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Assignment Title – Zabbix Installation & Configuration

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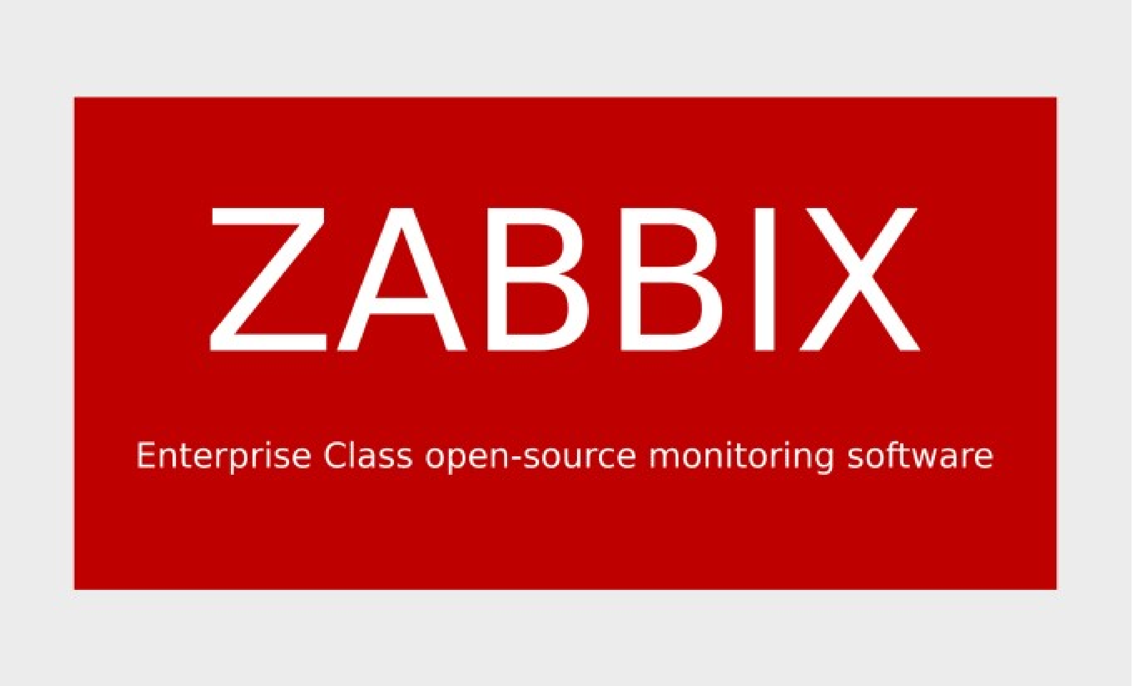
How to Install and Configure Zabbix to Securely Monitor Remote Servers on Ubuntu 16.04



Zabbix Overview:

Zabbix is an open-source monitoring software that provides real-time monitoring for networks and applications. It collects data from servers, virtual machines, and network devices, helping to assess IT infrastructure health and identify issues proactively. Data is stored in a database for historical analysis. Zabbix employs a client-server architecture, with a lightweight agent on monitored clients. Version 3 offers encrypted communication for data security. The server stores data in MySQL, PostgreSQL, or Oracle databases and provides a web interface for configuration. In this tutorial, we configure a server and a client for monitoring, using MySQL for data storage and Apache for the web interface.

Prerequisites:

To follow this tutorial, I will need:

- Two Ubuntu 16.04 servers, each configured with a sudo non-root user. I can set these up by following this initial Ubuntu server setup article.
- The server that will run the Zabbix server needs Apache, MySQL, and PHP installed. Follow this guide to configure those on one of servers.

Step 1 — Installing the Zabbix Server:

First, we need to install the Zabbix Server on the server where we installled MySQL, Apache, and PHP. We'll refer to this machine as the "Zabbix server" in this tutorial. Log into this machine as non-root user:

```
ssh sammy@your_zabbix_server_ip_address
```

Before we install Zabbix, we need to install a few PHP modules that Zabbix needs. First, update system's list of available packages:

```
sudo apt-get update
```

Then install the PHP modules Zabbix needs:

```
sudo apt-get install php7.0-xml php7.0-bcmath php7.0-mbstring
```

Now we can install Zabbix.

Zabbix is available in Ubuntu's package manager, but it's outdated, so we'll use the official Zabbix repository to install the latest stable version. Download and install the repository configuration package:

```
wget http://repo.zabbix.com/zabbix/3.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_3.2-1+xenial_all.deb
sudo dpkg -i zabbix-release_3.2-1+xenial_all.deb
```

let's see the following output:

```
Output
```

```
Selecting previously unselected package zabbix-release.
(Reading database ... 55276 files and directories currently installed.)
Preparing to unpack zabbix-release_3.2-1+xenial_all.deb ...
Unpacking zabbix-release (3.2-1+xenial) ...
Setting up zabbix-release (3.2-1+xenial) ...
```

Update the package index so the new repository is included:

```
sudo apt-get update
```

Then install the Zabbix server and web frontend with MySQL database support:

```
sudo apt-get install zabbix-server-mysql zabbix-frontend-php
```

Let’s also install the Zabbix agent, which will let us collect data about the Zabbix server status itself.

```
sudo apt-get install zabbix-agent
```

Before we can use Zabbix, we have to set up a database to hold the data that the Zabbix server will collect from its agents.

Step 2 — Configuring the MySQL Database For Zabbix:

We need to create a new MySQL database and populate it with some basic information in order to make it suitable for Zabbix. We’ll also create a specific user for this database so Zabbix isn’t logging into MySQL with the root account.

Log into MySQL as the root user using the root password that you set up during the MySQL server installation:

```
mysql -uroot -p
```

Create the Zabbix database with UTF-8 character support:

```
mysql&gt; create database zabbix character set utf8 collate utf8_bin;
```

Then create a user that the Zabbix server will use, give it access to the new database, and set the password for the user:

```
mysql&gt; grant all privileges on zabbix.* to zabbix@localhost identified by 'your_password';
```

Then apply these new permissions:

```
mysql&gt; flush privileges;
```

That takes care of the user and the database. Exit out of the database console.

```
mysql&gt; quit;
```

Next we have to import the initial schema and data. The Zabbix installation provided us with a file that sets this up for us.

Run the following command to set up the schema and import the data into the zabbix database. We’ll use zcat since the data in the file is compressed.

```
zcat /usr/share/doc/zabbix-server-mysql/create.sql.gz | mysql -uzabbix -p zabbix
```

Enter the password for the **zabbix** MySQL user that you configured when prompted.

This command will not output any errors if it was successful. If you see the error ERROR 1045 (28000): Access denied for user 'zabbix'@'localhost' (using password: YES) then make sure you used the password for the zabbix user and not the root user.

In order for the Zabbix server to use this database, you need to set the database password in the Zabbix server configuration file. Open the configuration file in your editor:

```
sudo nano /etc/zabbix/zabbix_server.conf
```

Look for the following section of the file:

/etc/zabbix/zabbix_server.conf

```
### Option: DBPassword
#       Database password. Ignored for SQLite.
#       Comment this line if no password is used.
#
# Mandatory: no
# Default:
# DBPassword=
```

These comments in the file explain how to connect to the database. We need to set the DBPassword value in the file to the password for our database user. Add this line below those comments to configure the database:

/etc/zabbix/zabbix_server.conf

```
DBPassword=your_zabbix_mysql_password
```

That takes care of the Zabbix server configuration, but we have to make some modifications to our PHP setup in order for the Zabbix web interface to work properly.

Step 3 — Configuring PHP For Zabbix:

The Zabbix web interface is written in PHP and requires some special PHP server settings. The Zabbix installation process created an Apache configuration file that contains these settings. It is located in the directory /etc/zabbix and is loaded automatically by Apache. We need to make a small change to this file, so open it up.

```
sudo nano /etc/zabbix/apache.conf
```

The file contains PHP settings that meet the necessary requirements for the Zabbix web interface. The only change you need to make is to set the appropriate timezone, which is commented out by default.

/etc/zabbix/apache.conf

```
...
<IfModule mod_php7.c>
   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 always_populate_raw_post_data -1
   # php_value date.timezone Europe/Riga
</IfModule>
```

Uncomment the timezone line, highlighted above, and change it to your time zone. You can use this list of supported time zones to find the right one for you. Then save and close the file.

Now restart Apache to apply these new settings.

```
sudo systemctl restart apache2
```

You can now start the Zabbix server.

```
sudo systemctl start zabbix-server
```

Then check whether the Zabbix server is running properly:

```
sudo systemctl status zabbix-server
```

You will see the following status:

```
Output
● zabbix-server.service - Zabbix Server
  Loaded: loaded (/lib/systemd/system/zabbix-server.service; disabled; vendor preset:
enabled)
  Active: :active (running) since Thu 2017-06-08 06:40:43 UTC; 6s ago
 Process: 15201 ExecStart=/usr/sbin/zabbix_server -c $CONFFILE (code=exited,
status=0/SUCCESS)
 ...
```

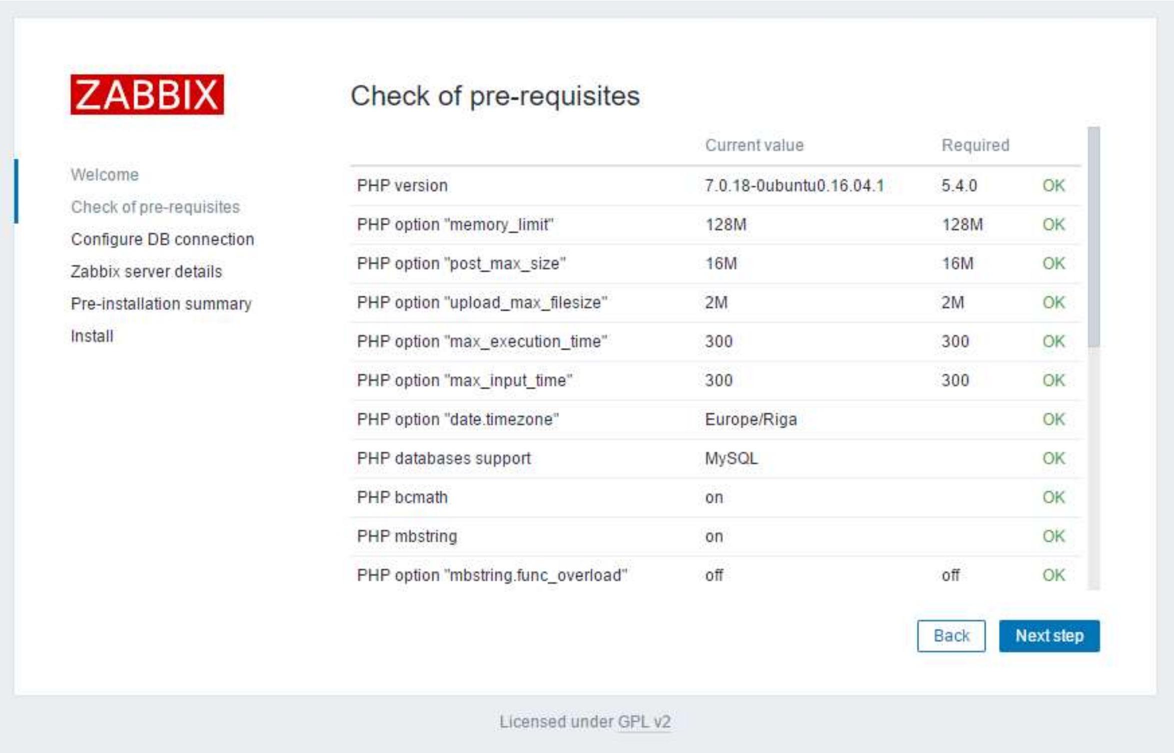
Finally, enable the server to start at boot time:

```
sudo systemctl enable zabbix-server
```

The server is set up and connected to the database. Now let's set up the web frontend.

Step 4 — Configuring Settings for the Zabbix Web Interface:

The web interface lets us see reports and add hosts that we want to monitor, but it needs some initial setup before we can use it. Launch your browser and go to the address http://your_zabbix_server_ip_address/zabbix/. On the first screen, you will see a welcome message. Click **Next step** to continue.



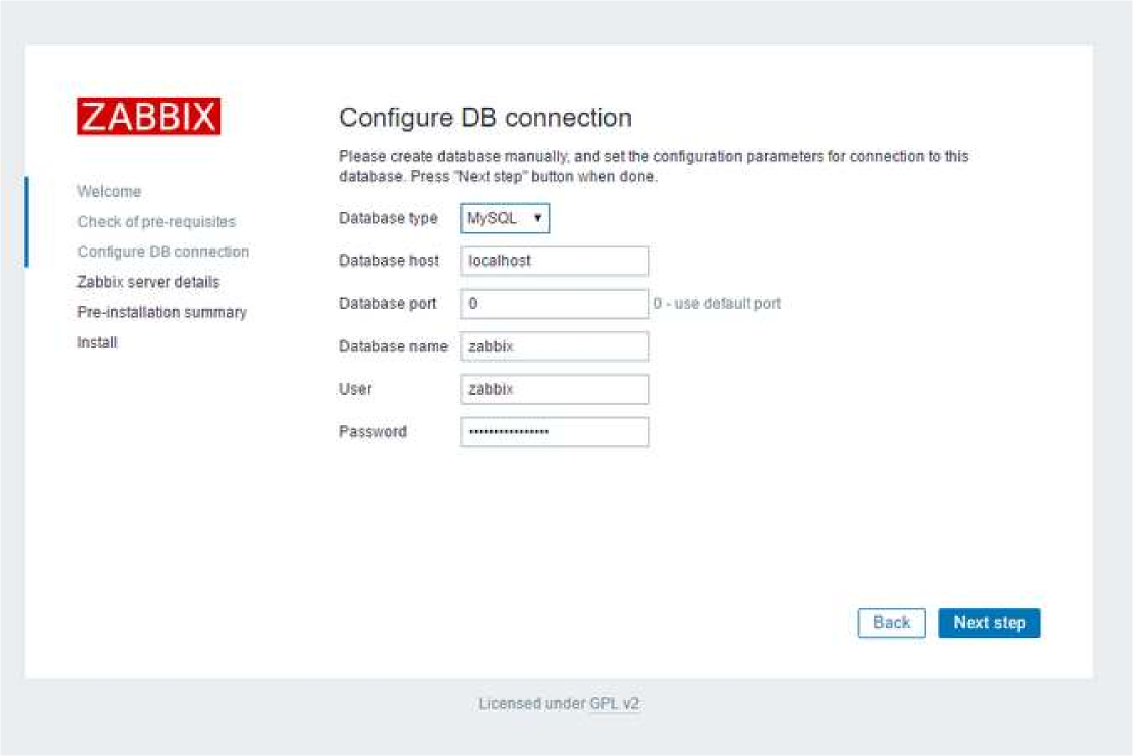
Check of pre-requisites

	Current value	Required	
PHP version	7.0.18-0ubuntu0.16.04.1	5.4.0	OK
PHP option "memory_limit"	128M	128M	OK
PHP option "post_max_size"	16M	16M	OK
PHP option "upload_max_filesize"	2M	2M	OK
PHP option "max_execution_time"	300	300	OK
PHP option "max_input_time"	300	300	OK
PHP option "date.timezone"	Europe/Riga		OK
PHP databases support	MySQL		OK
PHP bcmath	on		OK
PHP mbstring	on		OK
PHP option "mbstring.func_overload"	off	off	OK

On the next screen, you will see the table that lists all of the prerequisites to run Zabbix.

All of the values in this table must be **OK**, so verify that they are. Be sure to scroll down and look at all of the prerequisites. Once you've verified that everything is ready to go, click **Next step** to proceed.

The next screen asks for database connection information.



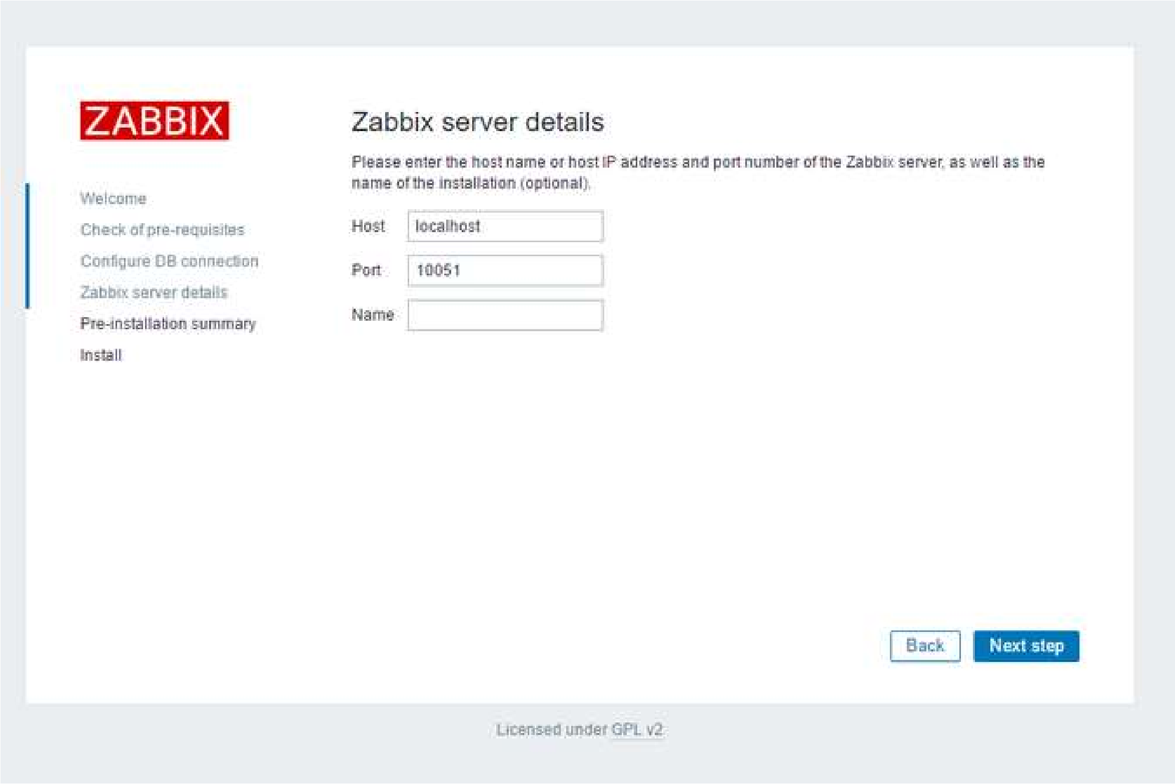
Configure DB connection

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	localhost
Database port	0 — 0 - use default port
Database name	zabbix
User	zabbix
Password	•••••••••••••••••

We told the Zabbix server about our database, but the Zabbix web interface also needs access to the database to manage hosts and read data. Therefore enter the MySQL credentials you configured in Step 2 and click **Next step** to proceed.

On the next screen, you can leave the options at their default values.



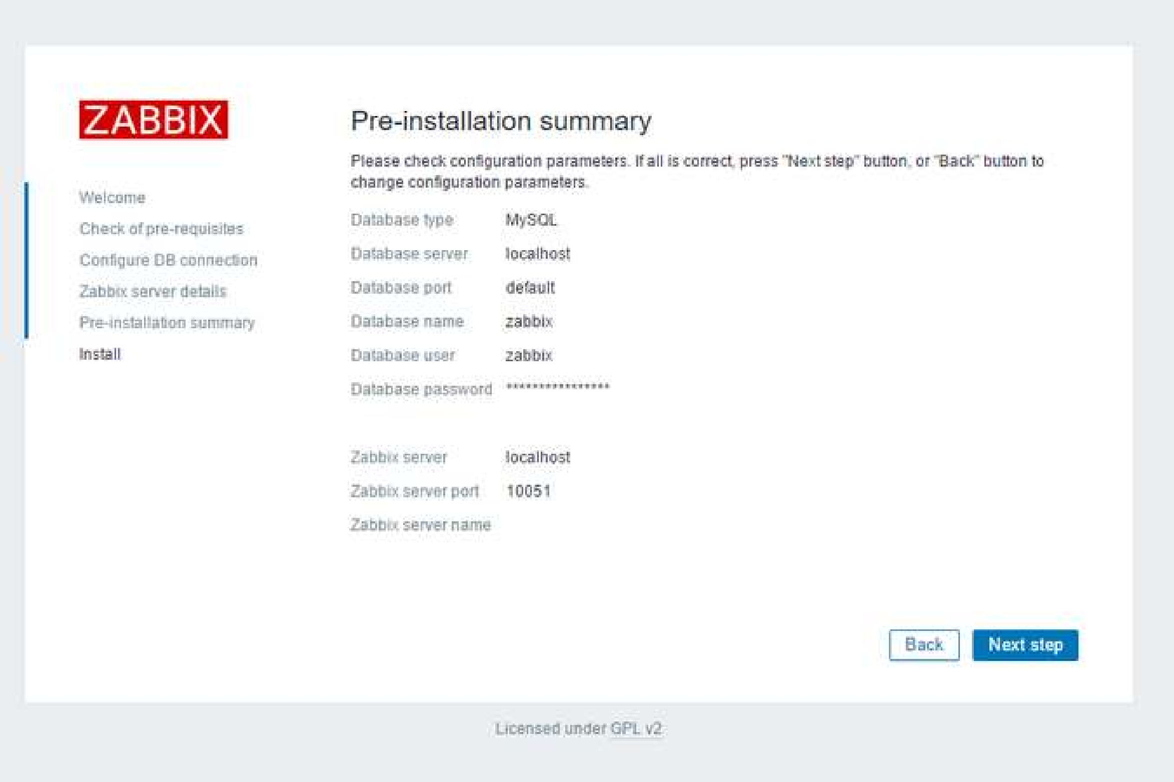
Zabbix server details

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	localhost
Port	10051
Name	

The **Name** is optional; it is used in the web interface to distinguish one server from another in case you have several monitoring servers. Click **Next step** to proceed.

The next screen will show the pre-installation summary so you can confirm everything is correct.



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	****************
Zabbix server	localhost
Zabbix server port	10051
Zabbix server name	

Click **Next step** to proceed to the final screen.

The web interface setup is complete! This process creates the configuration file /usr/share/zabbix/conf/zabbix.conf.php which you could back up and use in the future.

Click **Finish** to proceed to the login screen. The default user is **Admin** and the password is **zabbix**.

Before we log in, let’s set up the Zabbix agent on our other server.

Step 5 — Installing and Configuring the Zabbix Agent:

Now we need to configure the agent software that will send monitoring data to the Zabbix server.

Log in to the second server, which we’ll call the “monitored server”.

```
ssh sammy@your_monitored_server_ip_address
```

Then, just like on the Zabbix server, run the following commands to install the repository configuration package:

```
wget http://repo.zabbix.com/zabbix/3.2/ubuntu/pool/main/z/zabbix-release/zabbix-release_3.2-1+xenial_all.deb
```

```
sudo dpkg -i zabbix-release_3.2-1+xenial_all.deb
```

Next, update the package index:

```
sudo apt-get update
```

Then install the Zabbix agent:

```
sudo apt-get install zabbix-agent
```

While Zabbix supports certificate-based encryption, setting up a certificate authority is beyond the scope of this tutorial, but we can use pre-shared keys (PSK) to secure the connection between the server and agent.

So first, generate a PSK:

```
sudo sh -c "openssl rand -hex 32 > /etc/zabbix/zabbix_agentd.psk"
```

Show the key so you can copy it somewhere. You will need it to configure the host.

```
cat /etc/zabbix/zabbix_agentd.psk
```

The key will look something like this:

```
Output
cd12686e166a80aa09a227ae5f97834eaa3d5ae686d2ae39590f17ef85dd6de5
```

Now edit the Zabbix agent settings to set up its secure connection to the Zabbix server.

Open the agent configuration file in your text editor:

```
sudo nano /etc/zabbix/zabbix_agentd.conf
```

Each setting within this file is documented via informative comments throughout the file, but you only need to edit some of them.

First you have to edit the IP address of the Zabbix server. Find the following section:

/etc/zabbix/zabbix_agentd.conf

```
### Option: Server
#	List of comma delimited IP addresses (or hostnames) of Zabbix servers.
#	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.
#
# Mandatory: no
# Default:
# Server=

Server=127.0.0.1
```

Change the default value to the IP of your Zabbix server:

/etc/zabbix/zabbix_agentd.conf

```
Server=your_zabbix_server_ip_address
```

Next, find the section that configures the secure connection to the Zabbix server and enable pre-shared key support. Find the TSLConnect section, which looks like this:

/etc/zabbix/zabbix_agentd.conf

```
### Option: TLSConnect
#       How the agent should connect to server or proxy. Used for active checks.
#       Only one value can be specified:
#               unencrypted - connect without encryption
#               psk         - connect using TLS and a pre-shared key
#               cert        - connect using TLS and a certificate
#
# Mandatory: yes, if TLS certificate or PSK parameters are defined (even for 'unencrypted' connection)
# Default:
# TLSConnect=unencrypted
```

Then add this line to configure pre-shared key support:

/etc/zabbix/zabbix_agentd.conf

```
TLSConnect=psk
```

Next, locate the TLSAccept section, which looks like this:

/etc/zabbix/zabbix_agentd.conf

```
### Option: TLSAccept
#       What incoming connections to accept.
#       Multiple values can be specified, separated by comma:
#               unencrypted - accept connections without encryption
#               psk         - accept connections secured with TLS and a pre-shared key
#               cert        - accept connections secured with TLS and a certificate
#
# Mandatory: yes, if TLS certificate or PSK parameters are defined (even for 'unencrypted' connection)
# Default:
# TLSAccept=unencrypted
```

Configure incoming connections to support pre-shared keys by adding this line:

/etc/zabbix/zabbix_agentd.conf

```
TLSAccept=psk
```

Next, find the TLSPSKIdentity section, which looks like this:

/etc/zabbix/zabbix_agentd.conf

```
### Option: TLSPSKIdentity
#       Unique, case sensitive string used to identify the pre-shared key.
#
# Mandatory: no
# Default:
# TLSPSKIdentity=
```

Choose a unique name to identify your pre-shared key by adding this line:

/etc/zabbix/zabbix_agentd.conf

```
TLSPSKIdentity=PSK 001
```

You'll use this as the **PSK ID** when you add your host through the Zabbix web interface.

Then set the option which points to your previously created pre-shared key. Locate the TLSPSKFile option:

/etc/zabbix/zabbix_agentd.conf

```
### Option: TLSPSKFile
#       Full pathname of a file containing the pre-shared key.
#
# Mandatory: no
# Default:
# TLSPSKFile=
```

Add this line to point the Zabbix agent to your PSK file you created:

/etc/zabbix/zabbix_agentd.conf

```
TLSPSKFile=/etc/zabbix/zabbix_agentd.psk
```

Save and close the file. Now you can start the Zabbix agent and set it to start at boot time:

```
sudo systemctl start zabbix-agent
sudo systemctl enable zabbix-agent
```

For good measure, check that the Zabbix agent is running properly:

```
sudo systemctl status zabbix-agent
```

You will see the following status, indicating the agent is running:

```
Output
● zabbix-agent.service - Zabbix Agent
```

```
  Loaded: loaded (/lib/systemd/system/zabbix-agent.service; disabled; vendor preset:
enabled)
  Active: active (running) since Thu 2017-06-08 08:33:52 UTC; 4s ago
 Process: 18185 ExecStart=/usr/sbin/zabbix_agentd -c $CONFFILE (code=exited,
status=0/SUCCESS)
 ...
```

Our agent is now ready to send data to the Zabbix server. But in order to use it, we have to link to it from the server's web console.

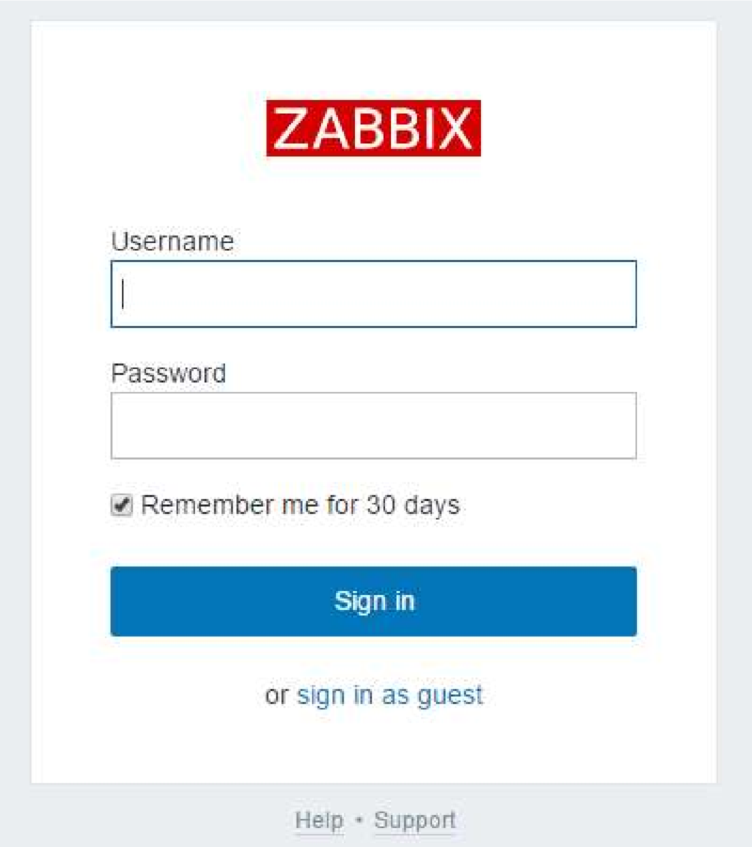
Note: If you are using UFW, configure it to allow connections to port 10050:

```
sudo ufw allow 10050/tcp
```

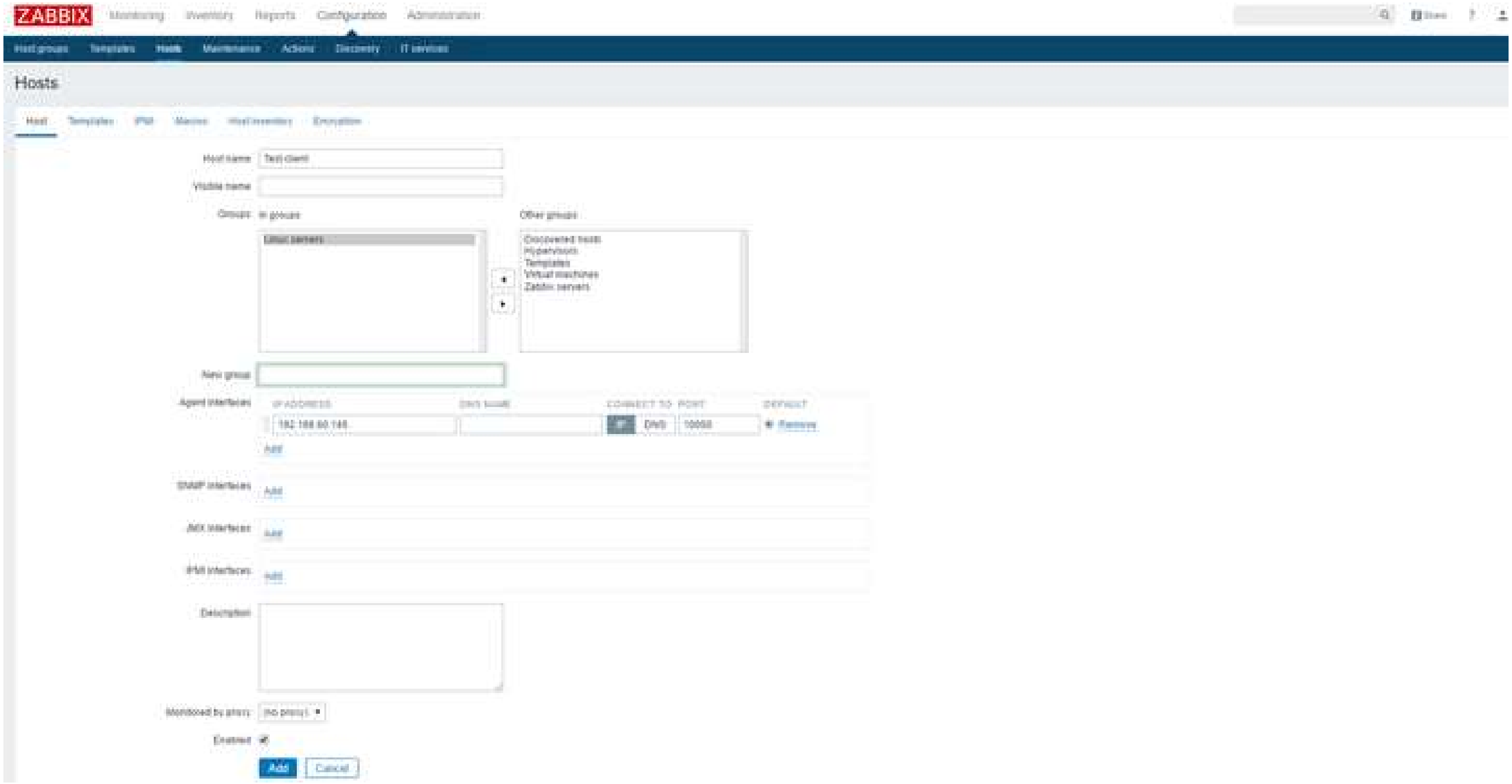
Step 6 — Adding the New Host to Zabbix Server:

Installing an agent on a server we want to monitor is only half of the process. Each host we want to monitor needs to be registered on the Zabbix server, which we can do through the web interface.

Log in to the Zabbix Server web interface by navigating to the address http://your_zabbix_server_ip_address/zabbix/.



When you have logged in, click on the **Configuration**, and then **Hosts** in the top navigation bar. Then click **Create host** button in the top right corner of the screen. This will open the host configuration page.



Host name: Test client

Visible name:

Groups: In groups: Linux servers — Other groups: Discovered hosts, Hypervisors, Templates, Virtual machines, Zabbix servers

New group:

Agent interfaces: IP ADDRESS 192.168.60.145 — DNS NAME — CONNECT TO IP — PORT 10050 — DEFAULT ● Remove

SNMP interfaces: Add

JMX interfaces: Add

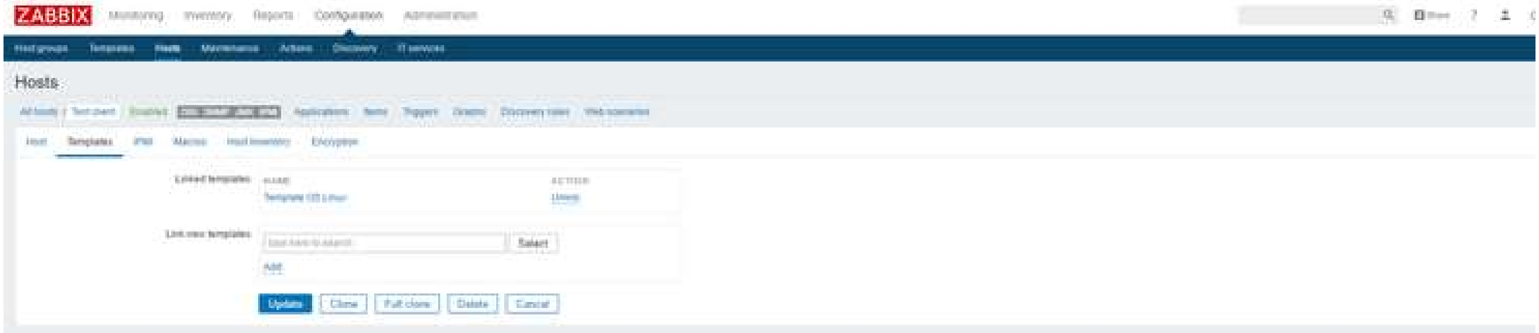
IPMI interfaces: Add

Description:

Monitored by proxy: (no proxy)

Enabled: ☑

Adjust the **Host name** and **IP ADDRESS** to reflect the host name and IP address of your client machine. Then add the host to a group by selecting one of the groups from the list, or by creating your own group. The host can be in multiple groups. The **Linux Servers** group is a good default choice. Once you've added the group, click the **Templates** tab.

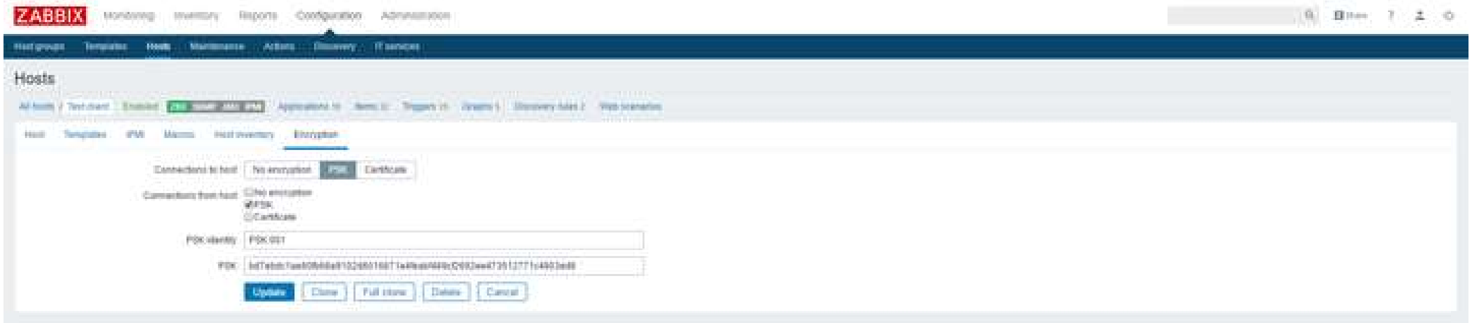


Linked templates: NAME Template OS Linux — ACTION Unlink

Link new templates: type here to search

Type Template OS Linux in the **Search** field and then click **Add** to add this template to the host.

Next, navigate to **Encryption** tab. Select **PSK** for both **Connections to host** and **Connections from host**. Then set **PSK identity** to PSK 001, which is the value of the **TLSPSKIdentity** setting of the Zabbix agent we configured previously. Then set **PSK** value to the key you generated for the Zabbix agent. It's the one stored in the file /etc/zabbix/zabbix_agentd.psk on the agent machine.



Connections to host: No encryption [✓ PSK] Certificate

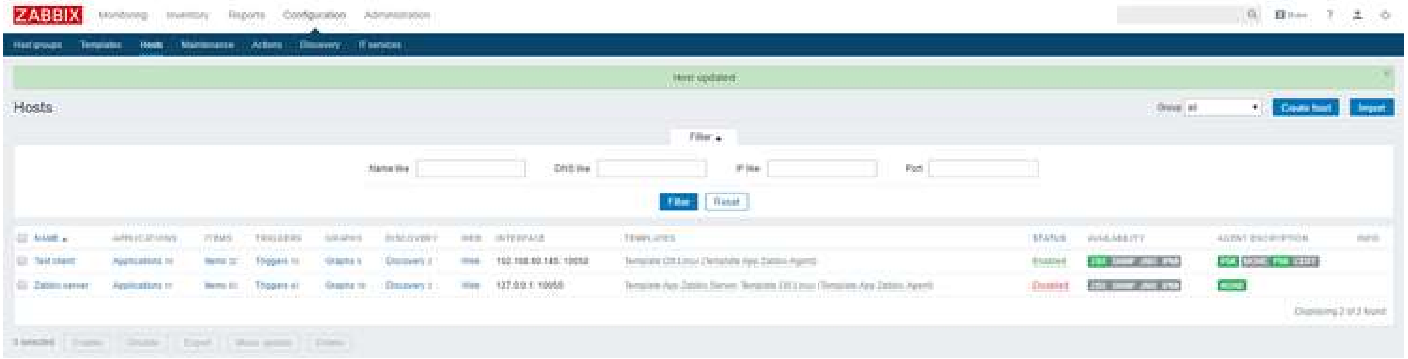
Connections from host: ☐ No encryption ☑ PSK ☐ Certificate

PSK identity: PSK 001

PSK: [illegible]

Finally, click the **Add** button at the bottom of the form to create the host.

You will see your new host with green labels indicating that everything is working fine and the connection is encrypted.

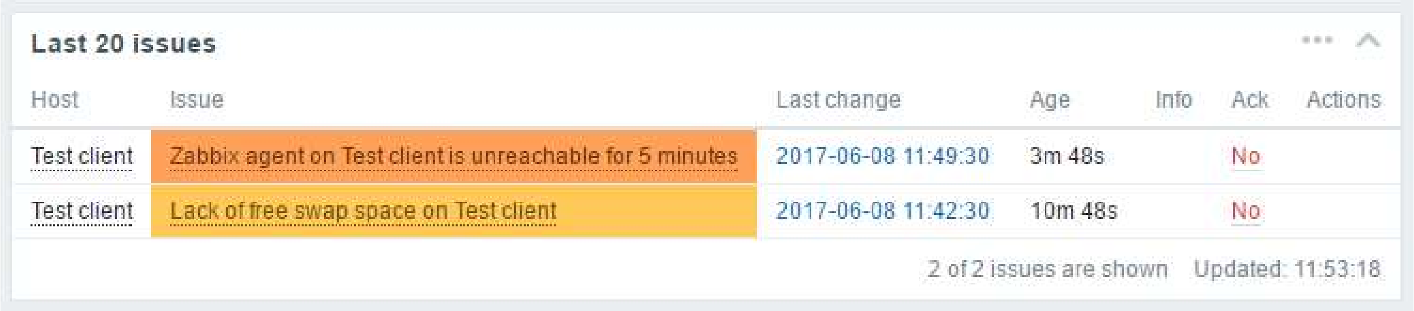


Host updated

NAME ▲	APPLICATIONS	ITEMS	TRIGGERS	GRAPHS	DISCOVERY	WEB	INTERFACE	TEMPLATES	STATUS	AVAILABILITY	AGENT ENCRYPTION	INFO
Test client	Applications 10	Items 32	Triggers 15	Graphs 5	Discovery 2	Web	192.168.60.145: 10050	Template OS Linux (Template App Zabbix Agent)	Enabled	ZBX SNMP JMX IPMI	PSK NONE PSK CERT	
Zabbix server	Applications 11	Items 83	Triggers 43	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent)	Disabled	ZBX SNMP JMX IPMI	NONE	

After several seconds you can navigate to **Monitoring** and then **Latest data** to see the data from your agent.

To ensure things are working, shut down your monitored server so you can see how Zabbix alerts you to problems. Once your monitored server is offline you will see the warning on the main dashboard:


Last 20 issues

Host	Issue	Last change	Age	Info	Ack	Actions
Test client	Zabbix agent on Test client is unreachable for 5 minutes	2017-06-08 11:49:30	3m 48s		No	
Test client	Lack of free swap space on Test client	2017-06-08 11:42:30	10m 48s		No	

2 of 2 issues are shown Updated: 11:53:18

If you have additional servers you need to monitor, log in to each host, install the Zabbix agent, generate a PSK, configure the agent, and add the host to the web interface following the same steps you followed to add your first host.

Conclusion:

In this tutorial, I’ve learned how to set up a simple and secure monitoring solution which will help me to monitor the state of servers. It can now warn me of problems, and I have the opportunity to plot some graphs based on the obtained data so you can analyze it and plan accordingly.