your_configuration_file> --install
```

A full path to the configuration file should be specified.

Multiple instances of Zabbix agent can be installed as services like this:

```
zabbix_agentd.exe --config <configuration_file_for_instance_1> --install --multiple-agents
zabbix_agentd.exe --config <configuration_file_for_instance_2> --install --multiple-agents
...
```

```
zabbix_agentd.exe --config <configuration_file_for_instance_N> --install --multiple-agents
```

The installed service should now be visible in Control Panel.

Starting agent

To start the agent service, you can use Control Panel or do it from command line.

To start a single instance of Zabbix agent with the default configuration file:

```
zabbix_agentd.exe --start
```

To start a single instance of Zabbix agent with another configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --start
```

To start one of multiple instances of Zabbix agent:

```
zabbix_agentd.exe --config <configuration_file_for_this_instance> --start --multiple-agents
```

Stopping agent

To stop the agent service, you can use Control Panel or do it from command line.

To stop a single instance of Zabbix agent started with the default configuration file:

```
zabbix_agentd.exe --stop
```

To stop a single instance of Zabbix agent started with another configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --stop
```

To stop one of multiple instances of Zabbix agent:

```
zabbix_agentd.exe --config <configuration_file_for_this_instance> --stop --multiple-agents
```

Uninstalling agent Windows service

To uninstall a single instance of Zabbix agent using the default configuration file:

```
zabbix_agentd.exe --uninstall
```

To uninstall a single instance of Zabbix agent using a non-default configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --uninstall
```

To uninstall multiple instances of Zabbix agent from Windows services:

```
zabbix_agentd.exe --config <configuration_file_for_instance_1> --uninstall --multiple-agents
zabbix_agentd.exe --config <configuration_file_for_instance_2> --uninstall --multiple-agents
...
zabbix_agentd.exe --config <configuration_file_for_instance_N> --uninstall --multiple-agents
```

## 10 Zabbix agent 2 on Microsoft Windows

Configuring agent

Zabbix agent 2 runs as a Windows service.

You can run a single instance of Zabbix agent 2 or multiple instances of the agent on a Microsoft Windows host. A single instance can use the default configuration file `C:\zabbix_agent2.conf` or a configuration file specified in the command line. In case of multiple instances each agent instance must have its own configuration file (one of the instances can use the default configuration file).

An example configuration file is available in Zabbix source archive as `conf/zabbix_agent2.win.conf`.

See the [configuration file](#) options for details on configuring Zabbix Windows agent 2.

### **Warning:**

**Zabbix agent for Windows does not support non-standard Windows configurations where CPUs are distributed non-uniformly across NUMA nodes.** If logical CPUs are distributed non-uniformly, then CPU performance metrics may not be available for some CPUs. For example, if there are 72 logical CPUs with 2 NUMA nodes, both nodes must have 36 CPUs each.

Hostname parameter

To perform **active checks** on a host Zabbix agent 2 needs to have the hostname defined. Moreover, the hostname value set on the agent side should exactly match the "Host name" configured for the host in the frontend.

The hostname value on the agent side can be defined by either the **Hostname** or **Hostnameltem** parameter in the agent **configuration file** - or the default values are used if any of these parameters are not specified.

The default value for **Hostnameltem** parameter is the value returned by the "system.hostname" agent key and for Windows platform it returns the NetBIOS host name.

The default value for **Hostname** is the value returned by the **Hostnameltem** parameter. So, in effect, if both these parameters are unspecified the actual hostname will be the host NetBIOS name; Zabbix agent 2 will use NetBIOS host name to retrieve the list of active checks from Zabbix server and send results to it.

**Attention:**

The **system.hostname** key always returns the NetBIOS host name which is limited to 15 symbols and in UPPERCASE only - regardless of the length and lowercase/uppercase characters in the real host name.

**Attention:**

The **system.hostname[host]** key always returns the full, real (case sensitive) Windows host name.

So, to simplify the configuration of `zabbix_agent2.conf` file and make it unified, two different approaches could be used.

1. leave **Hostname** or **Hostnameltem** parameters undefined and Zabbix agent 2 will use NetBIOS host name as the hostname;
2. leave **Hostname** parameter undefined and define **Hostnameltem** like this:

**Hostnameltem=system.hostname[host]**

and Zabbix agent 2 will use the full, real (case sensitive) Windows host name as the hostname.

Host name is also used as part of Windows service name which is used for installing, starting, stopping and uninstalling the Windows service. For example, if Zabbix agent 2 configuration file specifies `Hostname=Windows_db_server`, then the agent will be installed as a Windows service "Zabbix Agent [Windows\_db\_server]". Therefore, to have a different Windows service name for each Zabbix agent instance, each instance must use a different host name.

Installing agent as Windows service

To install a single instance of Zabbix agent 2 with the default configuration file `c:\zabbix_agent2.conf`:

```
zabbix_agent2.exe --install
```

**Attention:**

On a 64-bit system, a 64-bit Zabbix agent version is required for all checks related to running 64-bit processes to work correctly.

If you wish to use a configuration file other than `c:\zabbix_agent2.conf`, you should use the following command for service installation:

```
zabbix_agent2.exe --config <your_configuration_file> --install
```

A full path to the configuration file should be specified.

Multiple instances of Zabbix agent 2 can be installed as services like this:

```
zabbix_agent2.exe --config <configuration_file_for_instance_1> --install --multiple-agents
zabbix_agent2.exe --config <configuration_file_for_instance_2> --install --multiple-agents
...
zabbix_agent2.exe --config <configuration_file_for_instance_N> --install --multiple-agents
```

The installed service should now be visible in Control Panel.

Starting agent

To start the agent service, you can use Control Panel or do it from command line.

To start a single instance of Zabbix agent 2 with the default configuration file:

```
zabbix_agent2.exe --start
```

To start a single instance of Zabbix agent 2 with another configuration file:

```
zabbix_agent2.exe --config <your_configuration_file> --start
```

To start one of multiple instances of Zabbix agent 2:



```
zabbix_agent2.exe --config <configuration_file_for_this_instance> --start --multiple-agents
```

Stopping agent

To stop the agent service, you can use Control Panel or do it from command line.

To stop a single instance of Zabbix agent 2 started with the default configuration file:

```
zabbix_agent2.exe --stop
```

To stop a single instance of Zabbix agent 2 started with another configuration file:

```
zabbix_agent2.exe --config <your_configuration_file> --stop
```

To stop one of multiple instances of Zabbix agent 2:

```
zabbix_agent2.exe --config <configuration_file_for_this_instance> --stop --multiple-agents
```

Uninstalling agent Windows service

To uninstall a single instance of Zabbix agent 2 using the default configuration file:

```
zabbix_agent2.exe --uninstall
```

To uninstall a single instance of Zabbix agent 2 using a non-default configuration file:

```
zabbix_agent2.exe --config <your_configuration_file> --uninstall
```

To uninstall multiple instances of Zabbix agent 2 from Windows services:


```
zabbix_agent2.exe --config <configuration_file_for_instance_1> --uninstall --multiple-agents
zabbix_agent2.exe --config <configuration_file_for_instance_2> --uninstall --multiple-agents
...
zabbix_agent2.exe --config <configuration_file_for_instance_N> --uninstall --multiple-agents
```


## 11 SAML setup with Okta

This section describes how to configure Okta to enable SAML 2.0 authentication for Zabbix.

Okta configuration

1. Go to <https://okta.com> and register or sign in to your account.

2. In the Okta web interface navigate to Applications → Applications and press "Add Application" button ().

3. Press "Create New App" button (). In a popup window select Platform: Web, Sign on method: SAML 2.0 and press "Create" button.

Create a New Application Integration ✕

**Platform**

**Sign on method**

- Secure Web Authentication (SWA)  
Uses credentials to sign in. This integration works with most apps.
- SAML 2.0  
Uses the SAML protocol to log users into the app. This is a better option than SWA, if the app supports it.
- OpenID Connect  
Uses the OpenID Connect protocol to log users into an app you've built.

4. Fill in the fields in the General settings tab (the first tab that appears) according to your preferences and press "Next".
5. In the Configure SAML tab enter the values provided below, then press "Next".
  - In the **GENERAL** section:
    - Single sign on URL: `https://<your-zabbix-url>/ui/index_sso.php?acs`  
The checkbox Use this for Recipient URL and Destination URL should be marked)
    - Audience URI (SP Entity ID): `zabbix`  
Note, that this value will be used within the SAML assertion as a unique service provider identifier (if not matching, the operation will be rejected). It is possible to specify a URL or any string of data in this field.
    - Default RelayState:  
Leave this field blank; if a custom redirect is required, it can be added in Zabbix in the Administration → Users settings.
    - Fill in other fields according to your preferences.

## GENERAL

Single sign on URL ?

Use this for Recipient URL and Destination URL

Allow this app to request other SSO URLs

Audience URI (SP Entity ID) ?

Default RelayState ?

If no value is set, a blank RelayState is sent

Name ID format ?

Application username ?

Update application username  
on

[Show Advanced Settings](#)

### Note:

If planning to use encrypted connection, generate private and public encryption certificates, then upload public certificate to Okta. Certificate upload form appears when Assertion Encryption is set to Encrypted (click Show Advanced Settings to find this parameter).

- In the **ATTRIBUTE STATEMENTS (OPTIONAL)** section add an attribute statement with:
  - Name: usrEmail
  - Name format: Unspecified
  - Value: user.email

## ATTRIBUTE STATEMENTS (OPTIONAL)

[LEARN MORE](#)

Name

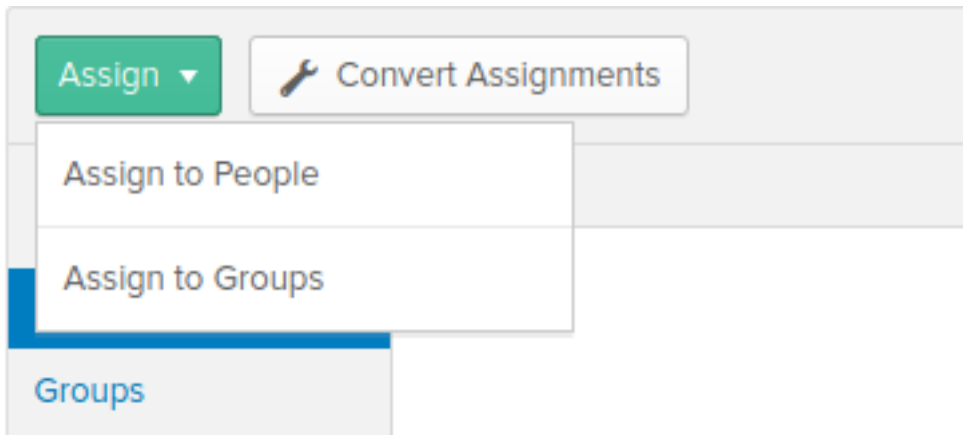
Name format  
(optional)

Value

[Add Another](#)

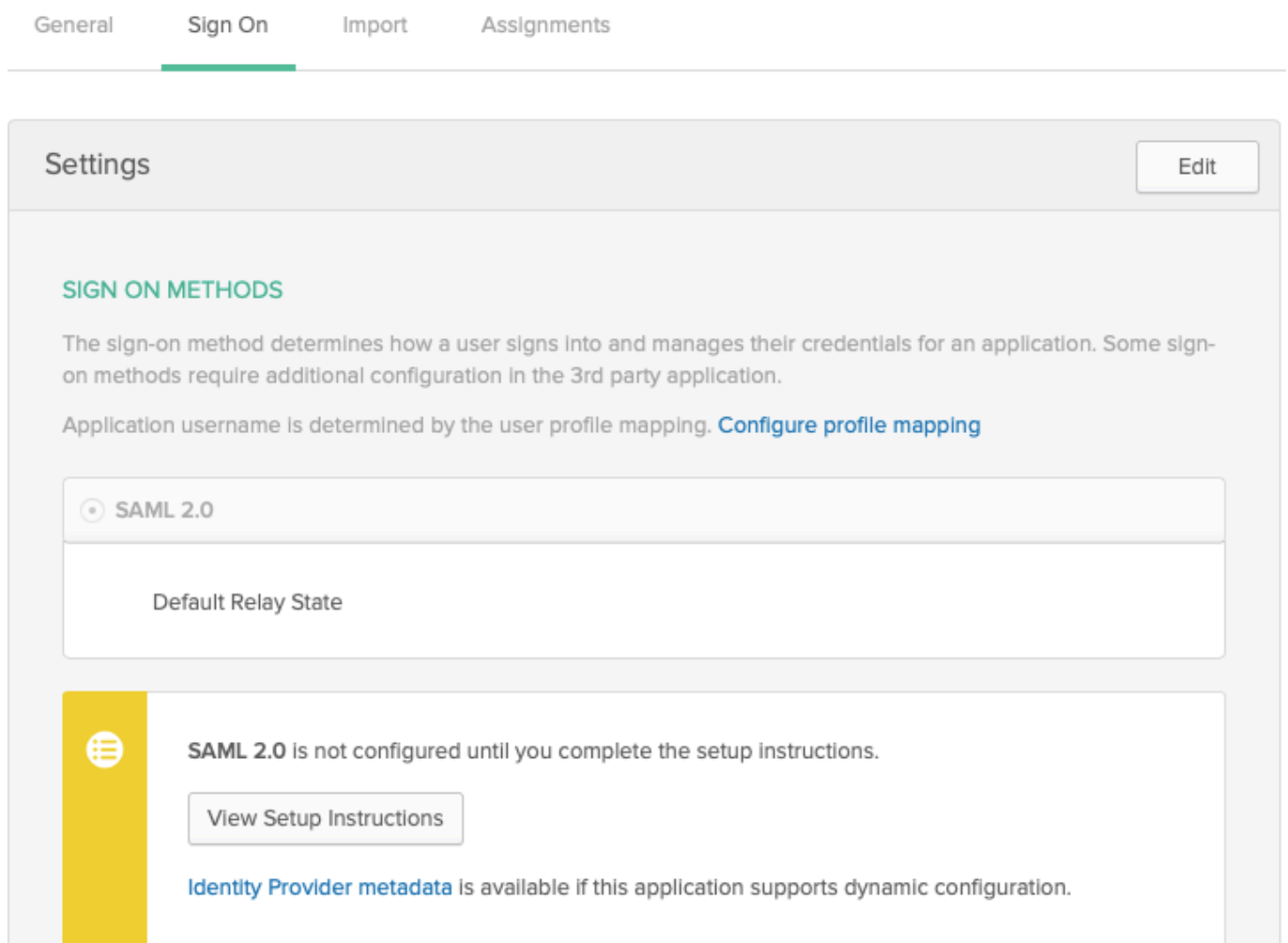
6. At the next tab, select "I'm a software vendor. I'd like to integrate my app with Okta" and press "Finish".

7. Now, navigate to Assignments tab and press the "Assign" button, then select Assign to People from the drop-down.



8. In a popup that appears, assign created app to people that will use SAML 2.0 to authenticate with Zabbix, then press "Save and go back".

9. Navigate to the Sign On tab and press the "View Setup Instructions" button. Setup instructions will be displayed in a new tab; keep this tab open while configuring Zabbix.



#### Zabbix configuration

1. In Zabbix, go to SAML settings in the Administration → Authentication section and copy information from Okta setup instructions into corresponding fields:

- Identity Provider Single Sign-On URL → SSO service URL
- Identity Provider Issuer → IdP entity ID
- Username attribute → Attribute name (usrEmail)
- SP entity ID → Audience URI

2. Download the certificate provided in the Okta setup instructions page into ui/conf/certs folder as idp.crt, and set permission 644

by running:

```
chmod 644 idp.crt
```

Note, that if you have upgraded to Zabbix 5.0 from an older version, you will also need to manually add these lines to `zabbix.conf.php` file (located in the `//ui/conf//` directory):

```
// Used for SAML authentication.  
$SSO['SP_KEY'] = 'conf/certs/sp.key'; // Path to your private key.  
$SSO['SP_CERT'] = 'conf/certs/sp.crt'; // Path to your public key.  
$SSO['IDP_CERT'] = 'conf/certs/idp.crt'; // Path to IdP public key.  
$SSO['SETTINGS'] = []; // Additional settings
```

See generic [SAML Authentication](#) instructions for more details.

3. If Assertion Encryption has been set to Encrypted in Okta, a checkbox "Assertions" of the Encrypt parameter should be marked in Zabbix as well.

[Authentication](#) [HTTP settings](#) [LDAP settings](#) [SAML settings](#)

---

Enable SAML authentication

\* IdP entity ID

\* SSO service URL

SLO service URL

\* Username attribute

\* SP entity ID

SP name ID format

Sign  Messages  
 Assertions  
 AuthN requests  
 Logout requests  
 Logout responses

Encrypt  Name ID  
 Assertions

Case sensitive login

4. Press the "Update" button to save these settings.

**Note:**

To sign in with SAML, user alias in Zabbix should match his Okta e-mail. This settings can be changed in the Administration → Users section of Zabbix web interface.

## 12 Additional frontend languages

### Overview

In order to use any other language than English in Zabbix web interface, its locale should be installed on the web server. Additionally, the PHP gettext extension is required for the translations to work.

### Installing locales

To list all installed languages, run:

```
locale -a
```

If some languages that are needed are not listed, open the `/etc/locale.gen` file and uncomment the required locales. Since Zabbix uses UTF-8 encoding, you need to select locales with UTF-8 charset.

Now, run:

```
locale-gen
```

Restart the web server.

The locales should now be installed. It may be required to reload Zabbix frontend page in browser using `Ctrl + F5` for new languages to appear.

### Installing Zabbix

If installing Zabbix directly from [Zabbix git repository](#), translation files should be generated manually. To generate translation files, run:

```
make gettext
locale/make_mo.sh
```

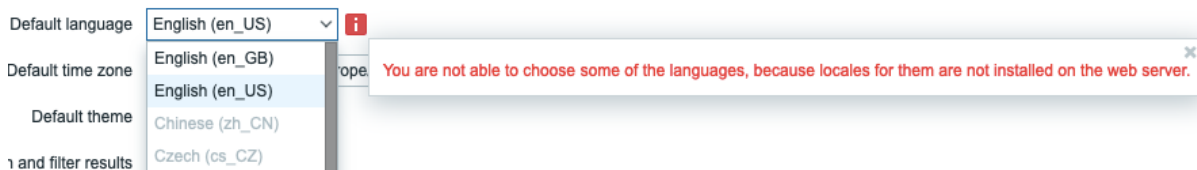
This step is not needed when installing Zabbix from packages or source tar.gz files.

### Selecting a language

There are several ways to select a language in Zabbix web interface:

- When installing web interface - in the frontend **installation wizard**. Selected language will be set as system default.
- After the installation, system default language can be changed in the Administration→General→GUI **menu section**.
- Language for a particular user can be changed in the **user profile**.

If a locale for a language is not installed on the machine, this language will be greyed out in Zabbix language selector. A red icon is displayed next to the language selector if at least one locale is missing. Upon pressing on this icon the following message will be displayed: "You are not able to choose some of the languages, because locales for them are not installed on the web server."



## 3 Process configuration

### 1 Zabbix server

#### Overview

This section lists parameters supported in a Zabbix server configuration file (`zabbix_server.conf`). Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without **BOM**;
- Comments starting with `"#"` are only supported in the beginning of the line.

#### Parameters

Parameter	Mandatory	Range	Default	Description
AlertScriptsPath	no		<code>/usr/local/share/zabbix/alertscripts</code>	Location of custom alert scripts (depends on compile-time installation variable <code>datadir</code> ).

Parameter	Mandatory	Range	Default	Description
AllowRoot	no		0	<p>Allow the server to run as 'root'. If disabled and the server is started by 'root', the server will try to switch to the 'zabbix' user instead. Has no effect if started under a regular user.</p> <p>0 - do not allow 1 - allow</p> <p>This parameter is supported since Zabbix 2.2.0.</p>
CacheSize	no	128K-64G	8M	<p>Size of configuration cache, in bytes.</p> <p>Shared memory size for storing host, item and trigger data.</p>
CacheUpdateFrequency	no	1-3600	60	<p>How often Zabbix will perform update of configuration cache, in seconds.</p> <p>See also <a href="#">runtime control</a> options.</p>
DBHost	no		localhost	<p>Database host name.</p> <p>In case of MySQL localhost or empty string results in using a socket. In case of PostgreSQL only empty string results in attempt to use socket.</p>
DBName	yes			Database name.
DBPassword	no			<p>Database password.</p> <p>Comment this line if no password is used.</p>
DBPort	no	1024-65535		Database port when not using local socket.
DBSchema	no			Schema name. Used for PostgreSQL.
DBSocket	no			Path to MySQL socket file.
DBUser	no			Database user.

Parameter	Mandatory	Range	Default	Description
DBTLSConnect	no			<p>Setting this option enforces to use TLS connection to database:</p> <p>required - connect using TLS  verify_ca - connect using TLS and verify certificate  verify_full - connect using TLS, verify certificate and verify that database identity specified by DBHost matches its certificate</p> <p>On MySQL starting from 5.7.11 and PostgreSQL the following values are supported: "required", "verify_ca", "verify_full". On MariaDB starting from version 10.2.6 "required" and "verify_full" values are supported.</p> <p>By default not set to any option and the behavior depends on database configuration.</p>
DBTLSCAFile	no (yes, if DBTLSConnect set to one of: verify_ca, verify_full)			<p>This parameter is supported since Zabbix 5.0.0.</p> <p>Full pathname of a file containing the top-level CA(s) certificates for database certificate verification.</p>
DBTLSCertFile	no			<p>This parameter is supported since Zabbix 5.0.0.</p> <p>Full pathname of file containing Zabbix server certificate for authenticating to database.</p>
DBTLSKeyFile	no			<p>This parameter is supported since Zabbix 5.0.0.</p> <p>Full pathname of file containing the private key for authenticating to database.</p>
DBTLSCipher	no			<p>This parameter is supported since Zabbix 5.0.0.</p> <p>The list of encryption ciphers that Zabbix server permits for TLS protocols up through TLSv1.2.</p> <p>Supported only for MySQL.</p>
DBTLSCipher13	no			<p>This parameter is supported since Zabbix 5.0.0.</p> <p>The list of encryption ciphersuites that Zabbix server permits for TLSv1.3 protocol.</p> <p>Supported only for MySQL, starting from version 8.0.16.</p> <p>This parameter is supported since Zabbix 5.0.0.</p>



Parameter	Mandatory	Range	Default	Description
DebugLevel	no	0-5	3	Specifies debug level: 0 - basic information about starting and stopping of Zabbix processes 1 - critical information 2 - error information 3 - warnings 4 - for debugging (produces lots of information) 5 - extended debugging (produces even more information) See also <a href="#">runtime control</a> options.
ExportDir	no			Directory for <a href="#">real-time export</a> of events, history and trends in newline-delimited JSON format. If set, enables real-time export. This parameter is supported since Zabbix 4.0.0.
ExportFileSize	no	1M-1G	1G	Maximum size per export file in bytes. Only used for rotation if ExportDir is set. This parameter is supported since Zabbix 4.0.0.
ExportType	no			List of comma-delimited entity types (events, history, trends) for <a href="#">real-time export</a> (all types by default). Valid only if ExportDir is set. Note that if ExportType is specified, but ExportDir is not, then this is a configuration error and the server will not start. e.g.: ExportType=history,trends - export history and trends only ExportType=events - export events only This parameter is supported since Zabbix 5.2.6.
ExternalScripts	no		/usr/local/share/zabbix/external_scripts	Location of external scripts (depends on compile-time installation variable datadir).
Fping6Location	no		/usr/sbin/fping6	Location of fping6. Make sure that fping6 binary has root ownership and SUID flag set. Make empty ("Fping6Location=") if your fping utility is capable to process IPv6 addresses.
FpingLocation	no		/usr/sbin/fping	Location of fping. Make sure that fping binary has root ownership and SUID flag set!

Parameter	Mandatory	Range	Default	Description
HistoryCacheSize	no	128K-2G	16M	Size of history cache, in bytes. Shared memory size for storing history data.
HistoryIndexCacheSize	no	128K-2G	4M	Size of history index cache, in bytes. Shared memory size for indexing history data stored in history cache. The index cache size needs roughly 100 bytes to cache one item. This parameter is supported since Zabbix 3.0.0.
HistoryStorageDateIndex	no		0	Enable preprocessing of history values in history storage to store values in different indices based on date: 0 - disable 1 - enable
HistoryStorageURL	no			History storage HTTP[S] URL. This parameter is used for <a href="#">Elasticsearch</a> setup.
HistoryStorageTypes	no		uint,dbl,str,log,text	Comma separated list of value types to be sent to the history storage. This parameter is used for <a href="#">Elasticsearch</a> setup.

Parameter	Mandatory	Range	Default	Description
HousekeepingFrequency	no	0-24	1	<p>How often Zabbix will perform housekeeping procedure (in hours). Housekeeping is removing outdated information from the database.</p> <p>Note: To prevent housekeeper from being overloaded (for example, when history and trend periods are greatly reduced), no more than 4 times HousekeepingFrequency hours of outdated information are deleted in one housekeeping cycle, for each item. Thus, if HousekeepingFrequency is 1, no more than 4 hours of outdated information (starting from the oldest entry) will be deleted per cycle.</p> <p>Note: To lower load on server startup housekeeping is postponed for 30 minutes after server start. Thus, if HousekeepingFrequency is 1, the very first housekeeping procedure after server start will run after 30 minutes, and will repeat with one hour delay thereafter. This postponing behavior is in place since Zabbix 2.4.0. Since Zabbix 3.0.0 it is possible to disable automatic housekeeping by setting HousekeepingFrequency to 0. In this case the housekeeping procedure can only be started by housekeeper_execute runtime control option and the period of outdated information deleted in one housekeeping cycle is 4 times the period since the last housekeeping cycle, but not less than 4 hours and not greater than 4 days.</p> <p>See also <a href="#">runtime control options</a>.</p>

Parameter	Mandatory	Range	Default	Description
Include	no			You may include individual files or all files in a directory in the configuration file. To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: <code>/absolute/path/to/config/files/*.</code> Pattern matching is supported since Zabbix 2.4.0. See <a href="#">special notes</a> about limitations.
JavaGateway	no			IP address (or hostname) of Zabbix Java gateway. Only required if Java pollers are started. This parameter is supported since Zabbix 2.0.0.
JavaGatewayPort	no	1024-32767	10052	Port that Zabbix Java gateway listens on. This parameter is supported since Zabbix 2.0.0.
ListenIP	no		0.0.0.0	List of comma delimited IP addresses that the trapper should listen on. Trapper will listen on all network interfaces if this parameter is missing. Multiple IP addresses are supported since Zabbix 1.8.3.
ListenPort	no	1024-32767	10051	Listen port for trapper.
LoadModule	no			Module to load at server startup. Modules are used to extend functionality of the server. Formats: LoadModule=<module.so> LoadModule=<path/module.so> LoadModule=</abs_path/module.so> Either the module must be located in directory specified by LoadModulePath or the path must precede the module name. If the preceding path is absolute (starts with '/') then LoadModulePath is ignored. It is allowed to include multiple LoadModule parameters.
LoadModulePath	no			Full path to location of server modules. Default depends on compilation options.
LogFile	yes, if LogType is set to file, otherwise no			Name of log file.

Parameter	Mandatory	Range	Default	Description
LogFileSize	no	0-1024	1	Maximum size of log file in MB. 0 - disable automatic log rotation. Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.
LogType	no		file	Log output type: file - write log to file specified by LogFile parameter, system - write log to syslog, console - write log to standard output. This parameter is supported since Zabbix 3.0.0.
LogSlowQueries	no	0-3600000	0	How long a database query may take before being logged (in milliseconds). 0 - don't log slow queries. This option becomes enabled starting with DebugLevel=3. This parameter is supported since Zabbix 1.8.2.
MaxHousekeeperDelete	no	0-1000000	5000	No more than 'MaxHousekeeperDelete' rows (corresponding to [tablename], [field], [value]) will be deleted per one task in one housekeeping cycle. If set to 0 then no limit is used at all. In this case you must know what you are doing, so as not to <b>overload the database!</b> <sup>2</sup> This parameter is supported since Zabbix 1.8.2 and applies only to deleting history and trends of already deleted items.
PidFile	no		/tmp/zabbix_server.pid	Name of PID file.
ProxyConfigFrequency	no	1-604800	3600	How often Zabbix server sends configuration data to a Zabbix proxy in seconds. Used only for proxies in a passive mode. This parameter is supported since Zabbix 1.8.3.
ProxyDataFrequency	no	1-3600	1	How often Zabbix server requests history data from a Zabbix proxy in seconds. Used only for proxies in a passive mode. This parameter is supported since Zabbix 1.8.3.

Parameter	Mandatory	Range	Default	Description
SNMPTrapperFile	no		/tmp/zabbix_traps.tmp	Temporary file used for passing data from SNMP trap daemon to the server. Must be the same as in zabbix_trap_receiver.pl or SNMPTT configuration file. This parameter is supported since Zabbix 2.0.0.
SocketDir	no		/tmp	Directory to store IPC sockets used by internal Zabbix services. This parameter is supported since Zabbix 3.4.0.
SourceIP	no			Source IP address for: <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix proxy and Zabbix agent;</li> <li>- agentless connections (VMware, SSH, JMX, SNMP, Telnet and simple checks);</li> <li>- HTTP agent connections;</li> <li>- script item JavaScript HTTP requests;</li> <li>- preprocessing JavaScript HTTP requests;</li> <li>- sending notification emails (connections to SMTP server);</li> <li>- webhook notifications (JavaScript HTTP connections);</li> <li>- connections to the Vault</li> </ul>
SSHKeyLocation	no			Location of public and private keys for SSH checks and actions
SSLCertLocation	no			Location of SSL client certificate files for client authentication. This parameter is used in web monitoring only and is supported since Zabbix 2.4.
SSLKeyLocation	no			Location of SSL private key files for client authentication. This parameter is used in web monitoring only and is supported since Zabbix 2.4.

Parameter	Mandatory	Range	Default	Description
SSLCALocation	no			<p>Override the location of certificate authority (CA) files for SSL server certificate verification. If not set, system-wide directory will be used.</p> <p>Note that the value of this parameter will be set as libcurl option <code>CURLOPT_CAPATH</code>. For libcurl versions before 7.42.0, this only has effect if libcurl was compiled to use OpenSSL. For more information see <a href="#">cURL web page</a>.</p> <p>This parameter is used in web monitoring since Zabbix 2.4.0 and in SMTP authentication since Zabbix 3.0.0.</p>
StartDBSyncers	no	1-100	4	<p>Number of pre-forked instances of DB Syncers.</p> <p>Note: Be careful when changing this value, increasing it may do more harm than good. Roughly, the default value should be enough to handle up to 4000 NVPS.</p> <p>The upper limit used to be 64 before version 1.8.5.</p> <p>This parameter is supported since Zabbix 1.8.3.</p>
StartAlerters	no	1-100	3	<p>Number of pre-forked instances of alerters.</p> <p>This parameter is supported since Zabbix 3.4.0.</p>
StartDiscoverers	no	0-250	1	<p>Number of pre-forked instances of discoverers.</p> <p>The upper limit used to be 255 before version 1.8.5.</p>
StartEscalators	no	1-100	1	<p>Number of pre-forked instances of escalators.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
StartHTTPOllers	no	0-1000	1	<p>Number of pre-forked instances of HTTP pollers<sup>1</sup>.</p> <p>The upper limit used to be 255 before version 1.8.5.</p>
StartIPMIPollers	no	0-1000	0	<p>Number of pre-forked instances of IPMI pollers.</p> <p>The upper limit used to be 255 before version 1.8.5.</p>
StartJavaPollers	no	0-1000	0	<p>Number of pre-forked instances of Java pollers<sup>1</sup>.</p> <p>This parameter is supported since Zabbix 2.0.0.</p>

Parameter	Mandatory	Range	Default	Description
StartLLDProcessors	no	1-100	2	Number of pre-forked instances of low-level discovery (LLD) workers <sup>1</sup> . The LLD manager process is automatically started when an LLD worker is started. This parameter is supported since Zabbix 4.2.0.
StartPingers	no	0-1000	1	Number of pre-forked instances of ICMP pingers <sup>1</sup> . The upper limit used to be 255 before version 1.8.5.
StartPollersUnreachable	no	0-1000	1	Number of pre-forked instances of pollers for unreachable hosts (including IPMI and Java) <sup>1</sup> . Since Zabbix 2.4.0, at least one poller for unreachable hosts must be running if regular, IPMI or Java pollers are started. The upper limit used to be 255 before version 1.8.5. This option is missing in version 1.8.3.
StartPollers	no	0-1000	5	Number of pre-forked instances of pollers <sup>1</sup> . Note that a non-zero value is required for internal, aggregated and calculated items to work.
StartPreprocessors	no	1-1000	3	Number of pre-forked instances of preprocessing workers <sup>1</sup> . The preprocessing manager process is automatically started when a preprocessor worker is started. This parameter is supported since Zabbix 3.4.0.
StartProxyPollers	no	0-250	1	Number of pre-forked instances of pollers for passive proxies <sup>1</sup> . The upper limit used to be 255 before version 1.8.5. This parameter is supported since Zabbix 1.8.3.
StartSNMPTrapper	no	0-1	0	If set to 1, SNMP trapper process will be started. This parameter is supported since Zabbix 2.0.0.
StartTimers	no	1-1000	1	Number of pre-forked instances of timers. Timers process maintenance periods. This parameter is supported since Zabbix 2.2.0.



Parameter	Mandatory	Range	Default	Description
StartTrappers	no	0-1000	5	Number of pre-forked instances of trappers <sup>1</sup> . Trappers accept incoming connections from Zabbix sender, active agents and active proxies. At least one trapper process must be running to display server availability and view queue in the frontend. The upper limit used to be 255 before version 1.8.5.
StartVMwareCollectors	no	0-250	0	Number of pre-forked vmware collector instances. This parameter is supported since Zabbix 2.2.0.
StatsAllowedIP	no			List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of external Zabbix instances. Stats request will be accepted only from the addresses listed here. If this parameter is not set no stats requests will be accepted. If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address. Example: StatsAllowedIP=127.0.0.1,192.168.1.0/24,::1,2001
Timeout	no	1-30	3	This parameter is supported since Zabbix 4.2.0. Specifies how long we wait for agent, SNMP device or external check (in seconds).
TLSCAFile	no			Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSCertFile	no			Full pathname of a file containing the server certificate or certificate chain, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.

Parameter	Mandatory	Range	Default	Description
TLSCipherAll	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example:            TLS_AES_256_GCM_SHA384:TLS_CHACHA20</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherAll13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:            EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherCert	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:            EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherCert13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>This parameter is supported since Zabbix 4.4.7.</p>

Parameter	Mandatory	Range	Default	Description
TLSCipherPSK	no			GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption. Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128 This parameter is supported since Zabbix 4.4.7.
TLSCipherPSK13	no			Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption. Example: TLS_CHACHA20_POLY1305_SHA256:TLS_AES This parameter is supported since Zabbix 4.4.7.
TLSCRLFile	no			Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSKeyFile	no			Full pathname of a file containing the server private key, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TmpDir	no		/tmp	Temporary directory.
TrapperTimeout	no	1-300	300	Specifies how many seconds trapper may spend processing new data.
TrendCacheSize	no	128K-2G	4M	Size of trend cache, in bytes. Shared memory size for storing trends data.
UnavailableDelay	no	1-3600	60	How often host is checked for availability during the <b>unavailability</b> period, in seconds.
UnreachableDelay	no	1-3600	15	How often host is checked for availability during the <b>unreachability</b> period, in seconds.
UnreachablePeriod	no	1-3600	45	After how many seconds of <b>unreachability</b> treat a host as unavailable.

Parameter	Mandatory	Range	Default	Description
User	no		zabbix	Drop privileges to a specific, existing user on the system. Only has effect if run as 'root' and AllowRoot is disabled. This parameter is supported since Zabbix 2.4.0.
ValueCacheSize	no	0,128K-64G	8M	Size of history value cache, in bytes. Shared memory size for caching item history data requests. Setting to 0 disables value cache (not recommended). When value cache runs out of the shared memory a warning message is written to the server log every 5 minutes. This parameter is supported since Zabbix 2.2.0.
VaultDBPath	no			Vault path from where credentials for database will be retrieved by keys 'password' and 'username'. Example: secret/zabbix/database This option can only be used if DBUser and DBPassword are not specified. This parameter is supported since Zabbix 5.2.0.
VaultToken	no			Vault authentication token that should have been generated exclusively for Zabbix server with read-only permission to the paths specified in <b>Vault macros</b> and read-only permission to the path specified in the optional VaultDBPath configuration parameter. It is an error if VaultToken and VAULT_TOKEN environment variable are defined at the same time. This parameter is supported since Zabbix 5.2.0.
VaultURL	no		https://127.0.0.1:8200	Vault server HTTP[S] URL. System-wide CA certificates directory will be used if SSLCAlocation is not specified. This parameter is supported since Zabbix 5.2.0.

Parameter	Mandatory	Range	Default	Description
VMwareCacheSize	no	256K-2G	8M	Shared memory size for storing VMware data. A VMware internal check <code>zabbix[vmware,buffer,...]</code> can be used to monitor the VMware cache usage (see <a href="#">Internal checks</a> ). Note that shared memory is not allocated if there are no vmware collector instances configured to start. This parameter is supported since Zabbix 2.2.0.
VMwareFrequency	no	10-86400	60	Delay in seconds between data gathering from a single VMware service. This delay should be set to the least update interval of any VMware monitoring item. This parameter is supported since Zabbix 2.2.0.
VMwarePerfFrequency	no	10-86400	60	Delay in seconds between performance counter statistics retrieval from a single VMware service. This delay should be set to the least update interval of any VMware monitoring <code>item</code> that uses VMware performance counters. This parameter is supported since Zabbix 2.2.9, 2.4.4
VMwareTimeout	no	1-300	10	The maximum number of seconds vmware collector will wait for a response from VMware service (vCenter or ESX hypervisor). This parameter is supported since Zabbix 2.2.9, 2.4.4

#### Footnotes

<sup>1</sup> Note that too many data gathering processes (pollers, unreachable pollers, HTTP pollers, Java pollers, pingers, trappers, proxy-pollers) together with IPMI manager, SNMP trapper and preprocessing workers can **exhaust** the per-process file descriptor limit for the preprocessing manager.

#### **Warning:**

This will cause Zabbix server to stop (usually shortly after the start, but sometimes it can take more time). The configuration file should be revised or the limit should be raised to avoid this situation.

<sup>2</sup> When a lot of items are deleted it increases the load to the database, because the housekeeper will need to remove all the history data that these items had. For example, if we only have to remove 1 item prototype, but this prototype is linked to 50 hosts and for every host the prototype is expanded to 100 real items, 5000 items in total have to be removed (1\*50\*100). If 500 is set for `MaxHousekeeperDelete` (`MaxHousekeeperDelete=500`), the housekeeper process will have to remove up to 2500000 values (5000\*500) for the deleted items from history and trends tables in one cycle.

## 2 Zabbix proxy

### Overview

This section lists parameters supported in a Zabbix proxy configuration file (`zabbix_proxy.conf`). Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with “#” are only supported in the beginning of the line.

#### Parameters

Parameter	Mandatory	Range	Default	Description
AllowRoot	no		0	Allow the proxy to run as 'root'. If disabled and the proxy is started by 'root', the proxy will try to switch to the 'zabbix' user instead. Has no effect if started under a regular user. 0 - do not allow 1 - allow This parameter is supported since Zabbix 2.2.0.
CacheSize	no	128K-64G	8M	Size of configuration cache, in bytes. Shared memory size, for storing host and item data.
ConfigFrequency	no	1-604800	3600	How often proxy retrieves configuration data from Zabbix server in seconds. Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).
DataSenderFrequency	no	1-3600	1	Proxy will send collected data to the server every N seconds. Note that active proxy will still poll Zabbix server every second for remote command tasks. Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).
DBHost	no		localhost	Database host name. In case of MySQL localhost or empty string results in using a socket. In case of PostgreSQL only empty string results in attempt to use socket.
DBName	yes			Database name or path to database file for SQLite3 (multi-process architecture of Zabbix does not allow to use <a href="#">in-memory database</a> , e.g. <code>:memory:</code> , <code>file::memory:?cache=shared</code> or <code>file:memdb1?mode=memory&amp;cache=sha</code> )
DBPassword	no			Warning: Do not attempt to use the same database Zabbix server is using. Database password. Ignored for SQLite. Comment this line if no password is used.
DBSchema	no			Schema name. Used for PostgreSQL.

Parameter	Mandatory	Range	Default	Description
DBSocket	no		3306	Path to MySQL socket. Database port when not using local socket. Ignored for SQLite.
DBUser				Database user. Ignored for SQLite.
DBTLSConnect	no			Setting this option enforces to use TLS connection to database: required - connect using TLS verify_ca - connect using TLS and verify certificate verify_full - connect using TLS, verify certificate and verify that database identity specified by DBHost matches its certificate  On MySQL starting from 5.7.11 and PostgreSQL the following values are supported: "required", "verify", "verify_full". On MariaDB starting from version 10.2.6 "required" and "verify_full" values are supported. By default not set to any option and the behavior depends on database configuration.
DBTLSCAFile	no (yes, if DBTLSConnect set to one of: verify_ca, verify_full)			This parameter is supported since Zabbix 5.0.0. Full pathname of a file containing the top-level CA(s) certificates for database certificate verification. This parameter is supported since Zabbix 5.0.0.
DBTLSCertFile	no			Full pathname of file containing Zabbix server certificate for authenticating to database. This parameter is supported since Zabbix 5.0.0.
DBTLSKeyFile	no			Full pathname of file containing the private key for authenticating to database. This parameter is supported since Zabbix 5.0.0.
DBTLSCipher	no			The list of encryption ciphers that Zabbix server permits for TLS protocols up through TLSv1.2. Supported only for MySQL. This parameter is supported since Zabbix 5.0.0.

Parameter	Mandatory	Range	Default	Description
DBTLSCipher13	no			The list of encryption ciphersuites that Zabbix server permits for TLSv1.3 protocol. Supported only for MySQL, starting from version 8.0.16. This parameter is supported since Zabbix 5.0.0.
DebugLevel	no	0-5	3	Specifies debug level: 0 - basic information about starting and stopping of Zabbix processes 1 - critical information 2 - error information 3 - warnings 4 - for debugging (produces lots of information) 5 - extended debugging (produces even more information)
EnableRemoteCommands	no		0	Whether remote commands from Zabbix server are allowed. 0 - not allowed 1 - allowed This parameter is supported since Zabbix 3.4.0.
ExternalScripts	no		/usr/local/share/zabbix/external/scripts	Location of external scripts (depends on compile-time installation variable datadir).
Fping6Location	no		/usr/sbin/fping6	Location of fping6. Make sure that fping6 binary has root ownership and SUID flag set. Make empty ("Fping6Location=") if your fping utility is capable to process IPv6 addresses.
FpingLocation	no		/usr/sbin/fping	Location of fping. Make sure that fping binary has root ownership and SUID flag set!
HeartbeatFrequency	no	0-3600	60	Frequency of heartbeat messages in seconds. Used for monitoring availability of proxy on server side. 0 - heartbeat messages disabled. Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).
HistoryCacheSize	no	128K-2G	16M	Size of history cache, in bytes. Shared memory size for storing history data.



Parameter	Mandatory	Range	Default	Description
HistoryIndexCacheSize	no	128K-2G	4M	<p>Size of history index cache, in bytes.</p> <p>Shared memory size for indexing history data stored in history cache.</p> <p>The index cache size needs roughly 100 bytes to cache one item.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
Hostname	no		Set by HostnameItem	<p>Unique, case sensitive Proxy name. Make sure the proxy name is known to the server!</p> <p>Allowed characters: alphanumeric, '.', '_', '-' and '-'. Maximum length: 128</p>
HostnameItem	no		system.hostname	<p>Item used for setting Hostname if it is undefined (this will be run on the proxy similarly as on an agent).</p> <p>Does not support UserParameters, performance counters or aliases, but does support system.run[].</p> <p>Ignored if Hostname is set.</p> <p>This parameter is supported since Zabbix 1.8.6.</p>

Parameter	Mandatory	Range	Default	Description
HousekeepingFrequency	no	0-24	1	<p>How often Zabbix will perform housekeeping procedure (in hours). Housekeeping is removing outdated information from the database.</p> <p>Note: To prevent housekeeper from being overloaded (for example, when configuration parameters ProxyLocalBuffer or ProxyOfflineBuffer are greatly reduced), no more than 4 times HousekeepingFrequency hours of outdated information are deleted in one housekeeping cycle. Thus, if HousekeepingFrequency is 1, no more than 4 hours of outdated information (starting from the oldest entry) will be deleted per cycle.</p> <p>Note: To lower load on proxy startup housekeeping is postponed for 30 minutes after proxy start. Thus, if HousekeepingFrequency is 1, the very first housekeeping procedure after proxy start will run after 30 minutes, and will repeat every hour thereafter. This postponing behavior is in place since Zabbix 2.4.0.</p> <p>Since Zabbix 3.0.0 it is possible to disable automatic housekeeping by setting HousekeepingFrequency to 0. In this case the housekeeping procedure can only be started by housekeeper_execute runtime control option and the period of outdated information deleted in one housekeeping cycle is 4 times the period since the last housekeeping cycle, but not less than 4 hours and not greater than 4 days.</p>

Parameter	Mandatory	Range	Default	Description
Include	no			You may include individual files or all files in a directory in the configuration file. To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: <code>/absolute/path/to/config/files/*.</code> Pattern matching is supported since Zabbix 2.4.0. See <a href="#">special notes</a> about limitations.
JavaGateway	no			IP address (or hostname) of Zabbix Java gateway. Only required if Java pollers are started. This parameter is supported since Zabbix 2.0.0.
JavaGatewayPort	no	1024-32767	10052	Port that Zabbix Java gateway listens on. This parameter is supported since Zabbix 2.0.0.
ListenIP	no		0.0.0.0	List of comma delimited IP addresses that the trapper should listen on. Trapper will listen on all network interfaces if this parameter is missing. Multiple IP addresses are supported since Zabbix 1.8.3.
ListenPort	no	1024-32767	10051	Listen port for trapper.
LoadModule	no			Module to load at proxy startup. Modules are used to extend functionality of the proxy. Formats: LoadModule=<module.so> LoadModule=<path/module.so> LoadModule=</abs_path/module.so> Either the module must be located in directory specified by LoadModulePath or the path must precede the module name. If the preceding path is absolute (starts with '/') then LoadModulePath is ignored. It is allowed to include multiple LoadModule parameters.
LoadModulePath	no			Full path to location of proxy modules. Default depends on compilation options.
LogFile	yes, if LogType is set to file, otherwise no			Name of log file.

Parameter	Mandatory	Range	Default	Description
LogFileSize	no	0-1024	1	Maximum size of log file in MB. 0 - disable automatic log rotation. Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.
LogRemoteCommands	no		0	Enable logging of executed shell commands as warnings. 0 - disabled 1 - enabled This parameter is supported since Zabbix 3.4.0.
LogType	no		file	Log output type: file - write log to file specified by LogFile parameter, system - write log to syslog, console - write log to standard output. This parameter is supported since Zabbix 3.0.0.
LogSlowQueries	no	0-3600000	0	How long a database query may take before being logged (in milliseconds). 0 - don't log slow queries. This option becomes enabled starting with DebugLevel=3. This parameter is supported since Zabbix 1.8.2.
PidFile	no		/tmp/zabbix_proxy.pid	Name of PID file.
ProxyLocalBuffer	no	0-720	0	Proxy will keep data locally for N hours, even if the data have already been synced with the server. This parameter may be used if local data will be used by third party applications.
ProxyMode	no	0-1	0	Proxy operating mode. 0 - proxy in the active mode 1 - proxy in the passive mode This parameter is supported since Zabbix 1.8.3. Note that (sensitive) proxy configuration data may become available to parties having access to the Zabbix server trapper port when using an active proxy. This is possible because anyone may pretend to be an active proxy and request configuration data; authentication does not take place.
ProxyOfflineBuffer	no	1-720	1	Proxy will keep data for N hours in case of no connectivity with Zabbix server. Older data will be lost.

Parameter	Mandatory	Range	Default	Description
ServerPort	no	1024-32767	10051	Port of Zabbix trapper on Zabbix server. Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter). If ProxyMode is set to active mode: IP address or DNS name of Zabbix server to get configuration data from and send data to.
Server	yes			If ProxyMode is set to passive mode: List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix server. Incoming connections will be accepted only from the addresses listed here. If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address. Example: Server=127.0.0.1,192.168.1.0/24,::1,2001:
SNMPTrapperFile	no		/tmp/zabbix_traps.tmp	Temporary file used for passing data from SNMP trap daemon to the proxy. Must be the same as in zabbix_trap_receiver.pl or SNMPTT configuration file. This parameter is supported since Zabbix 2.0.0.
SocketDir	no		/tmp	Directory to store IPC sockets used by internal Zabbix services. This parameter is supported since Zabbix 3.4.0.
SourceIP	no			Source IP address for: - outgoing connections to Zabbix server; - agentless connections (VMware, SSH, JMX, SNMP, Telnet and simple checks); - HTTP agent connections; - script item JavaScript HTTP requests; - preprocessing JavaScript HTTP requests; - connections to the Vault
SSHKeyLocation	no			Location of public and private keys for SSH checks and actions

Parameter	Mandatory	Range	Default	Description
SSLCertLocation	no			Location of SSL client certificate files for client authentication. This parameter is used in web monitoring only and is supported since Zabbix 2.4.0.
SSLKeyLocation	no			Location of SSL private key files for client authentication. This parameter is used in web monitoring only and is supported since Zabbix 2.4.0.
SSLCALocation	no			Location of certificate authority (CA) files for SSL server certificate verification. Note that the value of this parameter will be set as libcurl option CURLOPT_CAPATH. For libcurl versions before 7.42.0, this only has effect if libcurl was compiled to use OpenSSL. For more information see <a href="#">cURL web page</a> . This parameter is used in web monitoring since Zabbix 2.4.0 and in SMTP authentication since Zabbix 3.0.0.
StartDBSyncers	no	1-100	4	Number of pre-forked instances of DB Syncers. Note: Be careful when changing this value, increasing it may do more harm than good. The upper limit used to be 64 before version 1.8.5. This parameter is supported since Zabbix 1.8.3.
StartDiscoverers	no	0-250	1	Number of pre-forked instances of discoverers. The upper limit used to be 255 before version 1.8.5.
StartHTTTPollers	no	0-1000	1	Number of pre-forked instances of HTTP pollers.
StartIPMIPollers	no	0-1000	0	Number of pre-forked instances of IPMI pollers. The upper limit used to be 255 before version 1.8.5.
StartJavaPollers	no	0-1000	0	Number of pre-forked instances of Java pollers. This parameter is supported since Zabbix 2.0.0.
StartPingers	no	0-1000	1	Number of pre-forked instances of ICMP pingers. The upper limit used to be 255 before version 1.8.5.

Parameter	Mandatory	Range	Default	Description
StartPollersUnreachable	no	0-1000	1	Number of pre-forked instances of pollers for unreachable hosts (including IPMI and Java). Since Zabbix 2.4.0, at least one poller for unreachable hosts must be running if regular, IPMI or Java pollers are started. The upper limit used to be 255 before version 1.8.5. This option is missing in version 1.8.3.
StartPollers	no	0-1000	5	Number of pre-forked instances of pollers. The upper limit used to be 255 before version 1.8.5.
StartPreprocessors	no	1-1000	3	Number of pre-forked instances of preprocessing workers <sup>1</sup> . The preprocessing manager process is automatically started when a preprocessor worker is started. This parameter is supported since Zabbix 4.2.0.
StartSNMPTrapper	no	0-1	0	If set to 1, SNMP trapper process will be started. This parameter is supported since Zabbix 2.0.0.
StartTrappers	no	0-1000	5	Number of pre-forked instances of trappers. Trappers accept incoming connections from Zabbix sender and active agents. The upper limit used to be 255 before version 1.8.5.
StartVMwareCollectors	no	0-250	0	Number of pre-forked vmware collector instances. This parameter is supported since Zabbix 2.2.0.
StatsAllowedIP	no			List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of external Zabbix instances. Stats request will be accepted only from the addresses listed here. If this parameter is not set no stats requests will be accepted. If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address. Example: StatsAllowedIP=127.0.0.1,192.168.1.0/24,::1,2001: This parameter is supported since Zabbix 4.2.0.

Parameter	Mandatory	Range	Default	Description
Timeout	no	1-30	3	Specifies how long we wait for agent, SNMP device or external check (in seconds).
TLSAccept	yes for passive proxy, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			What incoming connections to accept from Zabbix server. Used for a passive proxy, ignored on an active proxy. Multiple values can be specified, separated by comma: unencrypted - accept connections without encryption (default) psk - accept connections with TLS and a pre-shared key (PSK) cert - accept connections with TLS and a certificate This parameter is supported since Zabbix 3.0.0.
TLSCAFile	no			Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLS_CERTIFICATE_FILE	no			Full pathname of a file containing the proxy certificate or certificate chain, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLS_CIPHERSUITES	no			GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption. Example: TLS_AES_256_GCM_SHA384:TLS_CHACHA20 This parameter is supported since Zabbix 4.4.7.



Parameter	Mandatory	Range	Default	Description
TLSCipherAll13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL::+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:            EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherCert	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:            EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherCert13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherPSK	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL</p> <p>Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>

Parameter	Mandatory	Range	Default	Description
TLSCipherPSK13	no			Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption. Example: TLS_CHACHA20_POLY1305_SHA256:TLS_AES This parameter is supported since Zabbix 4.4.7.
TLSCConnect	yes for active proxy, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			How the proxy should connect to Zabbix server. Used for an active proxy, ignored on a passive proxy. Only one value can be specified: unencrypted - connect without encryption (default) psk - connect using TLS and a pre-shared key (PSK) cert - connect using TLS and a certificate This parameter is supported since Zabbix 3.0.0.
TLSCRLFile	no			Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSKeyFile	no			Full pathname of a file containing the proxy private key, used for encrypted communications between Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSPSKFile	no			Full pathname of a file containing the proxy pre-shared key, used for encrypted communications with Zabbix server. This parameter is supported since Zabbix 3.0.0.
TLSPSKIdentity	no			Pre-shared key identity string, used for encrypted communications with Zabbix server. This parameter is supported since Zabbix 3.0.0.
TLSSEServerCertIssuer	no			Allowed server certificate issuer. This parameter is supported since Zabbix 3.0.0.
TLSSEServerCertSubject	no			Allowed server certificate subject. This parameter is supported since Zabbix 3.0.0.
TmpDir	no		/tmp	Temporary directory.

Parameter	Mandatory	Range	Default	Description
TrapperTimeout	no	1-300	300	Specifies how many seconds trapper may spend processing new data.
User	no		zabbix	Drop privileges to a specific, existing user on the system. Only has effect if run as 'root' and AllowRoot is disabled. This parameter is supported since Zabbix 2.4.0.
UnavailableDelay	no	1-3600	60	How often host is checked for availability during the <b>unavailability</b> period, in seconds.
UnreachableDelay	no	1-3600	15	How often host is checked for availability during the <b>unreachability</b> period, in seconds.
UnreachablePeriod	no	1-3600	45	After how many seconds of <b>unreachability</b> treat a host as unavailable.
VaultDBPath	no			Vault path from where credentials for database will be retrieved by keys 'password' and 'username'. Example: secret/zabbix/database This option can only be used if DBUser and DBPassword are not specified. This parameter is supported since Zabbix 5.2.0.
VaultToken	no			Vault authentication token that should have been generated exclusively for Zabbix proxy with read-only permission to the path specified in the optional VaultDBPath configuration parameter. It is an error if VaultToken and VAULT_TOKEN environment variable are defined at the same time. This parameter is supported since Zabbix 5.2.0.
VaultURL	no		https://127.0.0.1:8200	Vault server HTTP[S] URL. System-wide CA certificates directory will be used if SSLCAlocation is not specified. This parameter is supported since Zabbix 5.2.0.

Parameter	Mandatory	Range	Default	Description
VMwareCacheSize	no	256K-2G	8M	Shared memory size for storing VMware data. A VMware internal check <code>zabbix[vmware,buffer,...]</code> can be used to monitor the VMware cache usage (see <a href="#">Internal checks</a> ). Note that shared memory is not allocated if there are no vmware collector instances configured to start. This parameter is supported since Zabbix 2.2.0.
VMwareFrequency	no	10-86400	60	Delay in seconds between data gathering from a single VMware service. This delay should be set to the least update interval of any VMware monitoring item. This parameter is supported since Zabbix 2.2.0.
VMwarePerfFrequency	no	10-86400	60	Delay in seconds between performance counter statistics retrieval from a single VMware service. This delay should be set to the least update interval of any VMware monitoring <a href="#">item</a> that uses VMware performance counters. This parameter is supported since Zabbix 2.2.9, 2.4.4.
VMwareTimeout	no	1-300	10	The maximum number of seconds vmware collector will wait for a response from VMware service (vCenter or ESX hypervisor). This parameter is supported since Zabbix 2.2.9, 2.4.4.

### 3 Zabbix agent (UNIX)

#### Overview

This section lists parameters supported in a Zabbix agent configuration file (`zabbix_agentd.conf`). Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with `"#"` are only supported in the beginning of the line.

#### Parameters

Parameter	Mandatory	Range	Default	Description
Alias	no			<p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one.</p> <p>Multiple Alias parameters may be present. Multiple parameters with the same Alias key are allowed. Different Alias keys may reference the same item key. Aliases can be used in HostMetadataltem but not in HostnameItem parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the ID of user 'zabbix'. Alias=zabbix.userid:vfs.file.regex[/etc/passw9]+)"",\1] Now shorthand key <b>zabbix.userid</b> may be used to retrieve data.</li> <li>Getting CPU utilization with default and custom parameters. Alias=cpu.util:system.cpu.util Alias=cpu.util[*]:system.cpu.util[*] This allows use <b>cpu.util</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.util[all, idle, avg15]</b> to get specific data about CPU utilization.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items. Alias=vfs.fs.discovery[*]:vfs.fs.discovery Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.</li> </ol>

Parameter	Mandatory	Range	Default	Description
AllowKey	no			<p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a>.</p>
AllowRoot	no		0	<p>Allow the agent to run as 'root'. If disabled and the agent is started by 'root', the agent will try to switch to user 'zabbix' instead. Has no effect if started under a regular user.</p> <p>0 - do not allow 1 - allow</p>
BufferSend	no	1-3600	5	<p>Do not keep data longer than N seconds in buffer.</p>
BufferSize	no	2-65535	100	<p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.</p>
DebugLevel	no	0-5	3	<p>Specifies debug level:</p> <p>0 - basic information about starting and stopping of Zabbix processes 1 - critical information 2 - error information 3 - warnings 4 - for debugging (produces lots of information) 5 - extended debugging (produces even more information)</p>

Parameter	Mandatory	Range	Default	Description
DenyKey	no			Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a> .
EnableRemoteCommands	no		0	Whether remote commands from Zabbix server are allowed. This parameter is <b>deprecated</b> , use AllowKey=system.run[*] or DenyKey=system.run[*] instead It is internal alias for AllowKey/DenyKey parameters depending on value: 0 - DenyKey=system.run[*] 1 - AllowKey=system.run[*]
HostInterface	no	0-255 characters		Optional parameter that defines host interface. Host interface is used at host <a href="#">autoregistration</a> process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem. Supported since Zabbix 4.4.0.
HostInterfaceItem	no			Optional parameter that defines an item used for getting host interface. Host interface is used at host <a href="#">autoregistration</a> process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.

Parameter	Mandatory	Range	Default	Description
HostMetadata	no	0-255 characters		<p>Optional parameter that defines host metadata. Host metadata is used only at host autoregistration process (active agent).</p> <p>If not defined, the value will be acquired from HostMetadataItem.</p> <p>An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string.</p> <p>This option is supported in version 2.2.0 and higher.</p>
HostMetadataItem	no			<p>Optional parameter that defines a Zabbix agent item used for getting host metadata. This option is only used when HostMetadata is not defined.</p> <p>Supports UserParameters and aliases. Supports system.run[] regardless of AllowKey/DenyKey values. HostMetadataItem value is retrieved on each autoregistration attempt and is used only at host autoregistration process (active agent).</p> <p>During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters.</p> <p>The value returned by the item must be a UTF-8 string otherwise it will be ignored.</p> <p>This option is supported in version 2.2.0 and higher.</p>
Hostname	no		Set by HostnameItem	<p>List of comma-delimited unique, case-sensitive hostnames.</p> <p>Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined.</p> <p>Allowed characters: alphanumeric, '.', '_', '-' and '-'. Maximum length: 128 characters per hostname, 2048 characters for the entire line.</p>



Parameter	Mandatory	Range	Default	Description
HostnameItem	no		system.hostname	Optional parameter that defines a Zabbix agent item used for getting host name. This option is only used when Hostname is not defined. Does not support UserParameters or aliases, but does support system.run[] regardless of AllowKey/DenyKey values. The output length is limited to 512KB.
Include	no			You may include individual files or all files in a directory in the configuration file. To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: /absolute/path/to/config/files/*. Pattern matching is supported since Zabbix 2.4.0. See <a href="#">special notes</a> about limitations.
ListenIP	no		0.0.0.0	List of comma delimited IP addresses that the agent should listen on. Multiple IP addresses are supported in version 1.8.3 and higher.
ListenPort	no	1024-32767	10050	Agent will listen on this port for connections from the server.
LoadModule	no			Module to load at agent startup. Modules are used to extend functionality of the agent. Formats: LoadModule=<module.so> LoadModule=<path/module.so> LoadModule=</abs_path/module.so> Either the module must be located in directory specified by LoadModulePath or the path must precede the module name. If the preceding path is absolute (starts with '/') then LoadModulePath is ignored. It is allowed to include multiple LoadModule parameters.
LoadModulePath	no			Full path to location of agent modules. Default depends on compilation options.
LogFile	yes, if LogType is set to file, otherwise no			Name of log file.

Parameter	Mandatory	Range	Default	Description
LogFileSize	no	0-1024	1	Maximum size of log file in MB. 0 - disable automatic log rotation. Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.
LogType	no		file	Log output type: file - write log to file specified by LogFile parameter, system - write log to syslog, console - write log to standard output. This parameter is supported since Zabbix 3.0.0.
LogRemoteCommands	no		0	Enable logging of executed shell commands as warnings. 0 - disabled 1 - enabled Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataltem, HostInterfaceltem or HostnameItem parameters.
MaxLinesPerSecond	no	1-1000	20	Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log' and 'eventlog' active checks. The provided value will be overridden by the parameter 'maxlines', provided in 'log' or 'eventlog' item key. Note: Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.
PidFile	no		/tmp/zabbix_agentd.pid	Name of PID file.
RefreshActiveChecks	no	60-3600	120	How often list of active checks is refreshed, in seconds. Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.

Parameter	Mandatory	Range	Default	Description
Server	yes, if StartAgents is not explicitly set to 0			<p>List of comma delimited IP addresses, optionally in CIDR notation, or hostnames of Zabbix servers and Zabbix proxies.</p> <p>Incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.</p> <p>'0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Note, that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by <a href="#">RFC4291</a>.</p> <p>Example: Server=127.0.0.1,192.168.1.0/24,::1,2001::</p>
ServerActive	no			<p>Spaces are allowed.</p> <p>IP;port (or hostname:port) of Zabbix server or Zabbix proxy for active checks.</p> <p>Multiple comma-delimited addresses can be provided to use several independent Zabbix servers in parallel.</p> <p>Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p>
SourceIP	no			<p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>
StartAgents	no	0-100	3	<p>Number of pre-forked instances of zabbix_agentd that process passive checks.</p> <p>If set to 0, disables passive checks and the agent will not listen on any TCP port.</p> <p>The upper limit used to be 16 before version 1.8.5.</p>
Timeout	no	1-30	3	<p>Spend no more than Timeout seconds on processing.</p>

Parameter	Mandatory	Range	Default	Description
TLSAccept	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			<p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <p>unencrypted - accept connections without encryption (default)</p> <p>psk - accept connections with TLS and a pre-shared key (PSK)</p> <p>cert - accept connections with TLS and a certificate</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCAFile	no			<p>Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCertFile	no			<p>Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCipherAll	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example:</p> <p>TLS_AES_256_GCM_SHA384:TLS_CHACHA20</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherAll13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example for GnuTLS:</p> <p>NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NUL::+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:</p> <p>EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>

Parameter	Mandatory	Range	Default	Description
TLSCipherCert	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL:            EECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherCert13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherPSK	no			<p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption.</p> <p>Example for GnuTLS:            NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL</p> <p>Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>
TLSCipherPSK13	no			<p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption.</p> <p>Example:            TLS_CHACHA20_POLY1305_SHA256:TLS_AES</p> <p>This parameter is supported since Zabbix 4.4.7.</p>

Parameter	Mandatory	Range	Default	Description
TLSCConnect	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified: unencrypted - connect without encryption (default) psk - connect using TLS and a pre-shared key (PSK) cert - connect using TLS and a certificate This parameter is supported since Zabbix 3.0.0.
TLSCRLFile	no			Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSKeyFile	no			Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSPSKFile	no			Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSPSKIdentity	no			Pre-shared key identity string, used for encrypted communications with Zabbix server. This parameter is supported since Zabbix 3.0.0.
TLSServerCertIssuer	no			Allowed server (proxy) certificate issuer. This parameter is supported since Zabbix 3.0.0.
TLSServerCertSubject	no			Allowed server (proxy) certificate subject. This parameter is supported since Zabbix 3.0.0.
UnsafeUserParameters	no	0,1	0	Allow all characters to be passed in arguments to user-defined parameters. 0 - do not allow 1 - allow The following characters are not allowed: \ ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @ Additionally, newline characters are not allowed. Supported since Zabbix 1.8.2.

Parameter	Mandatory	Range	Default	Description
User	no		zabbix	Drop privileges to a specific, existing user on the system. Only has effect if run as 'root' and AllowRoot is disabled. This parameter is supported since Zabbix 2.4.0.
UserParameter	no			User-defined parameter to monitor. There can be several user-defined parameters. Format: UserParameter=<key>,<shell command> Note that shell command must not return empty string or EOL only. Shell commands may have relative paths, if UserParameterDir parameter is specified. Examples: UserParameter=system.test,who wc -l
UserParameterDir	no			UserParameter=check_cpu,./custom_script. Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path. Only one entry is allowed. Example: UserParameterDir=/opt/myscripts

See also

1. [Differences in the Zabbix agent configuration for active and passive checks starting from version 2.0.0](#)

## 4 Zabbix agent 2 (UNIX)

### Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent.

This section lists parameters supported in a Zabbix agent 2 configuration file (zabbix\_agent2.conf). Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with "#" are only supported in the beginning of the line.

### Parameters

Parameter	Mandatory	Range	Default	Description
Alias	no			<p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one.</p> <p>Multiple Alias parameters may be present. Multiple parameters with the same Alias key are allowed. Different Alias keys may reference the same item key.</p> <p>Aliases can be used in HostMetadataItem but not in HostNameItem parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the ID of user 'zabbix'. Alias=zabbix.userid:vfs.file.regexp[/etc/passwd/9]+)"/",\1] Now shorthand key <b>zabbix.userid</b> may be used to retrieve data.</li> <li>Getting CPU utilization with default and custom parameters. Alias=cpu.util:system.cpu.util Alias=cpu.util[*]:system.cpu.util[*] This allows use <b>cpu.util</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.util[all, idle, avg15]</b> to get specific data about CPU utilization.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items. Alias=vfs.fs.discovery[*]:vfs.fs.discovery Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.</li> </ol>



Parameter	Mandatory	Range	Default	Description
AllowKey	no			<p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.</p> <p>Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.</p> <p>This parameter is supported since Zabbix 5.0.0.</p> <p>See also: <a href="#">Restricting agent checks</a>.</p>
BufferSend	no	1-3600	5	<p>The time interval in seconds which determines how often values are sent from the buffer to Zabbix server.</p> <p>Note, that if the buffer is full, the data will be sent sooner.</p>
BufferSize	no	2-65535	100	<p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.</p> <p>This parameter should only be used if persistent buffer is disabled (EnablePersistentBuffer=0).</p>
ControlSocket	no		/tmp/agent.sock	<p>The control socket, used to send runtime commands with '-R' option.</p>
DebugLevel	no	0-5	3	<p>Specifies debug level:</p> <ul style="list-style-type: none"> <li>0 - basic information about starting and stopping of Zabbix processes</li> <li>1 - critical information</li> <li>2 - error information</li> <li>3 - warnings</li> <li>4 - for debugging (produces lots of information)</li> <li>5 - extended debugging (produces even more information)</li> </ul>

Parameter	Mandatory	Range	Default	Description
DenyKey	no			Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a> .
EnablePersistentBuffer	no	0-1	0	Enable usage of local persistent storage for active items. 0 - disabled 1 - enabled If persistent storage is disabled, the memory buffer will be used.
HostInterface	no	0-255 characters		Optional parameter that defines host interface. Host interface is used at host autoregistration process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem. Supported since Zabbix 4.4.0.
HostInterfaceItem	no			Optional parameter that defines an item used for getting host interface. Host interface is used at host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.

Parameter	Mandatory	Range	Default	Description
HostMetadata	no	0-255 characters		Optional parameter that defines host metadata. Host metadata is used at host autoregistration process. An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string. If not defined, the value will be acquired from HostMetadataItem.
HostMetadataItem	no			Optional parameter that defines an item used for getting host metadata. Host metadata item value is retrieved on each autoregistration attempt for host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters. This option is only used when HostMetadata is not defined. Supports UserParameters and aliases. Supports system.run[] regardless of AllowKey/DenyKey values. The value returned by the item must be a UTF-8 string otherwise it will be ignored.
Hostname	no		Set by HostnameItem	List of comma-delimited unique, case-sensitive hostnames. Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined. Allowed characters: alphanumeric, '.', '-', '_' and '-'. Maximum length: 128 characters per hostname, 2048 characters for the entire line.
HostnameItem	no		system.hostname	Item used for generating Hostname if it is not defined. Ignored if Hostname is defined. Does not support UserParameters or aliases, but does support system.run[] regardless of AllowKey/DenyKey values. The output length is limited to 512KB.

Parameter	Mandatory	Range	Default	Description
Include	no			<p>You may include individual files or all files in a directory in the configuration file. During installation Zabbix will create the include directory in <code>/usr/local/etc</code>, unless modified during the compile time.</p> <p>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example:  <code>/absolute/path/to/config/files/*</code></p> <p>See <a href="#">special notes</a> about limitations.</p>
ListenIP	no		0.0.0.0	<p>List of comma-delimited IP addresses that the agent should listen on.</p> <p>The first IP address is sent to Zabbix server, if connecting to it, to retrieve the list of active checks.</p>
ListenPort	no	1024-32767	10050	<p>Agent will listen on this port for connections from the server.</p>
LogFile	yes, if LogType is set to file, otherwise no		<code>/tmp/zabbix_agent2.log</code>	<p>Log file name if LogType is 'file'.</p>
LogFileSize	no	0-1024	1	<p>Maximum size of log file in MB.</p> <p>0 - disable automatic log rotation.</p> <p>Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.</p>
LogType	no		file	<p>Specifies where log messages are written to:  system - syslog,  file - file specified by LogFile parameter,  console - standard output.</p>
PersistentBufferFile	no			<p>The file, where Zabbix Agent2 should keep SQLite database.</p> <p>Must be a full filename.</p> <p>This parameter is only used if persistent buffer is enabled  (EnablePersistentBuffer=1).</p>

Parameter	Mandatory	Range	Default	Description
PersistentBufferPeriod	no	1m-365d	1h	The time period for which data should be stored, when there is no connection to the server or proxy. Older data will be lost. Log data will be preserved. This parameter is only used if persistent buffer is enabled (EnablePersistentBuffer=1).
PidFile	no		/tmp/zabbix_agent2.pid	Name of PID file.
Plugins	no			A plugin can have one or more plugin-specific configuration parameters in the format: Plugins.<PluginName>.<Parameter1>=<Value1> Plugins.<PluginName>.<Parameter2>=<Value2>
	no	<PluginName>.KeepAlive60-900	300	The maximum time of waiting (in seconds) before unused plugin connections are closed. Supported for the following plugins: Ceph, Memcached, MongoDB, MySQL, Oracle, Redis, PostgreSQL. <b>&lt;PluginName&gt;</b> - name of the plugin. Example: Plugins.Memcached.KeepAlive=200
	no	<PluginName>.Timeout1-30	global timeout	Request execution timeout (how long to wait for a request to complete before shutting it down). Supported for the following plugins: Docker, Memcached, Modbus, MongoDB, MQTT, MySQL, Redis, PostgreSQL, Smart.
	no	Ceph.InsecureSkipVerifyfalse / true	false	Determines whether an http client should verify the server's certificate chain and host name. If true, TLS accepts any certificate presented by the server and any host name in that certificate. In this mode, TLS is susceptible to man-in-the-middle attacks (should be used only for testing).
	no	Docker.Endpoint	unix:///var/run/docker.sock	Docker daemon unix-socket location. Must contain a scheme (only unix:// is supported).

Parameter	Mandatory	Range	Default	Description
PluginsLog.MaxLinesPerSecond		1-1000	20	<p>Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log' and 'eventlog' active checks.</p> <p>The provided value will be overridden by the parameter 'maxlines', provided in 'log' or 'eventlog' item key.</p> <p>Note: Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.</p> <p>This parameter is supported since 4.4.2 and replaces MaxLinesPerSecond.</p>
PluginsOracle.CallTimeout		1-30	global timeout	<p>The maximum wait time in seconds for a request to be completed.</p>
PluginsOracle.ConnectTimeout		1-30	global timeout	<p>The maximum wait time in seconds for a connection to be established.</p>
PluginsOracle.CustomQueriesPath				<p>Full pathname of a directory containing .sql files with custom queries.</p> <p>Disabled by default.</p> <p>Example: /etc/zabbix/oracle/sql</p>
PluginsOracle.Service			XE	<p>A service name to be used for connection (SID is not supported).</p>
PluginsPostgres.Host			localhost	<p>IP address or DNS name of the host used for PostgreSQL.</p> <p>Examples: localhost, 192.168.1.1</p>
PluginsPostgres.Port			5432	<p>A port to be used for PostgreSQL.</p>
PluginsSmart.Path			smartctl	<p>Path to the smartctl executable.</p> <p>This parameter is supported since Zabbix 5.2.5.</p>
PluginsSystemRun.LogRemoteCommands			0	<p>Enable logging of executed shell commands as warnings.</p> <p>0 - disabled 1 - enabled</p> <p>Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataItem, HostInterfaceItem or HostnameItem parameters.</p> <p>This parameter is supported since 4.4.2 and replaces LogRemoteCommands.</p>

Parameter	Mandatory	Range	Default	Description
Plugins' named sessions	no			<p>If Zabbix agent is used to monitor several instances of the same kind, you can create a named session with own set of authorization parameters for each instance. Named session parameters format:</p> <p>Plugins.&lt;PluginName&gt;.&lt;SessionName1&gt;  Plugins.&lt;PluginName&gt;.&lt;SessionName2&gt;  Named session password.</p> <p>Supported for: Memcached, MongoDB, MySQL, Oracle, PostgreSQL, Redis.</p> <p><b>&lt;PluginName&gt;</b> - name of the plugin.  <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p>
	no			<p>Plugins.&lt;PluginName&gt;.Sessions.&lt;SessionName&gt;.Password</p>
	no			<p>Plugins.&lt;PluginName&gt;.Sessions.&lt;SessionName&gt;.User</p> <p>Named session username.</p> <p>Supported for: Ceph, Memcached, MongoDB, MySQL, Oracle, PostgreSQL.</p> <p><b>&lt;PluginName&gt;</b> - name of the plugin.  <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p>
	no			<p>Plugins.&lt;PluginName&gt;.Sessions.&lt;SessionName&gt;.ApiKey</p> <p>Named session API key.</p> <p>Supported for: Ceph.</p> <p><b>&lt;PluginName&gt;</b> - name of the plugin.  <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p>
	no		https://localhost:8003	<p>Plugins.&lt;PluginName&gt;.Sessions.&lt;SessionName&gt;.Uri</p> <p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored).  Must match the URI format.  Only https scheme is supported; a scheme can be omitted (since version 5.2.3).  A port can be omitted (default=8003).  Examples:  https://127.0.0.1:8003  localhost</p>
	no			<p>Plugins.&lt;PluginName&gt;.Sessions.&lt;SessionName&gt;.Uri</p>

Parameter	Mandatory	Range	Default	Description
Plugins.Memcached.Sessions.<SessionName>.Uri	Yes		tcp://localhost:11211	<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=11211). Examples: tcp://localhost:11211 localhost unix:/var/run/memcached.sock</p>
Plugins.Modbus.Sessions.<SessionName>.Endpoint	Yes			<p>Endpoint of a named session.</p> <p>Supported for: Modbus.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Example: Plugins.Modbus.Sessions.MB1.Endpoint</p> <p>Note that this named session parameter is checked only if the value provided in the <b>item key</b> endpoint parameter is empty.</p>
Plugins.Modbus.Sessions.<SessionName>.SlaveID	Yes			<p>Slave ID of a named session.</p> <p>Supported for: Modbus.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Example: Plugins.Modbus.Sessions.MB1.SlaveID</p> <p>Note that this named session parameter is checked only if the value provided in the <b>item key</b> slave ID parameter is empty.</p>
Plugins.Modbus.Sessions.<SessionName>.Timeout	Yes			<p>Timeout of a named session.</p> <p>Supported for: Modbus.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Example: Plugins.Modbus.Sessions.MB1.Timeout</p>



Parameter	Mandatory	Range	Default	Description
PluginsMongo.Sessions.<SessionName>.Uri				<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Only tcp scheme is supported; a scheme can be omitted. A port can be omitted (default=27017). Examples: tcp://127.0.0.1:27017, tcp:localhost, localhost</p>
PluginsMysql.Sessions.<SessionName>.Uri			tcp://localhost:3306	<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=3306). Examples: tcp://localhost:3306 localhost unix:/var/run/mysql.sock</p>
PluginsOracle.Sessions.<SessionName>.Service				<p>Named session service name to be used for connection (SID is not supported). Supported for: Oracle.</p> <p><b>&lt;PluginName&gt;</b> - name of the plugin. <b>&lt;SessionName&gt;</b> -name of a session for using in item keys.</p>

Parameter	Mandatory	Range	Default	Description
	no		tcp://localhost:1521	<p>Named session connection string for Oracle.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Only tcp scheme is supported; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=1521). Examples: tcp://127.0.0.1:1521 localhost</p>
	no		postgres	<p>Database name of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p>
	no		tcp://localhost:6379	<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=6379). Examples: tcp://localhost:6379 localhost unix:/var/run/redis.sock</p>
RefreshActiveChecks	no	60-3600	120	<p>How often the list of active checks is refreshed, in seconds.</p> <p>Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.</p>

Parameter	Mandatory	Range	Default	Description
Server	yes			<p>List of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies. Incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Example: Server=127.0.0.1,192.168.1.0/24,::1,2001</p> <p>Spaces are allowed.</p>
ServerActive	no			<p>List of comma-delimited IP:port (or DNS name:port) pairs of Zabbix servers and Zabbix proxies for active checks.</p> <p>Multiple addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example: ServerActive=127.0.0.1:20051,zabbix.example.com</p>
SourceIP	no			<p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>
StatusPort	no	1024-32767		<p>If set, agent will listen on this port for HTTP status requests (http://localhost:&lt;port&gt;/status).</p>
Timeout	no	1-30	3	<p>Spend no more than Timeout seconds on processing.</p>

Parameter	Mandatory	Range	Default	Description
TLSAccept	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma: unencrypted - accept connections without encryption (default) psk - accept connections with TLS and a pre-shared key (PSK) cert - accept connections with TLS and a certificate
TLSCAFile	no			Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.
TLSCertFile	no			Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.
TLSConnect	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified: unencrypted - connect without encryption (default) psk - connect using TLS and a pre-shared key (PSK) cert - connect using TLS and a certificate
TLSCRLFile	no			Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.
TLSPSKFile	no			Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.
TLSPSKFile	no			Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.
TLSPSKIdentity	no			Pre-shared key identity string, used for encrypted communications with Zabbix server.
TLSServerCertIssuer	no			Allowed server (proxy) certificate issuer.
TLSServerCertSubject	no			Allowed server (proxy) certificate subject.

Parameter	Mandatory	Range	Default	Description
UnsafeUserParameters	no	0,1	0	<p>Allow all characters to be passed in arguments to user-defined parameters. The following characters are not allowed:</p> <pre>\ ' " * ? [ ] { } ~ \$ ! &amp; ; ( ) &gt;   # @</pre> <p>Additionally, newline characters are not allowed.</p>
UserParameter	no			<p>User-defined parameter to monitor. There can be several user-defined parameters.</p> <p>Format: UserParameter=&lt;key&gt;,&lt;shell command&gt;</p> <p>Note that shell command must not return empty string or EOL only. Shell commands may have relative paths, if UserParameterDir parameter is specified.</p> <p>Examples:</p> <pre>UserParameter=system.test,who wc -l UserParameter=check_cpu,./custom_script</pre>
UserParameterDir	no			<p>Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path. Only one entry is allowed.</p> <p>Example: UserParameterDir=/opt/myscripts</p>

## 5 Zabbix agent (Windows)

### Overview

This section lists parameters supported in a Zabbix agent (Windows) configuration file (zabbix\_agent.conf). Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with “#” are only supported in the beginning of the line.

### Parameters

Parameter	Mandatory	Range	Default	Description
Alias	no			<p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one.</p> <p>Multiple Alias parameters may be present. Multiple parameters with the same Alias key are allowed. Different Alias keys may reference the same item key. Aliases can be used in HostMetadataItem but not in HostNameItem or PerfCounter parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving paging file usage in percents from the server. Alias=pg_usage:perf_counter[\\Paging File(_Total)\% Usage] Now shorthand key <b>pg_usage</b> may be used to retrieve data.</li> <li>Getting CPU load with default and custom parameters. Alias=cpu.load:system.cpu.load Alias=cpu.load[*]:system.cpu.load[*] This allows use <b>cpu.load</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.load[percpu,avg15]</b> to get specific data about CPU load.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items. Alias=vfs.fs.discovery[*]:vfs.fs.discovery Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.</li> </ol>

Parameter	Mandatory	Range	Default	Description
AllowKey	no			<p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a>.</p>
BufferSend	no	1-3600	5	<p>Do not keep data longer than N seconds in buffer.</p>
BufferSize	no	2-65535	100	<p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.</p>
DebugLevel	no	0-5	3	<p>Specifies debug level:  0 - basic information about starting and stopping of Zabbix processes  1 - critical information  2 - error information  3 - warnings  4 - for debugging (produces lots of information)  5 - extended debugging (produces even more information)</p>
DenyKey	no			<p>Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a>.</p>

Parameter	Mandatory	Range	Default	Description
EnableRemoteCommands	no		0	Whether remote commands from Zabbix server are allowed. This parameter is <b>deprecated</b> , use AllowKey=system.run[*] or DenyKey=system.run[*] instead It is internal alias for AllowKey/DenyKey parameters depending on value: 0 - DenyKey=system.run[*] 1 - AllowKey=system.run[*].
HostInterface	no	0-255 characters		Optional parameter that defines host interface. Host interface is used at host autoregistration process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem. Supported since Zabbix 4.4.0.
HostInterfaceItem	no			Optional parameter that defines an item used for getting host interface. Host interface is used at host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.
HostMetadata	no	0-255 characters		Optional parameter that defines host metadata. Host metadata is used only at host autoregistration process (active agent). If not defined, the value will be acquired from HostMetadataItem. An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string. This option is supported in version 2.2.0 and higher.



Parameter	Mandatory	Range	Default	Description
HostMetadataltem	no			<p>Optional parameter that defines a Zabbix agent item used for getting host metadata. This option is only used when HostMetadata is not defined.</p> <p>Supports UserParameters, performance counters and aliases. Supports system.run[] regardless of EnableRemoteCommands value.</p> <p>HostMetadataltem value is retrieved on each autoregistration attempt and is used only at host autoregistration process (active agent).</p> <p>During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters.</p> <p>The value returned by the item must be a UTF-8 string otherwise it will be ignored.</p> <p>This option is supported in version 2.2.0 and higher.</p>
Hostname	no		Set by HostnameItem	<p>List of comma-delimited unique, case-sensitive hostnames.</p> <p>Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined.</p> <p>Allowed characters: alphanumeric, '.', '_', '-' and '-'. Maximum length: 128 characters per hostname, 2048 characters for the entire line.</p>
HostnameItem	no		system.hostname	<p>Optional parameter that defines a Zabbix agent item used for getting host name. This option is only used when Hostname is not defined.</p> <p>Does not support UserParameters, performance counters or aliases, but does support system.run[] regardless of EnableRemoteCommands value.</p> <p>The output length is limited to 512KB.</p> <p>See also a <a href="#">more detailed description</a>.</p>

Parameter	Mandatory	Range	Default	Description
Include	no			You may include individual files or all files in a directory in the configuration file. To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: <code>/absolute/path/to/config/files/*</code> . Pattern matching is supported since Zabbix 2.4.0. See <a href="#">special notes</a> about limitations.
ListenIP	no		0.0.0.0	List of comma-delimited IP addresses that the agent should listen on. Multiple IP addresses are supported since Zabbix 1.8.3.
ListenPort	no	1024-32767	10050	Agent will listen on this port for connections from the server.
LogFile	yes, if LogType is set to file, otherwise no		C:\zabbix_agentd.log	Name of the agent log file.
LogFileSize	no	0-1024	1	Maximum size of log file in MB. 0 - disable automatic log rotation. Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.
LogType	no		file	Log output type: file - write log to file specified by LogFile parameter, system - write log Windows Event Log, console - write log to standard output. This parameter is supported since Zabbix 3.0.0.
LogRemoteCommands	no		0	Enable logging of executed shell commands as warnings. 0 - disabled 1 - enabled
MaxLinesPerSecond	no	1-1000	20	Maximum number of new lines the agent will send per second to Zabbix server or proxy processing 'log', 'logrt' and 'eventlog' active checks. The provided value will be overridden by the parameter 'maxlines', provided in 'log', 'logrt' or 'eventlog' item keys. Note: Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.

Parameter	Mandatory	Range	Default	Description
PerfCounter	no			<p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax: &lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;</p> <p>For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following:  PerfCounter = interrupts,"\Processor(0)\Interrupts/sec",60</p> <p>Please note double quotes around performance counter path.</p> <p>The parameter name (interrupts) is to be used as the item key when creating an item.</p> <p>Samples for calculating average value will be taken every second.</p> <p>You may run "typeperf -qx" to get list of all performance counters available in Windows.</p>

Parameter	Mandatory	Range	Default	Description
PerfCounterEn	no			<p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax: &lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;</p> <p>Compared to PerfCounter, perfcounter paths must be in English.</p> <p>Supported only on <b>Windows Server 2008/Vista</b> and above.</p> <p>For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following: PerfCounterEn = interrupts,"\Processor(0)\Interrupts/sec",60</p> <p>Please note double quotes around performance counter path.</p> <p>The parameter name (interrupts) is to be used as the item key when creating an item.</p> <p>Samples for calculating average value will be taken every second.</p> <p>You can find the list of English strings by viewing the following registry key: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\CurrentVersion\Perflib\009.</p> <p>This parameter is supported since Zabbix 4.0.13 and 4.2.7.</p>
RefreshActiveChecks	no	60-3600	120	<p>How often list of active checks is refreshed, in seconds.</p> <p>Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.</p>

Parameter	Mandatory	Range	Default	Description
Server	yes, if StartAgents is not explicitly set to 0			<p>List of comma delimited IP addresses, optionally in CIDR notation, or hostnames of Zabbix servers.</p> <p>Incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.</p> <p>'0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Note, that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by <a href="#">RFC4291</a>.</p> <p>Example: Server=127.0.0.1,192.168.1.0/24,::1,2001::</p>
ServerActive	no	(*)		<p>Spaces are allowed.</p> <p>IP:port (or hostname:port) of Zabbix server or Zabbix proxy for active checks.</p> <p>Multiple comma-delimited addresses can be provided to use several independent Zabbix servers in parallel.</p> <p>Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p>
SourceIP	no			<p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>
StartAgents	no	0-63 (*)	3	<p>Number of pre-forked instances of zabbix_agentd that process passive checks.</p> <p>If set to 0, disables passive checks and the agent will not listen on any TCP port.</p> <p>The upper limit used to be 16 before version 1.8.5.</p>
Timeout	no	1-30	3	<p>Spend no more than Timeout seconds on processing</p>

Parameter	Mandatory	Range	Default	Description
TLSAccept	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			<p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <ul style="list-style-type: none"> <li>unencrypted - accept connections without encryption (default)</li> <li>psk - accept connections with TLS and a pre-shared key (PSK)</li> <li>cert - accept connections with TLS and a certificate</li> </ul> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCAFile	no			<p>Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCertFile	no			<p>Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSConnect	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			<p>How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified:</p> <ul style="list-style-type: none"> <li>unencrypted - connect without encryption (default)</li> <li>psk - connect using TLS and a pre-shared key (PSK)</li> <li>cert - connect using TLS and a certificate</li> </ul> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSCRLFile	no			<p>Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>
TLSSKeyFile	no			<p>Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>

Parameter	Mandatory	Range	Default	Description
TLSPSKFile	no			Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components. This parameter is supported since Zabbix 3.0.0.
TLSPSKIdentity	no			Pre-shared key identity string, used for encrypted communications with Zabbix server. This parameter is supported since Zabbix 3.0.0.
TLSServerCertIssuer	no			Allowed server (proxy) certificate issuer. This parameter is supported since Zabbix 3.0.0.
TLSServerCertSubject	no			Allowed server (proxy) certificate subject. This parameter is supported since Zabbix 3.0.0.
UnsafeUserParameters	no	0-1	0	Allow all characters to be passed in arguments to user-defined parameters. 0 - do not allow 1 - allow The following characters are not allowed: ` \ ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @` Additionally, newline characters are not allowed.
UserParameter	no			User-defined parameter to monitor. There can be several user-defined parameters. Format: UserParameter=<key>,<shell command> Note that shell command must not return empty string or EOL only. Shell commands may have relative paths, if UserParameterDir parameter is specified. Examples: UserParameter=system.test,who wc -l UserParameter=check_cpu,./custom_script.

Parameter	Mandatory	Range	Default	Description
UserParameterDir	no			Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path. Only one entry is allowed. Example: UserParameterDir=/opt/myscripts

**Note:**

(\*) The number of active servers listed in ServerActive plus the number of pre-forked instances for passive checks specified in StartAgents must be less than 64.

See also

1. [Differences in the Zabbix agent configuration for active and passive checks starting from version 2.0.0.](#)

## 6 Zabbix agent 2 (Windows)

Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent.

This section lists parameters supported in a Zabbix agent 2 configuration file (zabbix\_agent2.win.conf). Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with “#” are only supported in the beginning of the line.

Parameters



Parameter	Mandatory	Range	Default	Description
Alias	no			<p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one.</p> <p>Multiple Alias parameters may be present. Multiple parameters with the same Alias key are allowed. Different Alias keys may reference the same item key.</p> <p>Aliases can be used in HostMetadataItem but not in HostNameItem parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the ID of user 'zabbix'. Alias=zabbix.userid:vfs.file.regexp[/etc/passwd/9]+)"/",\1] Now shorthand key <b>zabbix.userid</b> may be used to retrieve data.</li> <li>Getting CPU utilization with default and custom parameters. Alias=cpu.util:system.cpu.util Alias=cpu.util[*]:system.cpu.util[*] This allows use <b>cpu.util</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.util[all, idle, avg15]</b> to get specific data about CPU utilization.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items. Alias=vfs.fs.discovery[*]:vfs.fs.discovery Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.</li> </ol>

Parameter	Mandatory	Range	Default	Description
AllowKey	no			<p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.</p> <p>Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.</p> <p>This parameter is supported since Zabbix 5.0.0.</p> <p>See also: <a href="#">Restricting agent checks</a>.</p>
BufferSend	no	1-3600	5	<p>The time interval in seconds which determines how often values are sent from the buffer to Zabbix server.</p> <p>Note, that if the buffer is full, the data will be sent sooner.</p>
BufferSize	no	2-65535	100	<p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.</p> <p>This parameter should only be used if persistent buffer is disabled (EnablePersistentBuffer=0).</p>
ControlSocket	no		\\.\pipe\agent.sock	<p>The control socket, used to send runtime commands with '-R' option.</p>
DebugLevel	no	0-5	3	<p>Specifies debug level:</p> <ul style="list-style-type: none"> <li>0 - basic information about starting and stopping of Zabbix processes</li> <li>1 - critical information</li> <li>2 - error information</li> <li>3 - warnings</li> <li>4 - for debugging (produces lots of information)</li> <li>5 - extended debugging (produces even more information)</li> </ul>

Parameter	Mandatory	Range	Default	Description
DenyKey	no			Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a> .
EnablePersistentBuffer	no	0-1	0	Enable usage of local persistent storage for active items. 0 - disabled 1 - enabled If persistent storage is disabled, the memory buffer will be used.
HostInterface	no	0-255 characters		Optional parameter that defines host interface. Host interface is used at host autoregistration process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem. Supported since Zabbix 4.4.0.
HostInterfaceItem	no			Optional parameter that defines an item used for getting host interface. Host interface is used at host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.

Parameter	Mandatory	Range	Default	Description
HostMetadata	no	0-255 characters		Optional parameter that defines host metadata. Host metadata is used at host autoregistration process. An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string. If not defined, the value will be acquired from HostMetadataItem.
HostMetadataItem	no			Optional parameter that defines an item used for getting host metadata. Host metadata item value is retrieved on each autoregistration attempt for host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters. This option is only used when HostMetadata is not defined. Supports UserParameters and aliases. Supports system.run[] regardless of EnableRemoteCommands value. The value returned by the item must be a UTF-8 string otherwise it will be ignored.
Hostname	no		Set by HostnameItem	List of comma-delimited unique, case-sensitive hostnames. Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined. Allowed characters: alphanumeric, '.', '_', '-' and '-'. Maximum length: 128 characters per hostname, 2048 characters for the entire line.

Parameter	Mandatory	Range	Default	Description
HostnameItem	no		system.hostname	Item used for generating Hostname if it is not defined. Ignored if Hostname is defined. Does not support UserParameters or aliases, but does support system.run[] regardless of EnableRemoteCommands value. The output length is limited to 512KB.
Include	no			You may include individual files or all files in a directory in the configuration file. During installation Zabbix will create the include directory in /usr/local/etc, unless modified during the compile time. To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: /absolute/path/to/config/files/* See <a href="#">special notes</a> about limitations.
ListenIP	no		0.0.0.0	List of comma-delimited IP addresses that the agent should listen on. The first IP address is sent to Zabbix server, if connecting to it, to retrieve the list of active checks.
ListenPort	no	1024-32767	10050	Agent will listen on this port for connections from the server.
LogFile	yes, if LogType is set to file, otherwise no		c:\zabbix_agent2.log	Log file name if LogType is 'file'.
LogFileSize	no	0-1024	1	Maximum size of log file in MB. 0 - disable automatic log rotation. Note: If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.
LogType	no		file	Specifies where log messages are written to: system - syslog, file - file specified by LogFile parameter, console - standard output.

Parameter	Mandatory	Range	Default	Description
PersistentBufferFile	no			The file, where Zabbix Agent2 should keep SQLite database. Must be a full filename. This parameter is only used if persistent buffer is enabled (EnablePersistentBuffer=1).
PersistentBufferPeriod	no	1m-365d	1h	The time period for which data should be stored, when there is no connection to the server or proxy. Older data will be lost. Log data will be preserved. This parameter is only used if persistent buffer is enabled (EnablePersistentBuffer=1).
Plugins	no			A plugin can have one or more plugin-specific configuration parameters in the format: Plugins.<PluginName>.<Parameter1>=<Value1> Plugins.<PluginName>.<Parameter2>=<Value2>
	Plugins.<PluginName>.KeepAlive	60-900	300	The maximum time of waiting (in seconds) before unused plugin connections are closed. Supported for the following plugins: Ceph, Memcached, MongoDB, MySQL, Oracle, Redis, PostgreSQL. <b>&lt;PluginName&gt;</b> - name of the plugin. Example: Plugins.Memcached.KeepAlive=200
	Plugins.<PluginName>.Timeout	1-30	global timeout	Request execution timeout (how long to wait for a request to complete before shutting it down). Supported for the following plugins: Docker, Memcached, Modbus, MongoDB, MQTT, MySQL, Redis, PostgreSQL, Smart.
	Plugins.Ceph.InsecureSkipVerify	false / true	false	Determines whether an http client should verify the server's certificate chain and host name. If true, TLS accepts any certificate presented by the server and any host name in that certificate. In this mode, TLS is susceptible to man-in-the-middle attacks (should be used only for testing).
	Plugins.Docker.Endpoint		unix:///var/run/docker.sock	Docker daemon unix-socket location. Must contain a scheme (only unix:// is supported).

Parameter	Mandatory	Range	Default	Description
PluginsLog.MaxLinesPerSecond		1-1000	20	<p>Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log' and 'eventlog' active checks.</p> <p>The provided value will be overridden by the parameter 'maxlines', provided in 'log' or 'eventlog' item key.</p> <p>Note: Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.</p> <p>This parameter is supported since 4.4.2 and replaces MaxLinesPerSecond.</p>
PluginsOracle.CallTimeout		1-30	global timeout	<p>The maximum wait time in seconds for a request to be completed.</p>
PluginsOracle.ConnectTimeout		1-30	global timeout	<p>The maximum wait time in seconds for a connection to be established.</p>
PluginsOracle.CustomQueriesPath				<p>Full pathname of a directory containing .sql files with custom queries.</p> <p>Disabled by default.</p> <p>Example: /etc/zabbix/oracle/sql</p>
PluginsOracle.Service			XE	<p>A service name to be used for connection (SID is not supported).</p>
PluginsPostgres.Host			localhost	<p>IP address or DNS name of the host used for PostgreSQL.</p> <p>Examples: localhost, 192.168.1.1</p>
PluginsPostgres.Port			5432	<p>A port to be used for PostgreSQL.</p>
PluginsSmart.Path			smartctl	<p>Path to the smartctl executable.</p> <p>This parameter is supported since Zabbix 5.2.5.</p>
PluginsSystemRun.LogRemoteCommands			0	<p>Enable logging of executed shell commands as warnings.</p> <p>0 - disabled 1 - enabled</p> <p>Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataItem, HostInterfaceItem or HostnameItem parameters.</p> <p>This parameter is supported since 4.4.2 and replaces LogRemoteCommands.</p>

Parameter	Mandatory	Range	Default	Description
	no	1-1000	Second 20	Maximum number of new lines the agent will send per second to Zabbix Server or Proxy processing 'eventlog' checks. The provided value will be overridden by the parameter 'maxlines', provided in 'eventlog' item keys.
Plugins' named sessions	no			If Zabbix agent is used to monitor several instances of the same kind, you can create a named session with own set of authorization parameters for each instance. Named session parameters format: Plugins.<PluginName>.<SessionName1> Plugins.<PluginName>.<SessionName2> Named session password. Supported for: Memcached, MongoDB, MySQL, Oracle, PostgreSQL, Redis. <b>&lt;PluginName&gt;</b> - name of the plugin. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.
	no			Named session username. Supported for: Ceph, Memcached, MongoDB, MySQL, Oracle, PostgreSQL. <b>&lt;PluginName&gt;</b> - name of the plugin. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.
	no			Named session API key. Supported for: Ceph. <b>&lt;PluginName&gt;</b> - name of the plugin. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.



Parameter	Mandatory	Range	Default	Description
<code>Plugins.Ceph.Sessions.&lt;SessionName&gt;.Uri</code>	Yes		<code>https://localhost:8003</code>	<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Only <code>https</code> scheme is supported; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=8003). Examples: <code>https://127.0.0.1:8003</code> <code>localhost</code></p>
<code>Plugins.Memcached.Sessions.&lt;SessionName&gt;.Uri</code>	Yes		<code>tcp://localhost:11211</code>	<p>Connection string of a named session.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: <code>tcp</code>, <code>unix</code>; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=11211). Examples: <code>tcp://localhost:11211</code> <code>localhost</code> <code>unix:/var/run/memcached.sock</code></p>
<code>Plugins.Modbus.Sessions.&lt;SessionName&gt;.Endpoint</code>	Yes			<p>Endpoint of a named session.</p> <p>Supported for: Modbus.</p> <p><b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Example: <code>Plugins.Modbus.Sessions.MB1.Endpoint</code></p> <p>Note that this named session parameter is checked only if the value provided in the <b>item key</b> endpoint parameter is empty.</p>

Parameter	Mandatory	Range	Default	Description
Plugins.Modbus.Sessions.<SessionName>.SlaveID	no			<p>Slave ID of a named session. Supported for: Modbus. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys. Example: Plugins.Modbus.Sessions.MB1.SlaveID</p> <p>Note that this named session parameter is checked only if the value provided in the <b>item key</b> slave ID parameter is empty.</p>
Plugins.Modbus.Sessions.<SessionName>.Timeout	no			<p>Timeout of a named session. Supported for: Modbus. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys. Example: Plugins.Modbus.Sessions.MB1.Timeout</p>
Plugins.Mongo.Sessions.<SessionName>.Uri	no			<p>Connection string of a named session. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Only tcp scheme is supported; a scheme can be omitted. A port can be omitted (default=27017). Examples: tcp://127.0.0.1:27017, tcp:localhost, localhost</p>
Plugins.Mysql.Sessions.<SessionName>.Uri	no		tcp://localhost:3306	<p>Connection string of a named session. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.</p> <p>Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=3306). Examples: tcp://localhost:3306 localhost unix:/var/run/mysql.sock</p>

Parameter	Mandatory	Range	Default	Description
	no			Named session service name to be used for connection (SID is not supported). Supported for: Oracle. <b>&lt;PluginName&gt;</b> - name of the plugin. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.
	no		tcp://localhost:1521	Named session connection string for Oracle. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.  Should not include embedded credentials (they will be ignored). Must match the URI format. Only tcp scheme is supported; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=1521). Examples: tcp://127.0.0.1:1521 localhost
	no			Database name of a named session. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.
	no		tcp://localhost:6379	Connection string of a named session. <b>&lt;SessionName&gt;</b> - name of a session for using in item keys.  Should not include embedded credentials (they will be ignored). Must match the URI format. Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3). A port can be omitted (default=6379). Examples: tcp://localhost:6379 localhost unix:/var/run/redis.sock
RefreshActiveChecks	no	60-3600	120	How often the list of active checks is refreshed, in seconds. Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.

Parameter	Mandatory	Range	Default	Description
Server	yes			<p>List of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies. Incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Example: Server=127.0.0.1,192.168.1.0/24,::1,2001</p> <p>Spaces are allowed.</p>
ServerActive	no			<p>List of comma-delimited IP:port (or DNS name:port) pairs of Zabbix servers and Zabbix proxies for active checks.</p> <p>Multiple addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example: ServerActive=127.0.0.1:20051,zabbix.example.com</p>
SourceIP	no			<p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>
StatusPort	no	1024-32767		<p>If set, agent will listen on this port for HTTP status requests (http://localhost:&lt;port&gt;/status).</p>
Timeout	no	1-30	3	<p>Spend no more than Timeout seconds on processing.</p>

Parameter	Mandatory	Range	Default	Description
TLSAccept	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma: unencrypted - accept connections without encryption (default) psk - accept connections with TLS and a pre-shared key (PSK) cert - accept connections with TLS and a certificate
TLSCAFile	no			Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.
TLSCertFile	no			Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.
TLSConnect	yes, if TLS certificate or PSK parameters are defined (even for unencrypted connection), otherwise no			How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified: unencrypted - connect without encryption (default) psk - connect using TLS and a pre-shared key (PSK) cert - connect using TLS and a certificate
TLSCRLFile	no			Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.
TLSSKeyFile	no			Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.
TLSPSKFile	no			Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.
TLSPSKIdentity	no			Pre-shared key identity string, used for encrypted communications with Zabbix server.
TLSServerCertIssuer	no			Allowed server (proxy) certificate issuer.
TLSServerCertSubject	no			Allowed server (proxy) certificate subject.

Parameter	Mandatory	Range	Default	Description
UnsafeUserParameters	no	0,1	0	Allow all characters to be passed in arguments to user-defined parameters. The following characters are not allowed: <code>\ ' " * ? [ ] { } ~ \$ ! &amp; ; ( ) &gt;   # @</code> Additionally, newline characters are not allowed.
UserParameter	no			User-defined parameter to monitor. There can be several user-defined parameters. Format: <code>UserParameter=&lt;key&gt;,&lt;shell command&gt;</code> Note that shell command must not return empty string or EOL only. Shell commands may have relative paths, if <code>UserParameterDir</code> parameter is specified. Examples: <code>UserParameter=system.test,who wc -l</code> <code>UserParameter=check_cpu,./custom_script</code>
UserParameterDir	no			Default search path for <code>UserParameter</code> commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, <code>UserParameter</code> commands can have a relative <code>./</code> prefix instead of a full path. Only one entry is allowed. Example: <code>UserParameterDir=/opt/myscripts</code>

## 7 Zabbix Java gateway

If you use `startup.sh` and `shutdown.sh` scripts for starting **Zabbix Java gateway**, then you can specify the necessary configuration parameters in the `settings.sh` file. The startup and shutdown scripts source the settings file and take care of converting shell variables (listed in the first column) to Java properties (listed in the second column).

If you start Zabbix Java gateway manually by running `java` directly, then you specify the corresponding Java properties on the command line.

Variable	Property	Mandatory	Range	Default	Description
LISTEN_IP	<code>zabbix.listenIP</code>	no		0.0.0.0	IP address to listen on.
LISTEN_PORT	<code>zabbix.listenPort</code>	no	1024-32767	10052	Port to listen on.
PID_FILE	<code>zabbix.pidFile</code>	no		<code>/tmp/zabbix_java.pid</code>	Name of PID file. If omitted, Zabbix Java Gateway is started as a console application.

Variable	Property	Mandatory	Range	Default	Description
PROPERTIES_FILE	zabbix.propertiesFile	no			Name of properties file. Can be used to set additional properties using a key-value format in such a way that they are not visible on a command line or to overwrite existing ones. For example: "javax.net.ssl.trustStorePassword=<p>Supported since Zabbix 5.2.3.
START_POLLERS	zabbix.startPollers	no	1-1000	5	Number of worker threads to start.
TIMEOUT	zabbix.timeout	no	1-30	3	How long to wait for network operations.

**Warning:**

Port 10052 is not [IANA registered](#).

## 8 Inclusion

### Overview

Additional files or directories can be included into server/proxy/agent configuration using the Include parameter.

### Notes on inclusion

If the Include parameter is used for including a file, the file must be readable.

If the Include parameter is used for including a directory:

- All files in the directory must be readable.
- No particular order of inclusion should be assumed (e.g. files are not included in alphabetical order)
- All files in the directory are included into configuration.
- Beware of file backup copies automatically created by some text editors. For example, if editing the '

If the Include parameter is used for including files using a pattern:

- All files matching the pattern must be readable.
- No particular order of inclusion should be assumed (e.g. files are not included in alphabetical order)

## 4 Protocols

### 1 Server-proxy data exchange protocol

#### Overview

Server - proxy data exchange is based on JSON format.

Request and response messages must begin with **header and data length**.

#### Passive proxy

#### Proxy config request

The proxy config request is sent by server to provide proxy configuration data. This request is sent every ProxyConfigFrequency (server configuration parameter) seconds.

name	value type	description
server→proxy:		
<b>request</b>	string	'proxy config'
<b>&lt;table&gt;</b>	object	one or more objects with <table> data
<b>fields</b>	array	array of field names
-	string	field name
<b>data</b>	array	array of rows
-	array	array of columns
-	string,number	column value with type depending on column type in database schema
proxy→server:		
<b>response</b>	string	the request success information ('success' or 'failed')
<b>version</b>	string	the proxy version (<major>.<minor>.<build>)

Example:

server→proxy:

```
{
  "request": "proxy config",
  "globalmacro":{
    "fields":[
      "globalmacroid",
      "macro",
      "value"
    ],
    "data":[
      [
        2,
        "{$SNMP_COMMUNITY}",
        "public"
      ]
    ]
  },
  "hosts":{
    "fields":[
      "hostid",
      "host",
      "status",
      "ipmi_authtype",
      "ipmi_privilege",
      "ipmi_username",
      "ipmi_password",
      "name",
      "tls_connect",
      "tls_accept",
      "tls_issuer",
      "tls_subject",
      "tls_psk_identity",
      "tls_psk"
    ],
    "data":[
      [
        10001,
        "Linux",
        3,
        -1,
        2,
        "",
        "",
        "Linux",

```



```

        1,
        1,
        "",
        "",
        "",
        ""
    ],
    [
        10050,
        "Zabbix Agent",
        3,
        -1,
        2,
        "",
        "",
        "Zabbix Agent",
        1,
        1,
        "",
        "",
        "",
        ""
    ],
    [
        10105,
        "Logger",
        0,
        -1,
        2,
        "",
        "",
        "Logger",
        1,
        1,
        "",
        "",
        "",
        ""
    ]
]
],
"interface":{
    "fields":[
        "interfaceid",
        "hostid",
        "main",
        "type",
        "useip",
        "ip",
        "dns",
        "port",
        "bulk"
    ],
    "data":[
        [
            2,
            10105,
            1,
            1,
            1,
            "127.0.0.1",
            ""
        ]
    ]
}

```

```

        "10050",
        1
    ]
}
},
...
}

```

proxy→server:

```

{
  "response": "success",
  "version": "5.2.0"
}

```

### Proxy request

The proxy data request is used to obtain host availability, historical, discovery and autoregistration data from proxy. This request is sent every ProxyDataFrequency (server configuration parameter) seconds.

name	value type	description
server→proxy: <b>request</b>	string	'proxy data'
proxy→server: <b>session</b>	string	data session token
<b>host availability</b>	array	(optional) array of host availability data objects
<b>hostid</b>	number	host identifier
<b>available</b>	number	Zabbix agent availability  0, HOST_AVAILABLE_UNKNOWN - unknown 1, HOST_AVAILABLE_TRUE - available 2, HOST_AVAILABLE_FALSE - unavailable
<b>error</b>	string	Zabbix agent error message or empty string
<b>snmp_available</b>	number	SNMP agent availability  0, HOST_AVAILABLE_UNKNOWN - unknown 1, HOST_AVAILABLE_TRUE - available 2, HOST_AVAILABLE_FALSE - unavailable
<b>snmp_error</b>	string	SNMP agent error message or empty string
<b>ipmi_available</b>	number	IPMI agent availability  0, HOST_AVAILABLE_UNKNOWN - unknown 1, HOST_AVAILABLE_TRUE - available 2, HOST_AVAILABLE_FALSE - unavailable
<b>ipmi_error</b>	string	IPMI agent error message or empty string
<b>jmx_available</b>	number	JMX agent availability  0, HOST_AVAILABLE_UNKNOWN - unknown 1, HOST_AVAILABLE_TRUE - available 2, HOST_AVAILABLE_FALSE - unavailable
<b>jmx_error</b>	string	JMX agent error message or empty string
<b>history data</b>	array	(optional) array of history data objects
<b>itemid</b>	number	item identifier
<b>clock</b>	number	item value timestamp (seconds)
<b>ns</b>	number	item value timestamp (nanoseconds)
<b>value</b>	string	(optional) item value
<b>id</b>	number	value identifier (ascending counter, unique within one data session)
<b>timestamp</b>	number	(optional) timestamp of log type items
<b>source</b>	string	(optional) eventlog item source value
<b>severity</b>	number	(optional) eventlog item severity value
<b>eventid</b>	number	(optional) eventlog item eventid value

name	value type	description
<b>discovery data</b>	<b>state</b> string	(optional) item state <b>0</b> , ITEM_STATE_NORMAL <b>1</b> , ITEM_STATE_NOTSUPPORTED
	<b>lastlogsize</b> number	(optional) last log size of log type items
	<b>mtime</b> number	(optional) modify time of log type items
	<b>data</b> array	(optional) array of discovery data objects
	<b>clock</b> number	the discovery data timestamp
	<b>druleid</b> number	the discovery rule identifier
	<b>dcheckid</b> number	the discovery check identifier or null for discovery rule data
	<b>type</b> number	the discovery check type:  <b>-1</b> discovery rule data <b>0</b> , SVC_SSH - SSH service check <b>1</b> , SVC_LDAP - LDAP service check <b>2</b> , SVC_SMTP - SMTP service check <b>3</b> , SVC_FTP - FTP service check <b>4</b> , SVC_HTTP - HTTP service check <b>5</b> , SVC_POP - POP service check <b>6</b> , SVC_NNTP - NNTP service check <b>7</b> , SVC_IMAP - IMAP service check <b>8</b> , SVC_TCP - TCP port availability check <b>9</b> , SVC_AGENT - Zabbix agent <b>10</b> , SVC_SNMPv1 - SNMPv1 agent <b>11</b> , SVC_SNMPv2 - SNMPv2 agent <b>12</b> , SVC_ICMPPING - ICMP ping <b>13</b> , SVC_SNMPv3 - SNMPv3 agent <b>14</b> , SVC_HTTPS - HTTPS service check <b>15</b> , SVC_TELNET - Telnet availability check
	<b>ip</b> string	the host IP address
	<b>dns</b> string	the host DNS name
	<b>port</b> number	(optional) service port number
	<b>key_</b> string	(optional) the item key for discovery check of type <b>9</b> SVC_AGENT
	<b>value</b> string	(optional) value received from the service, can be empty for most of services
	<b>status</b> number	(optional) service status:  <b>0</b> , DOBJECT_STATUS_UP - Service UP <b>1</b> , DOBJECT_STATUS_DOWN - Service DOWN
	<b>auto registration</b> array	(optional) array of autoregistration data objects
<b>tasks</b>	<b>clock</b> number	the autoregistration data timestamp
	<b>host</b> string	the host name
	<b>ip</b> string	(optional) the host IP address
	<b>dns</b> string	(optional) the resolved DNS name from IP address
	<b>port</b> string	(optional) the host port
<b>host_metadata</b> array	(optional) the host metadata sent by agent (based on HostMetadata or HostMetadataItem agent configuration parameter)	
<b>tasks</b> array	(optional) array of tasks	
<b>type</b> number	the task type:  <b>0</b> , ZBX_TM_TASK_PROCESS_REMOTE_COMMAND_RESULT - remote command result	

name	value type	description
<b>status</b>	number	the remote command execution status:  <b>0</b> , ZBX_TM_REMOTE_COMMAND_COMPLETED - the remote command completed successfully <b>1</b> , ZBX_TM_REMOTE_COMMAND_FAILED - the remote command failed
<b>error</b>	string	(optional) the error message
<b>parent_task_id</b>	number	the parent task id
<b>more</b>	number	(optional) 1 - there are more history data to send
<b>clock</b>	number	(optional) data transfer timestamp (seconds)
<b>ns</b>	number	(optional) data transfer timestamp (nanoseconds)
<b>version</b>	string	the proxy version (<major>.<minor>.<build>)
server→proxy: <b>response</b>	string	the request success information ('success' or 'failed')
<b>tasks</b>	array	(optional) array of tasks
<b>type</b>	number	the task type:  <b>1</b> , ZBX_TM_TASK_PROCESS_REMOTE_COMMAND - remote command
<b>clock</b>	number	the task creation time
<b>ttl</b>	number	the time in seconds after which task expires
<b>command_type</b>	number	the remote command type:  <b>0</b> , ZBX_SCRIPT_TYPE_CUSTOM_SCRIPT - use custom script <b>1</b> , ZBX_SCRIPT_TYPE_IPMI - use IPMI <b>2</b> , ZBX_SCRIPT_TYPE_SSH - use SSH <b>3</b> , ZBX_SCRIPT_TYPE_TELNET - use Telnet <b>4</b> , ZBX_SCRIPT_TYPE_GLOBAL_SCRIPT - use global script (currently functionally equivalent to custom script)
<b>command</b>	string	the remote command to execute
<b>execute_on</b>	number	the execution target for custom scripts:  <b>0</b> , ZBX_SCRIPT_EXECUTE_ON_AGENT - execute script on agent <b>1</b> , ZBX_SCRIPT_EXECUTE_ON_SERVER - execute script on server <b>2</b> , ZBX_SCRIPT_EXECUTE_ON_PROXY - execute script on proxy
<b>port</b>	number	(optional) the port for telnet and ssh commands
<b>auth_type</b>	number	(optional) the authentication type for ssh commands
<b>username</b>	string	(optional) the user name for telnet and ssh commands
<b>password</b>	string	(optional) the password for telnet and ssh commands
<b>public_key</b>	string	(optional) the public key for ssh commands
<b>private_key</b>	string	(optional) the private key for ssh commands
<b>parent_task_id</b>	number	the parent task id
<b>hostid</b>	number	target hostid

Example:

server→proxy:

```
{
  "request": "proxy data"
}
```

proxy→server:

```
{
  "session": "12345678901234567890123456789012"
  "host availability":[
    {
      "hostid":10106,
      "available":1,
      "error":"","
      "snmp_available":0,
      "snmp_error":"","
      "ipmi_available":0,
      "ipmi_error":"","
      "jmx_available":0,
      "jmx_error":""
    },
    {
      "hostid":10107,
      "available":1,
      "error":"","
      "snmp_available":0,
      "snmp_error":"","
      "ipmi_available":0,
      "ipmi_error":"","
      "jmx_available":0,
      "jmx_error":""
    }
  ],
  "history data":[
    {
      "itemid":"12345",
      "clock":1478609647,
      "ns":332510044,
      "value":"52956612",
      "id": 1
    },
    {
      "itemid":"12346",
      "clock":1478609647,
      "ns":330690279,
      "state":1,
      "value":"Cannot find information for this network interface in /proc/net/dev.",
      "id": 2
    }
  ],
  "discovery data":[
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":3,
      "type":12,
      "ip":"10.3.0.10",
      "dns":"vdebian",
      "status":1
    },
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":null,

```

```

        "type":-1,
        "ip":"10.3.0.10",
        "dns":"vdebian",
        "status":1
    }
],
"auto registration":[
    {
        "clock":1478608371,
        "host":"Logger1",
        "ip":"10.3.0.1",
        "dns":"localhost",
        "port":"10050"
    },
    {
        "clock":1478608381,
        "host":"Logger2",
        "ip":"10.3.0.2",
        "dns":"localhost",
        "port":"10050"
    }
],
"tasks":[
    {
        "type": 0,
        "status": 0,
        "parent_taskid": 10
    },
    {
        "type": 0,
        "status": 1,
        "error": "No permissions to execute task.",
        "parent_taskid": 20
    }
],
"version":"5.2.0"
}

```

server→proxy:

```

{
  "response": "success",
  "tasks":[
    {
      "type": 1,
      "clock": 1478608371,
      "ttl": 600,
      "commandtype": 2,
      "command": "restart_service1.sh",
      "execute_on": 2,
      "port": 80,
      "authtype": 0,
      "username": "userA",
      "password": "password1",
      "publickey": "MIGfMAOGCSqGSIB3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
      "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u091LHnsj6tQ5QCqGKuk01De7zhd",
      "parent_taskid": 10,
      "hostid": 10070
    },
    {
      "type": 1,
      "clock": 1478608381,
      "ttl": 600,

```

```

    "commandtype": 1,
    "command": "restart_service2.sh",
    "execute_on": 0,
    "authtype": 0,
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "parent_taskid": 20,
    "hostid": 10084
  }
]
}

```

## Active proxy

### Proxy heartbeat request

The proxy heartbeat request is sent by proxy to report that proxy is running. This request is sent every HeartbeatFrequency (proxy configuration parameter) seconds.

name	value type	description
proxy→server:		
<b>request</b>	string	'proxy heartbeat'
<b>host</b>	string	the proxy name
<b>version</b>	string	the proxy version (<major>.<minor>.<build>)
server→proxy:		
<b>response</b>	string	the request success information ('success' or 'failed')

#### proxy→server:

```

{
  "request": "proxy heartbeat",
  "host": "Proxy #12",
  "version": "5.2.0"
}

```

#### server→proxy:

```

{
  "response": "success"
}

```

### Proxy config request

The proxy config request is sent by proxy to obtain proxy configuration data. This request is sent every ConfigFrequency (proxy configuration parameter) seconds.

name	value type	description
proxy→server:		
<b>request</b>	string	'proxy config'
<b>host</b>	string	proxy name
<b>version</b>	string	the proxy version (<major>.<minor>.<build>)
server→proxy:		
<b>request</b>	string	'proxy config'
<b>&lt;table&gt;</b>	object	one or more objects with <table> data
<b>fields</b>	array	array of field names
-	string	field name
<b>data</b>	array	array of rows
-	array	array of columns
-	string,number	column value with type depending on column type in database schema

proxy→server:

name	value type	description
<b>response</b>	string	the request success information ('success' or 'failed')

Example:

proxy→server:

```
{
  "request": "proxy config",
  "host": "Proxy #12",
  "version": "5.2.0"
}
```

server→proxy:

```
{
  "globalmacro":{
    "fields":[
      "globalmacroid",
      "macro",
      "value"
    ],
    "data":[
      [
        2,
        "{$SNMP_COMMUNITY}",
        "public"
      ]
    ]
  },
  "hosts":{
    "fields":[
      "hostid",
      "host",
      "status",
      "ipmi_authtype",
      "ipmi_privilege",
      "ipmi_username",
      "ipmi_password",
      "name",
      "tls_connect",
      "tls_accept",
      "tls_issuer",
      "tls_subject",
      "tls_psk_identity",
      "tls_psk"
    ],
    "data":[
      [
        10001,
        "Linux",
        3,
        -1,
        2,
        "",
        "",
        "Linux",
        1,
        1,
        "",
        "",
        ""
      ]
    ]
  }
}
```



```

        ""
    ],
    [
        10050,
        "Zabbix Agent",
        3,
        -1,
        2,
        "",
        "",
        "Zabbix Agent",
        1,
        1,
        "",
        "",
        "",
        ""
    ],
    [
        [
            10105,
            "Logger",
            0,
            -1,
            2,
            "",
            "",
            "Logger",
            1,
            1,
            "",
            "",
            "",
            ""
        ]
    ]
},
"interface":{
    "fields":[
        "interfaceid",
        "hostid",
        "main",
        "type",
        "useip",
        "ip",
        "dns",
        "port",
        "bulk"
    ],
    "data":[
        [
            2,
            10105,
            1,
            1,
            1,
            "127.0.0.1",
            "",
            "10050",
            1
        ]
    ]
}
},

```

```

...
}

proxy→server:
{
  "response": "success"
}

```

### Proxy data request

The proxy data request is sent by proxy to provide host availability, history, discovery and autoregistration data. This request is sent every DataSenderFrequency (proxy configuration parameter) seconds.

name	value type	description
proxy→server:		
<b>request</b>	string	'proxy data'
<b>host</b>	string	the proxy name
<b>session</b>	string	data session token
<b>host availability</b>	array	(optional) array of host availability data objects
<b>hostid</b>	number	host identifier
<b>available</b>	number	Zabbix agent availability
		<b>0</b> , HOST_AVAILABLE_UNKNOWN - unknown
		<b>1</b> , HOST_AVAILABLE_TRUE - available
		<b>2</b> , HOST_AVAILABLE_FALSE - unavailable
<b>error</b>	string	Zabbix agent error message or empty string
<b>snmp_available</b>	number	SNMP agent availability
		<b>0</b> , HOST_AVAILABLE_UNKNOWN - unknown
		<b>1</b> , HOST_AVAILABLE_TRUE - available
		<b>2</b> , HOST_AVAILABLE_FALSE - unavailable
<b>snmp_error</b>	string	SNMP agent error message or empty string
<b>snmp_available</b>	number	SNMP agent availability
		<b>0</b> , HOST_AVAILABLE_UNKNOWN - unknown
		<b>1</b> , HOST_AVAILABLE_TRUE - available
		<b>2</b> , HOST_AVAILABLE_FALSE - unavailable
<b>ipmi_error</b>	string	IPMI agent error message or empty string
<b>ipmi_available</b>	number	IPMI agent availability
		<b>0</b> , HOST_AVAILABLE_UNKNOWN - unknown
		<b>1</b> , HOST_AVAILABLE_TRUE - available
		<b>2</b> , HOST_AVAILABLE_FALSE - unavailable
<b>jmx_error</b>	string	JMX agent error message or empty string
<b>jmx_available</b>	number	JMX agent availability
		<b>0</b> , HOST_AVAILABLE_UNKNOWN - unknown
		<b>1</b> , HOST_AVAILABLE_TRUE - available
		<b>2</b> , HOST_AVAILABLE_FALSE - unavailable
<b>history data</b>	array	(optional) array of history data objects
<b>itemid</b>	number	item identifier
<b>clock</b>	number	item value timestamp (seconds)
<b>ns</b>	number	item value timestamp (nanoseconds)
<b>value</b>	string	(optional) item value
<b>id</b>	number	value identifier (ascending counter, unique within one data session)
<b>timestamp</b>	number	(optional) timestamp of log type items
<b>source</b>	string	(optional) eventlog item source value
<b>severity</b>	number	(optional) eventlog item severity value
<b>eventid</b>	number	(optional) eventlog item eventid value
<b>state</b>	string	(optional) item state
		<b>0</b> , ITEM_STATE_NORMAL
		<b>1</b> , ITEM_STATE_NOTSUPPORTED
<b>lastlogsize</b>	number	(optional) last log size of log type items
<b>mtime</b>	number	(optional) modify time of log type items
<b>discovery data</b>	array	(optional) array of discovery data objects
<b>clock</b>	number	the discovery data timestamp
<b>druleid</b>	number	the discovery rule identifier

name	value type	description
<b>id</b>	number	the discovery check identifier or null for discovery rule data
<b>type</b>	number	the discovery check type:  <b>-1</b> discovery rule data <b>0</b> , SVC_SSH - SSH service check <b>1</b> , SVC_LDAP - LDAP service check <b>2</b> , SVC_SMTP - SMTP service check <b>3</b> , SVC_FTP - FTP service check <b>4</b> , SVC_HTTP - HTTP service check <b>5</b> , SVC_POP - POP service check <b>6</b> , SVC_NNTP - NNTP service check <b>7</b> , SVC_IMAP - IMAP service check <b>8</b> , SVC_TCP - TCP port availability check <b>9</b> , SVC_AGENT - Zabbix agent <b>10</b> , SVC_SNMPv1 - SNMPv1 agent <b>11</b> , SVC_SNMPv2 - SNMPv2 agent <b>12</b> , SVC_ICMPPING - ICMP ping <b>13</b> , SVC_SNMPv3 - SNMPv3 agent <b>14</b> , SVC_HTTPS - HTTPS service check <b>15</b> , SVC_TELNET - Telnet availability check
<b>ip</b>	string	the host IP address
<b>dns</b>	string	the host DNS name
<b>port</b>	number	(optional) service port number
<b>key_</b>	string	(optional) the item key for discovery check of type <b>9</b> SVC_AGENT
<b>value</b>	string	(optional) value received from the service, can be empty for most of services
<b>status</b>	number	(optional) service status:  <b>0</b> , DOBJECT_STATUS_UP - Service UP <b>1</b> , DOBJECT_STATUS_DOWN - Service DOWN
<b>auto registration</b>	array	(optional) array of autoregistration data objects
<b>clock</b>	number	the autoregistration data timestamp
<b>host</b>	string	the host name
<b>ip</b>	string	(optional) the host IP address
<b>dns</b>	string	(optional) the resolved DNS name from IP address
<b>port</b>	string	(optional) the host port
<b>host_metadata</b>	string	(optional) the host metadata sent by agent (based on HostMetadata or HostMetadataItem agent configuration parameter)
<b>tasks</b>	array	(optional) array of tasks
<b>type</b>	number	the task type:  <b>0</b> , ZBX_TM_TASK_PROCESS_REMOTE_COMMAND_RESULT - remote command result
<b>status</b>	number	the remote command execution status:  <b>0</b> , ZBX_TM_REMOTE_COMMAND_COMPLETED - the remote command completed successfully <b>1</b> , ZBX_TM_REMOTE_COMMAND_FAILED - the remote command failed
<b>error</b>	string	(optional) the error message
<b>parent_task_id</b>	number	the parent task id
<b>more</b>	number	(optional) 1 - there are more history data to send
<b>clock</b>	number	(optional) data transfer timestamp (seconds)
<b>ns</b>	number	(optional) data transfer timestamp (nanoseconds)

name	value type	description
<b>version</b>	string	the proxy version (<major>.<minor>.<build>)
server→proxy:		
<b>response</b>	string	the request success information ('success' or 'failed')
<b>tasks</b>	array	(optional) array of tasks
<b>type</b>	number	the task type:
		<b>1,</b> ZBX_TM_TASK_PROCESS_REMOTE_COMMAND - remote command the task creation time the time in seconds after which task expires the remote command type:
<b>clock</b>	number	
<b>ttl</b>	number	
<b>command</b>	string	
<b>execute</b>	number	<b>0,</b> ZBX_SCRIPT_TYPE_CUSTOM_SCRIPT - use custom script <b>1,</b> ZBX_SCRIPT_TYPE_IPMI - use IPMI <b>2,</b> ZBX_SCRIPT_TYPE_SSH - use SSH <b>3,</b> ZBX_SCRIPT_TYPE_TELNET - use Telnet <b>4,</b> ZBX_SCRIPT_TYPE_GLOBAL_SCRIPT - use global script (currently functionally equivalent to custom script) the remote command to execute the execution target for custom scripts:
<b>port</b>	number	
<b>auth</b>	number	<b>0,</b> ZBX_SCRIPT_EXECUTE_ON_AGENT - execute script on agent <b>1,</b> ZBX_SCRIPT_EXECUTE_ON_SERVER - execute script on server <b>2,</b> ZBX_SCRIPT_EXECUTE_ON_PROXY - execute script on proxy (optional) the port for telnet and ssh commands (optional) the authentication type for ssh commands
<b>username</b>	string	(optional) the user name for telnet and ssh commands
<b>password</b>	string	(optional) the password for telnet and ssh commands
<b>publickey</b>	string	(optional) the public key for ssh commands
<b>privatekey</b>	string	(optional) the private key for ssh commands
<b>parenttaskid</b>	number	the parent task id
<b>hostid</b>	number	target hostid

Example:

proxy→server:

```

{
  "request": "proxy data",
  "host": "Proxy #12",
  "session": "123456789012345678901234567890123456789012",
  "host availability": [
    {
      "hostid": 10106,
      "available": 1,
      "error": "",
      "snmp_available": 0,
      "snmp_error": "",
      "ipmi_available": 0,
      "ipmi_error": "",
      "jmx_available": 0,
      "jmx_error": ""
    }
  ]
}

```

```

    },
    {
      "hostid":10107,
      "available":1,
      "error":"","",
      "snmp_available":0,
      "snmp_error":"","",
      "ipmi_available":0,
      "ipmi_error":"","",
      "jmx_available":0,
      "jmx_error":""
    }
  ],
  "history data":[
    {
      "itemid":"12345",
      "clock":1478609647,
      "ns":332510044,
      "value":"52956612",
      "id": 1
    },
    {
      "itemid":"12346",
      "clock":1478609647,
      "ns":330690279,
      "state":1,
      "value":"Cannot find information for this network interface in /proc/net/dev.",
      "id": 2
    }
  ],
  "discovery data":[
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":3,
      "type":12,
      "ip":"10.3.0.10",
      "dns":"vdebian",
      "status":1
    },
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":null,
      "type":-1,
      "ip":"10.3.0.10",
      "dns":"vdebian",
      "status":1
    }
  ],
  "auto registration":[
    {
      "clock":1478608371,
      "host":"Logger1",
      "ip":"10.3.0.1",
      "dns":"localhost",
      "port":"10050"
    },
    {
      "clock":1478608381,
      "host":"Logger2",
      "ip":"10.3.0.2",

```

```

        "dns": "localhost",
        "port": "10050"
    }
],
"tasks": [
    {
        "type": 2,
        "clock": 1478608371,
        "ttl": 600,
        "commandtype": 2,
        "command": "restart_service1.sh",
        "execute_on": 2,
        "port": 80,
        "authtype": 0,
        "username": "userA",
        "password": "password1",
        "publickey": "MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
        "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u091HNsj6tQ5QCqGKuk01De7zhd",
        "parent_taskid": 10,
        "hostid": 10070
    },
    {
        "type": 2,
        "clock": 1478608381,
        "ttl": 600,
        "commandtype": 1,
        "command": "restart_service2.sh",
        "execute_on": 0,
        "authtype": 0,
        "username": "",
        "password": "",
        "publickey": "",
        "privatekey": "",
        "parent_taskid": 20,
        "hostid": 10084
    }
],
"tasks": [
    {
        "type": 0,
        "status": 0,
        "parent_taskid": 10
    },
    {
        "type": 0,
        "status": 1,
        "error": "No permissions to execute task.",
        "parent_taskid": 20
    }
],
"version": "5.2.0"
}

```

server→proxy:

```

{
  "response": "success",
  "tasks": [
    {
      "type": 1,
      "clock": 1478608371,
      "ttl": 600,
      "commandtype": 2,

```

```

    "command": "restart_service1.sh",
    "execute_on": 2,
    "port": 80,
    "authtype": 0,
    "username": "userA",
    "password": "password1",
    "publickey": "MIGfMAOGCSqGSIB3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
    "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u091HNsj6tQ5QcGKuk01De7zhd",
    "parent_taskid": 10,
    "hostid": 10070
  },
  {
    "type": 1,
    "clock": 1478608381,
    "ttl": 600,
    "commandtype": 1,
    "command": "restart_service2.sh",
    "execute_on": 0,
    "authtype": 0,
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "parent_taskid": 20,
    "hostid": 10084
  }
]
}

```

## 2 Zabbix agent protocol

Please refer to [Passive and active agent checks](#) page for more information.

## 3 Zabbix sender protocol

Please refer to the [trapper item](#) page for more information.

## 4 Header

### Overview

Header is present in response and request messages between Zabbix components. It is required to determine the length of message. The header consists of:

<PROTOCOL> - "ZBXD" (4 bytes).

<FLAGS> -the protocol flags, (1 byte). 0x01 - Zabbix communications protocol, 0x02 - compression).

<DATALEN> - data length (4 bytes). 1 will be formatted as 01/00/00/00 (four bytes, 32 bit number in little

<RESERVED> - reserved for protocol extensions (4 bytes).

When compression is enabled (0x02 flag) the <RESERVED> bytes contains uncompressed data size, 32 bit number in little-endian format.

Zabbix protocol has 1GB packet size limit per connection.

### Implementation

Here are code snippets showing how to add Zabbix protocol header to the data you want to send in order to obtain packet you should send to Zabbix so it is interpreted correctly.

Language	Code
bash	<code>printf -v LENGTH '%016x' "\${#DATA}"PACK=</code>
Java	<code>byte[] header = new byte[] {'Z', 'B', 'X', 'D'}</code>
PHP	<code>\$packet = "ZBXD\1" . pack('P', strlen(\$d</code>

Language	Code
Perl	<code>my \$packet = "ZBXD\1" . pack('&lt;Q', length</code>
Python	<code>packet = "ZBXD\1" + struct.pack('&lt;Q', le</code>

## 5 Real-time export protocol

This section presents details of the **real-time export** protocol in a newline-delimited JSON format for:

- **trigger events**
- **item values**
- **trends**

All files have a `.ndjson` extension. Each line of the export file is a JSON object.

Trigger events

The following information is exported for a problem event:

Field	Type	Description
clock	number	Number of seconds since Epoch to the moment when problem was detected (integer part).
ns	number	Number of nanoseconds to be added to <code>clock</code> to get a precise problem detection time.
value	number	1 (always).
eventid	number	Problem event ID.
name	string	Problem event name.
severity	number	Problem event severity (0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster).
hosts	array	This property is exported since Zabbix 5.2.7. List of hosts involved in the trigger expression; there should be at least one element in array.
-	object	
-	host	Host name.
-	name	Visible host name.
groups	array	list of host groups of all hosts involved in the trigger expression; there should be at least one element in array.
-	string	Host group name.
tags	array	List of problem tags (can be empty).
-	object	
-	tag	Tag name.
-	value	Tag value (can be empty).

The following information is exported for a recovery event:

Field	Type	Description
clock	number	Number of seconds since Epoch to the moment when problem was resolved (integer part).
ns	number	Number of nanoseconds to be added to <code>clock</code> to get a precise problem resolution time.
value	number	0 (always).
eventid	number	Recovery event ID.
p_eventid	number	Problem event ID.

Examples

Problem:

```
{ "clock":1519304285, "ns":123456789, "value":1, "name":"Either Zabbix agent is unreachable on Host B or polle
```

Recovery:



```
{"clock":1519304345,"ns":987654321,"value":0,"eventid":43,"p_eventid":42}
```

Problem (multiple problem event generation):

```
{"clock":1519304286,"ns":123456789,"value":1,"eventid":43,"name":"Either Zabbix agent is unreachable on Ho
```

```
{"clock":1519304286,"ns":123456789,"value":1,"eventid":43,"name":"Either Zabbix agent is unreachable on Ho
```

Recovery:

```
{"clock":1519304346,"ns":987654321,"value":0,"eventid":44,"p_eventid":43}
```

```
{"clock":1519304346,"ns":987654321,"value":0,"eventid":44,"p_eventid":42}
```

Item values

The following information is exported for a collected item value:

Field	Type	Description
host	object	Host name of the item host.
	host string	Host name.
	name string	Visible host name.
groups	array	List of host groups of the item host; there should be at least one element in array.
	- string	Host group name.
applications	array	List of the item applications; empty if there are none.
	- string	Application name.
itemid	number	Item ID.
name	string	Visible item name.
clock	number	Number of seconds since Epoch to the moment when value was collected (integer part).
ns	number	Number of nanoseconds to be added to clock to get a precise value collection time.
timestamp (Log only)	number	0 if not available.
source (Log only)	string	Empty string if not available.
severity (Log only)	number	0 if not available.
eventid (Log only)	number	0 if not available.
value	number (for numeric items) or string (for text items)	Collected item value.
type	number	Collected value type: 0 - numeric float, 1 - character, 2 - log, 3 - numeric unsigned, 4 - text

Examples

Numeric (unsigned) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"applications":
```

Numeric (float) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"applications":
```

Character, text value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"applications":
```

Log value:

```
{"host":{"host":"Host A","name":"Host A visible"},"groups":["Group X","Group Y","Group Z"],"applications":
```

Trends

The following information is exported for a calculated trend value:



Parameter	▼▼											
/ sys-												
tem												
▼▼	1	2	3	4	5	6	7	8	9	10	11	
<b>agent.hostname</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>agent.ping</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>agent.version</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>kernel.maxfiles</b>	-	X	X	X	-	-	-	?	X	X	X	X
<b>kernel.maxproc</b>	-	-	X	X	X	-	-	?	X	X	X	X
<b>log[file,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxlines&gt;,&lt;mode&gt;,&lt;output&gt;,&lt;maxdelay&gt;]</b>	X								X	X	X	X
<b>log.count[file,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxproclines&gt;,&lt;mode&gt;,&lt;maxdelay&gt;]</b>	X								X	X	X	X
<b>logrt[file_regexp,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxlines&gt;,&lt;mode&gt;,&lt;output&gt;,&lt;maxdelay&gt;,&lt;options&gt;]</b>	X											X
<b>logrt.count[file_regexp,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxproclines&gt;,&lt;mode&gt;,&lt;maxdelay&gt;,&lt;options&gt;]</b>	X											X
<b>modbus.get[endpoint,&lt;slave id&gt;,&lt;function&gt;,&lt;address&gt;,&lt;count&gt;,&lt;type&gt;,&lt;endianness&gt;,&lt;offset&gt;]</b>	X											
<b>net.dns[&lt;ip&gt;,&lt;zone&gt;,&lt;type&gt;,&lt;timeout&gt;,&lt;count&gt;]</b>	X				X	X	X	X	X	X	X	X
<b>net.dns.record[&lt;ip&gt;,&lt;zone&gt;,&lt;type&gt;,&lt;timeout&gt;,&lt;count&gt;]</b>	X				X	X	X	X	X	X	X	X
<b>net.if.collisions[if]</b>		X	X	X	X	-	X	-	X	X	r	
<b>net.if.discovery</b>	X	X	X	X	X	X	X	-	-	X	X	X
<b>net.if.in[if,&lt;mode&gt;]</b>	X	X	X	X	X	X <sup>1</sup>	X	-	X	X	r	r
mode bytes	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
▲ (de-fault)												
packets	X	X	X	X	X	X	X	-	X	X	r	r
errors	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
dropped	X	X	X	X	-	X	-	-	X	X	r	r
overruns	-	X	X	-	-	-	-	-	-	-	-	-
frame	-	X	X	-	-	-	-	-	-	-	-	-
compressed		X	X	-	-	-	-	-	-	-	-	-
multicast		X	X	-	-	-	-	-	-	-	-	-
<b>net.if.out[if,&lt;mode&gt;]</b>	X	X	X	X	X	X <sup>1</sup>	X	-	X	X	r	r
mode bytes	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
▲ (de-fault)												
packets	X	X	X	X	X	X	X	-	X	X	r	r
errors	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
dropped	X	X	X	-	-	X	-	-	-	-	-	-
overruns	-	X	X	-	-	-	-	-	-	-	-	-
collision	-	X	X	-	-	-	-	-	-	-	-	-
carrier	-	X	X	-	-	-	-	-	-	-	-	-
compressed		X	X	-	-	-	-	-	-	-	-	-
<b>net.if.total[if,&lt;mode&gt;]</b>	X	X	X	X	X	X <sup>1</sup>	X	-	X	X	r	r
mode bytes	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
▲ (de-fault)												
packets	X	X	X	X	X	X	X	-	X	X	r	r
errors	X	X	X	X	X <sup>2</sup>	X	X	-	X	X	r	r
dropped	X	X	X	-	-	X	-	-	-	-	-	-
overruns	-	X	X	-	-	-	-	-	-	-	-	-
compressed		X	X	-	-	-	-	-	-	-	-	-
<b>net.tcp.listen[port]</b>	X	X	X	X	X	-	-	-	X	-	-	-
<b>net.tcp.port[&lt;ip&gt;,&lt;port&gt;]</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>net.tcp.service[service,&lt;ip&gt;,&lt;port&gt;]</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>net.tcp.service.perf[service,&lt;ip&gt;,&lt;port&gt;]</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>net.udp.listen[port]</b>	X	X	X	X	X	-	-	-	X	-	-	-
<b>net.udp.service[service,&lt;ip&gt;,&lt;port&gt;]</b>	X	X	X	X	X	X	X	X	X	X	X	X
<b>net.udp.service.perf[service,&lt;ip&gt;,&lt;port&gt;]</b>	X	X	X	X	X	X	X	X	X	X	X	X
	1	2	3	4	5	6	7	8	9	10	11	
<b>proc.cpu.util[&lt;name&gt;,&lt;user&gt;,&lt;type&gt;,&lt;cmdline&gt;,&lt;mode&gt;,&lt;zone&gt;]</b>	-	-	-	-	X <sup>3</sup>	-	-	-	-	-	-	-
type total	-	X	X	-	X	-	-	-	-	-	-	-
▲ (de-fault)												

	user	-	X	X	-	X	-	-	-	-	-	-
	system	-	X	X	-	X	-	-	-	-	-	-
mode	avg1	-	X	X	-	X	-	-	-	-	-	-
▲	(de-fault)											
	avg5	-	X	X	-	X	-	-	-	-	-	-
	avg15	-	X	X	-	X	-	-	-	-	-	-
zone	current	-	-	-	-	X	-	-	-	-	-	-
▲	(de-fault)											
	all	-	-	-	-	X	-	-	-	-	-	-
	<b>proc.mem[&lt;name&gt;,&lt;user&gt;,&lt;mode&gt;,&lt;cmdline&gt;,&lt;memtype&gt;]</b>							X	X	-	X	X
mode	sum	-	X	X	X	X	-	X	X	-	X	X
▲	(de-fault)											
	avg	-	X	X	X	X	-	X	X	-	X	X
	max	-	X	X	X	X	-	X	X	-	X	X
	min	-	X	X	X	X	-	X	X	-	X	X
memtype		-	X	X	X	X	-	X	-	-	-	-
▲												
	<b>proc.num[&lt;name&gt;,&lt;user&gt;,&lt;state&gt;,&lt;cmdline&gt;,&lt;zone&gt;]</b>						X	X	X	-	X	X
state	all	-	X	X	X	X	X	X	X	-	X	X
▲	(de-fault)											
	disk	-	X	X	X	-	-	-	-	-	X	X
	sleep	-	X	X	X	X	X	X	X	-	X	X
	zomb	-	X	X	X	X	X	X	X	-	X	X
	run	-	X	X	X	X	X	X	X	-	X	X
	trace	-	X	X	X	-	-	-	-	-	X	X
cmdline		-	X	X	X	X	X	X	X	-	X	X
▲												
zone	current	-	-	-	-	X	-	-	-	-	-	-
▲	(de-fault)											
	all	-	-	-	-	X	-	-	-	-	-	-
	<b>sensor[device,sensor,&lt;mode&gt;]</b>										X	-
	<b>system.boottime</b>		X	X	X	X	-	-	-	X	X	X
	<b>system.cpu.discovery</b>		X	X	X	X	X	X	X	X	X	X
	<b>system.cpu.intr</b>	-	X	X	X	X	-	X	-	-	X	X
	<b>system.cpu.load[&lt;cpu&gt;,&lt;mode&gt;]</b>		X	X	X	X	X	X	X	X	X	X
cpu ▲	all	X	X	X	X	X	X	X	X	X	X	X
	(de-fault)											
	percpu	X	X	X	X	X	X	X	-	X	X	X
mode	avg1	X	X	X	X	X	X	X	X	X	X	X
▲	(de-fault)											
	avg5	X	X	X	X	X	X	X	X	X	X	X
	avg15	X	X	X	X	X	X	X	X	X	X	X
	<b>system.cpu.num[&lt;type&gt;]</b>		X	X	X	X	X	X	-	X	X	X
type	online	X	X	X	X	X	X	X	-	X	X	X
▲	(de-fault)											
	max	-	X	X	X	X	-	-	-	X	-	-
	<b>system.cpu.switches</b>		X	X	X	X	-	X	-	-	X	X
	<b>system.cpu.util[&lt;cpu&gt;,&lt;type&gt;,&lt;mode&gt;,&lt;logical_or_physical&gt;]</b>							X	X	-	X	X
type	user	-	X	X	X	X	X	X	X	-	X	X
▲	(de-fault)											
	nice	-	X	X	X	-	X	-	X	-	X	X
	idle	-	X	X	X	X	X	X	X	-	X	X

		1	2	3	4	5	6	7	8	9	10	11
	system (default for Windows)	X	X	X	X	X	X	X	X	-	X	X
	iowait	-	-	X	-	X	-	X	-	-	-	-
	interrupt-softirq	-	-	X	X	-	-	-	-	-	X	-
	steal	-	-	X	-	-	-	-	-	-	-	-
	guest	-	-	X	-	-	-	-	-	-	-	-
	guest_nice	-	-	X	-	-	-	-	-	-	-	-
mode	avg1 (default)	X	X	X	X	X	X	X	X	-	X	X
▲	avg5	X	X	X	X	X	X	X	-	-	X	X
	avg15	X	X	X	X	X	X	X	-	-	X	X
logical_or_physical	logical	-	-	-	-	-	-	X	-	-	-	-
▲	(default)											
	physical	-	-	-	-	-	-	X	-	-	-	-
	1	2	3	4	5	6	7	8	9	10	11	
	<b>system.hostname[&lt;type&gt;]</b>			X	X	X	X	X	X	X	X	X
	<b>system.hw.chassis[&lt;info&gt;]</b>			X	-	-	-	-	-	-	-	-
	<b>system.hw.cpu[&lt;cpu&gt;,&lt;info&gt;]</b>			X	-	-	-	-	-	-	-	-
	<b>system.hw.devices[&lt;type&gt;]</b>			X	-	-	-	-	-	-	-	-
	<b>system.hw.macaddr[&lt;interface&gt;,&lt;format&gt;]</b>											
	<b>system.localtime[&lt;type&gt;]</b>			X	X	X	X	X	X	X	X	X
type	utc	X	X	X	X	X	X	X	X	X	X	X
▲	(default)											
	local	X	X	X	X	X	X	X	X	X	X	X
	<b>system.run[command,&lt;mode&gt;]</b>			X	X	X	X	X	X	X	X	X
mode	wait	X	X	X	X	X	X	X	X	X	X	X
▲	(default)											
	nowait	X	X	X	X	X	X	X	X	X	X	X
	<b>system.stat[resource,&lt;type&gt;]</b>							X	-	-	-	-
	<b>system.sw.arch</b>	X	X	X	X	X	X	X	X	X	X	X
	<b>system.sw.os[&lt;info&gt;]</b>			X	X	-	-	-	-	-	-	-
	<b>system.sw.packages[&lt;package&gt;,&lt;manager&gt;,&lt;format&gt;]</b>											
	<b>system.swap.in[&lt;device&gt;,&lt;type&gt;]</b>					X	-	-	-	-	X	-
	(specifying a device is only supported under Linux)											
type	count	-	X	X	-	X	-	-	-	-	X	-
▲	(pages will only work if device was not specified)											
	sectors	-	X	X	-	-	-	-	-	-	-	-

pages (de-fault under Linux)	-	X	X	-	X	-	-	-	-	X	-
<b>system.swap.out[&lt;device&gt;, &lt;type&gt;]</b> (specifying a device is only supported under Linux)	-	X	-	-	-	-	-	-	X	-	
type count (de-fault under all except Linux)	-	X	X	-	X	-	-	-	-	X	-
▲ (pages will only work if device was not specified)											
sectors	-	X	X	-	-	-	-	-	-	-	-
pages (de-fault under Linux)	-	X	X	-	X	-	-	-	-	X	-
<b>system.swap.size[&lt;device&gt;, &lt;type&gt;]</b> (specifying a device is only supported under FreeBSD, for other platforms must be empty or "all")	X	X	-	X	X	-	X	X	-	X	-
type free (de-fault)	X	X	X	X	X	-	X	X	-	X	-
▲ total	X	X	X	X	X	-	X	X	-	X	-
used	X	X	X	X	X	-	X	X	-	X	-
pfree	X	X	X	X	X	-	X	X	-	X	-
pusued <sup>6</sup>	X	X	X	X	X	-	X	X	-	X	-
<b>system.uname</b>	X	X	X	X	X	X	X	X	X	X	X
<b>system.uptime</b>	X	X	X	X	X	-	X	?	X	X	X
<b>system.users.num</b>	X	X	X	X	X	X	X	X	X	X	X
<b>systemd.unit.discovery</b>	X	X	-	-	-	-	-	-	-	-	-
<b>systemd.unit.get</b>	X	X	-	-	-	-	-	-	-	-	-
<b>systemd.unit.info</b>	X	X	-	-	-	-	-	-	-	-	-

	1	2	3	4	5	6	7	8	9	10	11
<b>vfs.dev.discovery</b>		X	X	-	-	-	-	-	-	-	-
<b>vfs.dev.read[&lt;device&gt;,&lt;type&gt;,&lt;mode&gt;]</b>	X			X	X	-	X	-	-	X	-
type sectors	-	X	X	-	-	-	-	-	-	-	-
▲											
operations (de- fault for OpenBSD, AIX)		X	X	X	X	-	X	-	-	X	-
bytes (de- fault for So- laris)	-	-	-	X	X	-	X	-	-	X	-
sps (de- fault for Linux)	-	X	X	-	-	-	-	-	-	-	-
ops	-	X	X	X	-	-	-	-	-	-	-
bps (de- fault for FreeBSD)	-	-	-	X	-	-	-	-	-	-	-
mode avg1 (de- fault)	-	X	X	X	-	-	-	-	-	-	-
▲ (compatible only with type in: sps, ops, bps)											
avg5	-	X	X	X	-	-	-	-	-	-	-
avg15	-	X	X	X	-	-	-	-	-	-	-
<b>vfs.dev.write[&lt;device&gt;,&lt;type&gt;,&lt;mode&gt;]</b>	X			X	X	-	X	-	-	X	-
type sectors	-	X	X	-	-	-	-	-	-	-	-
▲											
operations (de- fault for OpenBSD, AIX)		X	X	X	X	-	X	-	-	X	-
bytes (de- fault for So- laris)	-	-	-	X	X	-	X	-	-	X	-
sps (de- fault for Linux)	-	X	X	-	-	-	-	-	-	-	-
ops	-	X	X	X	-	-	-	-	-	-	-

	bps	-	-	-	X	-	-	-	-	-	-	-
	(de- fault for FreeBSD)											
mode	avg1	-	X	X	X	-	-	-	-	-	-	-
▲	(de- fault)											
	only											
	with type											
	in:											
	sps,											
	ops,											
	bps)											
	avg5	-	X	X	X	-	-	-	-	-	-	-
	avg15	-	X	X	X	-	-	-	-	-	-	-
	<b>vfs.dir.count</b> [dir,<regex_incl>,<regex_excl>,<types_incl>,<types_excl>,<max_depth>,<min_size>,<max_size>,<min_age>]											
	<b>vfs.dir.size</b> [dir,<regex_incl>,<regex_excl>,<mode>,<max_depth>,<regex_excl_dir>]?									?	?	
	<b>vfs.file.cksum</b> [file]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.contents</b> [file,<encoding>]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.exists</b> [file,<types_incl>,<types_excl>]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.md5sum</b> [file]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.regexp</b> [file,regexp,<encoding>,<output>]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.regmatch</b> [file,regexp,<encoding>]		X	X	X	X	X	X	X	X	X	X
	<b>vfs.file.size</b> [file]	X	X	X	X	X	X	X	X	X	X	X
		1	2	3	4	5	6	7	8	9	10	11
	<b>vfs.file.time</b> [file,<mode>]	X	X	X	X	X	X	X	X	X	X	X
mode	modify	X	X	X	X	X	X	X	X	X	X	X
▲	(de- fault)											
	access	X	X	X	X	X	X	X	X	X	X	X
	change	X <sup>5</sup>	X	X	X	X	X	X	X	X	X	X
	<b>vfs.fs.discovery</b>	X	X	X	X	X	X	-	X	X	X	X
	<b>vfs.fs.get</b>	X	X	X	X	X	X	-	X	X	X	X
	<b>vfs.fs.inode</b> [fs,<mode>]	X	X	X	X	X	X	X	X	X	X	X
mode	total	-	X	X	X	X	X	X	X	X	X	X
▲	(de- fault)											
	free	-	X	X	X	X	X	X	X	X	X	X
	used	-	X	X	X	X	X	X	X	X	X	X
	pfree	-	X	X	X	X	X	X	X	X	X	X
	pusd	-	X	X	X	X	X	X	X	X	X	X
	<b>vfs.fs.size</b> [fs,<mode>]	X	X	X	X	X	X	X	X	X	X	X
mode	total	X	X	X	X	X	X	X	X	X	X	X
▲	(de- fault)											
	free	X	X	X	X	X	X	X	X	X	X	X
	used	X	X	X	X	X	X	X	X	X	X	X
	pfree	X	X	X	X	X	X	X	X	X	X	X
	pusd	X	X	X	X	X	X	X	X	X	X	X
	<b>vm.memory.size</b> [<mode>]	X	X	X	X	X	X	X	X	X	X	X
mode	total	X	X	X	X	X	X	X	X	X	X	X
▲	(de- fault)											
	active	-	-	-	X	-	X	-	-	X	X	X
	anon	-	-	-	-	-	-	-	-	-	-	X
	buffers	-	X	X	X	-	-	-	-	-	X	X
	cached	X	X	X	X	-	-	X	-	-	X	X
	exec	-	-	-	-	-	-	-	-	-	-	X
	file	-	-	-	-	-	-	-	-	-	-	X
	free	X	X	X	X	X	X	X	X	X	X	X
	inactive	-	-	-	X	-	-	-	-	X	X	X



pinned	-	-	-	-	-	-	X	-	-	-	-
shared	-	X	-	X	-	-	-	-	-	X	X
wired	-	-	-	X	-	-	-	-	X	X	X
used	X	X	X	X	X	X	X	X	X	X	X
used	X	X	X	X	X	X	X	X	X	X	X
available	X	X	X	X	X	X	X	X	X	X	X
pavailable	X	X	X	X	X	X	X	X	X	X	X
<b>web.page.get[host,&lt;path&gt;,&lt;port&gt;]</b>				X	X	X	X	X	X	X	X
<b>web.page.perf[host,&lt;path&gt;,&lt;port&gt;]</b>				X	X	X	X	X	X	X	X
<b>web.page.regexp[host,&lt;path&gt;,&lt;port&gt;,regexp,&lt;length&gt;,&lt;output&gt;]</b>				X	X	X	X	X	X	X	X
	1	2	3	4	5	6	7	8	9	10	11

**Note:**

See also a description of [vm.memory.size parameters](#).

Footnotes

<sup>1</sup> net.if.in, net.if.out and net.if.total items do not provide statistics of loopback interfaces (e.g. lo0).

<sup>2</sup> These values for these items are not supported for loopback interfaces on Solaris systems up to and including Solaris 10 6/06 as byte, error and utilization statistics are not stored and/or reported by the kernel. However, if you're monitoring a Solaris system via net-snmp, values may be returned as net-snmp carries legacy code from the cmu-snmp dated as old as 1997 that, upon failing to read byte values from the interface statistics returns the packet counter (which does exist on loopback interfaces) multiplied by an arbitrary value of 308. This makes the assumption that the average length of a packet is 308 octets, which is a very rough estimation as the MTU limit on Solaris systems for loopback interfaces is 8892 bytes.

These values should not be assumed to be correct or even closely accurate. They are guesstimates. The Zabbix agent does not do any guess work, but net-snmp will return a value for these fields.

<sup>3</sup> The command line on Solaris, obtained from /proc/pid/psinfo, is limited to 80 bytes and contains the command line as it was when the process was started.

<sup>4</sup> Not supported on Windows Event Log.

<sup>5</sup> On Windows XP vfs.file.time[file,change] may be equal to vfs.file.time[file,access].

<sup>6</sup> Supported only by Zabbix agent 2; not supported by Zabbix agent.

## 2 vm.memory.size parameters

### Overview

This section provides some parameter details for the [vm.memory.size\[<mode>\]](#) agent item.

### Parameters

The following parameters are available for this item:

- **active** - memory currently in use or very recently used, and so it is in RAM
- **anon** - memory not associated with a file (cannot be re-read from it)
- **available** - available memory, calculated differently depending on the platform (see the table below)
- **buffers** - cache for things like file system metadata
- **cached** - cache for various things
- **exec** - executable code, typically from a (program) file
- **file** - cache for contents of recently accessed files
- **free** - memory that is readily available to any entity requesting memory
- **inactive** - memory that is marked as not used
- **pavailable** - 'available' memory as percentage of 'total' (calculated as available/total\*100)
- **pinned** - same as 'wired'
- **pusd** - 'used' memory as percentage of 'total' (calculated as used/total\*100)
- **shared** - memory that may be simultaneously accessed by multiple processes
- **slab** - total amount of memory used by the kernel to cache data structures for its own use
- **total** - total physical memory available
- **used** - used memory, calculated differently depending on the platform (see the table below)
- **wired** - memory that is marked to always stay in RAM. It is never moved to disk.

**Warning:**

Some of these parameters are platform-specific and might not be available on your platform. See [Items supported by platform](#) for details.

Platform-specific calculation of **available** and **used**:

Platform	"available"	"used"
AIX	free + cached	real memory in use
FreeBSD	inactive + cached + free	active + wired + cached
HP UX	free	total - free
Linux<3.14	free + buffers + cached	total - free
Linux 3.14+ (also backported to 3.10 on RHEL 7)	/proc/meminfo, see "MemAvailable" in Linux kernel <a href="#">documentation</a> for details. Note that free + buffers + cached is no longer equal to 'available' due to not all the page cache can be freed and low watermark being used in calculation.	total - free
NetBSD	inactive + execpages + file + free	total - free
OpenBSD	inactive + free + cached	active + wired
OSX	inactive + free	active + wired
Solaris	free	total - free
Win32	free	total - free

**Attention:**

The sum of `vm.memory.size[used]` and `vm.memory.size[available]` does not necessarily equal total. For instance, on FreeBSD:

- \* Active, inactive, wired, cached memories are considered used, because they store some useful information.
- \* At the same time inactive, cached, free memories are considered available, because these kinds of memories can be given instantly to processes that request more memory.

So inactive memory is both used and available simultaneously. Because of this, the `vm.memory.size[used]` item is designed for informational purposes only, while `vm.memory.size[available]` is designed to be used in triggers.

See also

1. [Additional details about memory calculation in different OS](#)

**3 Passive and active agent checks**

Overview

This section provides details on passive and active checks performed by [Zabbix agent](#).

Zabbix uses a JSON based communication protocol for communicating with Zabbix agent.

Passive checks

A passive check is a simple data request. Zabbix server or proxy asks for some data (for example, CPU load) and Zabbix agent sends back the result to the server.

**Server request**

For definition of header and data length please refer to [protocol details](#).

<item key>

**Agent response**

<DATA>[\0<ERROR>]

Above, the part in square brackets is optional and is only sent for not supported items.

For example, for supported items:

1. Server opens a TCP connection
2. Server sends <HEADER><DATALEN>agent.ping
3. Agent reads the request and responds with <HEADER><DATALEN>1

4. Server processes data to get the value, '1' in our case
5. TCP connection is closed

For not supported items:

1. Server opens a TCP connection
2. Server sends **<HEADER><DATALEN>vfs.fs.size[/nono]**
3. Agent reads the request and responds with **<HEADER><DATALEN>ZBX\_NOTSUPPORTED\0Cannot obtain filesystem information: [2] No such file or directory**
4. Server processes data, changes item state to not supported with the specified error message
5. TCP connection is closed

Active checks

Active checks require more complex processing. The agent must first retrieve from the server(s) a list of items for independent processing.

The servers to get the active checks from are listed in the 'ServerActive' parameter of the agent **configuration file**. The frequency of asking for these checks is set by the 'RefreshActiveChecks' parameter in the same configuration file. However, if refreshing active checks fails, it is retried after hardcoded 60 seconds.

The agent then periodically sends the new values to the server(s).

**Note:**

If an agent is behind the firewall you might consider using only Active checks because in this case you wouldn't need to modify the firewall to allow initial incoming connections.

Getting the list of items

**Agent request**

```
{
  "request": "active checks",
  "host": "<hostname>"
}
```

**Server response**

```
{
  "response": "success",
  "data": [
    {
      "key": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "delay": 30,
      "lastlogsize": 0,
      "mtime": 0
    },
    {
      "key": "agent.version",
      "delay": 600,
      "lastlogsize": 0,
      "mtime": 0
    },
    {
      "key": "vfs.fs.size[/nono]",
      "delay": 600,
      "lastlogsize": 0,
      "mtime": 0
    }
  ]
}
```

The server must respond with success. For each returned item, all properties **key**, **delay**, **lastlogsize** and **mtime** must exist, regardless of whether item is a log item or not.

For example:

1. Agent opens a TCP connection
2. Agent asks for the list of checks

3. Server responds with a list of items (item key, delay)
4. Agent parses the response
5. TCP connection is closed
6. Agent starts periodical collection of data

**Attention:**

Note that (sensitive) configuration data may become available to parties having access to the Zabbix server trapper port when using an active check. This is possible because anyone may pretend to be an active agent and request item configuration data; authentication does not take place unless you use **encryption** options.

Sending in collected data

**Agent sends**

```
{
  "request": "agent data",
  "session": "12345678901234567890123456789012",
  "data": [
    {
      "host": "<hostname>",
      "key": "agent.version",
      "value": "2.4.0",
      "id": 1,
      "clock": 1400675595,
      "ns": 76808644
    },
    {
      "host": "<hostname>",
      "key": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "lastlogsize": 112,
      "value": " 19845:20140621:141708.521 Starting Zabbix Agent [<hostname>]. Zabbix 2.4.0 (revision",
      "id": 2,
      "clock": 1400675595,
      "ns": 77053975
    },
    {
      "host": "<hostname>",
      "key": "vfs.fs.size[/nono]",
      "state": 1,
      "value": "Cannot obtain filesystem information: [2] No such file or directory",
      "id": 3,
      "clock": 1400675595,
      "ns": 78154128
    }
  ],
  "clock": 1400675595,
  "ns": 78211329
}
```

A virtual ID is assigned to each value. Value ID is a simple ascending counter, unique within one data session (identified by the session token). This ID is used to discard duplicate values that might be sent in poor connectivity environments.

**Server response**

```
{
  "response": "success",
  "info": "processed: 3; failed: 0; total: 3; seconds spent: 0.003534"
}
```

**Attention:**

If sending of some values fails on the server (for example, because host or item has been disabled or deleted), agent will not retry sending of those values.

For example:

1. Agent opens a TCP connection
2. Agent sends a list of values
3. Server processes the data and sends the status back
4. TCP connection is closed

Note how in the example above the not supported status for `vfs.fs.size[/nono]` is indicated by the "state" value of 1 and the error message in "value" property.

**Attention:**

Error message will be trimmed to 2048 symbols on server side.

Older XML protocol

**Note:**

Zabbix will take up to 16 MB of XML Base64-encoded data, but a single decoded value should be no longer than 64 KB otherwise it will be truncated to 64 KB while decoding.

#### 4 Trapper items

Overview

Zabbix server uses a JSON- based communication protocol for receiving data from Zabbix sender with the help of **trapper item**.

Request and response messages must begin with **header and data length**.

Zabbix sender request

```
{
  "request": "sender data",
  "data": [
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value"
    }
  ]
}
```

Zabbix server response

```
{
  "response": "success",
  "info": "processed: 1; failed: 0; total: 1; seconds spent: 0.060753"
}
```

Zabbix sender request with a timestamp

Alternatively Zabbix sender can send a request with a timestamp and nanoseconds.

```
{
  "request": "sender data",
  "data": [
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value",
      "clock": 1516710794,
      "ns": 592397170
    },
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value",
      "clock": 1516710795,
      "ns": 192399456
    }
  ]
}
```

```

],
"clock":1516712029,
"ns":873386094
}

```

Zabbix server response

```

{
  "response":"success",
  "info":"processed: 2; failed: 0; total: 2; seconds spent: 0.060904"
}

```

## 5 Minimum permission level for Windows agent items

### Overview

When monitoring systems using an agent, a good practice is to obtain metrics from the host on which the agent is installed. To use the principle of least privilege, it is necessary to determine what metrics are obtained from the agent.

The table in this document allows you to select the minimum rights for guaranteed correct operation of Zabbix agent.

If a different user is selected for the agent to work, rather than 'LocalSystem', then for the operation of agent as a Windows service, the new user must have the rights "Log on as a service" from "Local Policy→User Rights Assignment" and the right to create, write and delete the Zabbix agent log file. An Active Directory user must be added to the Performance Monitor Users group.

#### Note:

When working with the rights of an agent based on the "minimum technically acceptable" group, prior provision of rights to objects for monitoring is required.

### Common agent items supported on Windows

Item key	User group	
	Recommended	Minimum technically acceptable (functionality is limited)
agent.hostname	Guests	Guests
agent.ping	Guests	Guests
agent.version	Guests	Guests
log	Administrators	Guests
log.count	Administrators	Guests
logrt	Administrators	Guests
logrt.count	Administrators	Guests
net.dns	Guests	Guests
net.dns.record	Guests	Guests
net.if.discovery	Guests	Guests
net.if.in	Guests	Guests
net.if.out	Guests	Guests
net.if.total	Guests	Guests
net.tcp.listen	Guests	Guests
net.tcp.port	Guests	Guests
net.tcp.service	Guests	Guests
net.tcp.service.perf	Guests	Guests
net.udp.service	Guests	Guests
net.udp.service.perf	Guests	Guests
proc.num	Administrators	Guests
system.cpu.discovery	Performance Monitor Users	Performance Monitor Users
system.cpu.load	Performance Monitor Users	Performance Monitor Users
system.cpu.num	Guests	Guests
system.cpu.util	Performance Monitor Users	Performance Monitor Users
system.hostname	Guests	Guests
system.localtime	Guests	Guests
system.run	Administrators	Guests
system.sw.arch	Guests	Guests
system.swap.size	Guests	Guests
system.uname	Guests	Guests

Item key	User group	
system.uptime	Performance Monitor Users	Performance Monitor Users
vfs.dir.count	Administrators	Guests
vfs.dir.size	Administrators	Guests
vfs.file.cksum	Administrators	Guests
vfs.file.contents	Administrators	Guests
vfs.file.exists	Administrators	Guests
vfs.file.md5sum	Administrators	Guests
vfs.file.regexp	Administrators	Guests
vfs.file.regmatch	Administrators	Guests
vfs.file.size	Administrators	Guests
vfs.file.time	Administrators	Guests
vfs.fs.discovery	Administrators	Guests
vfs.fs.size	Administrators	Guests
vm.memory.size	Guests	Guests
web.page.get	Guests	Guests
web.page.perf	Guests	Guests
web.page.regexp	Guests	Guests
zabbix.stats	Guests	Guests

#### Windows-specific item keys

Item key	User group	
	Recommended	Minimum technically acceptable (functionality is limited)
eventlog	Event Log Readers	Guests
net.if.list	Guests	Guests
perf_counter	Performance Monitor Users	Performance Monitor Users
proc_info	Administrators	Guests
service.discovery	Guests	Guests
service.info	Guests	Guests
services	Guests	Guests
wmi.get	Administrators	Guests
vm.vmemory.size	Guests	Guests

## 6 Encoding of returned values

Zabbix server expects every returned text value in the UTF8 encoding. This is related to any type of checks: zabbix agent, ssh, telnet, etc.

Different monitored systems/devices and checks can return non-ASCII characters in the value. For such cases, almost all possible zabbix keys contain an additional item key parameter - **<encoding>**. This key parameter is optional but it should be specified if the returned value is not in the UTF8 encoding and it contains non-ASCII characters. Otherwise the result can be unexpected and unpredictable.

A description of behavior with different database back-ends in such cases follows.

### MySQL

If a value contains a non-ASCII character in non UTF8 encoding - this character and the following will be discarded when the database stores this value. No warning messages will be written to the zabbix\_server.log.

Relevant for at least MySQL version 5.1.61

### PostgreSQL

If a value contains a non-ASCII character in non UTF8 encoding - this will lead to a failed SQL query (PGRES\_FATAL\_ERROR:ERROR invalid byte sequence for encoding) and data will not be stored. An appropriate warning message will be written to the zabbix\_server.log.

Relevant for at least PostgreSQL version 9.1.3

## 7 Large file support

Large file support, often abbreviated to LFS, is the term applied to the ability to work with files larger than 2 GB on 32-bit operating systems. Since Zabbix 2.0 support for large files has been added. This change affects at least **log file monitoring** and all **vfs.file.\* items**. Large file support depends on the capabilities of a system at Zabbix compilation time, but is completely disabled on a 32-bit Solaris due to its incompatibility with procs and swapctl.

## 8 Sensor

Each sensor chip gets its own directory in the sysfs `/sys/devices` tree. To find all sensor chips, it is easier to follow the device symlinks from `/sys/class/hwmon/hwmon*`, where `*` is a real number (0,1,2,...).

The sensor readings are located either in `/sys/class/hwmon/hwmon*/` directory for virtual devices, or in `/sys/class/hwmon/hwmon*/device` directory for non-virtual devices. A file, called `name`, located inside `hwmon*` or `hwmon*/device` directories contains the name of the chip, which corresponds to the name of the kernel driver used by the sensor chip.

There is only one sensor reading value per file. The common scheme for naming the files that contain sensor readings inside any of the directories mentioned above is: `<type><number>_<item>`, where

- **type** - for sensor chips is "in" (voltage), "temp" (temperature), "fan" (fan), etc.,
- **item** - "input" (measured value), "max" (high threshold), "min" (low threshold), etc.,
- **number** - always used for elements that can be present more than once (usually starts from 1, except for voltages which start from 0). If files do not refer to a specific element they have a simple name with no number.

The information regarding sensors available on the host can be acquired using **sensor-detect** and **sensors** tools (lm-sensors package: <http://lm-sensors.org/>). **Sensors-detect** helps to determine which modules are necessary for available sensors. When modules are loaded the **sensors** program can be used to show the readings of all sensor chips. The labeling of sensor readings, used by this program, can be different from the common naming scheme (`<type><number>_<item>`):

- if there is a file called `<type><number>_label`, then the label inside this file will be used instead of `<type><number><item>` name;
- if there is no `<type><number>_label` file, then the program searches inside the `/etc/sensors.conf` (could be also `/etc/sensors3.conf`, or different) for the name substitution.

This labeling allows user to determine what kind of hardware is used. If there is neither `<type><number>_label` file nor label inside the configuration file the type of hardware can be determined by the name attribute (`hwmon*/device/name`). The actual names of sensors, which zabbix\_agent accepts, can be obtained by running **sensors** program with `-u` parameter (**sensors -u**).

In **sensor** program the available sensors are separated by the bus type (ISA adapter, PCI adapter, SPI adapter, Virtual device, ACPI interface, HID adapter).

On Linux 2.4:

(Sensor readings are obtained from `/proc/sys/dev/sensors` directory)

- **device** - device name (if `<mode>` is used, it is a regular expression);
- **sensor** - sensor name (if `<mode>` is used, it is a regular expression);
- **mode** - possible values: avg, max, min (if this parameter is omitted, device and sensor are treated verbatim).

Example key: `sensor[w83781d-i2c-0-2d,temp1]`

Prior to Zabbix 1.8.4, the `sensor[temp1]` format was used.

On Linux 2.6+:

(Sensor readings are obtained from `/sys/class/hwmon` directory)

- **device** - device name (non regular expression). The device name could be the actual name of the device (e.g 0000:00:18.3) or the name acquired using sensors program (e.g. k8temp-pci-00c3). It is up to the user to choose which name to use;
- **sensor** - sensor name (non regular expression);
- **mode** - possible values: avg, max, min (if this parameter is omitted, device and sensor are treated verbatim).

Example key:

`sensor[k8temp-pci-00c3,temp,max]` or `sensor[0000:00:18.3,temp1]`

`sensor[sm5c47b397-isa-0880,in,avg]` or `sensor[sm5c47b397.2176,in1]`

Obtaining sensor names

Sensor labels, as printed by the sensors command, cannot always be used directly because the naming of labels may be different for each sensor chip vendor. For example, sensors output might contain the following lines:



```
$ sensors
in0:          +2.24 V (min = +0.00 V, max = +3.32 V)
Vcore:       +1.15 V (min = +0.00 V, max = +2.99 V)
+3.3V:       +3.30 V (min = +2.97 V, max = +3.63 V)
+12V:        +13.00 V (min = +0.00 V, max = +15.94 V)
M/B Temp:    +30.0°C (low = -127.0°C, high = +127.0°C)
```

Out of these, only one label may be used directly:

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,in0]
2.240000
```

Attempting to use other labels (like Vcore or +12V) will not work.

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,Vcore]
ZBX_NOTSUPPORTED
```

To find out the actual sensor name, which can be used by Zabbix to retrieve the sensor readings, run `sensors -u`. In the output, the following may be observed:

```
$ sensors -u
...
Vcore:
  in1_input: 1.15
  in1_min: 0.00
  in1_max: 2.99
  in1_alarm: 0.00
...
+12V:
  in4_input: 13.00
  in4_min: 0.00
  in4_max: 15.94
  in4_alarm: 0.00
...
```

So Vcore should be queried as in1, and +12V should be queried as in4.<sup>5</sup>

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,in1]
1.301000
```

Not only voltage (in), but also current (curr), temperature (temp) and fan speed (fan) readings can be retrieved by Zabbix.

## 9 Notes on memtype parameter in proc.mem items

### Overview

The **memtype** parameter is supported on Linux, AIX, FreeBSD, and Solaris platforms.

Three common values of 'memtype' are supported on all of these platforms: `pmem`, `rss` and `vsize`. Additionally, platform-specific 'memtype' values are supported on some platforms.

### AIX

See values supported for 'memtype' parameter on AIX in the table.

Supported value	Description	Source in proctentry64 structure	Tries to be compatible with
vsize (( - default value))	Virtual memory size	pi_size	
pmem	Percentage of real memory	pi_prm	ps -o pmem
rss	Resident set size	pi_trss + pi_drss	ps -o rssize
size	Size of process (code + data)	pi_dvm	"ps gvw" SIZE column
dsize	Data size	pi_dsize	
tsize	Text (code) size	pi_tsize	"ps gvw" TSIZ column

<sup>5</sup> According to [specification](#) these are voltages on chip pins and generally speaking may need scaling.

Supported value	Description	Source in procentry64 structure	Tries to be compatible with
sdsiz	Data size from shared library	pi_sdsiz	
drss	Data resident set size	pi_drss	
trss	Text resident set size	pi_trss	

#### FreeBSD

See values supported for 'memtype' parameter on FreeBSD in the table.

Supported value	Description	Source in kinfo_proc structure	Tries to be compatible with
vsize	Virtual memory size	kp_eproc.e_vm.vm_map.size or ki_size	ps -o vsz
pmem	Percentage of real memory	calculated from rss	ps -o pmem
rss	Resident set size	kp_eproc.e_vm.vm_rssize or ki_rssize	ps -o rss
size (( - default value))	Size of process (code + data + stack)	tsize + dsiz + ssiz	
tsize	Text (code) size	kp_eproc.e_vm.vm_tsize or ki_tsize	ps -o tsize
dsiz	Data size	kp_eproc.e_vm.vm_dsiz or ki_dsiz	ps -o dsiz
ssiz	Stack size	kp_eproc.e_vm.vm_ssiz or ki_ssiz	ps -o ssiz

#### Linux

See values supported for 'memtype' parameter on Linux in the table.

Supported value	Description	Source in /proc/<pid>/status file
vsize (( - default value))	Virtual memory size	VmSize
pmem	Percentage of real memory	(VmRSS/total_memory) * 100
rss	Resident set size	VmRSS
data	Size of data segment	VmData
exe	Size of code segment	VmExe
hwm	Peak resident set size	VmHWM
lck	Size of locked memory	VmLck
lib	Size of shared libraries	VmLib
peak	Peak virtual memory size	VmPeak
pin	Size of pinned pages	VmPin
pte	Size of page table entries	VmPTE
size	Size of process code + data + stack segments	VmExe + VmData + VmStk
stk	Size of stack segment	VmStk
swap	Size of swap space used	VmSwap

#### Notes for Linux:

1. Not all 'memtype' values are supported by older Linux kernels. For example, Linux 2.4 kernels do not support hwm, pin, peak, pte and swap values.
2. We have noticed that self-monitoring of the Zabbix agent active check process with `proc.mem[... , ... , ... , ... , data]` shows a value that is 4 kB larger than reported by VmData line in the agent's /proc/<pid>/status file. At the time of self-measurement the agent's data segment increases by 4 kB and then returns to the previous size.

#### Solaris

See values supported for 'memtype' parameter on Solaris in the table.

Supported value	Description	Source in psinfo structure	Tries to be compatible with
vsz (( - default value))	Size of process image	pr_size	ps -o vsz
pmem	Percentage of real memory	pr_pctmem	ps -o pmem
rss	Resident set size It may be underestimated - see rss description in "man ps".	pr_rssize	ps -o rss

## 10 Notes on selecting processes in proc.mem and proc.num items

Processes modifying their commandline

Some programs use modifying their commandline as a method for displaying their current activity. A user can see the activity by running `ps` and `top` commands. Examples of such programs include PostgreSQL, Sendmail, Zabbix.

Let's see an example from Linux. Let's assume we want to monitor a number of Zabbix agent processes.

`ps` command shows processes of interest as

```
$ ps -fu zabbix
UID          PID  PPID  C  STIME TTY          TIME CMD
...
zabbix      6318    1    0  12:01 ?           00:00:00 sbin/zabbix_agentd -c /home/zabbix/ZBXNEXT-1078/zabbix_age
zabbix      6319   6318    0  12:01 ?           00:00:01 sbin/zabbix_agentd: collector [idle 1 sec]
zabbix      6320   6318    0  12:01 ?           00:00:00 sbin/zabbix_agentd: listener #1 [waiting for connection]
zabbix      6321   6318    0  12:01 ?           00:00:00 sbin/zabbix_agentd: listener #2 [waiting for connection]
zabbix      6322   6318    0  12:01 ?           00:00:00 sbin/zabbix_agentd: listener #3 [waiting for connection]
zabbix      6323   6318    0  12:01 ?           00:00:00 sbin/zabbix_agentd: active checks #1 [idle 1 sec]
...
```

Selecting processes by name and user does the job:

```
$ zabbix_get -s localhost -k 'proc.num[zabbix_agentd,zabbix]'
6
```

Now let's rename `zabbix_agentd` executable to `zabbix_agentd_30` and restart it.

`ps` now shows

```
$ ps -fu zabbix
UID          PID  PPID  C  STIME TTY          TIME CMD
...
zabbix      6715    1    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30 -c /home/zabbix/ZBXNEXT-1078/zabbix_
zabbix      6716   6715    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30: collector [idle 1 sec]
zabbix      6717   6715    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30: listener #1 [waiting for connection]
zabbix      6718   6715    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30: listener #2 [waiting for connection]
zabbix      6719   6715    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30: listener #3 [waiting for connection]
zabbix      6720   6715    0  12:53 ?           00:00:00 sbin/zabbix_agentd_30: active checks #1 [idle 1 sec]
...
```

Now selecting processes by name and user produces an incorrect result:

```
$ zabbix_get -s localhost -k 'proc.num[zabbix_agentd_30,zabbix]'
1
```

Why a simple renaming of executable to a longer name lead to quite different result ?

Zabbix agent starts with checking the process name. `/proc/<pid>/status` file is opened and the line `Name` is checked. In our case the `Name` lines are:

```
$ grep Name /proc/{6715,6716,6717,6718,6719,6720}/status
/proc/6715/status:Name:  zabbix_agentd_3
/proc/6716/status:Name:  zabbix_agentd_3
```



The reason is that Zabbix agent takes the regular expression specified in `cmdline` parameter and applies it to contents of process `/proc/<pid>/cmdline`. For kernel threads their `/proc/<pid>/cmdline` files are empty. So, `cmdline` parameter never matches.

Counting of threads in `proc.mem[]` and `proc.num[]` items

Linux kernel threads are counted by `proc.num[]` item but do not report memory in `proc.mem[]` item. For example:

```
$ ps -ef | grep kthreadd
root          2      0  0 09:51 ?                00:00:00 [kthreadd]
```

```
$ zabbix_get -s localhost -k 'proc.num[kthreadd]'
1
```

```
$ zabbix_get -s localhost -k 'proc.mem[kthreadd]'
ZBX_NOTSUPPORTED: Cannot get amount of "VmSize" memory.
```

But what happens if there is a user process with the same name as a kernel thread? Then it could look like this:

```
$ ps -ef | grep kthreadd
root          2      0  0 09:51 ?                00:00:00 [kthreadd]
zabbix       9611  6133  0 17:58 pts/1           00:00:00 ./kthreadd
```

```
$ zabbix_get -s localhost -k 'proc.num[kthreadd]'
2
```

```
$ zabbix_get -s localhost -k 'proc.mem[kthreadd]'
4157440
```

`proc.num[]` counted both the kernel thread and the user process. `proc.mem[]` reports memory for the user process only and counts the kernel thread memory as if it was 0. This is different from the case above when `ZBX_NOTSUPPORTED` was reported.

Be careful when using `proc.mem[]` and `proc.num[]` items if the program name happens to match one of the thread.

Before putting parameters into `proc.mem[]` and `proc.num[]` items, you may want to test the parameters using `proc.num[]` item and `ps` command.

## 11 Implementation details of net.tcp.service and net.udp.service checks

Implementation of `net.tcp.service` and `net.udp.service` checks is detailed on this page for various services specified in the service parameter.

Item `net.tcp.service` parameters

### ftp

Creates a TCP connection and expects the first 4 characters of the response to be "220 ", then sends "QUIT\r\n". Default port 21 is used if not specified.

### http

Creates a TCP connection without expecting and sending anything. Default port 80 is used if not specified.

### https

Uses (and only works with) `libcurl`, does not verify the authenticity of the certificate, does not verify the host name in the SSL certificate, only fetches the response header (HEAD request). Default port 443 is used if not specified.

### imap

Creates a TCP connection and expects the first 4 characters of the response to be "\* OK", then sends "a1 LOGOUT\r\n". Default port 143 is used if not specified.

### ldap

Opens a connection to an LDAP server and performs an LDAP search operation with filter set to `(objectClass=*)`. Expects successful retrieval of the first attribute of the first entry. Default port 389 is used if not specified.

### nntp

Creates a TCP connection and expects the first 3 characters of the response to be "200" or "201", then sends "QUIT\r\n". Default port 119 is used if not specified.

## pop

Creates a TCP connection and expects the first 3 characters of the response to be "+OK", then sends "QUIT\r\n". Default port 110 is used if not specified.

## smtp

Creates a TCP connection and expects the first 3 characters of the response to be "220", followed by a space, the line ending or a dash. The lines containing a dash belong to a multi-line response and the response will be re-read until a line without the dash is received. Then sends "QUIT\r\n". Default port 25 is used if not specified.

## ssh

Creates a TCP connection. If the connection has been established, both sides exchange an identification string (SSH-major.minor-XXXX), where major and minor are protocol versions and XXXX is a string. Zabbix checks if the string matching the specification is found and then sends back the string "SSH-major.minor-zabbix\_agent\r\n" or "0\r\n" on mismatch. Default port 22 is used if not specified.

## tcp

Creates a TCP connection without expecting and sending anything. Unlike the other checks requires the port parameter to be specified.

## telnet

Creates a TCP connection and expects a login prompt (':' at the end). Default port 23 is used if not specified.

Item net.udp.service parameters

## ntp

Sends an SNTP packet over UDP and validates the response according to [RFC 4330, section 5](#). Default port 123 is used if not specified.

## 12 Unreachable/unavailable host settings

### Overview

Several configuration [parameters](#) define how Zabbix server should behave when an agent check (Zabbix, SNMP, IPMI, JMX) fails and a host becomes unreachable.

### Unreachable host

A host is treated as unreachable after a failed check (network error, timeout) by Zabbix, SNMP, IPMI or JMX agents. Note that Zabbix agent active checks do not influence host availability in any way.

From that moment **UnreachableDelay** defines how often a host is rechecked using one of the items (including LLD rules) in this unreachability situation and such rechecks will be performed already by unreachable pollers (or IPMI pollers for IPMI checks). By default it is 15 seconds before the next check.

In the Zabbix server log unreachability is indicated by messages like these:

```
Zabbix agent item "system.cpu.load[percpu,avg1]" on host "New host" failed: first network error, wait for  
Zabbix agent item "system.cpu.load[percpu,avg15]" on host "New host" failed: another network error, wait for
```

Note that the exact item that failed is indicated and the item type (Zabbix agent).

#### Note:

The Timeout parameter will also affect how early a host is rechecked during unreachability. If the Timeout is 20 seconds and UnreachableDelay 30 seconds, the next check will be in 50 seconds after the first attempt.

The **UnreachablePeriod** parameter defines how long the unreachability period is in total. By default UnreachablePeriod is 45 seconds. UnreachablePeriod should be several times bigger than UnreachableDelay, so that a host is rechecked more than once before a host becomes unavailable.

### Switching host back to available

When unreachability period is over, the host is polled again, decreasing priority for item, that turned host into unreachable state. If the unreachable host reappears, the monitoring returns to normal automatically:

```
resuming Zabbix agent checks on host "New host": connection restored
```

**Note:**

Once host becomes available, it does not poll all its items immediately for two reasons:

- It might overload the host.
- The host restore time is not always matching planned item polling schedule time.

So, after the host becomes available, items are not polled immediately, but they are getting rescheduled to their next polling round.

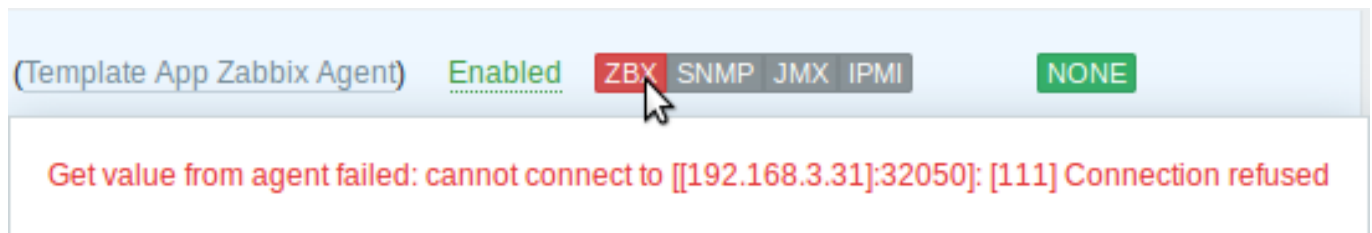
**Unavailable host**

After the `UnreachablePeriod` ends and the host has not reappeared, the host is treated as unavailable.

In the server log it is indicated by messages like these:

```
temporarily disabling Zabbix agent checks on host "New host": host unavailable
```

and in the **frontend** the host availability icon for the respective interface goes from green (or gray) to red (note that on mouseover a tooltip with the error description is displayed):



The **UnavailableDelay** parameter defines how often a host is checked during host unavailability.

By default it is 60 seconds (so in this case "temporarily disabling", from the log message above, will mean disabling checks for one minute).

When the connection to the host is restored, the monitoring returns to normal automatically, too:

```
enabling Zabbix agent checks on host "New host": host became available
```

**13 Remote monitoring of Zabbix stats****Overview**

It is possible to make some internal metrics of Zabbix server and proxy accessible remotely by another Zabbix instance or a third party tool. This can be useful so that supporters/service providers can monitor their client Zabbix servers/proxies remotely or, in organizations where Zabbix is not the main monitoring tool, that Zabbix internal metrics can be monitored by a third party system in an umbrella-monitoring setup.

Zabbix internal stats are exposed to a configurable set of addresses listed in the new 'StatsAllowedIP' **server/proxy** parameter. Requests will be accepted only from these addresses.

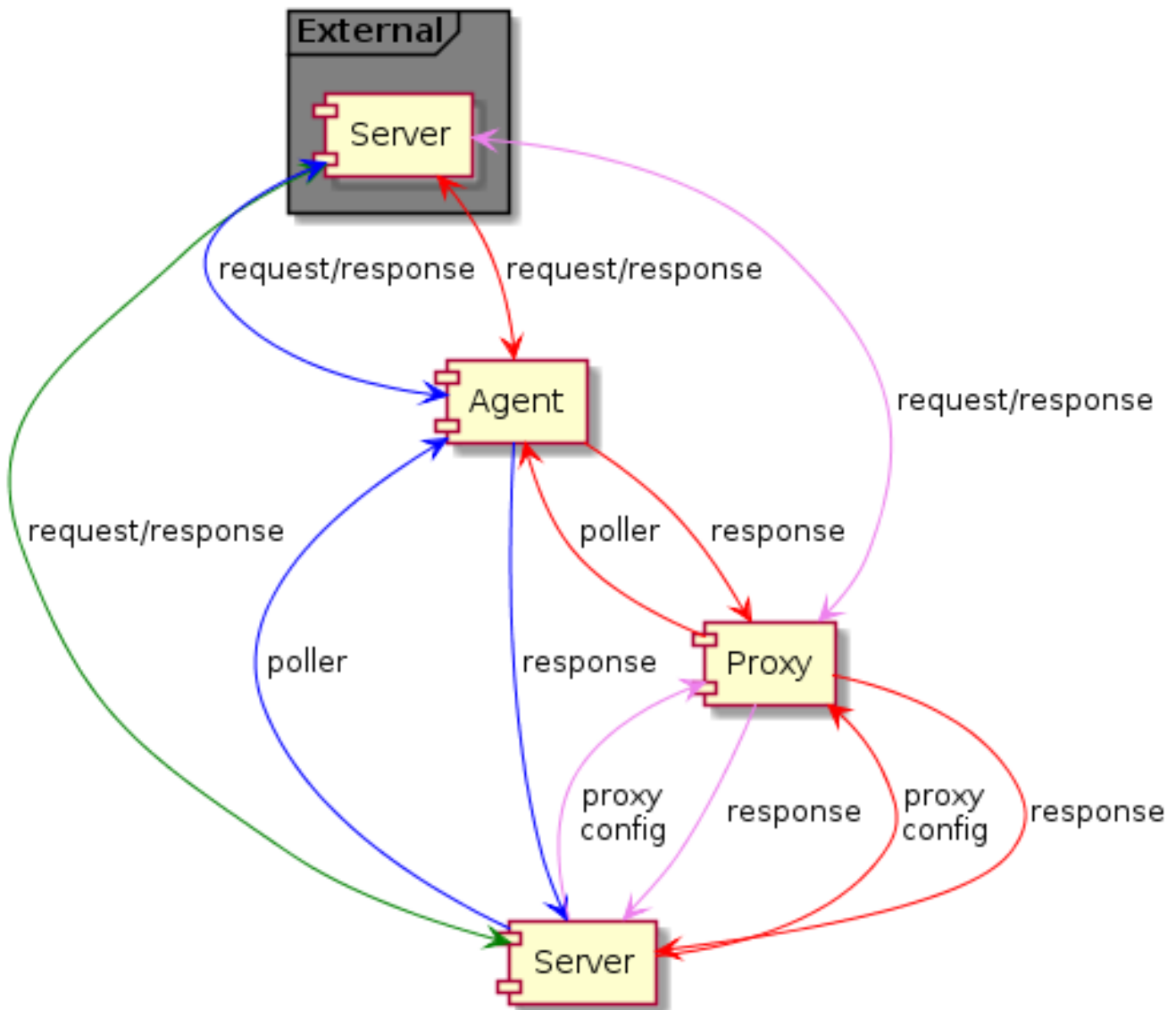
**Items**

To configure querying of internal stats on another Zabbix instance, you may use two items:

- `zabbix[stats,<ip>,<port>]` internal item - for direct remote queries of Zabbix server/proxy. `<ip>` and `<port>` are used to identify the target instance.
- `zabbix.stats[<ip>,<port>]` agent item - for agent-based remote queries of Zabbix server/proxy. `<ip>` and `<port>` are used to identify the target instance.

See also: [Internal items](#), [Zabbix agent items](#)

The following diagram illustrates the use of either item depending on the context.



- ■ - Server → external Zabbix instance (zabbix[stats, <ip>, <port>])
- ■ - Server → proxy → external Zabbix instance (zabbix[stats, <ip>, <port>])
- ■ - Server → agent → external Zabbix instance (zabbix.stats[<ip>, <port>])
- ■ - Server → proxy → agent → external Zabbix instance (zabbix.stats[<ip>, <port>])

To make sure that the target instance allows querying it by the external instance, list the address of the external instance in the 'StatsAllowedIP' parameter on the target instance.

#### Exposed metrics

The stats items gather the statistics in bulk and return a JSON, which is the basis for dependent items to get their data from. The following **internal metrics** are returned by either of the two items:

- zabbix[boottime]
- zabbix[hosts]
- zabbix[items]
- zabbix[items\_unsupported]
- zabbix[preprocessing\_queue] (server only)
- zabbix[process, <type>, <mode>, <state>] (only process type based statistics)
- zabbix[rcache, <cache>, <mode>]
- zabbix[requiredperformance]
- zabbix[triggers] (server only)
- zabbix[uptime]
- zabbix[vcache, buffer, <mode>] (server only)
- zabbix[vcache, cache, <parameter>]



- zabbix[version]
- zabbix[vmware,buffer,<mode>]
- zabbix[wcache,<cache>,<mode>] ('trends' cache type server only)

## Templates

Templates are available for **remote monitoring** of Zabbix server or proxy internal metrics from an external instance:

- Remote Zabbix server
- Remote Zabbix proxy

Note that in order to use a template for remote monitoring of multiple external instances, a separate host is required for each external instance monitoring.

## Trapper process

Receiving internal metric requests from an external Zabbix instance is handled by the trapper process that validates the request, gathers the metrics, creates the JSON data buffer and sends the prepared JSON back, for example, from server:

```
{
  "response": "success",
  "data": {
    "boottime": N,
    "uptime": N,
    "hosts": N,
    "items": N,
    "items_unsupported": N,
    "preprocessing_queue": N,
    "process": {
      "alert manager": {
        "busy": {
          "avg": N,
          "max": N,
          "min": N
        },
        "idle": {
          "avg": N,
          "max": N,
          "min": N
        },
        "count": N
      },
      ...
    },
    "queue": N,
    "rcache": {
      "total": N,
      "free": N,
      "pfree": N,
      "used": N,
      "pused": N
    },
    "requiredperformance": N,
    "triggers": N,
    "uptime": N,
    "vcache": {
      "buffer": {
        "total": N,
        "free": N,
        "pfree": N,
        "used": N,
        "pused": N
      },
      "cache": {
        "requests": N,
        "hits": N,

```



This section describes an example of configuring Kerberos with Zabbix server to perform web monitoring of `www.example.com` with user 'zabbix'.

## Steps

### Step 1

Install Kerberos package.

For Debian/Ubuntu:

```
apt install krb5-user
```

For RHEL/CentOS:

```
yum install krb5-workstation
```

### Step 2

Configure Kerberos configuration file (see MIT documentation for details)

```
cat /etc/krb5.conf
[libdefaults]
    default_realm = EXAMPLE.COM

#### The following krb5.conf variables are only for MIT Kerberos.
    kdc_timesync = 1
    ccache_type = 4
    forwardable = true
    proxiable = true

[realms]
    EXAMPLE.COM = {
    }

[domain_realm]
    .example.com=EXAMPLE.COM
    example.com=EXAMPLE.COM
```

### Step 3

Create a Kerberos ticket for user zabbix. Run the following command as user zabbix:

```
kinit zabbix
```

#### **Attention:**

It is important to run the above command as user zabbix. If you run it as root the authentication will not work.

### Step 4

Create a web scenario or HTTP agent item with Kerberos authentication type.

Optionally can be tested with the following curl command:

```
curl -v --negotiate -u : http://example.com
```

Note that for lengthy web monitoring it is necessary to take care of renewing the Kerberos ticket. Default time of ticket expiration is 10h.

## 15 modbus.get parameters

### Overview

The table below presents details of the `modbus.get[]` item parameters.

### Parameters

Parameter	Description	Defaults	Example
endpoint	<p>Protocol and address of the endpoint, defined as  <code>protocol://connection_string</code></p> <p>Possible protocol values: rtu, ascii (Agent 2 only), tcp</p> <p>Connection string format:  with tcp - <code>address:port</code>  with serial line: <code>rtu, ascii - port_name:speed:params</code>  where  'speed' - 1200, 9600 etc  'params' - data bits (5,6,7 or 8), parity (n,e or o for none/even/odd), stop bits (1 or 2)</p>	<p>protocol: none</p> <p>rtu/ascii protocol:  port_name: none  speed: 115200  params: 8n1</p> <p>tcp protocol:  address: none  port: 502</p>	<p><code>tcp://192.168.6.1:511</code>  <code>tcp://192.168.6.2</code>  <code>tcp://[::1]:511</code>  <code>tcp://::1</code>  <code>tcp://localhost:511</code>  <code>tcp://localhost</code>  <code>rtu://COM1:9600:8n</code>  <code>ascii://COM2:1200:7o2</code>  <code>rtu://ttyS0:9600</code>  <code>ascii://ttyS1</code></p>
slave id	<p>Modbus address of the device it is intended for (1 to 247), see <a href="#">MODBUS Messaging Implementation Guide</a> (page 23)</p> <p>tcp device (not GW) will ignore the field</p>	<p>serial: 1</p> <p>tcp: 255 (0xFF)</p>	2
function	<p>Empty or value of a supported function:</p> <p>1 - Read Coil,  2 - Read Discrete Input,  3 - Read Holding Registers,  4 - Read Input Registers</p>	empty	3
address	<p>Address of the first registry, coil or input.</p> <p>If 'function' is empty, then 'address' should be in range for:  Coil - 00001 - 09999  Discrete input - 10001 - 19999  Input register - 30001 - 39999  Holding register - 40001 - 49999</p> <p>If 'function' is not empty, the 'address' field will be from 0 till 65535 and used without modification (PDU)</p>	<p>empty function: 00001</p> <p>non-empty function: 0</p>	9999
count	<p>Count of sequenced 'type' which will be read from device, where:</p> <p>for Coil or Discrete input the 'type' = 1 bit  for other cases: <math>(count * type) / 2 =</math> real count of registers for reading  If 'offset' is not 0, the value will be added to 'real count'  Acceptable range for 'real count' is 1:65535</p>	1	2

Parameter	Description	Defaults	Example
type	Data type:  for Read Coil and Read Discrete Input - bit  for Read Holding Registers and Read Input Registers: int8 - 8bit uint8 - 8bit (unsigned) int16 - 16bit uint16 - 16bit (unsigned) int32 - 32bit uint32 - 32bit (unsigned) float - 32bit uint64 - 64bit (unsigned) double - 64bit	bit uint16	uint64
endianness	Endianness type: be - Big Endian le - Little Endian mbe - Mid-Big Endian mle - Mid-Little Endian	be	le
offset	Limitations: for 1 bit - be for 8 bits - be,le for 16 bits - be,le Number of registers, starting from 'address', the result of which will be discarded.  The size of each register is 16bit (needed to support equipment that does not support random read access).	0	4

## 6 Triggers

### 1 Supported trigger functions

All functions supported in **trigger expressions** are listed here.

---

FUNCTION

---

Description Parameters Comments

**abschange**

---

FUNCTION

---

The amount of absolute difference between the previous and latest value.

Supported value types: float, int, str, text, log

For example:  
(previous value;latest value=abschange)  
1;5=4  
3;1=2  
0;-  
2.5=2.5

For strings returns:  
0 - values are equal  
1 - values differ

**avg** (sec|#num,<time\_shift>)

Average value of an item within the defined evaluation period.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

Supported value types: float, int

Examples: => avg(#5) → average value for the five latest values => avg(1h) → average value for an hour => avg(1h,1d) → average value for an hour one day ago.

The `time_shift` parameter is supported since Zabbix 1.8.2. It is useful when there is a need to compare the current average value with the average value `time_shift` seconds back.

**band** (<sec|#num>,mask,<time\_shift>)

Value of "bitwise AND" of an item value and mask.

**sec** (ignored, equals #1) or **#num** (optional)  
 - the Nth most recent value

**mask** (mandatory) - 64-bit unsigned integer (0 - 18446744073709551615)

**time\_shift** (optional)  
 - evaluation point is moved the number of seconds back in time

Supported value types: int

Take note that #num works differently here than with many other functions (see last()).

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

Examples:  
 =>  
 band(,12)=8  
 or  
 band(,12)=4  
 → 3rd or 4th bit set, but not both at the same time  
 =>  
 band(,20)=16  
 → 3rd bit not set and 5th bit set.

This function is supported since Zabbix 2.2.0.



---

FUNCTION

---

**change**

The amount of difference between the previous and latest value.

Supported value types: float, int, str, text, log

For example:  
(previous value;latest value=change)  
1;5=+4  
3;1=-2  
0;-2.5=-2.5

See also:  
[ab-](#)  
[schange](#)  
for comparison

For strings returns:  
0 - values are equal  
1 - values differ

**count** (sec|#num,<pattern>,<operator>,<time\_shift>)

Number of values within the defined evaluation period.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**pattern** (optional) - required pattern

**operator** (optional)

Supported operators: eq - equal ne - not equal gt - greater ge - greater or equal lt - less le - less or equal like - matches if contains pattern (case-sensitive) band - bitwise AND regexp - case sensitive match of regular expression given in pattern iregexp - case insensitive match of regular expression given in pattern

Supported value types: float, integer, string, text, log Float items match with the precision of 0.000001.

With band as third parameter, the second pattern parameter can be specified as two numbers, separated by '/':

**number\_to\_compare\_with** count() calculates "bitwise AND" from the value and the mask and compares the result to number\_to\_compare\_with. If the result of "bitwise AND" is equal to number\_to\_compare\_with, the value is counted. If number\_to\_compare\_with and mask are equal, only the mask need be specified (without '/').

Note that: With regexp or

---

FUNCTION

---

**date**

Current date in YYYYM-MDD format.

Supported value types: any

Example of returned value: 20150731

**dayofmonth**

Day of month in range of 1 to 31.

Supported value types: any

This function is supported since Zabbix 1.8.5.

**dayofweek**

Day of week in range of 1 to 7 (Mon - 1, Sun - 7).

Supported value types: any

**delta** (sec|#num,<time\_shift>)

Difference between the maximum and minimum values within the defined evaluation period ('max()' minus 'min()').

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values specified (preceded by a hash mark)

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

Supported value types: float, int

The **time\_shift** parameter is supported since Zabbix 1.8.2.

**diff**

---

FUNCTION

---

Checking  
if last and  
previous  
values  
differ.

Supported  
value  
types:  
float, int,  
str, text,  
log

Returns:  
1 - last  
and  
previous  
values  
differ  
0 -  
otherwise

**forecast** (sec|#num,<time\_shift>,time,<fit>,<mode>)

Future value, max, min, delta or avg of the item.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values specified (preceded by a hash mark) **time\_shift** (optional) - evaluation point is moved the number of seconds back in time **time** - forecasting horizon in seconds **fit** (optional) - function used to fit historical data

Supported fits: linear - linear function polynomialN - polynomial of degree N (1 ≤ N ≤ 6) exponential - exponential function logarithmic - logarithmic function power - power function

Supported value types: float, int

If value to return is larger than 1.7976931348623157E+ or less than -1.7976931348623157E+ return value is cropped to 1.7976931348623157E+ or -1.7976931348623157E+ correspondingly.

Becomes not supported only if misused in expression (wrong item type, invalid parameters), otherwise returns -1 in case of errors.

Examples: => forecast(#10,,1h) → forecast of item value after one hour based on last 10 values => forecast(1h,,30m) → forecast of item value after 30 minutes based on last hour data => forecast(1h,1d,12h) → forecast

Note that: linear is default, polynomial1 is

---

FUNCTION

---

**fuzzytime** (sec)

---

**FUNCTION**

---

Checking how much the passive agent time differs from the Zabbix server/proxy time.

**sec** - seconds

Supported value types: float, int

Returns: 1 - difference between the passive item value (as times-tamp) and Zabbix server/proxy times-tamp is less than or equal to T seconds 0 - otherwise

Usually used with the 'system.localtime' item to check that local time is in sync with the local time of Zabbix server. Note that 'system.localtime' must be configured as a **passive check**. Can be used also with `vfs.file.time[/path/file,mode]` key to check that file didn't get updates for long time.

Example:  
=> `fuzzy-time(60)=0`  
→ detect a problem if time

---

FUNCTION

---

**iregexp** (<pattern>,<sec|#num>)

This function is a non case-sensitive analog of regexp().

see  
regexp()

Supported value types: str, log, text

**last** (<sec|#num>,<time\_shift>)



---

**FUNCTION**

---

The most recent value.

**sec** (ignored, equals #1) or **#num** (optional) - the Nth most recent value

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

Supported value types: float, int, str, text, log

Take note that #num works differently here than with many other functions. For example: last() is always equal to last(#1) last(#3) - third most recent value (not three latest values)

Zabbix does not guarantee exact order of values if more than two values exist within one second in history.

The #num parameter is supported since Zabbix 1.6.2. The time\_shift parameter is supported since Zabbix 1.8.2.

**logeventid** (<pattern>)

---

FUNCTION

---

	Checking if event ID of the last log entry matches a regular expression.	<b>pattern</b> (optional) - regular expression describing the required pattern, <a href="#">Perl Compatible Regular Expression (PCRE)</a> style. Supported value types: log Returns: 0 - does not match 1 - matches This function is supported since Zabbix 1.8.5.
<b>logseverity</b>	Log severity of the last log entry.	Supported value types: log Returns: 0 - default severity N - severity (integer, useful for Windows event logs: 1 - Information, 2 - Warning, 4 - Error, 7 - Failure Audit, 8 - Success Audit, 9 - Critical, 10 - Verbose). Zabbix takes log severity from <b>Information</b> field of Windows event log.
<b>logsource</b> (<pattern>)		

---

FUNCTION

---

Checking if log source of the last log entry matches a regular expression.

**pattern** (optional)  
- regular expression describing the required pattern, [Perl Compatible Regular Expression](#) (PCRE) style.

Supported value types: log

Returns:  
0 - does not match  
1 - matches

Normally used for Windows event logs. For example, log-source("VMware Server").

**max** (sec|#num,<time\_shift>)

Highest value of an item within the defined evaluation period.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**time\_shift** (optional)  
- evaluation point is moved the number of seconds back in time

Supported value types: float, int

The **time\_shift** parameter is supported since Zabbix 1.8.2.

**min** (sec|#num,<time\_shift>)

---

**FUNCTION**

---

Lowest value of an item within the defined evaluation period.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

Supported value types: float, int

The **time\_shift** parameter is supported since Zabbix 1.8.2.

**nodata** (sec,<mode>)

<p>Checking for no data received.</p>	<p><b>sec</b> - evaluation period in seconds. The period should not be less than 30 seconds because the history syncer process calculates this function only every 30 seconds.</p> <p>nodata(0) is disallowed.</p> <p><b>mode</b> - if set to strict, this function will be insensitive to proxy availability (see comments for details).</p>	<p>Supported value types: any</p> <p>Returns: 1 - if no data received during the defined period of time 0 - otherwise</p> <p>Since Zabbix 5.0, the 'nodata' triggers monitored by proxy are, by default, sensitive to proxy availability - if proxy becomes unavailable, the 'nodata' triggers will not fire immediately after a restored connection, but will skip the data for the delayed period. Note that for passive proxies suppression is activated if connection is restored more than 15 seconds and no less than 2 &amp; ProxyUpdate-Frequency</p>
---------------------------------------	---	---

---

**FUNCTION**

---

**now**

Number of seconds since the Epoch (00:00:00 UTC, January 1, 1970).

Supported value types: any

**percentile** (sec|#num,<time\_shift>,percentage)

P-th percentile of a period, where P (percentage) is specified by the third parameter.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

**percentage** - a floating-point number between 0 and 100 (inclusive) with up to 4 digits after the decimal point

Supported value types: float, int

This function is supported since Zabbix 3.0.0.

**prev**

Previous value.

Supported value types: float, int, str, text, log

**regexp** (<pattern>,<sec|#num>)

Returns the same as last(#2).

---

**FUNCTION**

---

Checking if the latest (most recent) value matches regular expression.

**pattern** (optional)  
- regular expression, [Perl Compatible Regular Expression](#) (PCRE) style.  
**sec** or **#num** (optional)  
- maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark). In this case, more than one value may be processed.

Supported value types: str, text, log

Returns:  
1 - found  
0 - otherwise

If more than one value is processed, '1' is returned if there is at least one matching value.

This function is case-sensitive.

**str** (<pattern>,<sec|#num>)

---

**FUNCTION**

---

Finding a string in the latest (most recent) value.

**pattern** (optional)  
- required string  
**sec** or **#num** (optional)  
- maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark). In this case, more than one value may be processed.

Supported value types: str, text, log

Returns:  
1 - found  
0 - otherwise

If more than one value is processed, '1' is returned if there is at least one matching value.

This function is case-sensitive.

Tip: You may use the 'count' function with the like operator to count string values that match a pattern.

**strlen** (<sec|#num>, <time\_shift>)



---

**FUNCTION**

---

Length of the latest (most recent) value in characters (not bytes).

**sec** (ignored, equals #1) or **#num** (optional) - the Nth most recent value

**time\_shift** (optional) - evaluation point is moved the number of seconds back in time

Supported value types: str, text, log

Take note that #num works differently here than with many other functions.

Examples:  
=> strlen()(is equal to strlen(#1))  
→ length of the latest value  
=> strlen(#3)  
→ length of the third most recent value  
=> strlen(,1d)  
→ length of the most recent value one day ago.

This function is supported since Zabbix 1.8.4.

**sum** (sec|#num,<time\_shift>)

---

FUNCTION

---

	Sum of collected values within the defined evaluation period.	<b>sec</b> or <b>#num</b> - maximum evaluation period <sup>1</sup> in seconds or in latest collected values (preceded by a hash mark) <b>time_shift</b> (optional) - evaluation point is moved the number of seconds back in time	Supported value types: float, int The <b>time_shift</b> parameter is supported since Zabbix 1.8.2.
<b>time</b>	Current time in HHMMSS format.		Supported value types: any Example of returned value: 123055
<b>timeleft</b>	(sec #num,<time_shift>,threshold,<fit>)		

Time in seconds needed for an item to reach a specified threshold.

**sec** or **#num** - maximum evaluation period<sup>1</sup> in seconds or in latest collected values (preceded by a hash mark)

**time\_shift** (optional)  
- evaluation point is moved the number of seconds back in time

**threshold**  
- value to reach

**fit** (optional)  
- see forecast()

Supported value types: float, int

If value to return is larger than 1.7976931348623157E+ return value is cropped to 1.7976931348623157E+

Returns 1.7976931348623157E+ if threshold cannot be reached.

Becomes not supported only if misused in expression (wrong item type, invalid parameters), otherwise returns -1 in case of errors.

Examples:  
=>  
timeleft(#10,,0)  
→ time until item value reaches zero based on last 10 values  
=>  
timeleft(1h,,100)  
→ time until item value reaches 100 based on last hour data  
=>  
timeleft(1h,1d,0)  
→ time until item value

---

FUNCTION

---

**trendavg** (period,period\_shift)

Average of trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as  $\langle N \rangle \langle \text{time unit} \rangle$  where  $N$  - number of time units  $\text{unit} - h$  (hour),  $d$  (day),  $w$  (week),  $M$  (month) or  $y$  (year).

Examples:  $\Rightarrow$  `trendavg(1h,now/h)`  $\rightarrow$  average for the previous hour (e.g. 12:00-13:00)  $\Rightarrow$  `trendavg(1h,now/h-1h)`  $\rightarrow$  average for two hours ago (11:00-12:00)  $\Rightarrow$  `trendavg(1h,now/h-2h)`  $\rightarrow$

**period\_shift**average - the time period offset: starts with `now` - specifying the current time, and is followed by any combination of time operations:  $\langle \text{time unit} \rangle$  - defines the beginning and end of the time unit, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month,  $+N \langle \text{time unit} \rangle$  or  $-N \langle \text{time unit} \rangle$  - adds or

for three hours ago (10:00-11:00)  $\Rightarrow$  `trendavg(1M,now/M-1y)`  $\rightarrow$  average for the previous month a year ago

Note that time operations of the `period_shift` parameter are calculated from left to right without priorities. For example, `now/d+1h/w` will be parsed like `((now/d)+1h)/w`.

This function is supported since 5.2.0.

---

FUNCTION

---

**trendcount** (period,period\_shift)

Number of successfully retrieved trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as  $\langle N \rangle \langle \text{time unit} \rangle$  where  $N$  - number of time units  $\text{time unit} - h$  (hour),  $d$  (day),  $w$  (week),  $M$  (month) or  $y$  (year).

**period\_shift** - the time period offset: starts with `now` - specifying the current time, and is followed by any combination of time operations:  $\langle \text{time unit} \rangle$  - defines the beginning and end of the time unit, for example, `midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month,  $+N \langle \text{time unit} \rangle$  or  $-N \langle \text{time unit} \rangle$`  - adds or

Examples:  $\Rightarrow$  `trendcount(1h,now/h)`  $\rightarrow$  count for the previous hour (e.g. 12:00-13:00)  $\Rightarrow$  `trendcount(1h,now/h-1h)`  $\rightarrow$  count for two hours ago (11:00-12:00)  $\Rightarrow$  `trendcount(1h,now/h-2h)`  $\rightarrow$  count for three hours ago (10:00-11:00)  $\Rightarrow$  `trendcount(1M,now/M-1y)`  $\rightarrow$  count for the previous month a year ago

Note that time operations of the `period_shift` parameter are calculated from left to right without priorities. For example, `now/d+1h/w` will be parsed like  $((\text{now}/d)+1h)/w$ .

This function is supported since 5.2.0.

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FUNCTION

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**trenddelta** (period,period\_shift)



Difference between the maximum and minimum in trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as  $\langle N \rangle \langle \text{time unit} \rangle$  where  $N$  - number of time units **time unit** - h (hour), d (day), w (week), M (month) or y (year).

Examples:  $\Rightarrow$  trenddelta(1h,now/h)  $\rightarrow$  delta for the previous hour (e.g. 12:00-13:00)  $\Rightarrow$  trenddelta(1h,now/h-1h)  $\rightarrow$  delta for two hours ago (11:00-12:00)  $\Rightarrow$  trenddelta(1h,now/h-2h)  $\rightarrow$  delta for three hours ago (10:00-11:00)  $\Rightarrow$  trenddelta(1M,now/M-1y)  $\rightarrow$  delta for the previous month a year ago

**period\_shift**three

- the time period offset: starts with now - specifying the current time, and is followed by any combination of time operations:  $\langle \text{time unit} \rangle$  - defines the beginning and end of the time unit, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month,  $+N \langle \text{time unit} \rangle$  or  $-N \langle \text{time unit} \rangle$  - adds or

Note that time operations of the period\_shift parameter are calculated from left to right without priorities. For example,  $\text{now/d}+1\text{h/w}$  will be parsed like  $((\text{now/d})+1\text{h})/\text{w}$ .

This function is supported since 5.2.0.

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FUNCTION

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**trendmax** (period,period\_shift)

The maximum in trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as  $\langle N \rangle \langle \text{time unit} \rangle$  where  $N$  - number of time units  $\text{time unit} - h$  (hour),  $d$  (day),  $w$  (week),  $M$  (month) or  $y$  (year).

**period\_shift** - the time period offset: starts with `now` - specifying the current time, and is followed by any combination of time operations:  $\langle \text{time unit} \rangle$  - defines the beginning and end of the time unit, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month,  $+N \langle \text{time unit} \rangle$  or  $-N \langle \text{time unit} \rangle$  - adds or

Examples:  
 $\Rightarrow$  `trendmax(1h,now/h)`  
 $\rightarrow$  maximum for the previous hour (e.g. 12:00-13:00)  
 $\Rightarrow$  `trendmax(1h,now/h-1h)`  $\rightarrow$  maximum for two hours ago (11:00-12:00)  
 $\Rightarrow$  `trendmax(1h,now/h-2h)`  $\rightarrow$  maximum for three hours ago (10:00-11:00)  
 $\Rightarrow$  `trendmax(1M,now/M-1y)`  $\rightarrow$  maximum for the previous month a year ago

Note that time operations of the `period_shift` parameter are calculated from left to right without priorities. For example, `now/d+1h/w` will be parsed like `((now/d)+1h)/w`.

This function is supported since 5.2.0.

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FUNCTION

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**trendmin** (period,period\_shift)

The minimum in trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as `<N><time unit>` where `N` - number of time units `time unit` - h (hour), d (day), w (week), M (month) or y (year).

Examples: `=> trendmin(1h,now/h)` → minimum for the previous hour (e.g. 12:00-13:00) `=> trendmin(1h,now/h-1h)` → minimum for two hours ago (11:00-12:00) `=> trendmin(1h,now/h-2h)` → minimum for three hours ago (10:00-11:00) `=> trendmin(1M,now/M-1y)` → minimum for the previous month a year ago

**period\_shift** - the time period offset: starts with `now` - specifying the current time, and is followed by any combination of time operations: `/<time unit>` - defines the beginning and end of the time unit, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month, `+N<time unit>` or `-N<time unit>` - adds or

Note that time operations of the `period_shift` parameter are calculated from left to right without priorities. For example, `now/d+1h/w` will be parsed like `((now/d)+1h)/w`.

This function is supported since 5.2.0.

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FUNCTION

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**trendsum** (period,period\_shift)

Sum of trend values within the defined time period.

**period** - the time period (minimum '1h'), defined as <N><time unit> where N - number of time units time unit - h (hour), d (day), w (week), M (month) or y (year).

Examples: => trendsum(1h,now/h) → sum for the previous hour (e.g. 12:00-13:00) => trendsum(1h,now/h-1h) → sum for two hours ago (11:00-12:00) => trendsum(1h,now/h-2h) → sum for three hours ago

**period\_shift**(10:00-11:00) => trendsum(1M,now/M-1y) → sum for the previous month a year ago

Note that time operations of the period\_shift parameter are calculated from left to right without priorities. For example, now/d+1h/w will be parsed like ((now/d)+1h)/w.

This function is supported since 5.2.0.

is followed by any combination of time operations: /<time unit> - defines the beginning and end of the time unit, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month, +N<time unit> or -N<time unit> - adds or

**Warning:**

Important notes:

- 1) Some of the functions cannot be used for non-numeric values!
- 2) String arguments should be double quoted. Otherwise, they might get misinterpreted.
- 3) For all trigger functions **sec** and **time\_shift** must be an integer with an optional **time unit suffix** and has absolutely nothing to do with the item's data type.

Footnotes

<sup>1</sup> The function is evaluated starting with the first received value (unless the `time_shift` parameter is used).

Functions and unsupported items

Since Zabbix 3.2, **nodata()**, **date()**, **dayofmonth()**, **dayofweek()**, **now()** and **time()** functions are calculated for unsupported items, too. Other functions require that the referenced item is in a supported state.

**7 Macros**

**1 Supported macros**

Overview

The table contains a complete list of macros supported by Zabbix out-of-the-box.

**Note:**

To see all macros supported in a location (for example, in "map URL"), you may paste the location name into the search box at the bottom of your browser window (accessible by pressing CTRL+F) and do a search for next.

Macro	Supported in	Description
{ACTION.ID}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> </ul>	Numeric ID of the triggered action. Supported since 2.2.0.
{ACTION.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> </ul>	Name of the triggered action. Supported since 2.2.0.
{ALERT.MESSAGE}	→ Alert script parameters	'Default message' value from action configuration. Supported since 3.0.0.
{ALERT.SENDTO}	→ Alert script parameters	'Send to' value from user media configuration. Supported since 3.0.0.
{ALERT.SUBJECT}	→ Alert script parameters	'Default subject' value from action configuration. Supported since 3.0.0.
{DATE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> </ul>	Current date in yyyy.mm.dd. format.
{DISCOVERY.DEVICE.IPADDRESS}	→ Discovery notifications and commands	IP address of the discovered device. Available always, does not depend on host being added.



Macro	Supported in	Description
{DISCOVERY.DEVICE.DNS}	Discovery notifications and commands	DNS name of the discovered device. Available always, does not depend on host being added.
{DISCOVERY.DEVICE.STATUS}	Discovery notifications and commands	Status of the discovered device: can be either UP or DOWN.
{DISCOVERY.DEVICE.UPTIME}	Discovery notifications and commands	Time since the last change of discovery status for a particular device, with precision down to a second. For example: 1h 29m 01s. For devices with status DOWN, this is the period of their downtime.
{DISCOVERY.RULE.NAME}	Discovery notifications and commands	Name of the discovery rule that discovered the presence or absence of the device or service.
{DISCOVERY.SERVICE.NAME}	Discovery notifications and commands	Name of the service that was discovered. For example: HTTP.
{DISCOVERY.SERVICE.PORT}	Discovery notifications and commands	Port of the service that was discovered. For example: 80.
{DISCOVERY.SERVICE.STATUS}	Discovery notifications and commands	Status of the discovered <code>service://</code> can be either UP or DOWN.   {DISCOVERY.SERVICE.UPTIME}  → Discovery notifications and commands  Time since the last change of discovery status for a particular service, with precision down to a second. For example: 1h 29m 01s. For services with status DOWN, this is the period of their downtime.   {ESC.HISTORY}  → Trigger-based notifications and commands → Problem update notifications and commands → Internal notifications  Escalation history. Log of previously sent messages. Shows previously sent notifications, on which escalation step they were sent and their status (sent//, in progress or failed).
{EVENT.ACK.STATUS}	→ Trigger-based notifications and commands → Problem update notifications and commands	Acknowledgment status of the event (Yes/No).
{EVENT.AGE}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Age of the event that triggered an action, with precision down to a second. Useful in escalated messages.
{EVENT.DATE}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Date of the event that triggered an action.
{EVENT.DURATION}	→ Trigger-based notifications and commands → Problem update notifications and commands → Internal notifications	Duration of the event (time difference between problem and recovery events), with precision down to a second. Useful in problem recovery messages.
{EVENT.ID}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications → Trigger URLs	Supported since 5.0.0. Numeric ID of the event that triggered an action.
{EVENT.NAME}	→ Trigger-based notifications and commands → Problem update notifications and commands	Name of the problem event that triggered an action. Supported since 4.0.0.

Macro	Supported in	Description
{EVENT.NSEVERITY}	→ Trigger-based notifications and commands → Problem update notifications and commands	Numeric value of the event severity. Possible values: 0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster. Supported since 4.0.0.
{EVENT.OBJECT}	→ Trigger-based notifications and commands → Problem update notifications and commands	Numeric value of of the event object. Possible values: 0 - Trigger, 1 - Discovered host, 2 - Discovered service, 3 - Autoregistration, 4 - Item, 5 - Low-level discovery rule. Supported since 4.4.0.
{EVENT.OPDATA}	→ Trigger-based notifications and commands → Problem update notifications and commands	Operational data of the underlying trigger of a problem. Supported since 4.4.0.
{EVENT.RECOVERY.DATE}	→ Problem <b>recovery notifications</b> and commands	Date of the recovery event. Supported since 2.2.0.
{EVENT.RECOVERY.ID}	→ Problem <b>recovery notifications</b> and commands	Numeric ID of the recovery event. Supported since 2.2.0.
{EVENT.RECOVERY.NAME}	→ Problem <b>recovery notifications</b> and commands	Name of the recovery event. Supported since 4.4.1.
{EVENT.RECOVERY.STATUS}	→ Problem <b>recovery notifications</b> and commands	Verbal value of the recovery event. Supported since 2.2.0.
{EVENT.RECOVERY.TAGS}	→ Problem <b>recovery notifications</b> and commands	A comma separated list of recovery event tags. Expanded to an empty string if no tags exist. Supported since 3.2.0.
{EVENT.RECOVERY.TAGSJSON}	→ Problem <b>recovery notifications</b> and commands	A JSON array containing event tag <b>objects</b> . Expanded to an empty array if no tags exist. Supported since 5.0.0.
{EVENT.RECOVERY.TIME}	→ Problem <b>recovery notifications</b> and commands	Time of the recovery event. Supported since 2.2.0.
{EVENT.RECOVERY.VALUE}	→ Problem <b>recovery notifications</b> and commands	Numeric value of the recovery event. Supported since 2.2.0.
{EVENT.SEVERITY}	→ Trigger-based notifications and commands → Problem update notifications and commands	Name of the event severity. Supported since 4.0.0.
{EVENT.SOURCE}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Numeric value of the event source. Possible values: 0 - Trigger, 1 - Discovery, 2 - Autoregistration, 3 - Internal. Supported since 4.4.0.
{EVENT.STATUS}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Verbal value of the event that triggered an action. Supported since 2.2.0.
{EVENT.TAGS}	→ Trigger-based notifications and commands → Problem update notifications and commands	A comma separated list of event tags. Expanded to an empty string if no tags exist. Supported since 3.2.0.
{EVENT.TAGSJSON}	→ Trigger-based notifications and commands → Problem update notifications and commands	A JSON array containing event tag <b>objects</b> . Expanded to an empty array if no tags exist. Supported since 5.0.0.
{EVENT.TAGS.<tag name>}	→ Trigger-based notifications and commands → Problem update notifications and commands → Problem and event URLs	Event tag value referenced by the tag name. A tag name containing non-alphanumeric characters (including non-English multibyte-UTF characters) should be double quoted. Quotes and backslashes inside a quoted tag name must be escaped with a backslash. Supported since 4.4.2.
{EVENT.TIME}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Time of the event that triggered an action.

Macro	Supported in	Description
{EVENT.UPDATE.ACTION}	→ Problem update notifications and commands	Human-readable name of the action(s) performed during <b>problem update</b> . Resolves to the following values: acknowledged, commented, changed severity from (original severity) to (updated severity) and closed (depending on how many actions are performed in one update). Supported since 4.0.0.
{EVENT.UPDATE.DATE}	→ Problem update notifications and commands	Date of problem update (acknowledgment, etc). Deprecated name: {ACK.DATE}
{EVENT.UPDATE.HISTORY}	→ Trigger-based notifications and commands → Problem update notifications and commands	Log of problem updates (acknowledgments, etc). Deprecated name: {EVENT.ACK.HISTORY}
{EVENT.UPDATE.MESSAGE}	→ Problem update notifications and commands	Problem update message. Deprecated name: {ACK.MESSAGE}
{EVENT.UPDATE.STATUS}	→ Trigger-based notifications and commands → Problem update notifications and commands	Numeric value of of the problem update status. Possible values: 0 - Webhook was called because of problem/recovery event, 1 - Update operation. Supported since 4.4.0.
{EVENT.UPDATE.TIME}	→ Problem update notifications and commands	Time of problem update (acknowledgment, etc). Deprecated name: {ACK.TIME}
{EVENT.VALUE}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Numeric value of the event that triggered an action (1 for problem, 0 for recovering). Supported since 2.2.0.
{HOST.CONN}	→ Trigger-based notifications and commands → Problem update notifications and commands → Internal notifications → Global scripts (including confirmation text) → Map element labels, map URL names and values → Item key parameters <sup>1</sup> → Host interface IP/DNS → Trapper item "Allowed hosts" field → Database monitoring additional parameters → SSH and Telnet scripts → JMX item endpoint field → Web monitoring <sup>4</sup> → Low-level discovery rule filter regular expressions → URL field of dynamic URL dashboard widget/screen element → Trigger names, event names, operational data and descriptions → Trigger URLs → Tag names and values → Script type item, item prototype and discovery rule parameter names and values → HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file, Allowed hosts.	Host IP address or DNS name, depending on host settings <sup>2</sup> .  May be used with a numeric index as {HOST.CONN<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .
{HOST.DESCRPTION}	→ Trigger-based notifications and commands → Problem update notifications and commands → Internal notifications → Map element labels	Host description.  This macro may be used with a numeric index e.g. {HOST.DESCRPTION<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .

Macro	Supported in	Description
{HOST.DNS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Global scripts (including confirmation text)</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters<sup>1</sup></li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget/screen element</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file, Allowed hosts.</li> </ul>	<p>Host DNS name<sup>2</sup>.</p> <p>This macro may be used with a numeric index e.g. {HOST.DNS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{HOST.HOST}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Global scripts (including confirmation text)</li> <li>→ Item key parameters</li> <li>→ Map element labels, map URL names and values</li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget/screen element</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file, Allowed hosts.</li> </ul>	<p>Host name.</p> <p>This macro may be used with a numeric index e.g. {HOST.HOST&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{HOSTNAME&lt;1-9&gt;} is deprecated.</p>
{HOST.ID}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ URL field of dynamic URL dashboard widget/screen element</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> </ul>	<p>Host ID.</p> <p>May be used with a numeric index as {HOST.ID&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{HOST.IP}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Global scripts (including confirmation text)</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters<sup>1</sup></li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget/screen element</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file, Allowed hosts.</li> </ul>	<p>Host IP address<sup>2</sup>.</p> <p>This macro may be used with a numeric index e.g. {HOST.IP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{IPADDRESS&lt;1-9&gt;} is deprecated.</p>
{HOST.METADATA}	<ul style="list-style-type: none"> <li>→ Autoregistration notifications and commands</li> </ul>	<p>Host metadata. Used only for active agent autoregistration. Supported since 2.2.0.</p>
{HOST.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Global scripts (including confirmation text)</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters</li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget/screen element</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file, Allowed hosts.</li> </ul>	<p>Visible host name.</p> <p>This macro may be used with a numeric index e.g. {HOST.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{HOST.PORT}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ JMX item endpoint field</li> <li>→ Tag names and values</li> </ul>	<p>Host (agent) port<sup>2</sup>.</p> <p>This macro may be used with a numeric index e.g. {HOST.PORT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{HOSTGROUP.ID}	<ul style="list-style-type: none"> <li>→ Map element labels, map URL names and values</li> </ul>	Host group ID.
{INVENTORY.ALIAS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Alias field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.ALIAS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.ASSET.TAG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Asset tag field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.ASSET.TAG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.CHASSIS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Chassis field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.CHASSIS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.CONTACT}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Contact field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.CONTACT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.CONTRACT.NUMBER}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.CONTACT&lt;1-9&gt;} is deprecated.</p> <p>Contract number field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.CONTRACT.NUMBER&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.DEPLOYMENT.STATUS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Deployment status field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.DEPLOYMENT.STATUS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HARDWARE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Hardware field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HARDWARE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{PROFILE.HARDWARE&lt;1-9&gt;} is deprecated.</p>

Macro	Supported in	Description
{INVENTORY.HARDWARE.FULL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Hardware (Full details) field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HARDWARE.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HOST.NETMASK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Host subnet mask field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HOST.NETMASK&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HOST.NETWORKS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Host networks field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HOST.NETWORKS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HOST.ROUTER}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Host router field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HOST.ROUTER&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HW.ARCH}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Hardware architecture field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HW.ARCH&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HW.DATE.DECOMM}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Date hardware decommissioned field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.DECOMM&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HW.DATE.EXPIRY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Date hardware maintenance expires field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.EXPIRY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HW.DATE.INSTALL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Date hardware installed field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.INSTALL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.HW.DATE.PURCHASE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Date hardware purchased field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.PURCHASE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{INVENTORY.INSTALLER.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Installer name field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.INSTALLER.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.LOCATION}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Location field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.LOCATION.LAT}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.LOCATION&lt;1-9&gt;} is deprecated.</p> <p>Location latitude field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION.LAT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.LOCATION.LON}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Location longitude field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION.LON&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.MACADDRESS.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>MAC address A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.MACADDRESS.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.MACADDRESS.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.MACADDRESS&lt;1-9&gt;} is deprecated.</p> <p>MAC address B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.MACADDRESS.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.MODEL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Model field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.MODEL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Name field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
		<p>{PROFILE.NAME&lt;1-9&gt;} is deprecated.</p>



Macro	Supported in	Description
{INVENTORY.NOTES}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Notes field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OOB.IP}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.NOTES&lt;1-9&gt;} is deprecated.</p> <p>OOB IP address field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.IP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OOB.NETMASK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>OOB subnet mask field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.NETMASK&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OOB.ROUTER}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>OOB router field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.ROUTER&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OS}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>OS field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OS.FULL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.OS&lt;1-9&gt;} is deprecated.</p> <p>OS (Full details) field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.OS.SHORT}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>OS (Short) field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS.SHORT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.POC.PRIMARY.CELL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Primary POC cell field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.CELL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.POC.PRIMARY.EMAIL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Primary POC email field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.EMAIL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{INVENTORY.POC.PRIMARY.NAME}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Primary POC name field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.NAME<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.PRIMARY.NOTES}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Primary POC notes field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.NOTES<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.PRIMARY.PHONE.A}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Primary POC phone A field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.PHONE.A<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.PRIMARY.PHONE.B}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Primary POC phone B field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.PHONE.B<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.PRIMARY.SCREEN}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Primary POC screen name field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.SCREEN<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.SECONDARY.CELL}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Secondary POC cell field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.CELL<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.SECONDARY.EMAIL}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Secondary POC email field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.EMAIL<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.SECONDARY.NAME}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Secondary POC name field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.NAME<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .
{INVENTORY.POC.SECONDARY.NOTES}	→ Problem update notifications and commands → Internal notifications → Tag names and values → Map element labels, map URL names and values	Secondary POC notes field in host inventory.  This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.NOTES<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .

Macro	Supported in	Description
{INVENTORY.POC.SECONDARY.PHONE.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Secondary POC phone A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.PHONE.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.POC.SECONDARY.PHONE.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Secondary POC phone B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.PHONE.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.POC.SECONDARY.SCREEN}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Secondary POC screen name field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.SCREEN&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SERIALNO.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Serial number A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SERIALNO.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SERIALNO.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.SERIALNO&lt;1-9&gt;} is deprecated.</p> <p>Serial number B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SERIALNO.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.ADDRESS.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site address A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.ADDRESS.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site address B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.ADDRESS.C}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site address C field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.C&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.CITY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site city field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.CITY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{INVENTORY.SITE.COUNTRY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site country field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.COUNTRY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.NOTES}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site notes field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.RACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site rack location field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.RACK&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.STATE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site state/province field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.STATE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SITE.ZIP}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Site ZIP/postal field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ZIP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE.APP.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.SOFTWARE&lt;1-9&gt;} is deprecated.</p> <p>Software application A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE.APP.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software application B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE.APP.C}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software application C field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.C&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE.APP.D}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software application D field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.D&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{INVENTORY.SOFTWARE.APP.E}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software application E field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.E&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.SOFTWARE.FULL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Software (Full details) field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.TAG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Tag field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TAG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.TYPE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.TAG&lt;1-9&gt;} is deprecated.</p> <p>Type field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TYPE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.TYPE.FULL}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>{PROFILE.DEVICETYPE&lt;1-9&gt;} is deprecated.</p> <p>Type (Full details) field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TYPE.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.URL.A}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>URL A field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.URL.B}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>URL B field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.URL.C}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>URL C field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.C&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{INVENTORY.VENDOR}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Tag names and values</li> <li>→ Map element labels, map URL names and values</li> </ul>	<p>Vendor field in host inventory.</p> <p>This macro may be used with a numeric index e.g. {INVENTORY.VENDOR&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{ITEM.DESCRPTION}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> </ul>	<p>Description of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.DESCRPTION&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.DESCRPTION.ORIG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> </ul>	<p>Description (with macros unresolved) of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.DESCRPTION.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.ID}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values <sup>8</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, query fields, request body, headers, proxy, SSL certificate file, SSL key file.</li> </ul>	<p>Supported since 5.2.0.</p> <p>Numeric ID of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.ID&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.KEY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values <sup>8</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, query fields, request body, headers, proxy, SSL certificate file, SSL key file.</li> </ul>	<p>Key of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.KEY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.KEY.ORIG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values <sup>8</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, query fields, request body, headers, proxy, SSL certificate file, SSL key file <sup>8</sup>.</li> </ul>	<p>{TRIGGER.KEY} is deprecated.</p> <p>Original key (with macros not expanded) of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.KEY.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{ITEM.LASTVALUE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Tag names and values</li> <li>→ Trigger URLs<sup>7</sup></li> </ul>	<p>The latest value of the Nth item in the trigger expression that caused a notification.</p> <p>It will resolve to *UNKNOWN* in the frontend if the latest history value has been collected more than the Max history display period time ago (set in the <a href="#">Administration</a>→<a href="#">General</a> menu section).</p> <p>Note that since 4.0, when used in the problem name, it will not resolve to the latest item value when viewing problem events, instead it will keep the item value from the time of problem happening.</p> <p>Supported since 1.4.3. It is alias to <code>{HOST.HOST}: {ITEM.KEY}.last()</code>.</p> <p><a href="#">Customizing</a> the macro value is supported for this macro; starting with Zabbix 3.2.0.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LASTVALUE&lt;1-9&gt;}</code> to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.AGE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Age of the log item event, with precision down to a second.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.AGE&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.DATE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Date of the log item event.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.DATE&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.EVENTID}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>ID of the event in the event log.</p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.EVENTID&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.NSEVERITY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Numeric severity of the event in the event log.</p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.NSEVERITY&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.SEVERITY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Verbal severity of the event in the event log.</p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.SEVERITY&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.LOG.SOURCE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Source of the event in the event log.</p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. <code>{ITEM.LOG.SOURCE&lt;1-9&gt;}</code> to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>

Macro	Supported in	Description
{ITEM.LOG.TIME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> </ul>	<p>Time of the log item event.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.TIME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> </ul>	<p>Name of the Nth item (with macros resolved) in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.NAME.ORIG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> </ul>	<p>Original name (i.e. without macros resolved) of the Nth item in the trigger expression that caused a notification.</p> <p>This macro may be used with a numeric index e.g. {ITEM.NAME.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.STATE}	<ul style="list-style-type: none"> <li>→ Item-based internal notifications</li> </ul>	<p>The latest state of the Nth item in the trigger expression that caused a notification. Possible values: <b>Not supported</b> and <b>Normal</b>.</p> <p>This macro may be used with a numeric index e.g. {ITEM.STATE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>
{ITEM.VALUE}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Tag names and values</li> <li>→ Trigger URLs<sup>7</sup></li> </ul>	<p>Resolved to either:</p> <ol style="list-style-type: none"> <li>1) the historical (at-the-time-of-event) value of the Nth item in the trigger expression, if used in the context of trigger status change, for example, when displaying events or sending notifications.</li> <li>2) the latest value of the Nth item in the trigger expression, if used without the context of trigger status change, for example, when displaying a list of triggers in a pop-up selection window. In this case works the same as {ITEM.LASTVALUE}</li> </ol> <p>In the first case it will resolve to *UNKNOWN* if the history value has already been deleted or has never been stored.</p> <p>In the second case, and in the frontend only, it will resolve to *UNKNOWN* if the latest history value has been collected more than the Max history display period time ago (set in the <a href="#">Administration</a>→<a href="#">General</a> menu section).</p> <p>Supported since 1.4.3.</p> <p><a href="#">Customizing</a> the macro value is supported for this macro, starting with Zabbix 3.2.0.</p> <p>This macro may be used with a numeric index e.g. {ITEM.VALUE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>
{LLDRULE.DESCRPTION}	LLD-rule based internal notifications	<p>Description of the low-level discovery rule which caused a notification.</p> <p>Supported since 2.2.0.</p>



Macro	Supported in	Description
{LLDRULE.DESCRPTION-ORIG}	→ LLD-rule based internal notifications	Description (with macros unresolved) of the low-level discovery rule which caused a notification. Supported since 5.2.0.
{LLDRULE.ID}	→ LLD-rule based internal notifications	Numeric ID of the low-level discovery rule which caused a notification. Supported since 2.2.0.
{LLDRULE.KEY}	→ LLD-rule based internal notifications	Key of the low-level discovery rule which caused a notification. Supported since 2.2.0.
{LLDRULE.KEY.ORIG}	→ LLD-rule based internal notifications	Original key (with macros not expanded) of the low-level discovery rule which caused a notification. Supported since 2.2.0.
{LLDRULE.NAME}	→ LLD-rule based internal notifications	Name of the low-level discovery rule (with macros resolved) that caused a notification. Supported since 2.2.0.
{LLDRULE.NAME.ORIG}	→ LLD-rule based internal notifications	Original name (i.e. without macros resolved) of the low-level discovery rule that caused a notification. Supported since 2.2.0.
{LLDRULE.STATE}	→ LLD-rule based internal notifications	The latest state of the low-level discovery rule. Possible values: <b>Not supported</b> and <b>Normal</b> . Supported since 2.2.0.
{MAP.ID}	→ Map element labels, map URL names and values	Network map ID.
{MAP.NAME}	→ Map element labels, map URL names and values → Text field in map shapes	Network map name. Supported since 3.4.0.
{PROXY.DESCRPTION}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Description of the proxy. Resolves to either: 1) proxy of the Nth item in the trigger expression (in trigger-based notifications). You may use <b>indexed</b> macros here. 2) proxy, which executed discovery (in discovery notifications). Use {PROXY.DESCRPTION} here, without indexing. 3) proxy to which an active agent registered (in autoregistration notifications). Use {PROXY.DESCRPTION} here, without indexing.  This macro may be used with a numeric index e.g. {PROXY.DESCRPTION<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .
{PROXY.NAME}	→ Trigger-based notifications and commands → Problem update notifications and commands → Discovery notifications and commands → Autoregistration notifications and commands → Internal notifications	Name of the proxy. Resolves to either: 1) proxy of the Nth item in the trigger expression (in trigger-based notifications). You may use <b>indexed</b> macros here. 2) proxy, which executed discovery (in discovery notifications). Use {PROXY.NAME} here, without indexing. 3) proxy to which an active agent registered (in autoregistration notifications). Use {PROXY.NAME} here, without indexing.  This macro may be used with a numeric index e.g. {PROXY.NAME<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .

Macro	Supported in	Description
{TIME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Trigger event names</li> </ul>	Current time in hh:mm:ss.
{TRIGGER.DESCRPTION}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Trigger description. Supported since 2.0.4. Starting with 2.2.0, all macros supported in a trigger description will be expanded if {TRIGGER.DESCRPTION} is used in notification text.</p> <p>{TRIGGER.COMMENT} is deprecated.</p>
{TRIGGER.EVENTS.ACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Map element labels</li> </ul>	<p>Number of acknowledged events for a map element in maps, or for the trigger which generated current event in notifications. Supported since 1.8.3.</p>
{TRIGGER.EVENTS.PROBLEM.ACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Map element labels</li> </ul>	<p>Number of acknowledged PROBLEM events for all triggers disregarding their state. Supported since 1.8.3.</p>
{TRIGGER.EVENTS.PROBLEM.UNACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Map element labels</li> </ul>	<p>Number of unacknowledged PROBLEM events for all triggers disregarding their state. Supported since 1.8.3.</p>
{TRIGGER.EVENTS.UNACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Map element labels</li> </ul>	<p>Number of unacknowledged events for a map element in maps, or for the trigger which generated current event in notifications. Supported in map element labels since 1.8.3.</p>
{TRIGGER.HOSTGROUP.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>A sorted (by SQL query), comma-space separated list of host groups in which the trigger is defined. Supported since 2.0.6.</p>
{TRIGGER.PROBLEM.EVENTS.PROBLEM.ACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> </ul>	<p>Number of acknowledged PROBLEM events for triggers in PROBLEM state. Supported since 1.8.3.</p>
{TRIGGER.PROBLEM.EVENTS.PROBLEM.UNACK}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> </ul>	<p>Number of unacknowledged PROBLEM events for triggers in PROBLEM state. Supported since 1.8.3.</p>
{TRIGGER.EXPRESSION}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Trigger expression. Supported since 1.8.12.</p>
{TRIGGER.EXPRESSION.RECOVERY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Trigger recovery expression if OK event generation in <a href="#">trigger configuration</a> is set to 'Recovery expression'; otherwise an empty string is returned.</p> <p>Supported since 3.2.0.</p>
{TRIGGER.ID}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ Trigger URLs</li> <li>→ Trigger tag values</li> </ul>	<p>Numeric trigger ID which triggered this action. Supported in trigger URLs since Zabbix 1.8.8, in trigger tag values since 4.4.1.</p>
{TRIGGER.NAME}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Name of the trigger (with macros resolved). Note that since 4.0.0 {EVENT.NAME} can be used in actions to display the triggered event/problem name with macros resolved.</p>
{TRIGGER.NAME.ORIG}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Original name of the trigger (i.e. without macros resolved).</p> <p>Supported since 2.0.6.</p>
{TRIGGER.NSEVERITY}	<ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger-based internal notifications</li> </ul>	<p>Numerical trigger severity. Possible values: 0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster.</p> <p>Supported starting from Zabbix 1.6.2.</p>

Macro	Supported in	Description
{TRIGGER.SEVERITY}	→ Trigger-based notifications and commands → Problem update notifications and commands → Trigger-based internal notifications	Trigger severity name. Can be defined in Administration → General → Trigger displaying options.
{TRIGGER.STATE}	→ Trigger-based internal notifications	The latest state of the trigger. Possible values: <b>Unknown</b> and <b>Normal</b> . Supported since 2.2.0.
{TRIGGER.STATUS}	→ Trigger-based notifications and commands → Problem update notifications and commands	Current trigger value. Can be either PROBLEM or OK. {STATUS} is deprecated.
{TRIGGER.TEMPLATE.NAMES}	→ Trigger-based notifications and commands → Problem update notifications and commands → Trigger-based internal notifications	A sorted (by SQL query), comma-space separated list of templates in which the trigger is defined, or *UNKNOWN* if the trigger is defined in a host. Supported since 2.0.6.
{TRIGGER.URL}	→ Trigger-based notifications and commands → Problem update notifications and commands → Trigger-based internal notifications	Trigger URL.
{TRIGGER.VALUE}	→ Trigger-based notifications and commands → Problem update notifications and commands → Trigger expressions	Current trigger numeric value: 0 - trigger is in OK state, 1 - trigger is in PROBLEM state.
{TRIGGERS.UNACK}	→ Map element labels	Number of unacknowledged triggers for a map element, disregarding trigger state. A trigger is considered to be unacknowledged if at least one of its PROBLEM events is unacknowledged.
{TRIGGERS.PROBLEM.UNACK}	→ Map element labels	Number of unacknowledged PROBLEM triggers for a map element. A trigger is considered to be unacknowledged if at least one of its PROBLEM events is unacknowledged. Supported since 1.8.3.
{TRIGGERS.ACK}	→ Map element labels	Number of acknowledged triggers for a map element, disregarding trigger state. A trigger is considered to be acknowledged if all of its PROBLEM events are acknowledged. Supported since 1.8.3.
{TRIGGERS.PROBLEM.ACK}	→ Map element labels	Number of acknowledged PROBLEM triggers for a map element. A trigger is considered to be acknowledged if all of its PROBLEM events are acknowledged. Supported since 1.8.3.
{USER.ALIAS}	→ Global scripts (including confirmation text)	Alias (username) of the user who started the script. Supported since 5.0.2.
{USER.FULLNAME}	→ Problem update notifications and commands → Global scripts (including confirmation text)	Name, surname and alias of the user who added event acknowledgment or started the script. Supported for problem updates since 3.4.0, for global scripts since 5.0.2
{USER.NAME}	→ Global scripts (including confirmation text)	Name of the user who started the script. Supported since 5.0.2.
{USER.SURNAME}	→ Global scripts (including confirmation text)	Surname name of the user who started the script. Supported since 5.0.2.
{host:key.func(param)}	→ Trigger-based notifications and commands → Problem update notifications and commands → Map element/shape labels <sup>3</sup> → Link labels in maps <sup>3</sup> → Graph names <sup>5</sup> → Trigger expressions <sup>6</sup>	Simple macros, as used in building trigger expressions. Supported for shape labels in maps since 3.4.2.
{\$MACRO}	→ See: <a href="#">User macros supported by location</a>	<a href="#">User-definable</a> macros.

Macro	Supported in	Description
{#MACRO}	→ See: <a href="#">Low-level discovery macros</a>	Low-level discovery macros. Supported since 2.0.0.  <b>Customizing</b> the macro value is supported for this macro, starting with Zabbix 4.0.0.
{?EXPRESSION}	→ Trigger event names	Expression macro for formula calculations. Calculated by expanding all macros inside and evaluating the resulting expression. See <a href="#">example</a> of using an expression macro in the event name. Supported since 5.2.0.

#### Footnotes

<sup>1</sup> The {HOST.\*} macros supported in item key parameters will resolve to the interface that is selected for the item. When used in items without interfaces they will resolve to either the Zabbix agent, SNMP, JMX or IPMI interface of the host in this order of priority or to 'UNKNOWN' if the host does not have any interface.

<sup>2</sup> In remote commands, global scripts, interface IP/DNS fields and web scenarios the macro will resolve to the main agent interface, however, if it is not present, the main SNMP interface will be used. If SNMP is also not present, the main JMX interface will be used. If JMX is not present either, the main IPMI interface will be used. If the host does not have any interface, the macro resolves to 'UNKNOWN'.

<sup>3</sup> Only the **avg**, **last**, **max** and **min** functions, with seconds as parameter are supported in this macro in map labels.

<sup>4</sup> Supported since Zabbix 2.2.0, {HOST.\*} macros are supported in web scenario Variables, Headers, SSL certificate file and SSL key file fields and in scenario step URL, Post, Headers and Required string fields. Macros {HOST.\*} in web scenario Name and web scenario step Name are not supported since Zabbix 5.2.2.

<sup>5</sup> Supported since Zabbix 2.2.0. Only the **avg**, **last**, **max** and **min** functions, with seconds as parameter are supported within this macro in graph names. The {HOST.HOST<1-9>} macro can be used as host within the macro. For example:

```
* {Cisco switch:ifAlias[{-#SNMPINDEX}].last()}
* {{HOST.HOST}:ifAlias[{-#SNMPINDEX}].last()}
```

<sup>6</sup> While supported to build trigger expressions, simple macros may not be used inside each other.

<sup>7</sup> Supported since 4.0.0.

<sup>8</sup> Supported since 5.2.5.

#### Indexed macros

The indexed macro syntax of {MACRO<1-9>} works only in the context of **trigger expressions**. It can be used to reference hosts in the order in which they appear in the expression. Macros like {HOST.IP1}, {HOST.IP2}, {HOST.IP3} will resolve to the IP of the first, second and third host in the trigger expression (providing the trigger expression contains those hosts).

Additionally the {HOST.HOST<1-9>} macro is also supported within the {host:key.func(param)} macro in **graph names**. For example, {{HOST.HOST2}:key.func()} in the graph name will refer to the host of the second item in the graph.

#### Warning:

Indexed macros will not resolve in any other context, except the two cases mentioned here. For other contexts, use macros **without** index (i. e. {HOST.HOST}, {HOST.IP}, etc) instead.

## 2 User macros supported by location

### Overview

This section contains a list of locations, where **user-definable** macros are supported.

#### Note:

Only global-level user macros are supported for Actions, Network discovery, Proxies and all locations listed under Other locations section of this page. In the mentioned locations, host-level and template-level macros will not be resolved.

### Actions

In **actions**, user macros can be used in the following fields:

Location	Multiple macros/mix with text <sup>1</sup>
Trigger-based notifications and commands	yes
Trigger-based internal notifications	yes
Problem update notifications	yes
Time period condition	no
Operations	
	Default operation step duration no
	Step duration no

#### Hosts/host prototypes

In a **host** and **host prototype** configuration, user macros can be used in the following fields:

Location	Multiple macros/mix with text <sup>1</sup>
Interface IP/DNS	DNS only
Interface port	no
SNMP v1, v2	
	SNMP community yes
SNMP v3	
	Context name yes
	Security name yes
	Authentication passphrase yes
	Privacy passphrase yes
IPMI	
	Username yes
	Password yes
//Tags //	
	Tag names yes
	Tag values yes

#### Items / item prototypes

In an **item** or an **item prototype** configuration, user macros can be used in the following fields:

Location	Multiple macros/mix with text <sup>1</sup>
Name (deprecated)	yes
Item key parameters	yes
Update interval	no
Custom intervals	no
History storage period	no
Trend storage period	no
Description	yes
//Calculated item //	
	Formula yes
Database monitor	
	Username yes
	Password yes
	SQL query yes
//HTTP agent //	
	URL <sup>2</sup> yes
	Query fields yes
	Timeout no
	Request body yes
	Headers (names and values) yes
	Required status codes yes
	HTTP proxy yes
	HTTP authentication username yes
	HTTP authentication password yes

Location		Multiple macros/mix with text <sup>1</sup>
JMX agent	SSI certificate file	yes
	SSI key file	yes
	SSI key password	yes
	Allowed hosts	yes
//Script item //	JMX endpoint	yes
	Parameter names and values	yes
//SNMP agent //	SNMP OID	yes
	SNMP OID	yes
//SSH agent //	Username	yes
	Public key file	yes
	Private key file	yes
	Password	yes
	Script	yes
//TELNET agent //	Username	yes
	Password	yes
	Script	yes
//Zabbix trapper //	Allowed hosts	yes
	Step parameters (including custom scripts)	yes

#### Low-level discovery

In a **low-level discovery rule**, user macros can be used in the following fields:

Location		Multiple macros/mix with text <sup>1</sup>
Name		yes
Key parameters		yes
Update interval		no
Custom interval		no
Keep lost resources period		no
Description		yes
SNMP agent	SNMP OID	yes
	SNMP OID	yes
SSH agent	Username	yes
	Public key file	yes
	Private key file	yes
	Password	yes
	Script	yes
TELNET agent	Username	yes
	Password	yes
	Script	yes
Zabbix trapper	Allowed hosts	yes
Database monitor	Additional parameters	yes
JMX agent	JMX endpoint	yes
HTTP agent	URL <sup>2</sup>	yes
	Query fields	yes
	Timeout	no
	Request body	yes
	Headers (names and values)	yes

Location		Multiple macros/mix with text <sup>1</sup>
	Required status codes	yes
	HTTP authentication username	yes
	HTTP authentication password	yes
//Filters //		
	Regular expression	yes
//Overrides //		
	Filters: regular expression	yes
	Operations: update interval (for item prototypes)	no
	Operations: history storage period (for item prototypes)	no
	Operations: trend storage period (for item prototypes)	no

## Network discovery

In a **network discovery rule**, user macros can be used in the following fields:

Location		Multiple macros/mix with text <sup>1</sup>
	Update interval	no
	SNMP v1, v2	
	SNMP community	yes
	SNMP OID	yes
	SNMP v3	
	Context name	yes
	Security name	yes
	Authentication passphrase	yes
	Privacy passphrase	yes
	SNMP OID	yes

## Proxies

In a **proxy** configuration, user macros can be used in the following field:

Location		Multiple macros/mix with text <sup>1</sup>
	Interface port (for passive proxy)	no

## Templates

In a **template** configuration, user macros can be used in the following fields:

Location		Multiple macros/mix with text <sup>1</sup>
//Tags //		
	Tag names	yes
	Tag values	yes

## Triggers

In a **trigger** configuration, user macros can be used in the following fields:

Location		Multiple macros/mix with text <sup>1</sup>
	Name	yes
	Operational data	yes

Location	Multiple macros/mix with text <sup>1</sup>
Expression (only in constants and function parameters; secret macros are not supported).	yes
Description	yes
URL <sup>2</sup>	yes
Tag for matching	yes
//Tags //	
Tag names	yes
Tag values	yes

### Web scenario

In a **web scenario** configuration, user macros can be used in the following fields:

Location	Multiple macros/mix with text <sup>1</sup>
Name	yes
Update interval	no
Agent	yes
HTTP proxy	yes
Variables (values only)	yes
Headers (names and values)	yes
//Steps //	
Name	yes
URL <sup>2</sup>	yes
Variables (values only)	yes
Headers (names and values)	yes
Timeout	no
Required string	yes
Required status codes	no
//Authentication //	
User	yes
Password	yes
SSL certificate	yes
SSL key file	yes
SSL key password	yes

### Other locations

In addition to the locations listed here, user macros can be used in the following fields:

Location	Multiple macros/mix with text <sup>1</sup>
Global scripts (including confirmation text)	yes
Monitoring → Screens	yes
Administration → Users → Media	URL <sup>2</sup> field of dynamic URL screen element
Administration → General → GUI	When active
	Working time
	no
	no



Location	Multiple macros/mix with text <sup>1</sup>
Administration → Media types → Message templates	
Subject	yes
Message	yes

For a complete list of all macros supported in Zabbix, see [supported macros](#).

#### Footnotes

<sup>1</sup> If multiple macros in a field or macros mixed with text are not supported for the location, a single macro has to fill the whole field.

<sup>2</sup> URLs that contain a [secret macro](#) will not work, as the macro in them will be resolved as "\*\*\*\*\*".

## 8 Unit symbols

### Overview

Having to use some large numbers, for example '86400' to represent the number of seconds in one day, is both difficult and error-prone. This is why you can use some appropriate unit symbols (or suffixes) to simplify Zabbix trigger expressions and item keys.

Instead of '86400' for the number of seconds you can simply enter '1d'. Suffixes function as multipliers.

### Time suffixes

For time you can use:

- **s** - seconds (when used, works the same as the raw value)
- **m** - minutes
- **h** - hours
- **d** - days
- **w** - weeks

Time suffixes are supported in:

- trigger [expression](#) constants and function parameters
- constants of [calculated item](#) formulas
- parameters of the **zabbix[queue,<from>,<to>]** [internal item](#)
- last parameter of [aggregate checks](#)
- item configuration ('Update interval', 'Custom intervals', 'History storage period' and 'Trend storage period' fields)
- item prototype configuration ('Update interval', 'Custom intervals', 'History storage period' and 'Trend storage period' fields)
- low-level discovery rule configuration ('Update interval', 'Custom intervals', 'Keep lost resources' fields)
- network discovery configuration ('Update interval' field)
- web scenario configuration ('Update interval', 'Timeout' fields)
- action operation configuration ('Default operation step duration', 'Step duration' fields)
- slide show configuration ('Default delay' field)
- user profile settings ('Auto-logout', 'Refresh', 'Message timeout' fields)
- graph [widget](#) of Monitoring → Dashboard ('Time shift' field)
- Administration → General → Housekeeping (storage period fields)
- Administration → General → Trigger displaying options ('Display OK triggers for', 'On status change triggers blink for' fields)
- Administration → General → Other ('Login blocking interval' field and fields related to communication with Zabbix server)

### Memory suffixes

Memory size suffixes are supported in:

- trigger [expression](#) constants and function parameters
- constants of [calculated item](#) formulas

For memory size you can use:

- **K** - kilobyte
- **M** - megabyte
- **G** - gigabyte
- **T** - terabyte

## Other uses

Unit symbols are also used for a human-readable representation of data in the frontend.

In both Zabbix server and frontend these symbols are supported:

- **K** - kilo
- **M** - mega
- **G** - giga
- **T** - tera

When item values in B, Bps are displayed in the frontend, base 2 is applied (1K = 1024). Otherwise a base of 10 is used (1K = 1000).

Additionally the frontend also supports the display of:

- **P** - peta
- **E** - exa
- **Z** - zetta
- **Y** - yotta

## Usage examples

By using some appropriate suffixes you can write trigger expressions that are easier to understand and maintain, for example these expressions:

```
{host:zabbix[proxy,zabbix_proxy,lastaccess]}>120
{host:system.uptime[] .last()}<86400
{host:system.cpu.load.avg(600)}<10
{host:vm.memory.size[available].last()}<20971520
```

could be changed to:

```
{host:zabbix[proxy,zabbix_proxy,lastaccess]}>2m
{host:system.uptime.last()}<1d
{host:system.cpu.load.avg(10m)}<10
{host:vm.memory.size[available].last()}<20M
```

## 9 Time period syntax

### Overview

To set a time period, the following format has to be used:

```
d-d, hh:mm-hh:mm
```

where the symbols stand for the following:

Symbol	Description
d	Day of the week: 1 - Monday, 2 - Tuesday ,... , 7 - Sunday
hh	Hours: 00-24
mm	Minutes: 00-59

You can specify more than one time period using a semicolon (;) separator:

```
d-d, hh:mm-hh:mm; d-d, hh:mm-hh:mm . . .
```

Leaving the time period empty equals 01-07,00:00-24:00, which is the default value.

### Attention:

The upper limit of a time period is not included. Thus, if you specify 09:00-18:00 the last second included in the time period is 17:59:59.

### Examples

Working hours. Monday - Friday from 9:00 till 18:00:

```
1-5,09:00-18:00
```

Working hours plus weekend. Monday - Friday from 9:00 till 18:00 and Saturday, Sunday from 10:00 till 16:00:

1-5,09:00-18:00;6-7,10:00-16:00

## 10 Command execution

Zabbix uses common functionality for external checks, user parameters, system.run items, custom alert scripts, remote commands and user scripts.

Execution steps

The command/script is executed similarly on both Unix and Windows platforms:

1. Zabbix (the parent process) creates a pipe for communication
2. Zabbix sets the pipe as the output for the to-be-created child process
3. Zabbix creates the child process (runs the command/script)
4. A new process group (in Unix) or a job (in Windows) is created for the child process
5. Zabbix reads from the pipe until timeout occurs or no one is writing to the other end (ALL handles/file descriptors have been closed). Note that the child process can create more processes and exit before they exit or close the handle/file descriptor.
6. If the timeout has not been reached, Zabbix waits until the initial child process exits or timeout occurs
7. If the initial child process exited and the timeout has not been reached, Zabbix checks exit code of the initial child process and compares it to 0 (non-zero value is considered as execution failure, only for custom alert scripts, remote commands and user scripts executed on Zabbix server and Zabbix proxy)
8. At this point it is assumed that everything is done and the whole process tree (i.e. the process group or the job) is terminated

### Attention:

Zabbix assumes that a command/script has done processing when the initial child process has exited AND no other process is still keeping the output handle/file descriptor open. When processing is done, ALL created processes are terminated.

All double quotes and backslashes in the command are escaped with backslashes and the command is enclosed in double quotes.

Exit code checking

Exit code are checked with the following conditions:

- \*Only for custom alert scripts, remote commands and user scripts executed on Zabbix server and Zabbix proxy
- \*Any exit code that is different from 0 is considered as execution failure.
- \*Contents of standard error and standard output for failed executions are collected and available in frontend
- \*Additional log entry is created for remote commands on Zabbix server to save script execution output and error

Possible frontend messages and log entries for failed commands/scripts:

- Contents of standard error and standard output for failed executions (if any).
- "Process exited with code: N." (for empty output, and exit code not equal to 0).
- "Process killed by signal: N." (for process terminated by a signal, on Linux only).
- "Process terminated unexpectedly." (for process terminated for unknown reasons).

---

Read more about:

- [External checks](#)
- [User parameters](#)
- [system.run items](#)
- [Custom alert scripts](#)
- [Remote commands](#)
- [Global scripts](#)

## 11 Recipes for monitoring

General

Monitoring server availability

At least three methods (or combination of all methods) may be used in order to monitor availability of a server.

- ICMP ping ("icmpping" key)
- "zabbix[host,agent,available]" item
- trigger function nodata() for monitoring the availability of hosts that use active checks only

#### Sending alerts via WinPopUps

WinPopUps maybe very useful if you're running Windows OS and want to get quick notification from Zabbix. It could be good addition for email-based alert messages. Details about enabling of WinPopUps can be found at <http://www.zabbix.com/forum/showthread.php?t=2147>.

#### Monitoring specific applications

##### AS/400

IBM AS/400 platform can be monitored using SNMP. More information is available at <http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sg244504.html?Open>.

##### MySQL

Several user parameters can be used for the monitoring of MySQL in the agent configuration file: /usr/local/etc/zabbix\_agentd.conf

```
### Set of parameters for monitoring MySQL server (v3.23.42 and later)
### Change -u and add -p if required
#UserParameter=mysql.ping,mysqladmin -uroot ping|grep alive|wc -l
#UserParameter=mysql.uptime,mysqladmin -uroot status|cut -f2 -d":"|cut -f2 -d" "
#UserParameter=mysql.threads,mysqladmin -uroot status|cut -f3 -d":"|cut -f2 -d" "
#UserParameter=mysql.questions,mysqladmin -uroot status|cut -f4 -d":"|cut -f2 -d" "
#UserParameter=mysql.slowqueries,mysqladmin -uroot status|cut -f5 -d":"|cut -f2 -d" "
#UserParameter=mysql.qps,mysqladmin -uroot status|cut -f9 -d":"|cut -f2 -d" "
#UserParameter=mysql.version,mysql -V
```

- mysql.ping

Check whether MySQL is alive.

```
Result: 0 - not started 1 - alive
```

- mysql.uptime

Number of seconds MySQL is running.

- mysql.threads

Number of MySQL threads.

- mysql.questions

Number of processed queries.

- mysql.slowqueries

Number of slow queries.

- mysql.qps

Queries per second.

- mysql.version

Version of MySQL. For example: mysql Ver 14.14 Distrib 5.1.53, for pc-linux-gnu (i686)

For additional information see also the userparameter\_mysql.conf file in conf/zabbix\_agentd directory.

#### Mikrotik routers

Use SNMP agent provided by Mikrotik. See <http://www.mikrotik.com> for more information.

#### Windows

Use Zabbix Windows agent included (pre-compiled) into Zabbix distribution.

#### Tuxedo

Tuxedo command line utilities tadmin and qadmin can be used in definition of a UserParameter in order to return per server/service/queue performance counters and availability of Tuxedo resources.

#### Informix

Standard Informix utility **onstat** can be used for monitoring of virtually every aspect of Informix database. Also, Zabbix can retrieve information provided by Informix SNMP agent.

#### HP OpenView

Zabbix can be configured to send messages to OpenView server. The following steps must be performed:

##### Step 1

Define new media.

The media will execute a script which will send required information to OpenView.

##### Step 2

Define new user.

The user has to be linked with the media.

##### Step 3

Configure actions.

Configure actions to send all (or selected) trigger status changes to the user.

##### Step 4

Write media script.

The script will have the following logic. If trigger is ON, then execute OpenView command `opcmsg -id application=<application> msg_grp=<msg_grp> object=<object> msg_text=<text>`. The command will return unique message ID which has to be stored somewhere, preferably in a new table of ZABBIX database. If trigger is OFF then `opcmsg <message id>` has to be executed with message ID retrieved from the database.

Refer to OpenView official documentation for more details about `opcmsg` and `opcmsgack`. The media script is not given here.

## 12 Performance tuning

### Attention:

This is a work in progress.

#### Overview

It is very important to have Zabbix system properly tuned for maximum performance.

#### Hardware

General advice on hardware:

- Use fastest processor available
- SCSI or SAS is better than IDE (performance of IDE disks may be significantly improved by using utility `hdparm`) and SATA
- 15K RPM is better than 10K RPM which is better than 7200 RPM
- Use fast RAID storage
- Use fast Ethernet adapter
- Having more memory is always better

#### Operating system

- Use latest (stable!) version of OS
- Exclude unnecessary functionality from kernel
- Tune kernel parameters

#### Zabbix configuration parameters

Many parameters may be tuned to get optimal performance.

#### `zabbix_server`

##### StartPollers

General rule - keep value of this parameter as low as possible. Every additional instance of `zabbix_server` adds known overhead, in the same time, parallelism is increased. Optimal number of instances is achieved when queue, on average, contains minimum number of parameters (ideally, 0 at any given moment). This value can be monitored by using internal check `zabbix[queue]`.

**Note:**

See the **"See also"** section at the bottom of this page to find out how to configure optimal count of zabbix processes.

**DebugLevel**

Optimal value is 3.

**DBSocket**

MySQL only. It is recommended to use DBSocket for connection to the database. That is the fastest and the most secure way.

Database engine

This is probably the most important part of Zabbix tuning. Zabbix heavily depends on the availability and performance of database engine.

- use fastest database engine, i.e. MySQL or PostgreSQL
- use stable release of a database engine
- rebuild MySQL or PostgreSQL from sources to get maximum performance
- follow performance tuning instructions taken from MySQL or PostgreSQL documentation
- for MySQL, use InnoDB table structure
- ZABBIX works at least 1.5 times faster (comparing to MyISAM) if InnoDB is used. This is because of increased parallelism. However, InnoDB requires more CPU power.
- tuning the database server for the best performance is highly recommended.
- keep database tables on different hard disks
- 'history', 'history\_str', 'items', 'functions', 'triggers', and 'trends' are most heavily used tables.
- for large installations keeping MySQL temporary files in tmpfs is:
  - MySQL >= 5.5: not recommended ([MySQL bug #58421](#))
  - MySQL < 5.5: recommended

**GUI debugging**

Problems related to the frontend performance may be diagnosed using the frontend **debug mode**.

**General advice**

- monitor required parameters only
- tune 'Update interval' for all items. Keeping a small update interval may be good for nice graphs, however, this may overload Zabbix
- tune parameters for default templates
- tune housekeeping parameters
- do not monitor parameters which return the same information.
- avoid the use of triggers with long period given as function argument. For example, max(3600) will be calculated significantly slower than max(60).

**Viewing Zabbix process performance with "ps" and "top"**

Since Zabbix 2.2 processes change their commandlines to display current activity and meaningful statistics, like:

```

UID          PID    PPID  C  STIME TTY          TIME CMD
zabbix22    4584      1  0 14:55 ?        00:00:00 zabbix_server -c /home/zabbix22/zabbix_server.conf
zabbix22    4587    4584  0 14:55 ?        00:00:00 zabbix_server: configuration syncer [synced configuration in 0.018748 s]
zabbix22    4588    4584  0 14:55 ?        00:00:00 zabbix_server: db watchdog [synced alerts config in 0.018748 s]
zabbix22    4608    4584  0 14:55 ?        00:00:00 zabbix_server: timer #1 [updated 0 hosts, suppressed 0 events]
zabbix22    4637    4584  0 14:55 ?        00:00:01 zabbix_server: history syncer #3 [processed 0 values, 0 triggers]
zabbix22    4657    4584  0 14:55 ?        00:00:00 zabbix_server: vmware collector #1 [updated 0, removed 0 VMware hosts]
zabbix22    4670      1  0 14:55 ?        00:00:00 zabbix_proxy -c /home/zabbix22/zabbix_proxy.conf
zabbix22    4673    4670  0 14:55 ?        00:00:00 zabbix_proxy: configuration syncer [synced config 15251 bytes]
zabbix22    4674    4670  0 14:55 ?        00:00:00 zabbix_proxy: heartbeat sender [sending heartbeat message success]
zabbix22    4688    4670  0 14:55 ?        00:00:00 zabbix_proxy: icmp pinger #1 [got 1 values in 1.811128 sec, id=1]
zabbix22    4690    4670  0 14:55 ?        00:00:00 zabbix_proxy: housekeeper [deleted 9870 records in 0.233491 sec]
zabbix22    4701    4670  0 14:55 ?        00:00:08 zabbix_proxy: http poller #2 [got 1 values in 0.024105 sec, id=1]
zabbix22    4707    4670  0 14:55 ?        00:00:00 zabbix_proxy: history syncer #4 [processed 0 values, 0 triggers]
zabbix22    4738      1  0 14:55 ?        00:00:00 zabbix_agentd -c /home/zabbix22/zabbix_agentd.conf
zabbix22    4739    4738  0 14:55 ?        00:00:00 zabbix_agentd: collector [idle 1 sec]
zabbix22    4740    4738  0 14:55 ?        00:00:00 zabbix_agentd: listener #1 [waiting for connection]
zabbix22    4741    4738  0 14:55 ?        00:00:00 zabbix_agentd: listener #2 [processing request]

```

The main process is an exception. Instead of current activity the original commandline is shown. This helps to distinguish processes on systems with multiple Zabbix instances.

This feature is not implemented for Microsoft Windows.

If logging level is set to **DebugLevel=4** these activity and statistics messages are also written into log file.

Linux

On Linux systems `ps` command can be used together with `watch` command for observing how Zabbix is doing. For example, to run `ps` command 5 times per second to see process activities:

```
watch -n 0.2 ps -fu zabbix
```

To show only Zabbix proxy and agent processes:

```
watch -tn 0.2 'ps -f -C zabbix_proxy -C zabbix_agentd'
```

To show only history syncer processes:

```
watch -tn 0.2 'ps -fC zabbix_server | grep history'
```

The `ps` command produces a wide output (approximately 190 columns) as some activity messages are long. If your terminal has less than 190 columns of text you can try

```
watch -tn 0.2 'ps -o cmd -C zabbix_server -C zabbix_proxy -C zabbix_agentd'
```

to display only commandlines without UID, PID, start time etc.

`top` command also can be used for observing Zabbix performance. Pressing 'c' key in `top` shows processes with their commandlines. In our tests on Linux `top` and `atop` correctly displayed changing activities of Zabbix processes, but `htop` was not displaying changing activities.

BSD systems

If `watch` command is not installed, a similar effect can be achieved with

```
while [ 1 ]; do ps x; sleep 0.2; clear; done
```

AIX, HP-UX

If `watch` command is not available, one can try

```
while [ 1 ]; do ps -fu zabbix; sleep 1; clear; done
```

Solaris

By default the `ps` command does not show changing activities. One option is to use `/usr/ucb/ps` instead. If `watch` command is not installed, a periodically updated list of processes can be shown with

```
while [ 1 ]; do /usr/ucb/ps gxww; sleep 1; clear; done
```

On Solaris 11:

- `/usr/ucb/ps` is not installed by default. You may need to install `ucb` package, e.g. `pkg install compatibility/ucb`,
- if Zabbix daemon has been started by privileged user its activities are not shown to non-privileged user.
- the `sleep` command accepts not only whole seconds but also fractions of second (e.g. `sleep 0.2`).

## See also

1. [How to configure optimal count of zabbix processes](#)

## 13 Version compatibility

Supported agents

To be compatible with Zabbix 5.2, Zabbix agent must not be older than version 1.4 and must not be newer than 5.2.

You may need to review the configuration of older agents as some parameters have changed, for example, parameters related to [logging](#) for versions before 3.0.

To take full advantage of the latest metrics, improved performance and reduced memory usage, use the latest supported agent.

Supported agents 2

Older Zabbix agents 2 from version 4.4 and 5.0 are compatible with Zabbix 5.2.x (except 5.2.0, see [known issues](#)); Zabbix agent 2 must not be newer than 5.2.

Note that when using Zabbix agent 2 versions 4.4 and 5.0, the default interval of 10 minutes is used for refreshing unsupported items.

To take full advantage of the latest metrics, improved performance and reduced memory usage, use the latest supported agent 2.

Supported Zabbix proxies

To be compatible with Zabbix 5.2, the proxy must be of the same major version; thus only Zabbix 5.2.x proxies can work with Zabbix 5.2.x server.

**Attention:**

It is no longer possible to start the upgraded server and have older, yet unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled, as the server will ignore data from unupgraded proxies. See also the [upgrade procedure](#).

Warnings about using incompatible Zabbix daemon versions are logged.

Supported XML files

XML files not older than version 1.8 are supported for import in Zabbix 5.2.

**Attention:**

In the XML export format, trigger dependencies are stored by name only. If there are several triggers with the same name (for example, having different severities and expressions) that have a dependency defined between them, it is not possible to import them. Such dependencies must be manually removed from the XML file and re-added after import.

## 14 Database error handling

If Zabbix detects that the backend database is not accessible, it will send a notification message and continue the attempts to connect to the database. For some database engines, specific error codes are recognized.

MySQL

- CR\_CONN\_HOST\_ERROR
- CR\_SERVER\_GONE\_ERROR
- CR\_CONNECTION\_ERROR
- CR\_SERVER\_LOST
- CR\_UNKNOWN\_HOST
- ER\_SERVER\_SHUTDOWN
- ER\_ACCESS\_DENIED\_ERROR
- ER\_ILLEGAL\_GRANT\_FOR\_TABLE
- ER\_TABLEACCESS\_DENIED\_ERROR
- ER\_UNKNOWN\_ERROR

## 15 Zabbix sender dynamic link library for Windows

In a Windows environment applications can send data to Zabbix server/proxy directly by using the Zabbix sender dynamic link library (zabbix\_sender.dll) instead of having to launch an external process (zabbix\_sender.exe).

The dynamic link library with the development files is located in bin\winXX\dev folders. To use it, include the zabbix\_sender.h header file and link with the zabbix\_sender.lib library. An example file with Zabbix sender API usage can be found in build\win32\examples\zabbix\_sender folder.

The following functionality is provided by the Zabbix sender dynamic link library:

```
int zabbix_sender_send_values(const char *address, unsigned short port, const char *source, const zabbix_
char **result);{.c}
```

The following data structures are used by the Zabbix sender dynamic link library:



```

typedef struct
{
    /* host name, must match the name of target host in Zabbix */
    char    *host;
    /* the item key */
    char    *key;
    /* the item value */
    char    *value;
}
zabbix_sender_value_t;

typedef struct
{
    /* number of total values processed */
    int total;
    /* number of failed values */
    int failed;
    /* time in seconds the server spent processing the sent values */
    double time_spent;
}
zabbix_sender_info_t;

```

## 16 Issues with SELinux

Socket-based inter-process communication has been added since Zabbix 3.4. On systems where SELinux is enabled it may be required to add SELinux rules to allow Zabbix create/use UNIX domain sockets in the SocketDir directory. Currently socket files are used by server (alerter, preprocessing, IPMI) and proxy (IPMI). Socket files are persistent, meaning are present while the process is running.

## 17 Other issues

### Login and systemd

We recommend **creating** a zabbix user as system user, that is, without ability to log in. Some users ignore this recommendation and use the same account to log in (e. g. using SSH) to host running Zabbix. This might crash Zabbix daemon on log out. In this case you will get something like the following in Zabbix server log:

```

zabbix_server [27730]: [file:'selfmon.c',line:375] lock failed: [22] Invalid argument
zabbix_server [27716]: [file:'dbconfig.c',line:5266] lock failed: [22] Invalid argument
zabbix_server [27706]: [file:'log.c',line:238] lock failed: [22] Invalid argument

```

and in Zabbix agent log:

```

zabbix_agentd [27796]: [file:'log.c',line:238] lock failed: [22] Invalid argument

```

This happens because of default systemd setting RemoveIPC=yes configured in /etc/systemd/logind.conf. When you log out of the system the semaphores created by Zabbix previously are removed which causes the crash.

A quote from systemd documentation:

RemoveIPC=

Controls whether System V and POSIX IPC objects belonging to the user shall be removed when the user fully logs out. Takes a boolean argument. If enabled, the user may not consume IPC resources after the last of the user's sessions terminated. This covers System V semaphores, shared memory and message queues, as well as POSIX shared memory and message queues. Note that IPC objects of the root user and other system users are excluded from the effect of this setting. Defaults to "yes".

There are 2 solutions to this problem:

1. (recommended) Stop using zabbix account for anything else than Zabbix processes, create a dedicated account for other things.

- (not recommended) Set `RemoveIPC=no` in `/etc/systemd/logind.conf` and reboot the system. Note that `RemoveIPC` is a system-wide parameter, changing it will affect the whole system.

#### Using Zabbix frontend behind proxy

If Zabbix frontend runs behind proxy server, the cookie path in the proxy configuration file needs to be rewritten in order to match the reverse-proxied path. See examples below. If the cookie path is not rewritten, users may experience authorization issues, when trying to login to Zabbix frontend.

Example configuration for nginx

```
# ..
location / {
# ..
proxy_cookie_path /zabbix /;
proxy_pass http://192.168.0.94/zabbix/;
# ..
```

Example configuration for Apache

```
# ..
ProxyPass "/" http://host/zabbix/
ProxyPassReverse "/" http://host/zabbix/
ProxyPassReverseCookiePath /zabbix /
ProxyPassReverseCookieDomain host zabbix.example.com
# ..
```

## 18 Agent vs agent 2 comparison

This section describes the differences between the Zabbix agent and the Zabbix agent 2.

Parameter	Zabbix agent	Zabbix agent 2
Programming language	C	Go with some parts in C
Daemonization	yes	by systemd only (yes on Windows)
Supported extensions	Custom <b>loadable modules</b> in C.	Custom <b>plugins</b> in Go.
Requirements		
Supported platforms	Linux, IBM AIX, FreeBSD, NetBSD, OpenBSD, HP-UX, Mac OS X, Solaris: 9, 10, 11, Windows: all desktop and server versions since XP	Linux, Windows: all desktop and server versions since XP.
Supported crypto libraries	GnuTLS 3.1.18 and newer OpenSSL 1.0.1, 1.0.2, 1.1.0, 1.1.1 LibreSSL - tested with versions 2.7.4, 2.8.2 (certain limitations apply, see the <b>Encryption</b> page for details).	Linux: OpenSSL 1.0.1 and later is supported since Zabbix 4.4.8. MS Windows: OpenSSL 1.1.1 or later. The OpenSSL library must have PSK support enabled. LibreSSL is not supported.
Monitoring processes		
Processes	A separate active check process for each server/proxy record.	Single process with automatically created threads. The maximum number of threads is determined by the GOMAXPROCS environment variable.
Metrics	<b>UNIX:</b> see a list of supported <b>items</b> .  <b>Windows:</b> see a list of additional Windows-specific <b>items</b> .	<b>UNIX:</b> All metrics supported by Zabbix agent. Additionally, the agent 2 provides Zabbix-native monitoring solution for: Docker, Memcached, MySQL, PostgreSQL, Redis, systemd (see a list of agent 2 specific <b>items</b> ).  <b>Windows:</b> All metrics supported by Zabbix agent, and also net.tcp.service* checks of HTTPS, LDAP. Additionally, the agent 2 provides Zabbix-native monitoring solution for: PostgreSQL, Redis.
Concurrency	Active checks for single server are executed sequentially.	Checks from different plugins or multiple checks within one plugin can be executed concurrently.

Parameter	Zabbix agent	Zabbix agent 2
Scheduled/flexible intervals	Supported for passive checks only.	Supported for passive and active checks.
Third party traps	no	yes
Additional features		
Persistent storage	no	yes
Timeout settings	Defined on an agent level only.	Plugin timeout can override the timeout defined on an agent level.
Changes user at runtime	yes (Unix-like systems only)	no (controlled by systemd)
User-configurable ciphersuites	yes	no

**See also:**

- Zabbix processes description: [Zabbix agent](#), [Zabbix agent 2](#)
- Configuration parameters: [Zabbix agent UNIX / Windows](#), [Zabbix agent 2 UNIX / Windows](#)

## Zabbix manpages

These are Zabbix manpages for Zabbix processes.

### **zabbix\_agent2**

Section: Maintenance Commands (8)

Updated: 2019-01-29

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#### **NAME**

zabbix\_agent2 - Zabbix agent 2

#### **SYNOPSIS**

```
zabbix_agent2 [-c config-file]
zabbix_agent2 [-c config-file] -p
zabbix_agent2 [-c config-file] -t item-key
zabbix_agent2 [-c config-file] -R runtime-option
zabbix_agent2 -h
zabbix_agent2 -V
```

#### **DESCRIPTION**

**zabbix\_agent2** is an application for monitoring parameters of various services.

#### **OPTIONS**

**-c, --config** config-file  
Use the alternate config-file instead of the default one.

**-R, --runtime-control** runtime-option  
Perform administrative functions according to runtime-option.

**Runtime control options: loglevel increase**

Increase log level

**loglevel decrease**

Decrease log level

**help**

List available runtime control options

**metrics**

List available metrics

**version**

Display version

**-p, --print**

Print known items and exit. For each item either generic defaults are used, or specific defaults for testing are supplied. These defaults are listed in square brackets as item key parameters. Returned values are enclosed in square brackets and prefixed with the type of the returned value, separated by a pipe character. For user parameters type is always **t**, as the agent can not determine all possible return values. Items, displayed as working, are not guaranteed to work from the Zabbix server or `zabbix_get` when querying a running agent daemon as permissions or environment may be different. Returned value types are:

**d**

Number with a decimal part.

**m**

Not supported. This could be caused by querying an item that only works in the active mode like a log monitoring item or an item that requires multiple collected values. Permission issues or incorrect user parameters could also result in the not supported state.

**s**

Text. Maximum length not limited.

**t**

Text. Same as **s**.

**u**

Unsigned integer.

**-t, --test item-key**

Test single item and exit. See **--print** for output description.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

**FILES**

`/usr/local/etc/zabbix_agent2.conf`

Default location of Zabbix agent 2 configuration file (if not modified during compile time).

**SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd(8)**, **zabbix\_get(8)**, **zabbix\_js(8)**, **zabbix\_proxy(8)**, **zabbix\_sender(8)**, **zabbix\_server(8)**

**AUTHOR**

Zabbix LLC

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## zabbix\_agentd

Section: Maintenance Commands (8)

Updated: 2019-01-29

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---

### NAME

zabbix\_agentd - Zabbix agent daemon

### SYNOPSIS

**zabbix\_agentd** [-c config-file]

**zabbix\_agentd** [-c config-file] **-p**

**zabbix\_agentd** [-c config-file] **-t** item-key

**zabbix\_agentd** [-c config-file] **-R** runtime-option

**zabbix\_agentd -h**

**zabbix\_agentd -V**

### DESCRIPTION

**zabbix\_agentd** is a daemon for monitoring various server parameters.

### OPTIONS

**-c, --config** config-file

Use the alternate config-file instead of the default one.

**-f, --foreground**

Run Zabbix agent in foreground.

**-R, --runtime-control** runtime-option

Perform administrative functions according to runtime-option.

Runtime control options

**log\_level\_increase**[=target]

Increase log level, affects all processes if target is not specified

**log\_level\_decrease**[=target]

Decrease log level, affects all processes if target is not specified

Log level control targets

process-type

All processes of specified type (active checks, collector, listener)

process-type,N

Process type and number (e.g., listener,3)

pid

Process identifier, up to 65535. For larger values specify target as "process-type,N"

**-p, --print**

Print known items and exit. For each item either generic defaults are used, or specific defaults for testing are supplied. These defaults are listed in square brackets as item key parameters. Returned values are enclosed in square brackets and prefixed with the type of the returned value, separated by a pipe character. For user parameters type is always **t**, as the agent can not determine all possible return values. Items, displayed as working, are not guaranteed to work from the Zabbix server or `zabbix_get` when querying a running agent daemon as permissions or environment may be different. Returned value types are:

d

Number with a decimal part.

m

Not supported. This could be caused by querying an item that only works in the active mode like a log monitoring item or an item that requires multiple collected values. Permission issues or incorrect user parameters could also result in the not supported state.

s

Text. Maximum length not limited.

t

Text. Same as **s**.

u

Unsigned integer.

**-t, --test** item-key

Test single item and exit. See **--print** for output description.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

**FILES**

`/usr/local/etc/zabbix_agentd.conf`

Default location of Zabbix agent configuration file (if not modified during compile time).

**SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agent2**(8), **zabbix\_get**(1), **zabbix\_js**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8)

**AUTHOR**

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## **zabbix\_get**

Section: User Commands (1)

Updated: 2020-02-29

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---

### NAME

**zabbix\_get** - Zabbix get utility

### SYNOPSIS

**zabbix\_get -s** host-name-or-IP [-**p** port-number] [-**I** IP-address] -**k** item-key

**zabbix\_get -s** host-name-or-IP [-**p** port-number] [-**I** IP-address] --**tls-connect** **cert** --**tls-ca-file** CA-file [--**tls-crl-file** CRL-file] [--**tls-agent-cert-issuer** cert-issuer] [--**tls-agent-cert-subject** cert-subject] --**tls-cert-file** cert-file --**tls-key-file** key-file [--**tls-cipher13** cipher-string] [--**tls-cipher** cipher-string] -**k** item-key

**zabbix\_get -s** host-name-or-IP [-**p** port-number] [-**I** IP-address] --**tls-connect** **psk** --**tls-psk-identity** PSK-identity --**tls-psk-file** PSK-file [--**tls-cipher13** cipher-string] [--**tls-cipher** cipher-string] -**k** item-key

**zabbix\_get -h**

**zabbix\_get -V**

### DESCRIPTION

**zabbix\_get** is a command line utility for getting data from Zabbix agent.

### OPTIONS

-**s**, --**host** host-name-or-IP

Specify host name or IP address of a host.

-**p**, --**port** port-number

Specify port number of agent running on the host. Default is 10050.

-**I**, --**source-address** IP-address

Specify source IP address.

-**k**, --**key** item-key

Specify key of item to retrieve value for.

--**tls-connect** value

How to connect to agent. Values:

#### **unencrypted**

connect without encryption (default)

#### **psk**

connect using TLS and a pre-shared key

#### **cert**

connect using TLS and a certificate

**--tls-ca-file** CA-file

Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification.

**--tls-crl-file** CRL-file

Full pathname of a file containing revoked certificates.

**--tls-agent-cert-issuer** cert-issuer

Allowed agent certificate issuer.

**--tls-agent-cert-subject** cert-subject

Allowed agent certificate subject.

**--tls-cert-file** cert-file

Full pathname of a file containing the certificate or certificate chain.

**--tls-key-file** key-file

Full pathname of a file containing the private key.

**--tls-psk-identity** PSK-identity

PSK-identity string.

**--tls-psk-file** PSK-file

Full pathname of a file containing the pre-shared key.

**--tls-cipher13** cipher-string

Cipher string for OpenSSL 1.1.1 or newer for TLS 1.3. Override the default ciphersuite selection criteria. This option is not available if OpenSSL version is less than 1.1.1.

**--tls-cipher** cipher-string

GnuTLS priority string (for TLS 1.2 and up) or OpenSSL cipher string (only for TLS 1.2). Override the default ciphersuite selection criteria.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## EXAMPLES

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]"
```

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]" --tls-connect cert --tls-ca-file /home/zabbix/zabbix_ca_file  
--tls-agent-cert-issuer "CN=Signing CA,OU=IT operations,O=Example Corp,DC=example,DC=com" --tls-agent-cert-  
subject "CN=server1,OU=IT operations,O=Example Corp,DC=example,DC=com" --tls-cert-file /home/zabbix/zabbix_get.crt  
--tls-key-file /home/zabbix/zabbix_get.key
```

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]" --tls-connect psk --tls-psk-identity "PSK ID Zabbix  
agentd" --tls-psk-file /home/zabbix/zabbix_agentd.psk
```

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agent2**(8), **zabbix\_agentd**(8), **zabbix\_js**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8)

## AUTHOR

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## **zabbix\_js**

Section: User Commands (1)

Updated: 2019-01-29

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### NAME

`zabbix_js` - Zabbix JS utility

### SYNOPSIS

**zabbix\_js -s** script-file **-p** input-param [**-l** log-level] [**-t** timeout]

**zabbix\_js -s** script-file **-i** input-file [**-l** log-level] [**-t** timeout]

**zabbix\_js -h**

**zabbix\_js -V**

### DESCRIPTION

**zabbix\_js** is a command line utility that can be used for embedded script testing.

### OPTIONS

**-s, --script** script-file

Specify the file name of the script to execute. If '-' is specified as file name, the script will be read from stdin.

**-p, --param** input-param

Specify the input parameter.

**-i, --input** input-file

Specify the file name of the input parameter. If '-' is specified as file name, the input will be read from stdin.

**-l, --loglevel** log-level

Specify the log level.

**-t, --timeout** timeout

Specify the timeout in seconds.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

### EXAMPLES

**zabbix\_js -s script-file.js -p example**

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

[zabbix\\_agent2\(8\)](#), [zabbix\\_agentd\(8\)](#), [zabbix\\_get\(1\)](#), [zabbix\\_proxy\(8\)](#), [zabbix\\_sender\(1\)](#), [zabbix\\_server\(8\)](#)

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## **zabbix\_proxy**

Section: Maintenance Commands (8)

Updated: 2020-09-04

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### **NAME**

**zabbix\_proxy** - Zabbix proxy daemon

### **SYNOPSIS**

**zabbix\_proxy** [-c config-file]

**zabbix\_proxy** [-c config-file] **-R** runtime-option

**zabbix\_proxy -h**

**zabbix\_proxy -V**

### **DESCRIPTION**

**zabbix\_proxy** is a daemon that collects monitoring data from devices and sends it to Zabbix server.

### **OPTIONS**

**-c, --config** config-file

Use the alternate config-file instead of the default one.

**-f, --foreground**

Run Zabbix proxy in foreground.

**-R, --runtime-control** runtime-option

Perform administrative functions according to runtime-option.

Runtime control options

### **config\_cache\_reload**

Reload configuration cache. Ignored if cache is being currently loaded. Active Zabbix proxy will connect to the Zabbix server and request configuration data. Default configuration file (unless **-c** option is specified) will be used to find PID file and signal will be sent to process, listed in PID file.

### **snmp\_cache\_reload**

Reload SNMP cache.

### **housekeeper\_execute**

Execute the housekeeper. Ignored if housekeeper is being currently executed.

### **diaginfo**[=section]

Log internal diagnostic information of the specified section. Section can be historycache, preprocessing. By default diagnostic information of all sections is logged.

### **log\_level\_increase**[=target]

Increase log level, affects all processes if target is not specified.

### **log\_level\_decrease**[=target]

Decrease log level, affects all processes if target is not specified.

Log level control targets

process-type

All processes of specified type (configuration syncer, data sender, discoverer, heartbeat sender, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, poller, self-monitoring, snmp trapper, task manager, trapper, unreachable poller, vmware collector)

process-type,N

Process type and number (e.g., poller,3)

pid

Process identifier, up to 65535. For larger values specify target as "process-type,N"

### **-h, --help**

Display this help and exit.

### **-V, --version**

Output version information and exit.

## **FILES**

/usr/local/etc/zabbix\_proxy.conf

Default location of Zabbix proxy configuration file (if not modified during compile time).

## **SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_sender**(1), **zabbix\_server**(8), **zabbix\_js**(1), **zabbix\_agent2**(8)

## **AUTHOR**

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## zabbix\_sender

Section: User Commands (1)

Updated: 2020-02-29

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## NAME

zabbix\_sender - Zabbix sender utility

## SYNOPSIS

```
zabbix_sender [-v] -z server [-p port] [-I IP-address] -s host -k key -o value
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-s host] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] -k key -o value
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -z server [-p port] [-I IP-address] -s host --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -z server [-p port] [-I IP-address] -s host --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-s host] --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-s host] --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
zabbix_sender -h
zabbix_sender -V
```

## DESCRIPTION

**zabbix\_sender** is a command line utility for sending monitoring data to Zabbix server or proxy. On the Zabbix server an item of type **Zabbix trapper** should be created with corresponding key. Note that incoming values will only be accepted from hosts specified in **Allowed hosts** field for this item.

## OPTIONS

**-c, --config** config-file

Use config-file. **Zabbix sender** reads server details from the agentd configuration file. By default **Zabbix sender** does not read any configuration file. Only parameters **Hostname**, **ServerActive**, **SourceIP**, **TLSCConnect**, **TLSCAFile**, **TLSCRLFile**, **TLSServerCertIssuer**, **TLSServerCertSubject**, **TLSCertFile**, **TLSKeyFile**, **TLSPSKIdentity** and **TLSPSKFile** are supported. All addresses defined in the agent **ServerActive** configuration parameter are used for sending data. If sending of batch data fails to one address, the following batches are not sent to this address.

**-z, --zabbix-server** server

Hostname or IP address of Zabbix server. If a host is monitored by a proxy, proxy hostname or IP address should be used instead. When used together with **--config**, overrides the entries of **ServerActive** parameter specified in agentd configuration file.

**-p, --port** port

Specify port number of Zabbix server trapper running on the server. Default is 10051. When used together with **--config**, overrides the port entries of **ServerActive** parameter specified in agentd configuration file.

**-l, --source-address** IP-address

Specify source IP address. When used together with **--config**, overrides **SourceIP** parameter specified in agentd configuration file.

**-s, --host** host

Specify host name the item belongs to (as registered in Zabbix frontend). Host IP address and DNS name will not work. When used together with **--config**, overrides **Hostname** parameter specified in agentd configuration file.

**-k, --key** key

Specify item key to send value to.

**-o, --value** value

Specify item value.

**-i, --input-file** input-file

Load values from input file. Specify - as **<input-file>** to read values from standard input. Each line of file contains whitespace delimited: **<hostname> <key> <value>**. Each value must be specified on its own line. Each line must contain 3 whitespace delimited entries: **<hostname> <key> <value>**, where "hostname" is the name of monitored host as registered in Zabbix frontend, "key" is target item key and "value" - the value to send. Specify - as **<hostname>** to use hostname from agent configuration file or from **--host** argument.

An example of a line of an input file:

**"Linux DB3" db.connections 43**

The value type must be correctly set in item configuration of Zabbix frontend. Zabbix sender will send up to 250 values in one connection. Contents of the input file must be in the UTF-8 encoding. All values from the input file are sent in a sequential order top-down. Entries must be formatted using the following rules:

- Quoted and non-quoted entries are supported.
- Double-quote is the quoting character.
- Entries with whitespace must be quoted.
- Double-quote and backslash characters inside quoted entry must be escaped with a backslash.
- Escaping is not supported in non-quoted entries.
- Linefeed escape sequences (\n) are supported in quoted strings.
- Linefeed escape sequences are trimmed from the end of an entry.

**-T, --with-timestamps**

This option can be only used with **--input-file** option.

Each line of the input file must contain 4 whitespace delimited entries: **<hostname> <key> <timestamp> <value>**. Timestamp should be specified in Unix timestamp format. If target item has triggers referencing it, all timestamps must be in an increasing order, otherwise event calculation will not be correct.

An example of a line of the input file:

**"Linux DB3" db.connections 1429533600 43**

For more details please see option **--input-file**.

If a timestamped value is sent for a host that is in a "no data" maintenance type then this value will be dropped; however, it is possible to send a timestamped value in for an expired maintenance period and it will be accepted.

**-N, --with-ns**

This option can be only used with **--with-timestamps** option.

Each line of the input file must contain 5 whitespace delimited entries: **<hostname> <key> <timestamp> <ns> <value>**.

An example of a line of the input file:

**"Linux DB3" db.connections 1429533600 7402561 43**

For more details please see option **--input-file**.

**-r, --real-time**

Send values one by one as soon as they are received. This can be used when reading from standard input.

**--tls-connect** value

How to connect to server or proxy. Values:

**unencrypted**

connect without encryption (default)

**psk**

connect using TLS and a pre-shared key

**cert**

connect using TLS and a certificate

**--tls-ca-file** CA-file

Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification.

**--tls-crl-file** CRL-file

Full pathname of a file containing revoked certificates.

**--tls-server-cert-issuer** cert-issuer

Allowed server certificate issuer.

**--tls-server-cert-subject** cert-subject

Allowed server certificate subject.

**--tls-cert-file** cert-file

Full pathname of a file containing the certificate or certificate chain.

**--tls-key-file** key-file

Full pathname of a file containing the private key.

**--tls-psk-identity** PSK-identity

PSK-identity string.

**--tls-psk-file** PSK-file

Full pathname of a file containing the pre-shared key.

**--tls-cipher13** cipher-string

Cipher string for OpenSSL 1.1.1 or newer for TLS 1.3. Override the default ciphersuite selection criteria. This option is not available if OpenSSL version is less than 1.1.1.

**--tls-cipher** cipher-string

GnuTLS priority string (for TLS 1.2 and up) or OpenSSL cipher string (only for TLS 1.2). Override the default ciphersuite selection criteria.

**-v, --verbose**

Verbose mode, **-vv** for more details.

**-h, --help**

Display this help and exit.

## **-V, --version**

Output version information and exit.

## **EXIT STATUS**

The exit status is 0 if the values were sent and all of them were successfully processed by server. If data was sent, but processing of at least one of the values failed, the exit status is 2. If data sending failed, the exit status is 1.

## **EXAMPLES**

**zabbix\_sender -c /etc/zabbix/zabbix\_agentd.conf -k mysql.queries -o 342.45**

Send **342.45** as the value for **mysql.queries** item of monitored host. Use monitored host and Zabbix server defined in agent configuration file.

**zabbix\_sender -c /etc/zabbix/zabbix\_agentd.conf -s "Monitored Host" -k mysql.queries -o 342.45**

Send **342.45** as the value for **mysql.queries** item of **Monitored Host** host using Zabbix server defined in agent configuration file.

**zabbix\_sender -z 192.168.1.113 -i data\_values.txt**

Send values from file **data\_values.txt** to Zabbix server with IP **192.168.1.113**. Host names and keys are defined in the file.

**echo "- hw.serial.number 1287872261 SQ4321ASDF" | zabbix\_sender -c /usr/local/etc/zabbix\_agentd.conf -T -i -**

Send a timestamped value from the commandline to Zabbix server, specified in the agent configuration file. Dash in the input data indicates that hostname also should be used from the same configuration file.

**echo ""Zabbix server" trapper.item "" | zabbix\_sender -z 192.168.1.113 -p 10000 -i -**

Send empty value of an item to the Zabbix server with IP address **192.168.1.113** on port **10000** from the commandline. Empty values must be indicated by empty double quotes.

**zabbix\_sender -z 192.168.1.113 -s "Monitored Host" -k mysql.queries -o 342.45 --tls-connect cert --tls-ca-file /home/zabbix/zabbix\_ca\_file --tls-cert-file /home/zabbix/zabbix\_agentd.crt --tls-key-file /home/zabbix/zabbix\_agentd.key**

Send **342.45** as the value for **mysql.queries** item in **Monitored Host** host to server with IP **192.168.1.113** using TLS with certificate.

**zabbix\_sender -z 192.168.1.113 -s "Monitored Host" -k mysql.queries -o 342.45 --tls-connect psk --tls-psk-identity "PSK ID Zabbix agentd" --tls-psk-file /home/zabbix/zabbix\_agentd.psk**

Send **342.45** as the value for **mysql.queries** item in **Monitored Host** host to server with IP **192.168.1.113** using TLS with pre-shared key (PSK).

## **SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agent2**(8) **zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_js**(1), **zabbix\_proxy**(8), **zabbix\_server**(8)

## **AUTHOR**

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## zabbix\_server

Section: Maintenance Commands (8)

Updated: 2020-09-04

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### NAME

zabbix\_server - Zabbix server daemon

### SYNOPSIS

**zabbix\_server** [-c config-file]

**zabbix\_server** [-c config-file] **-R** runtime-option

**zabbix\_server -h**

**zabbix\_server -V**

### DESCRIPTION

**zabbix\_server** is the core daemon of Zabbix software.

### OPTIONS

**-c, --config** config-file

Use the alternate config-file instead of the default one.

**-f, --foreground**

Run Zabbix server in foreground.

**-R, --runtime-control** runtime-option

Perform administrative functions according to runtime-option.

Runtime control options

#### **config\_cache\_reload**

Reload configuration cache. Ignored if cache is being currently loaded. Default configuration file (unless **-c** option is specified) will be used to find PID file and signal will be sent to process, listed in PID file.



**snmp\_cache\_reload**

Reload SNMP cache.

**housekeeper\_execute**

Execute the housekeeper. Ignored if housekeeper is being currently executed.

**diaginfo**[=section]

Log internal diagnostic information of the specified section. Section can be historycache, preprocessing, alerting, lld, valuecache. By default diagnostic information of all sections is logged.

**log\_level\_increase**[=target]

Increase log level, affects all processes if target is not specified

**log\_level\_decrease**[=target]

Decrease log level, affects all processes if target is not specified

Log level control targets

process-type

All processes of specified type (alerter, alert manager, configuration syncer, discoverer, escalator, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, lld manager, lld worker, poller, preprocessing manager, preprocessing worker, proxy poller, self-monitoring, snmp trapper, task manager, timer, trapper, unreachable poller, vmware collector)

process-type,N

Process type and number (e.g., poller,3)

pid

Process identifier, up to 65535. For larger values specify target as "process-type,N"

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

**FILES**

/usr/local/etc/zabbix\_server.conf

Default location of Zabbix server configuration file (if not modified during compile time).

**SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_js**(1), **zabbix\_agent2**(8)

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