Zabbix

Open-source Monitoring Tool

Documented by

4HPC

[Group-4]

Group Members

- Han Min Myat
- Khant Hmuu
- Yeon Myat Eain
- Ye Htet Mg Mg

Table of Contents

1.Zabbix Introduction

1.1 What is Zabbix?

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.

Zabbix is free of cost. Zabbix ,distributed under the GPL General Public License version 2.

1.2 History

Zabbix started as an internal software project in 1998. After three years, in 2001, it was released to the public under GPL and currently is actively developed and supported by Zabbix SIA.

- Initial release : April 2001; 18 years ago
- Written in : C (server, proxy, agent), PHP (frontend), Java (Java gateway)
- Operating System : Cross-platform
- License : under GPLv2

1.3 Main Components

If you start to use Zabbix , you will definitely need to know about Zabbix's main components :

1.Server

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.

2.Agent

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 can perform passive and active checks.

3.Proxy

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.

4.Java Gateway

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.

5.Sender

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.

6.Get

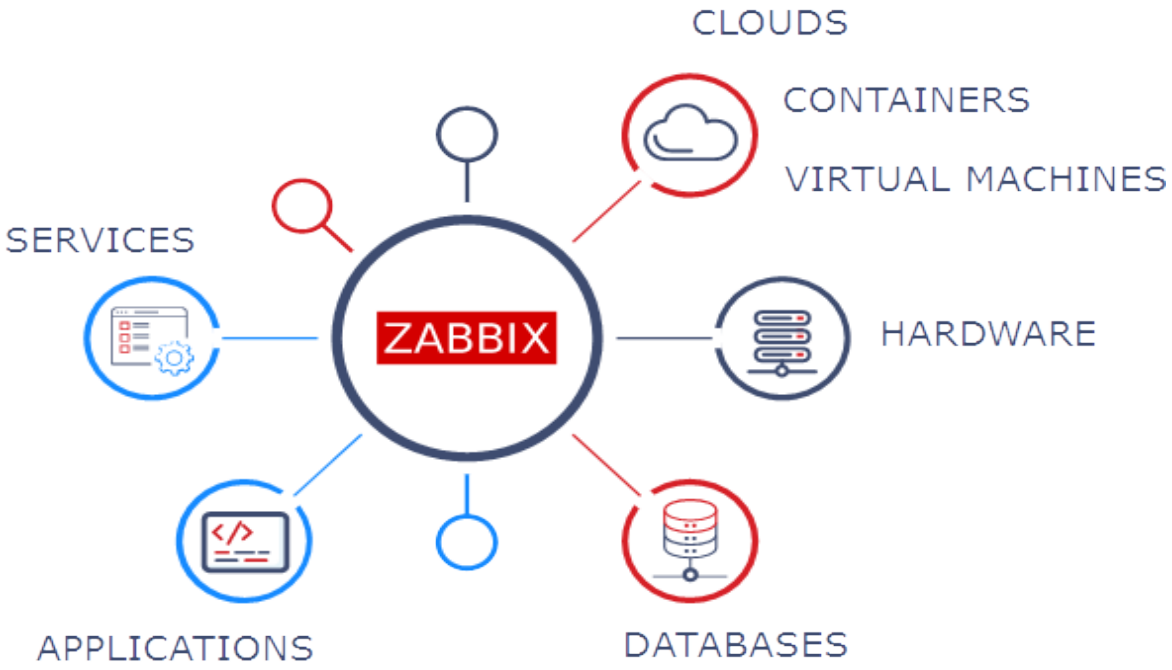
Zabbix get is a command line utility which can be used to communicate with Zabbix agent and retrieve required information from the agent.The utility is usually used for the troubleshooting of Zabbix agents.

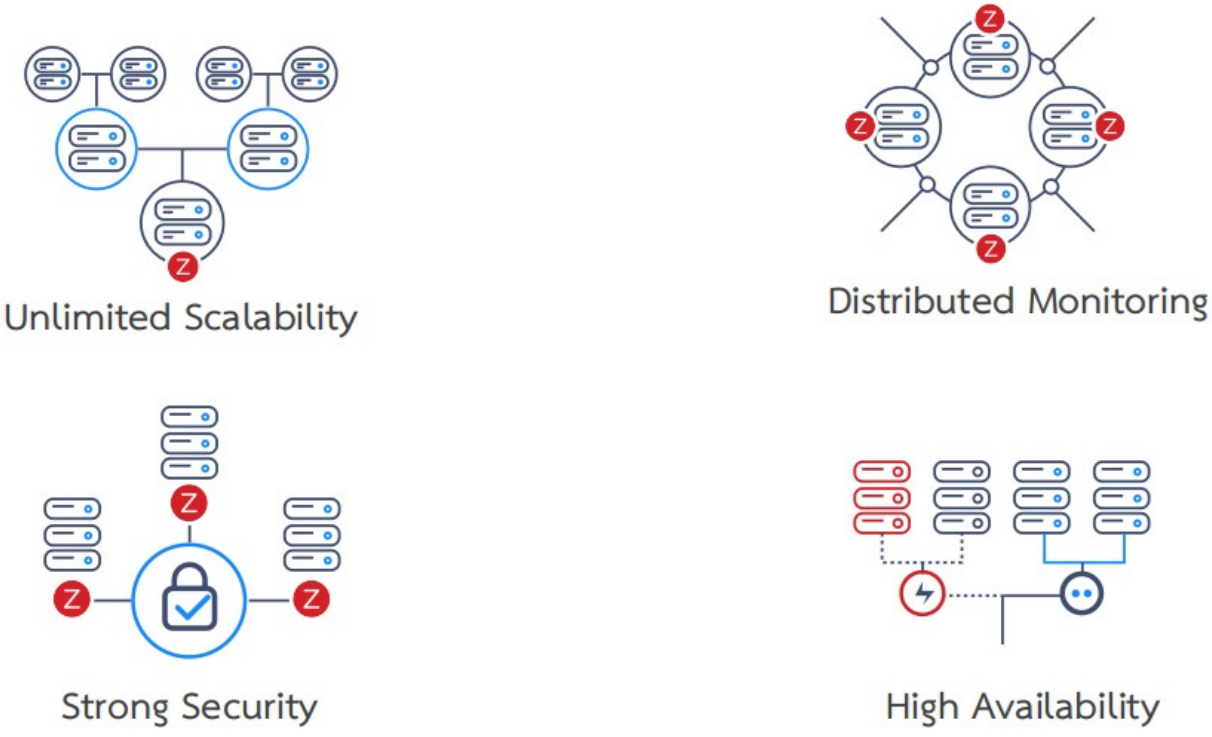
7.JS

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.

1.4 Monitoring

Zabbix can monitor anything.It is the solutions for any kind of IT infrastructure, services, applications, cloud resources.Zabbix is the ultimate enterprise-level software designed for real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices.Zabbix can monitor Fault and performance only except Configuration , accounting , and Security.It also provides monitoring metrics, such as network utilization, CPU load and disk space consumption.It can be deployed for agent-based and agentless monitoring.Zabbix can monitor both Linux and Windows environments.





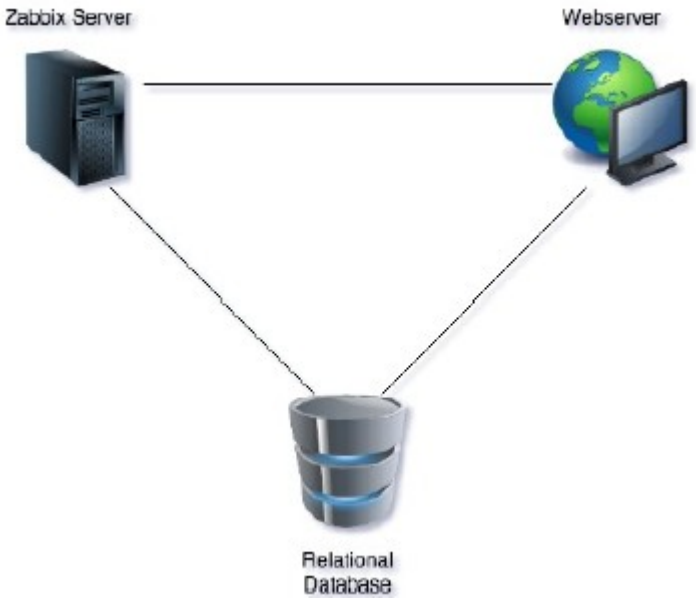
Zabbix's support for Enterprise Monitoring

1.5 Zabbix Features and Architecture

.

Features that Zabbix provides :

- A centralized, easy to use web interface
- A server that runs on most UNIX-like operating systems, including Linux,
- AIX, FreeBSD, OpenBSD, and Solaris
- Native agents for most UNIX-like operating systems and Microsoft Windows versions
- The ability to directly monitor SNMP (SNMPv1, SNMPv2c, and SNMPv3) and IPMI devices
- The ability to directly monitor Java applications using JMX
- The ability to directly monitor vCenter or vSphere instances using the VMware API
- Built-in graphing and other visualization capabilities
- Notifications that allow easy integration with other systems
- Flexible configuration, including templating
- Low-Level Discovery (LLD) and the ability to generate items, graphs, and triggers (among others) in an automated way
- A lot of other features that allow you to implement a sophisticated monitoring solution



Zabbix's Architecture

2. Zabbix Installation

2.1.Configuring step-by-step

Prerequisites

- ❖ Apache web server
- ❖ PHP with required extensions
- ❖ MySQL/ MariaDB server
- ❖ Installing Zabbix on CentOS

Step 1 – Disable SELinux

Open SELinux configuration and edit the file:

```
- vim /etc/sysconfig/selinux
```

Change “SELINUX=enforcing” to “SELINUX=disabled”
Save and exit the file. Then reboot the system.

```
: reboot
```

Step 2 – Install and Configure Apache

Use the following commands:

```
- yum -y install httpd
```

Check service status.

```
- systemctl status httpd.service
```

If Apache service is not running, start it manually

```
systemctl start httpd.service
```

Enable httpd service on system boot.

```
- systemctl enable httpd
```

Step 3 – Configure Needed Repositories

Install epel and remi repos.

```
  - yum -y install epel-release
```

```
  - yum install http://rpms.remirepo.net/enterprise/remi-release-7.rpm
```

Disable PHP 5 repositories and enable PHP 7.2 repo.

```
  - yum-config-manager --disable remi-php54

  - yum-config-manager --enable remi-php72
```

Step 4 – Install PHP

```
- yum install php php-pear php-cgi php-common php-mbstring php-snmp php-gd php-pecl-mysql php-xml php-mysql php-gettext php-bcmath
```

Modify the PHP time Zone by editing the php.ini file.

```
- vim /etc/php.ini
```

Uncomment the following line and add your time zone.

```
date.timezone = Asia/Yangon
```

Step 5 – Install MariaDB

```
yum install mariadb-server
```

Start the MariaDB service.

```
systemctl start mariadb.service
```

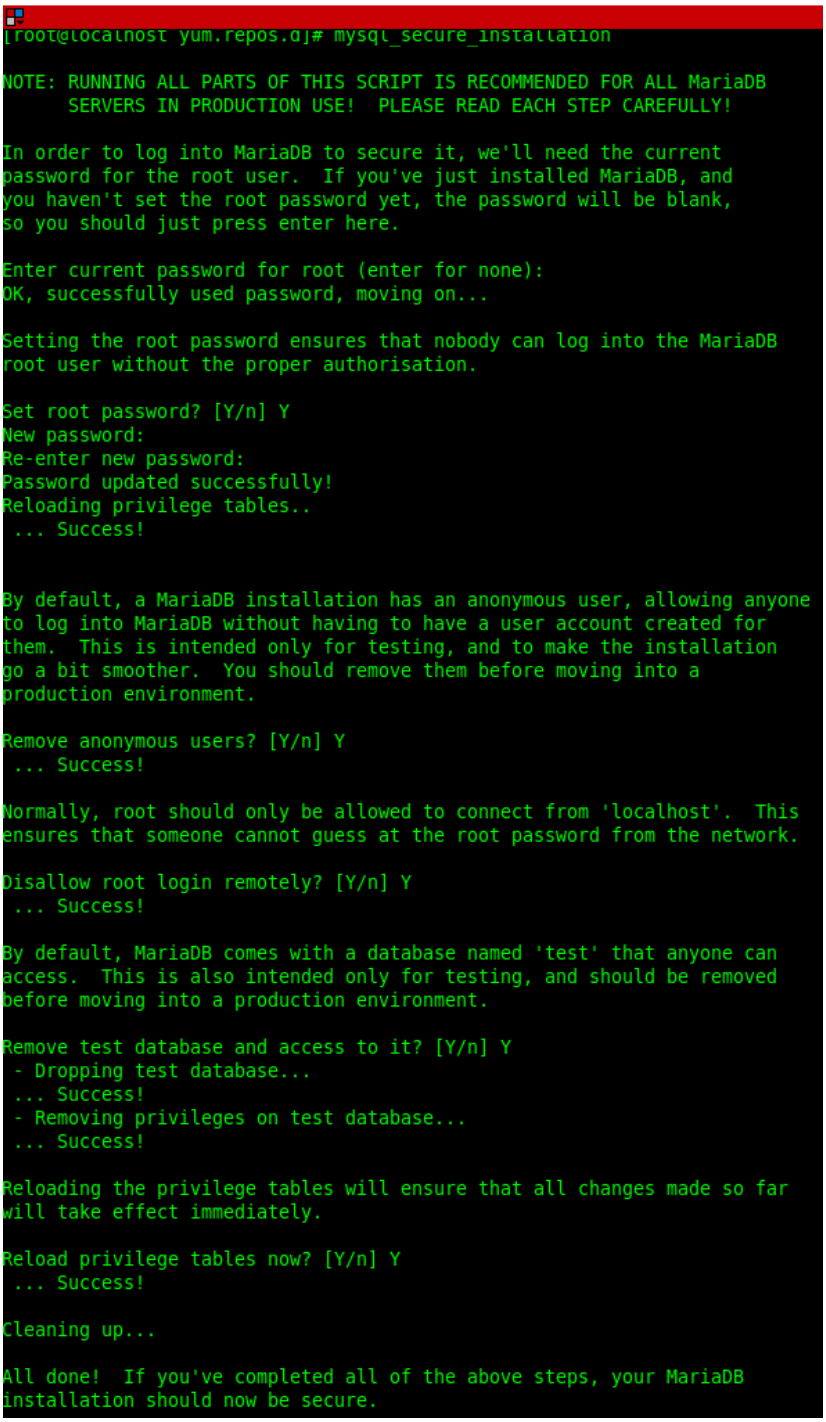
Enable MariaDB on system boot.

```
systemctl enable mariadb
```

Run the following command to secure MariaDB.

```
mysql_secure_installation
```

Add a new root password and continue. Then it will ask a few questions. Type “Y” to agree to that.



MariaDB Secure Installation

Login to DB server and verify.

```
mysql -u root -p
```

Step 6 – Create a Database for Zabbix

You can choose any name for the database in place of *zabbix* in the below command:

```
Create database zabbix;
```

Create a DB user and grant privileges.

```
create user 'zabbixuser'@'localhost' identified BY 'g4zabbix';

grant all privileges on zabbix.* to zabbixuser@localhost ;
```

Flush privileges.

```
flush privileges;
```

Step 7 – Install Zabbix and needed dependencies

Adding Zabbix repository. Copy the latest download URL from the official website. Paste it in the below command appropriately.

```
rpm -ivh https://repo.zabbix.com/zabbix/4.0/rhel/7/x86_64/zabbix-release-4.0-1.el7.noarch.rpm
```

Install Zabbix.

```
yum install zabbix-server-mysql  zabbix-web-mysql zabbix-agent zabbix-get
```

Step 8 – Configure Zabbix

Change Time Zone by editing the Zabbix Apache configuration file.

```
vim /etc/httpd/conf.d/zabbix.conf
```

Uncomment the following line and add your Time Zone.

```
php_value date.timezone Asia/Yangon
```

PHP Parameters should look like as follows:

```
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 Asia/Yangon
```

Restart HTTPD service.

```
systemctl restart httpd.service
```

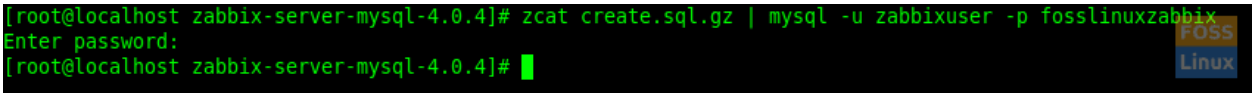
Generally, Zabbix installation package gives SQL file which includes an initial schema and data for the Zabbix server with MySQL.

Change directory and go the Zabbix directory.

```
cd /usr/share/doc/zabbix-server-mysql-4.0.4/
```

Import the MySQL dump file.

```
zcat create.sql.gz | mysql -u zabbixuser -p Zabbix
```



Import SQL Dump

Now modify the Zabbix configuration file with Database details.

```
vim /etc/zabbix/zabbix_server.conf
```

Modify the following parameters

```
DBHost=localhost

DBName=zabbix

DBUser=zabbixuser

DBPassword=g4zabbix
```

Then save and exit the file. Restart Zabbix service.

```
systemctl status zabbix-server.service
```

Enable Zabbix on system boot.

```
 systemctl enable zabbix-server.service
```

Modify firewall rules.

```
firewall-cmd --add-service={http,https} --permanent
```

```
firewall-cmd --add-port={10051/tcp,10050/tcp} --permanent

firewall-cmd --reload
```

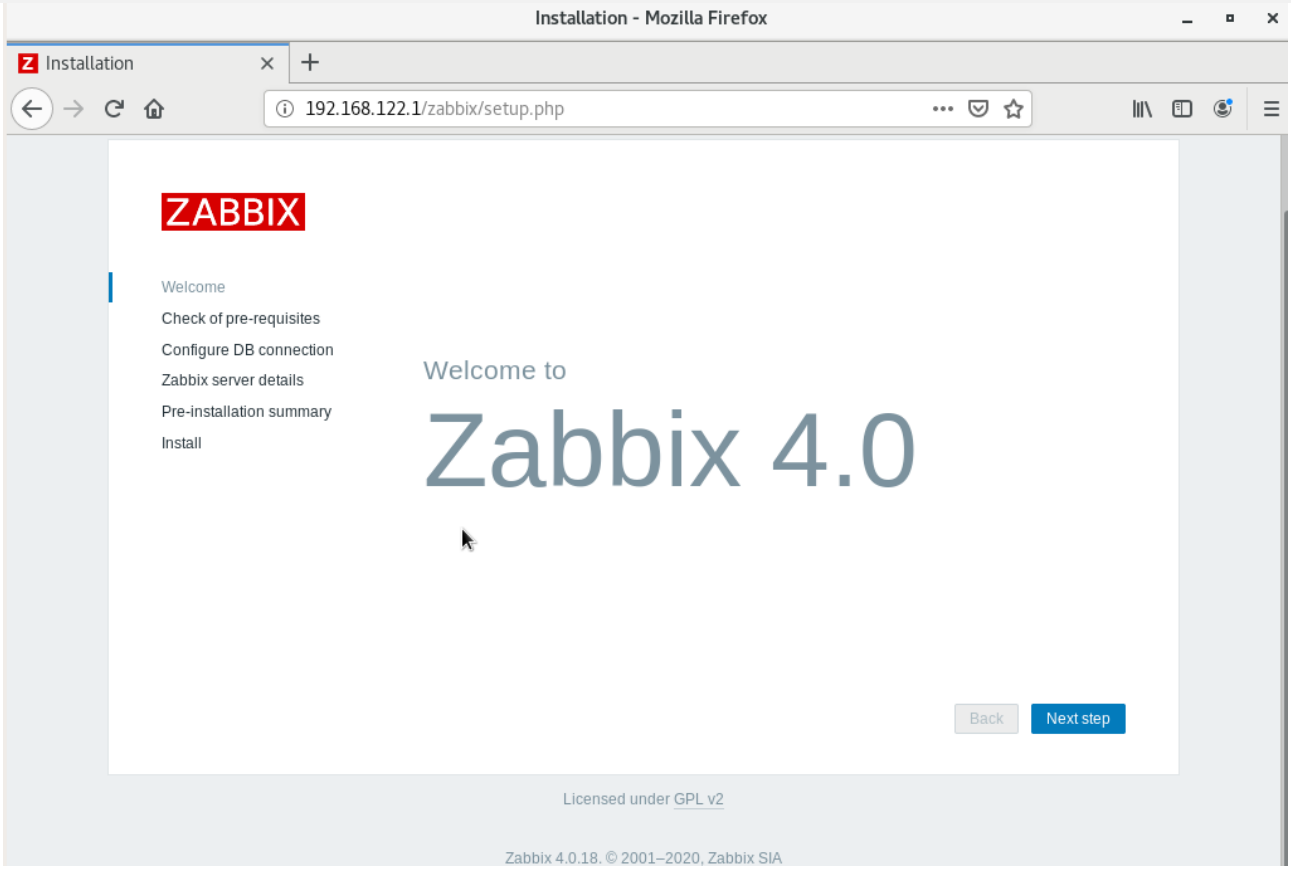
Now restart httpd service.

```
systemctl restart httpd
```

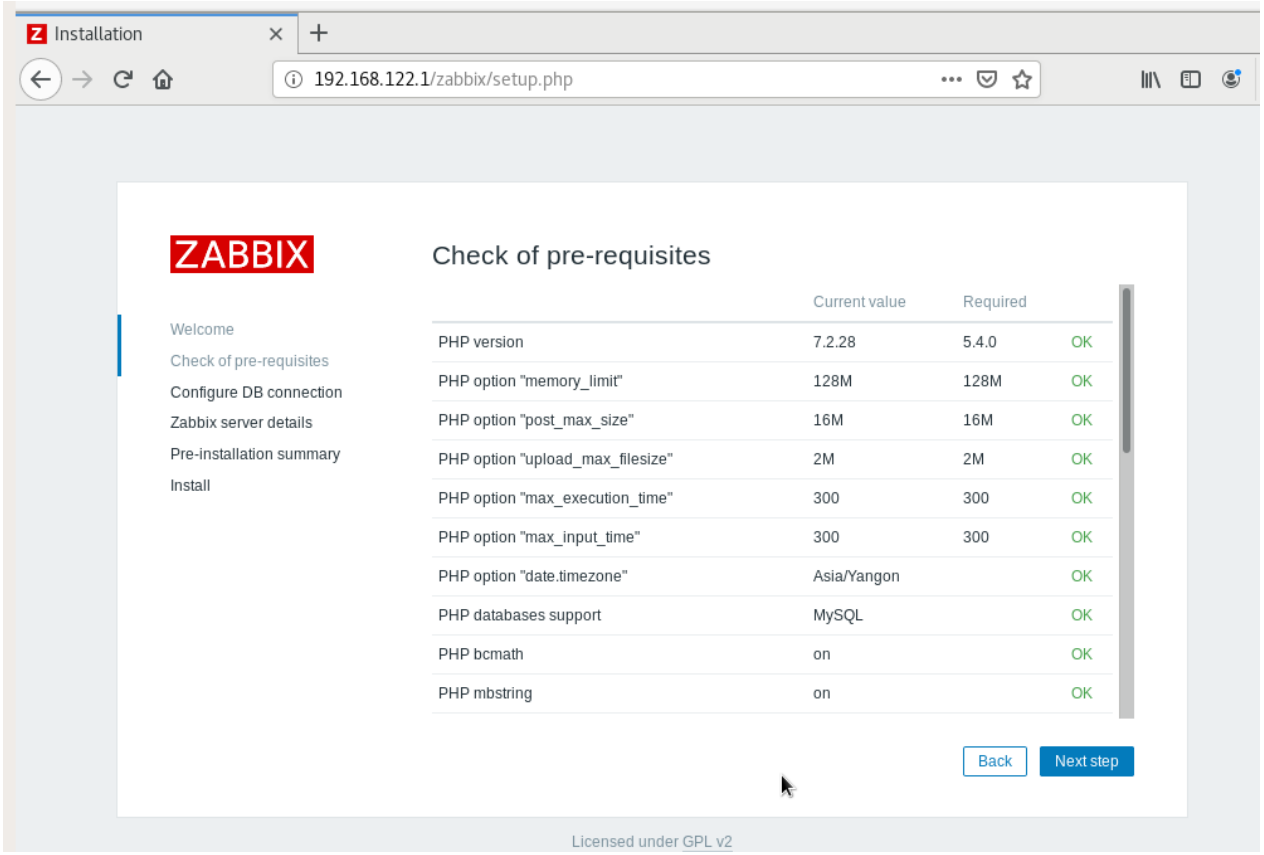
Step 9 – Setup Zabbix

You can access Zabbix using following URL:

```
http://Server-Host-Name Or IP /zabbix/
```

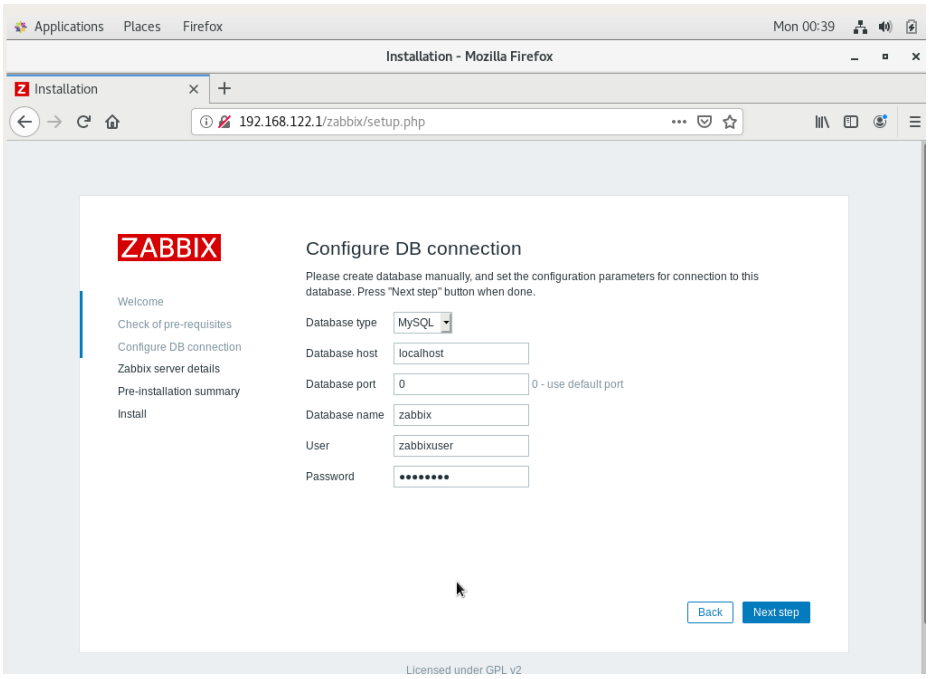


Click Next.



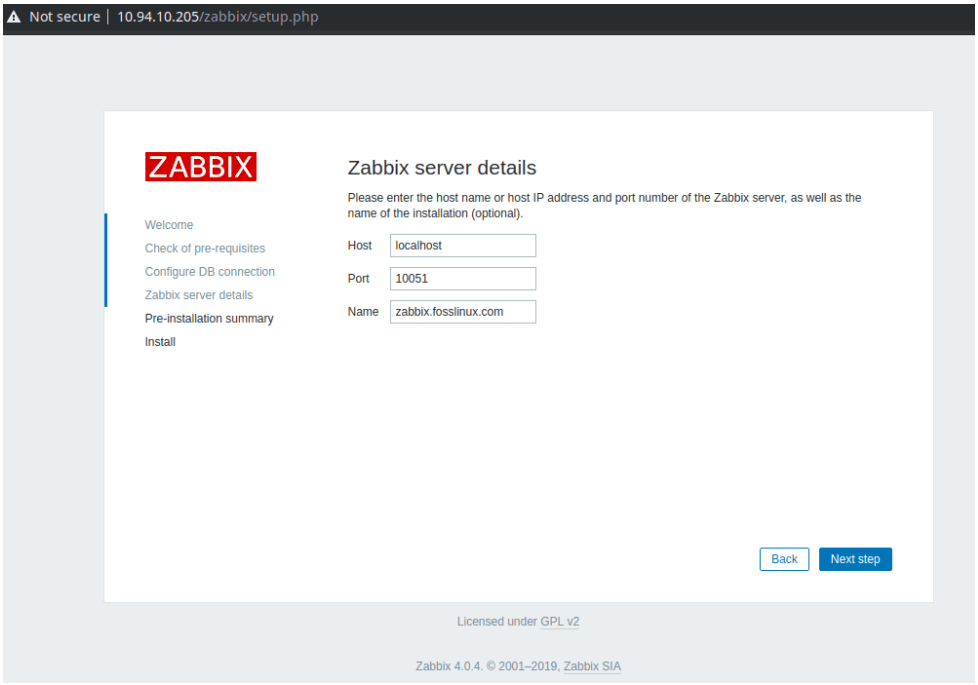
Here you Zabbix will check installed PHP, MySQL/MariaDB versions and parameters, etc.If you see any parameter failing, you have to modify it and refresh the page.

E.g.:- for PHP parameter you have to modify (/etc/php.ini) file. Click Next.



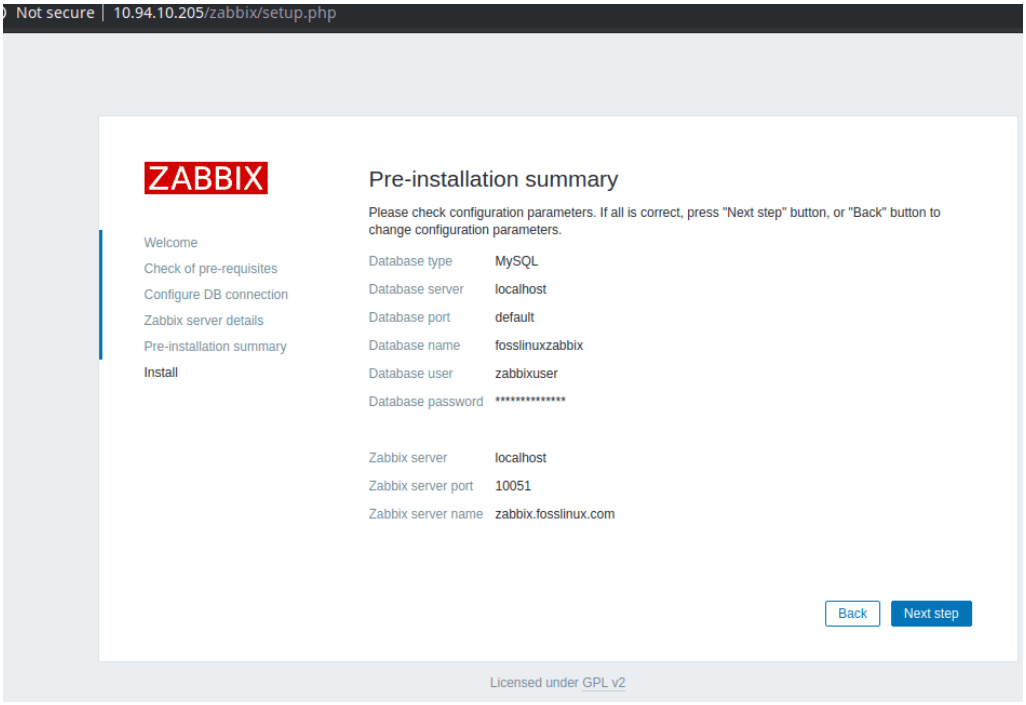
Configure DB Connection

Add database details and click Next. Then you will see server details, and you can add any name for “Name”.



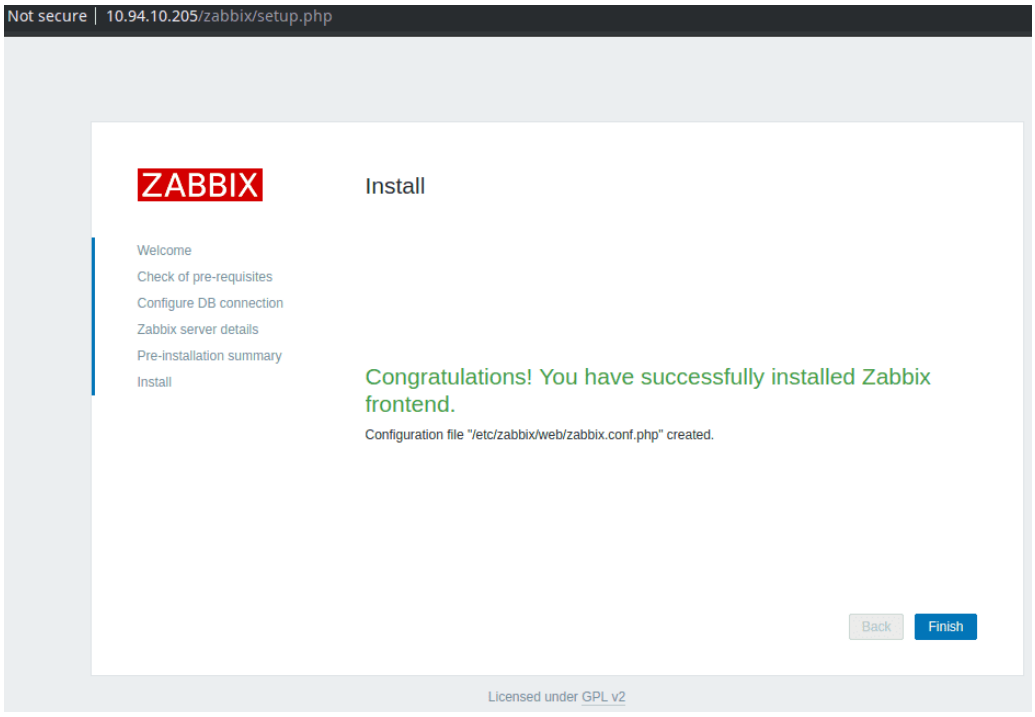
Zabbix Server Details

Click Next. You should see the Database details and server details.

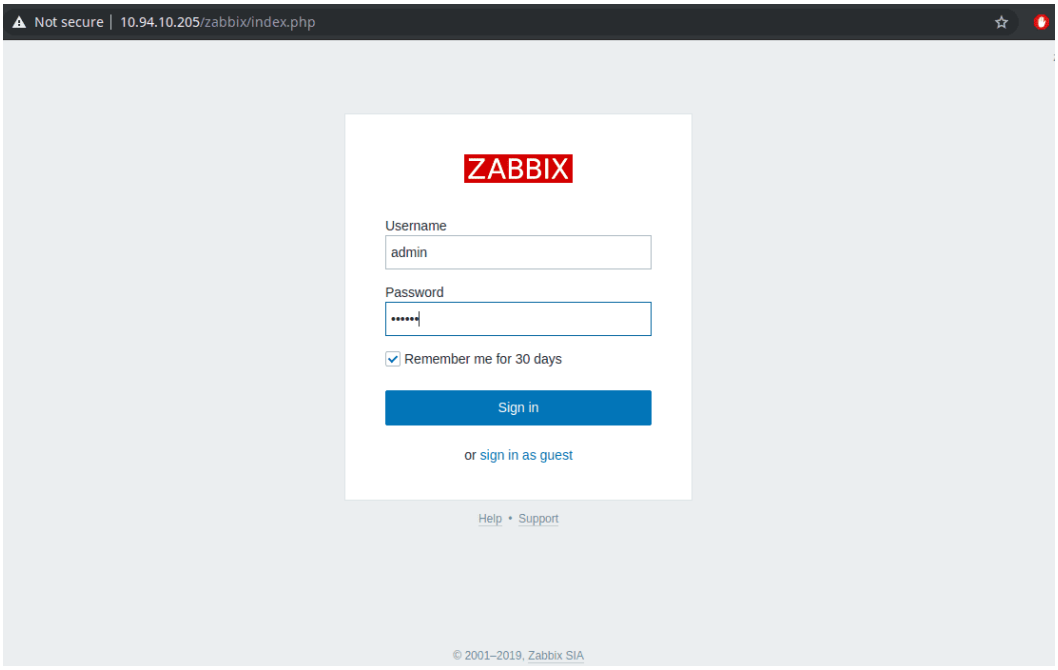


Pre-installation Summary

Click Next to complete the installation.



Click finish to access the login page



Login Page

The default login name is “admin” and password is “zabbix”. You will go to the Zabbix Dashboard.

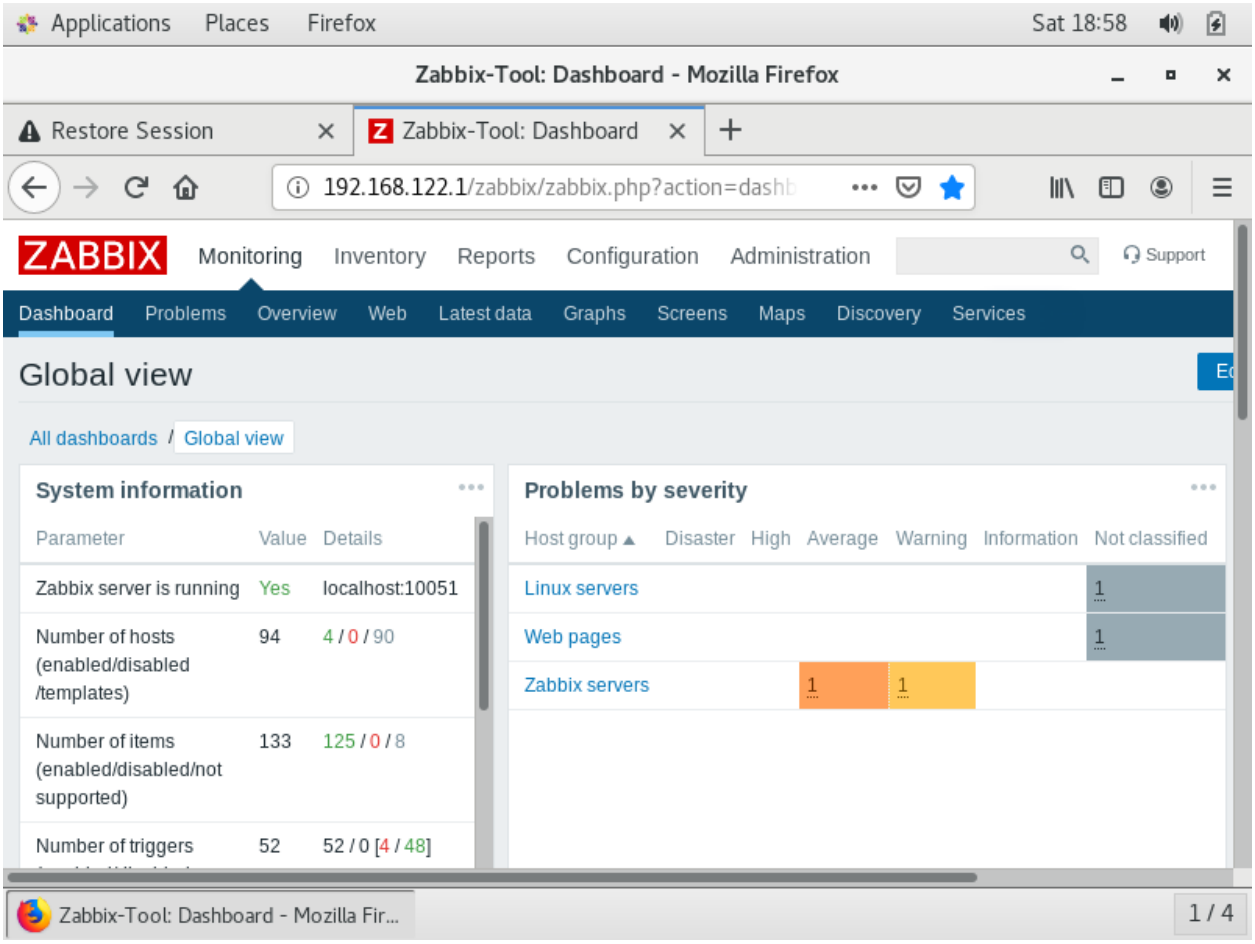
3. Zabbix Interface

Username=Admin

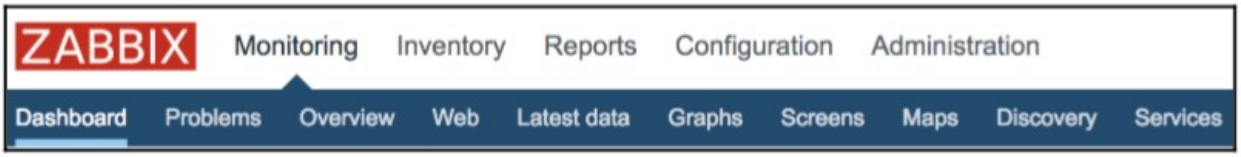
Password=zabbix

We can log in to the zabbix interface.

3.1 Zabbix initial frontend screen



There are five categories in the navigation bar:



Monitoring : This category contains most of the monitoring-related pages.We can view data,problems and graphs here.

Inventory : Inventory data for monitored system can be viewed.

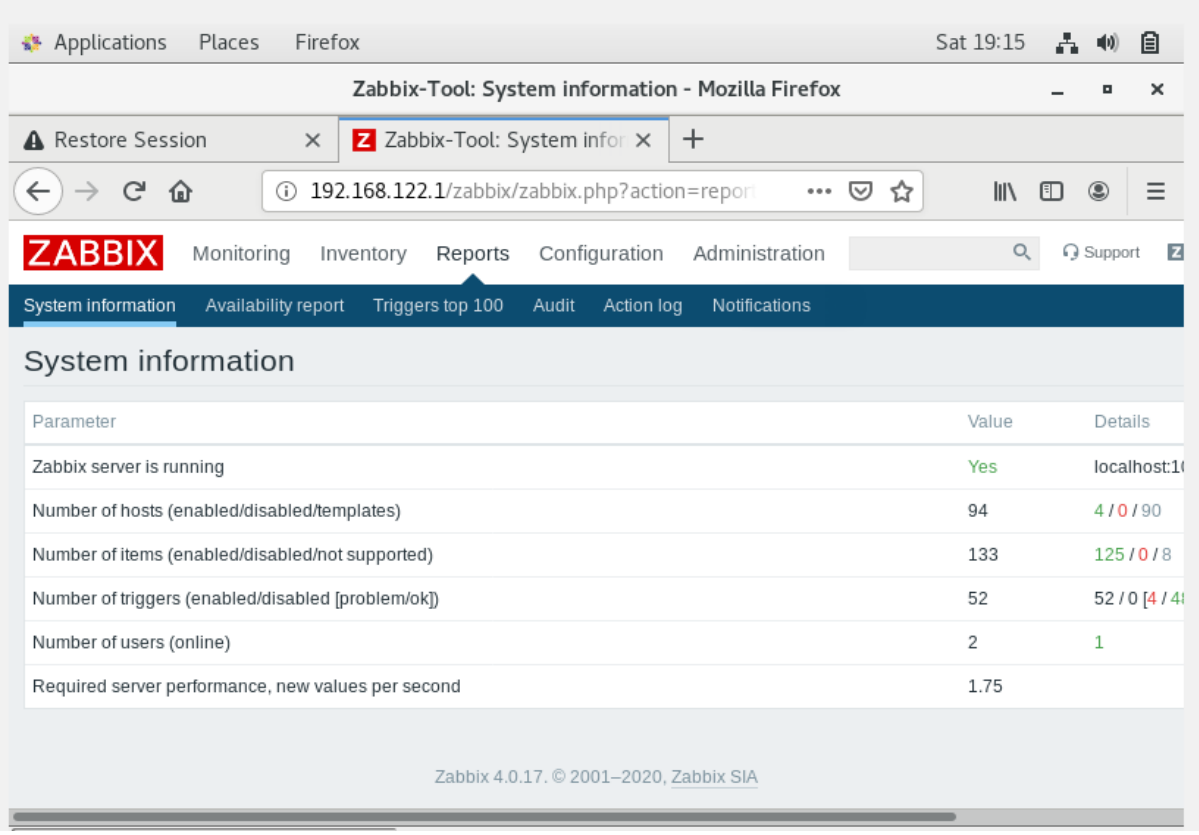
Report:This section contains some simple reports.

Configuration:Setting up everything related to the monitoring of systems,parameters,notification sending, and so on happens here.

Administration: This section allows you to set up more of the Zabbix internals, including authentication,methods,users, permission, and global Zabbix configuration.

3.2 System Information

Click on **Report** and then click on **System information**, the very first report:



Here,System informations are shown.

Number of hosts are 94 by default in zabbix server.

Number of items are 76 by default.Here is the adding items .

Number of users is 2 by default in zabbix tool, **Admin** and **Guest**. Here, We enable the admin of zabbix .So, 1 is in the **Detail** column

There are also many informations in the Zabbix tool .The above informations are a part of that I'll make the motinoring and you can also search more information.

4.Monitoring

There are a lot of monitorings using zabbix. Among them, we will make the Web Monitoring of the websites.
With Zabbix,we can check several availability aspect of website.

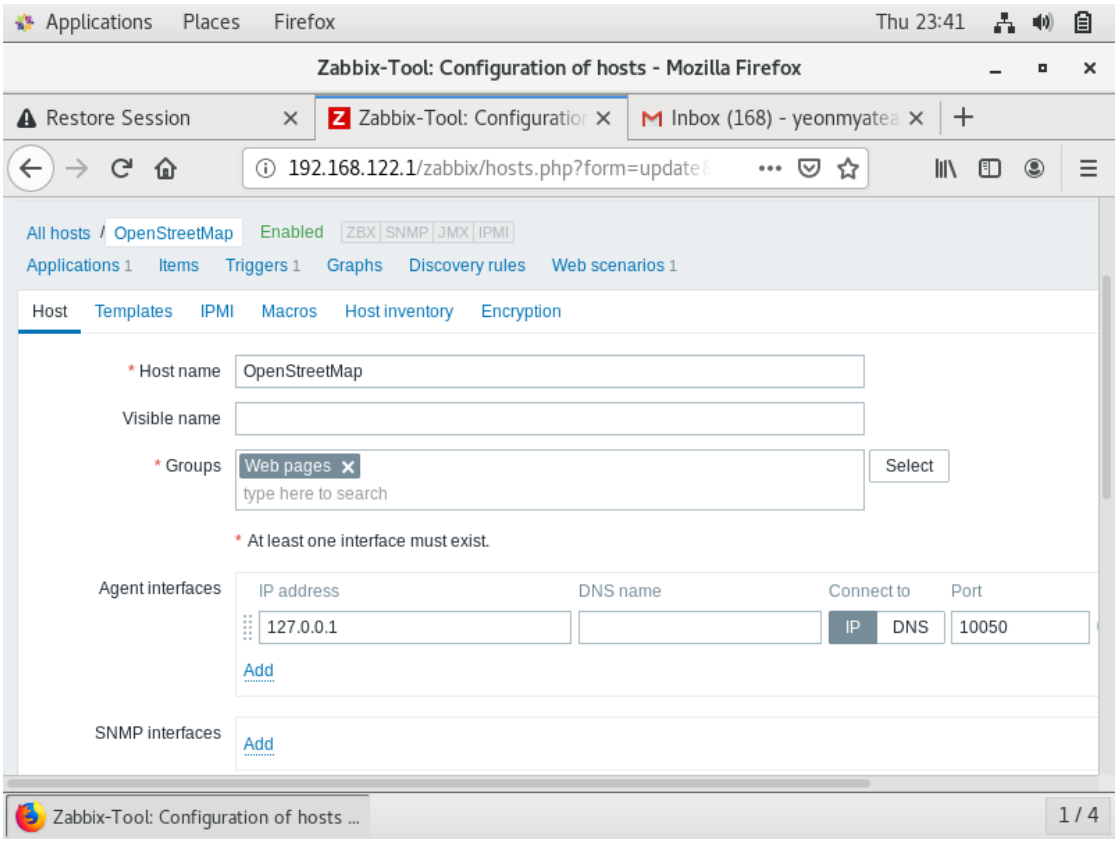
4.1 Configuration

4.1.1 Create a new host

There is an existing default host called Zabbix Server by default.But in our monitoring,we create a dedicated host called **OpenStreetMap**.
Navigate to **Configuration | Hosts,** click on **Create host,** and fill in these values:

- **Name:** OpenStreetMap
- **Groups:** Web pages

Group-we need to choose a related group because all access permissions are assigned to host groups, not individual hosts.
In this configuration, we will make web monitoring so choose **Web pages** group.



4.1.2 Create a scenario

To activate web monitoring we 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.

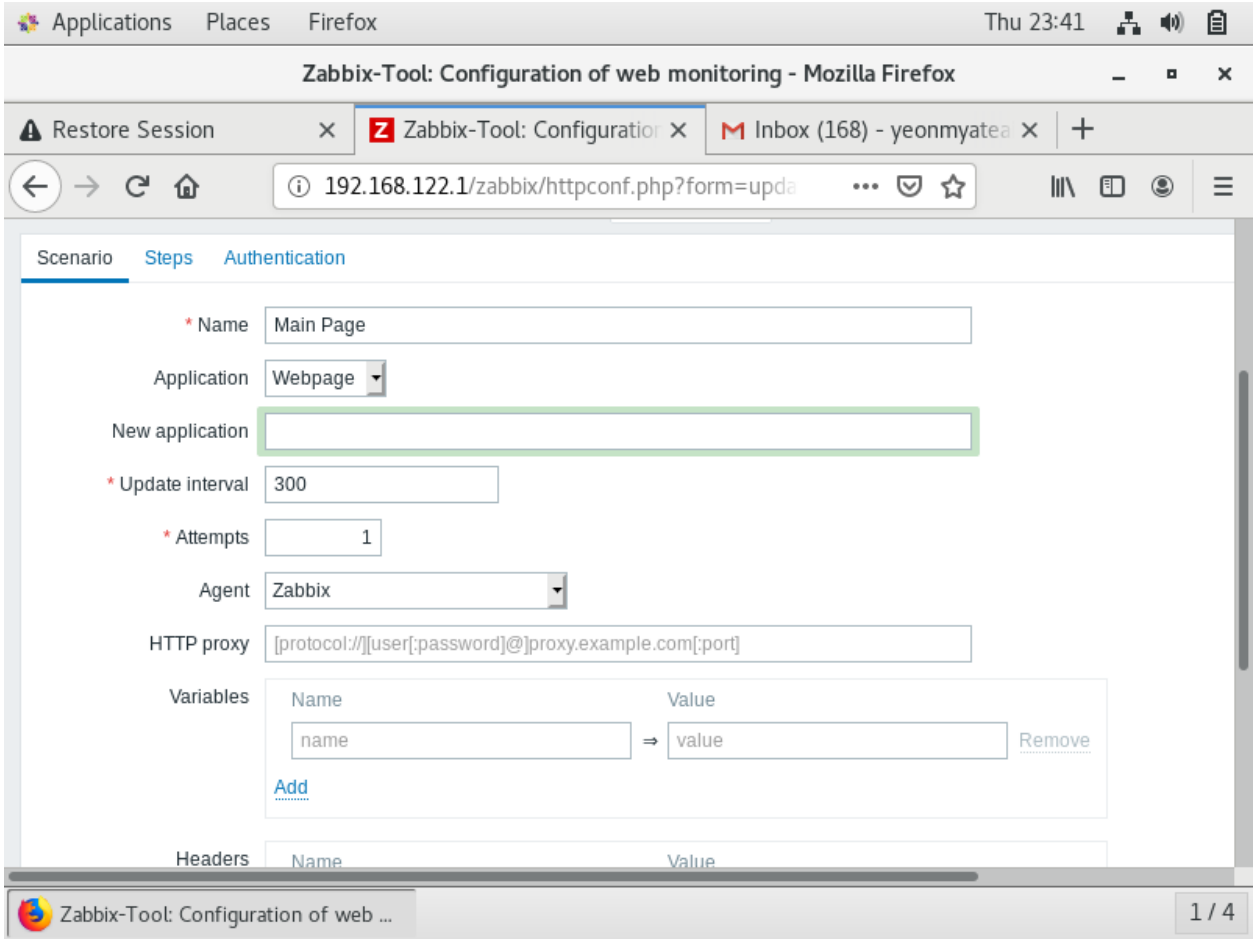
In the list of hosts, click on **Web** next to ***OpenStreetMap*** .

Click on Create web scenario. In the scenario properties, enter these values:

Name : Main page

New application : Webpage

Update interval : 300



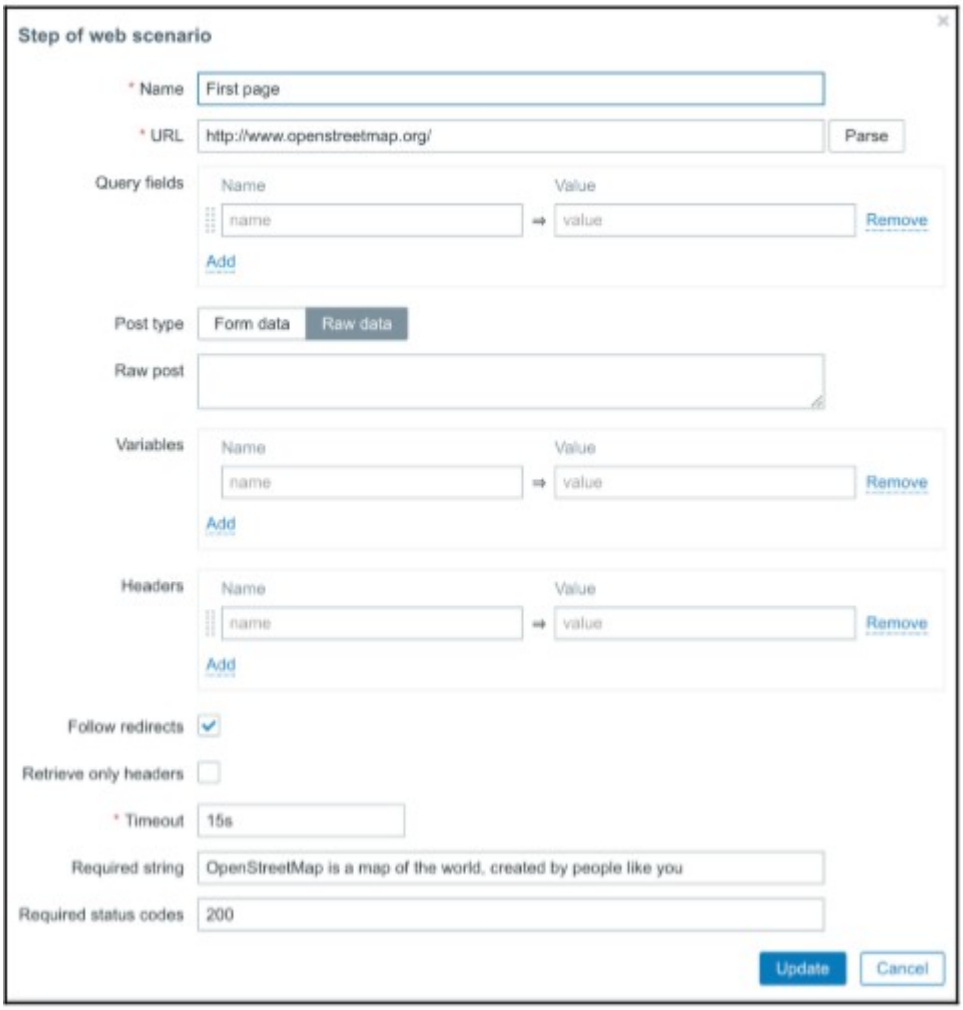
Application- it will show the items of web scenario in group in Monitoring | latest data.

Update interval-How often the scenario will be executed.

Next,The Steps for web monitoring are the actual queries performed on the web server.

Switch to the Steps tab and click on Add in the Steps section.

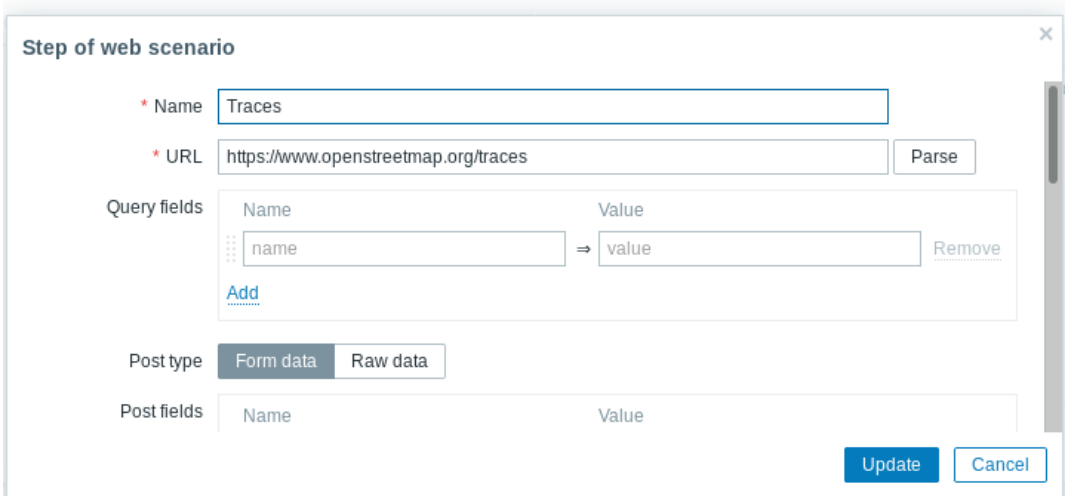
The form is :

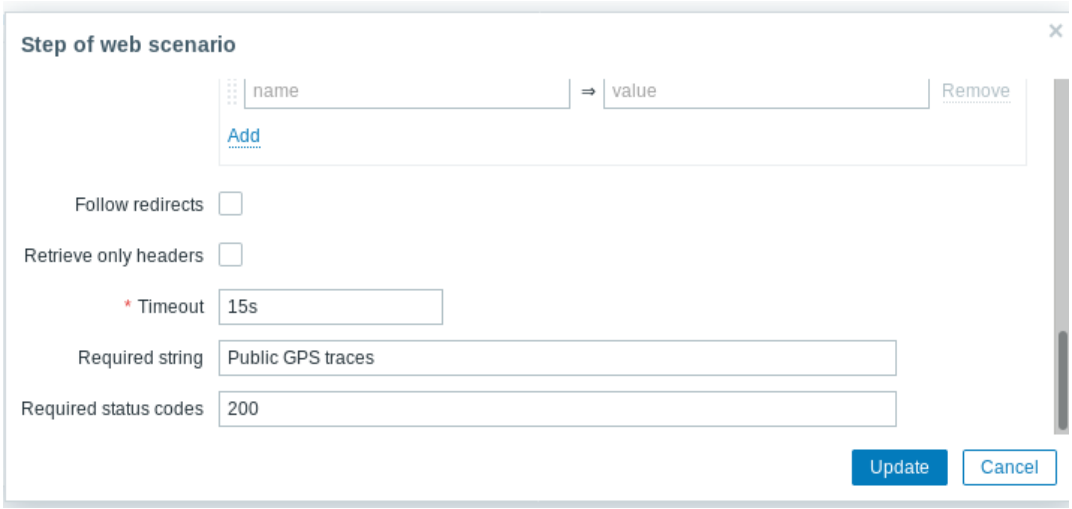


URL- The values must be the actual address of website. Otherwise, this step will be fail.

Required string- This field will search for a particular string in the returned page, and it will fail if such a string is not found.

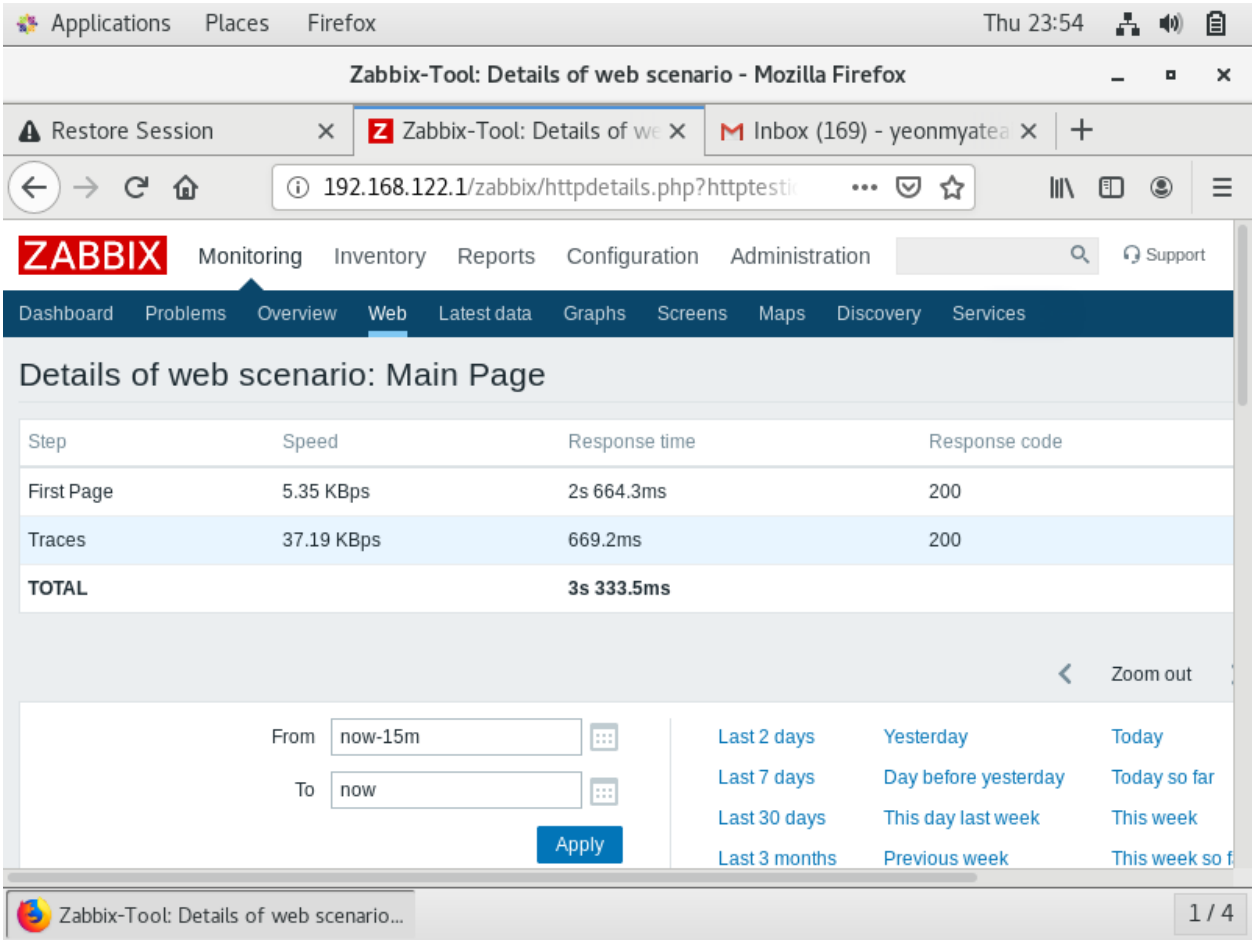
Requires status codes- Enter 200.Here, The return code doesn't match, this step is a failure. A status code of 200 means OK-the website is available and no downtime.





4.2 Result of Website

Open Monitoring | Web and click on Main page next to OpenStreetMap.



We can see the result of website we monitored.

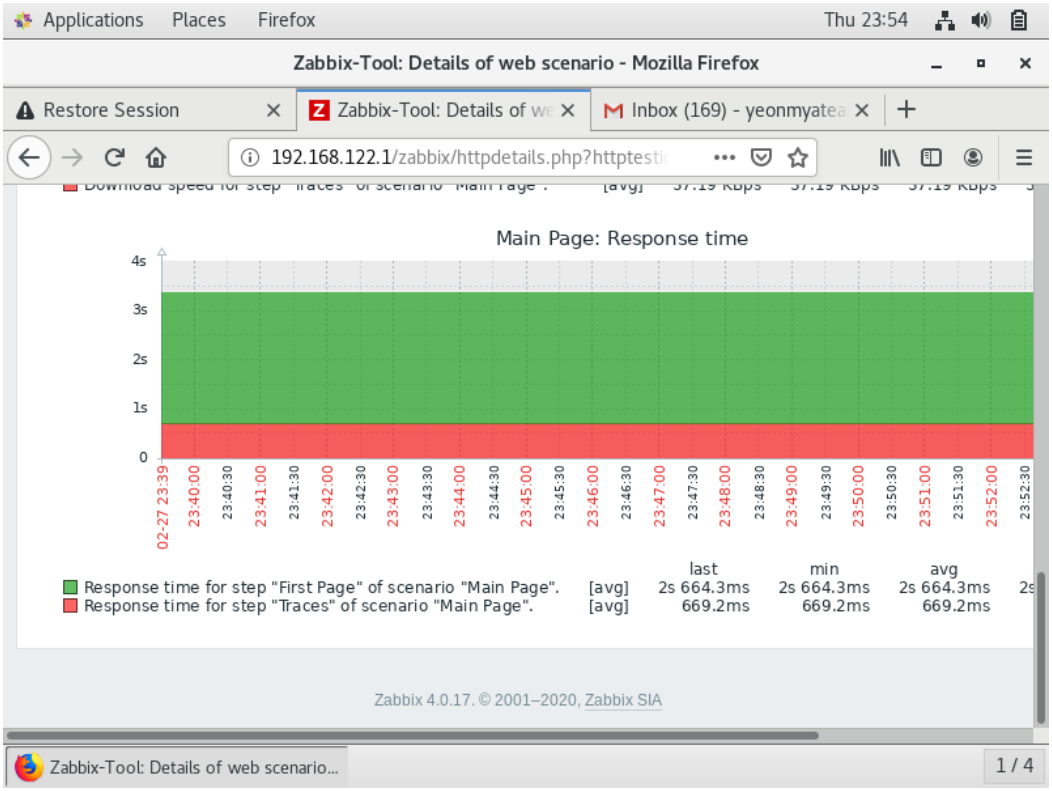
The information collected by the web scenario

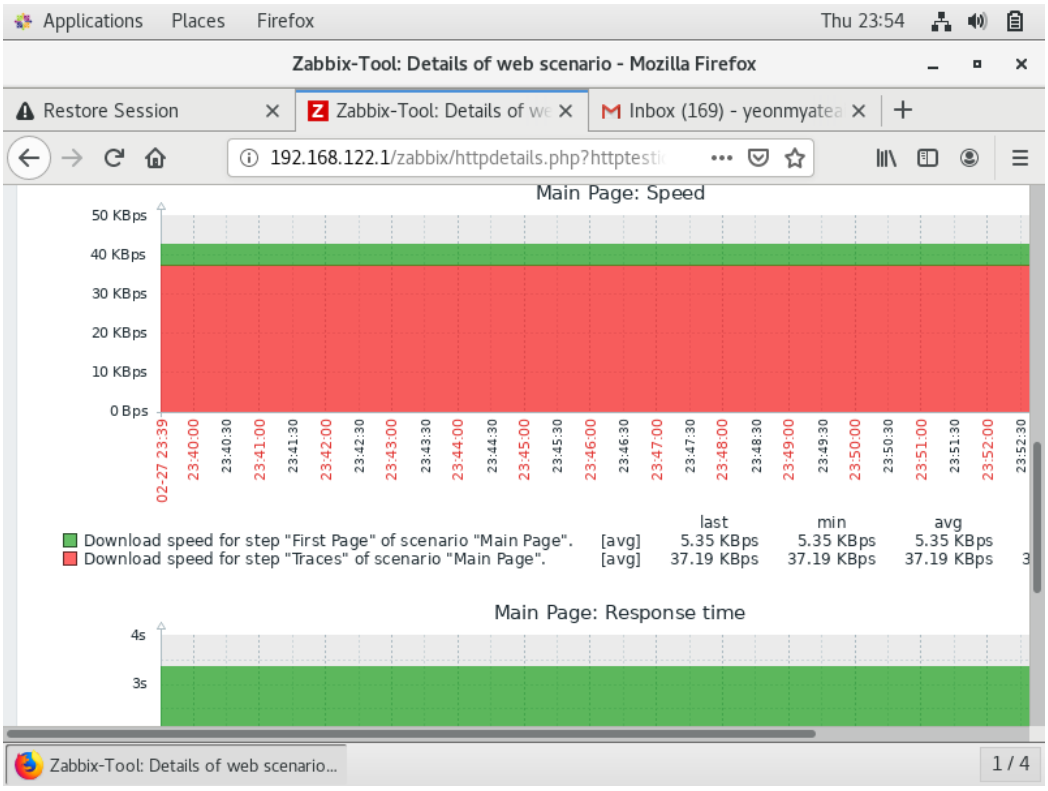
- **Download speed per second**
- **Response time**
- **Response code**

There are more information collected by the scenario

- Average download speed per second for all steps of whole scenario
- Number of the step that failed
- Last error message

The result will be shown by graph





4.3 Using agent items

There are three web page-related item keys:

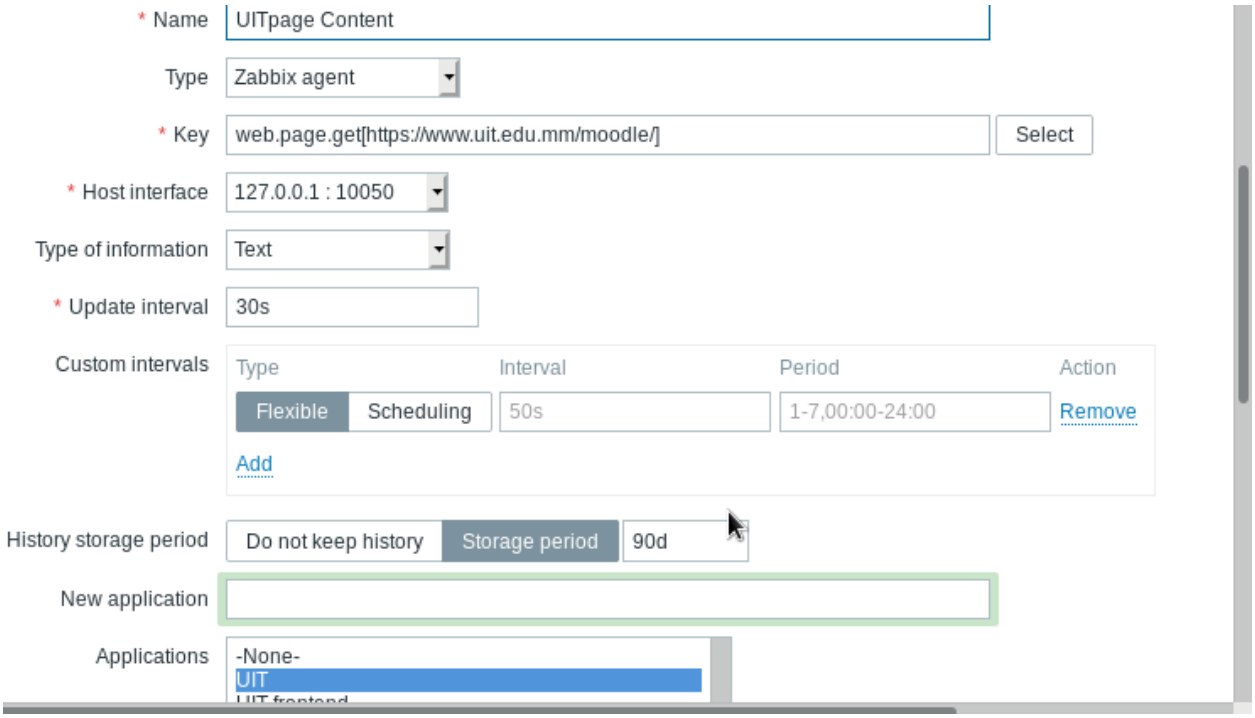
- *web.page.get*
- *web.page.perf*
- *web.page.regexp*

4.3.1 Getting the page

The simplest web page-related agent item key, ***web.page.get,*** allows us to retrieve page content.(HTTP request)

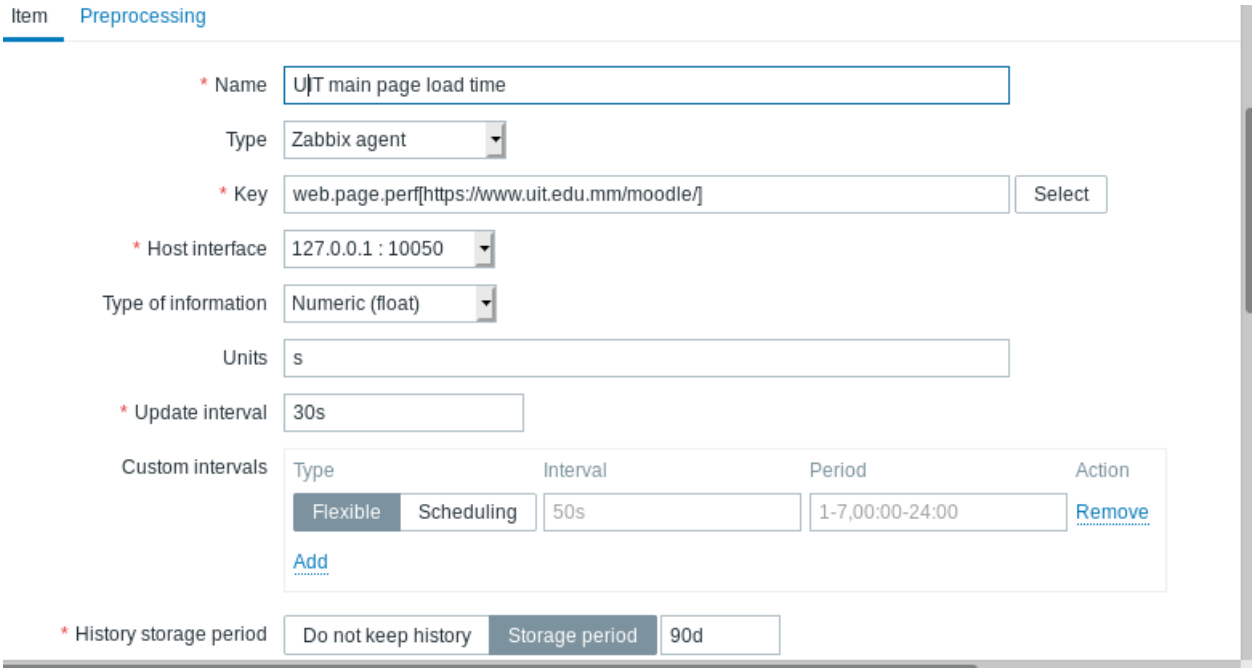
Navigate to **Configuration** | **Hosts,** and select **Linux servers** in the Group, Drop-down

Click on Items next to **A test host**, and click on **Create item.** Fill in the following values:



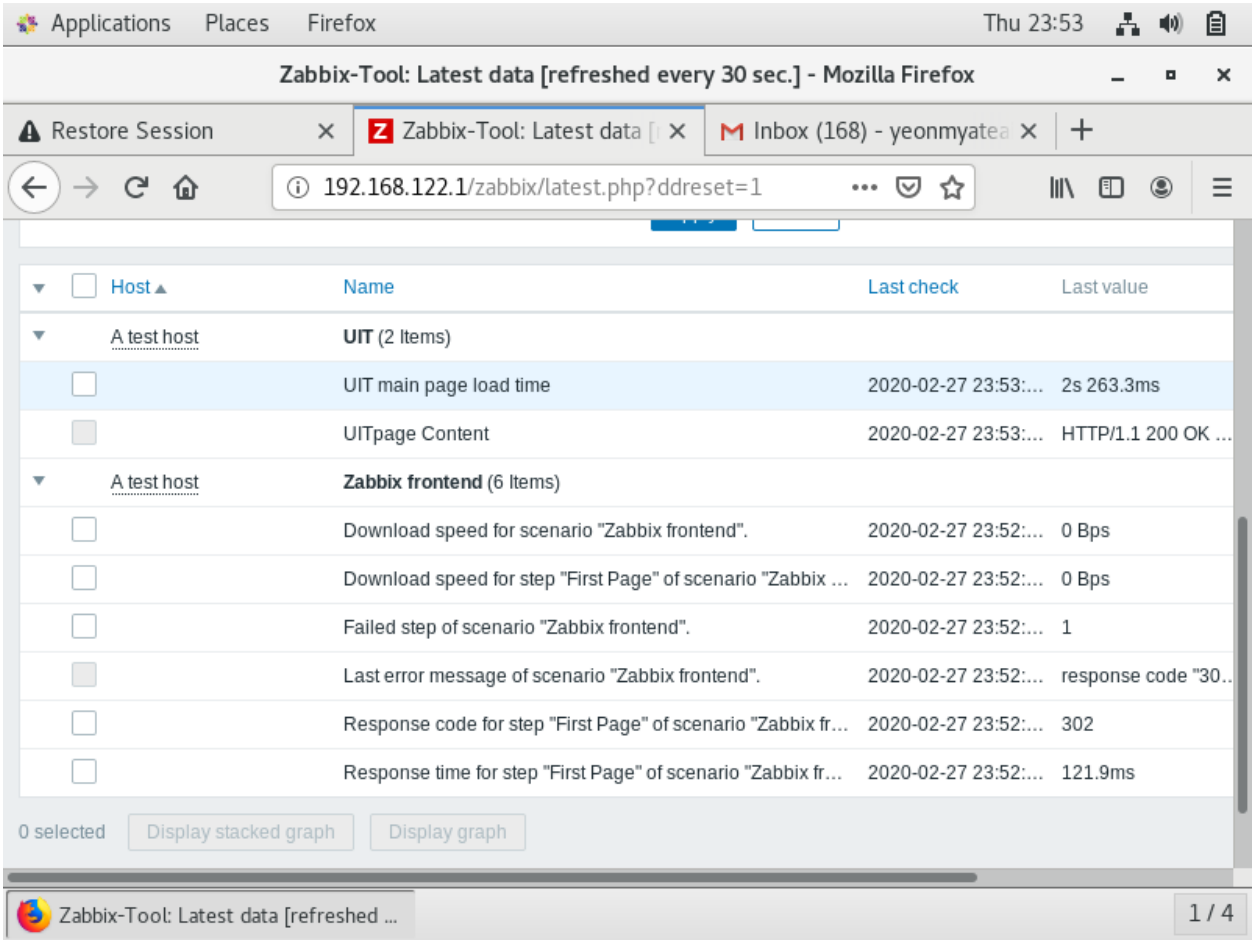
Another web page-related agent item is ***web.page.perf***. It returns the loading time of the page in seconds.(performance)

Click on **Create item,** and fill in the following :

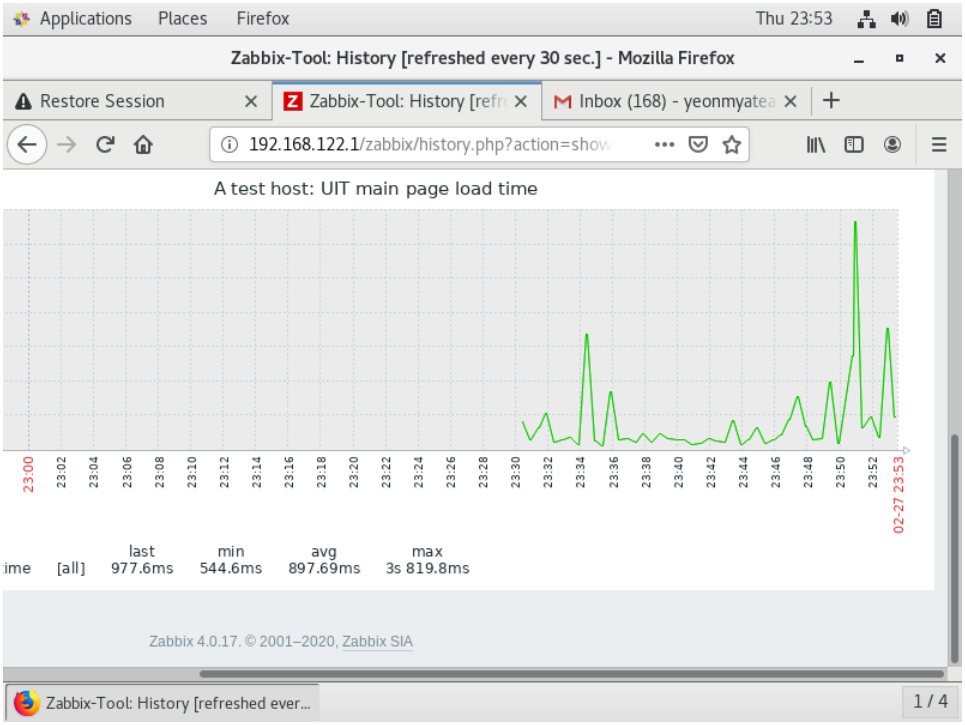


4.3.3 Showing Result

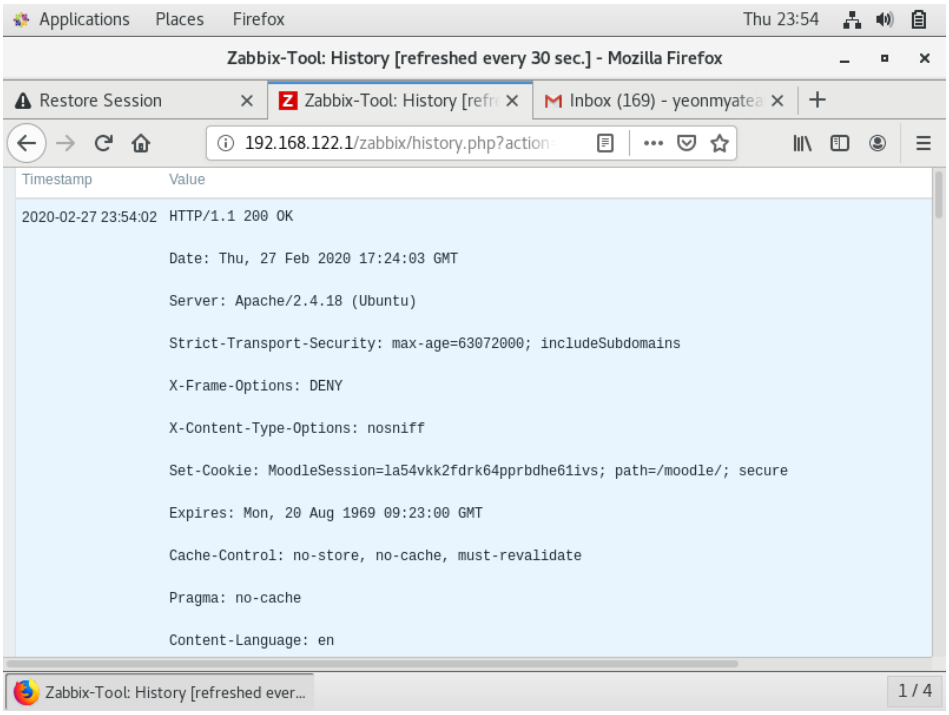
Now we will see the result provided by the web agent.



By graph, we can see the performance of the page



We can know the HTTP of the page

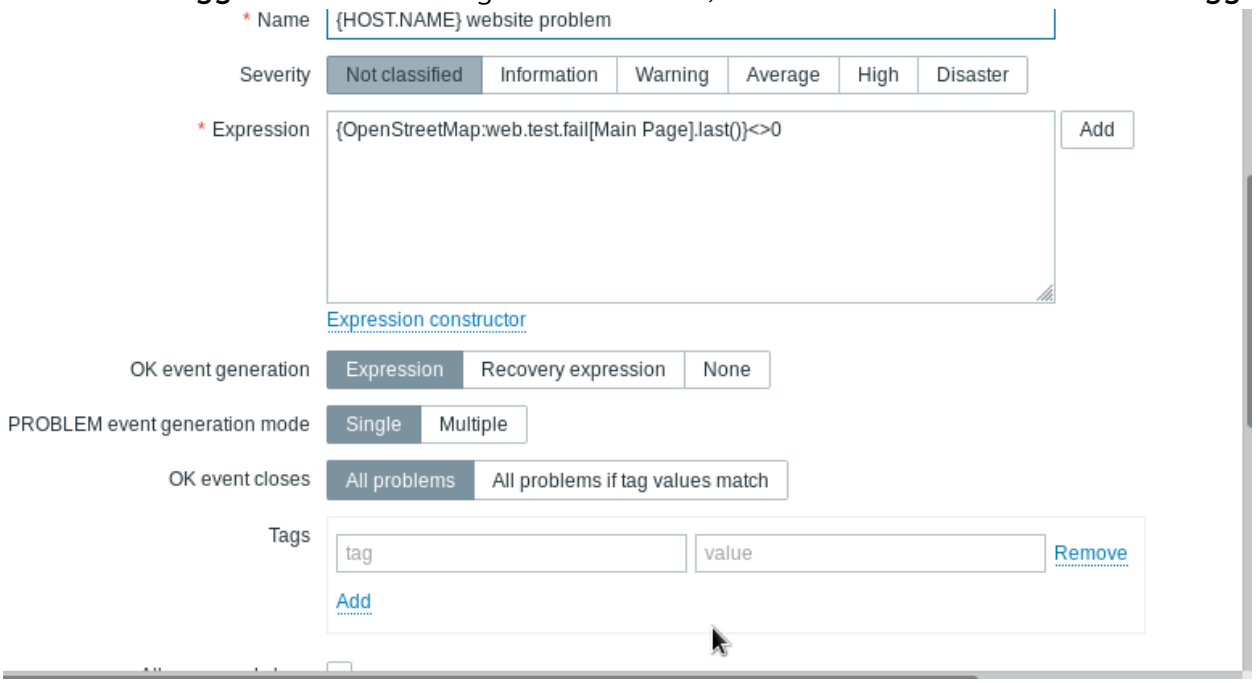


4.4: Alerting on web scenario

Let's create a trigger that warns us when any one of the steps in the scenario fails.If the failed step item holds 0, all is good. Otherwise, the web scenario will stop at any failure, and we cannot know other states.

4.4.1: Creating Trigger

Item- the basic of gathering data in Zabbix.
Trigger- To atomically evaluate incoming data we need to define triggers. A trigger can expression that defines a threshold of what is an acceptable level of the data.
Click on **Triggers** in the navigation header, and then click on **Create trigger**.



Name : {HOST.NAME} website problem.

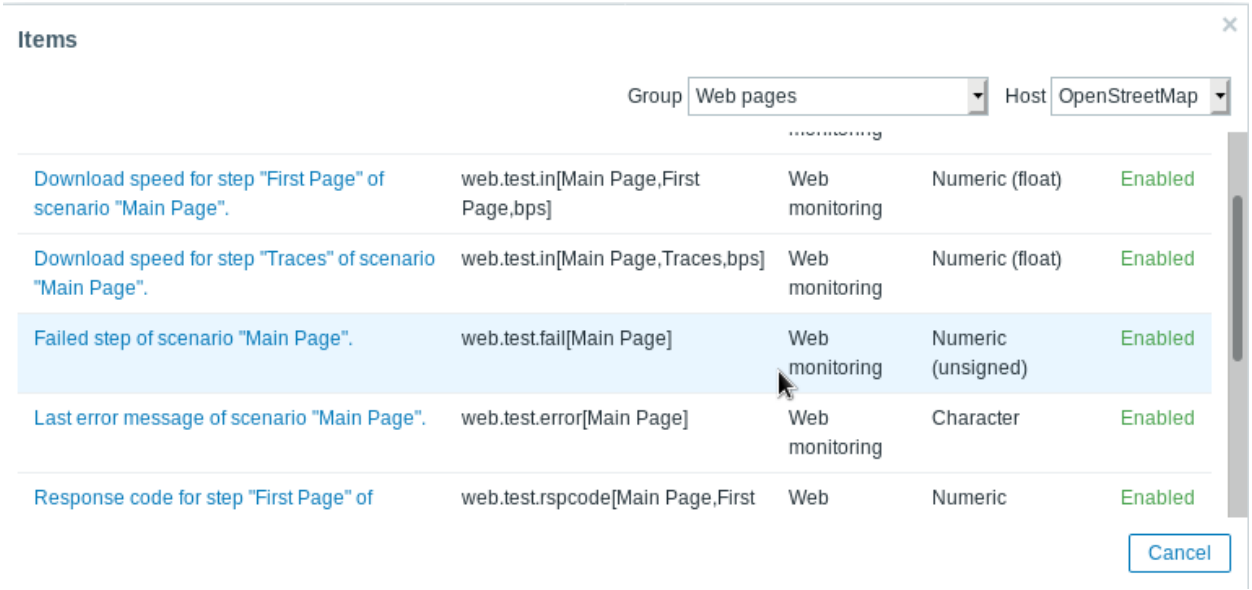
Expression: Click on **Add**, then click on **Select** next to the **Item** field in the resulting popup. Select **Web pages** in the **Group** drop-down and **OpenStreetMap** in the **Host** drop-down.

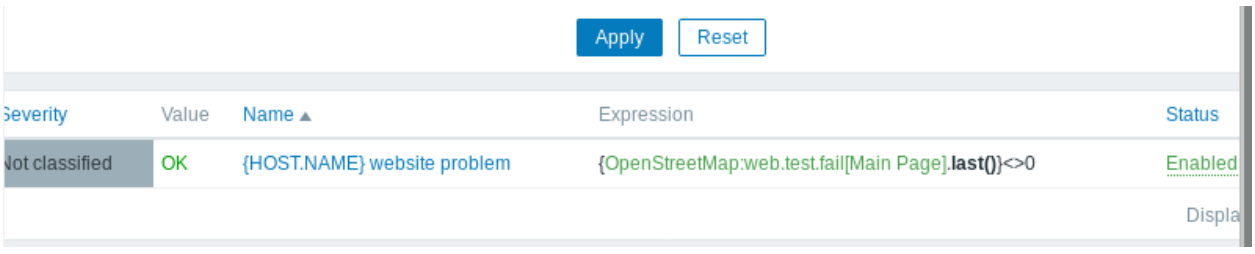
Then, click on **Failed step of scenario Main page** in the **Name** column.

In the **Function** drop-down, **choose last() - Last (most recent T value)**.

For Result, choose **<>** and **0**.

In the **Item** field, you can choose another items for the limit of website you want to get.





4.4.2: Setting up Email for Notification

First, go to the **terminal**

Install ssmtp server

yum install ssmtp //in CentOs7

sudo apt-get update, sudo apt-get install ssmtp //In Ubuntu

Next, edit the file,

#vi /etc/ssmtp/ssmtp.conf

root= yourmail@gmail.com

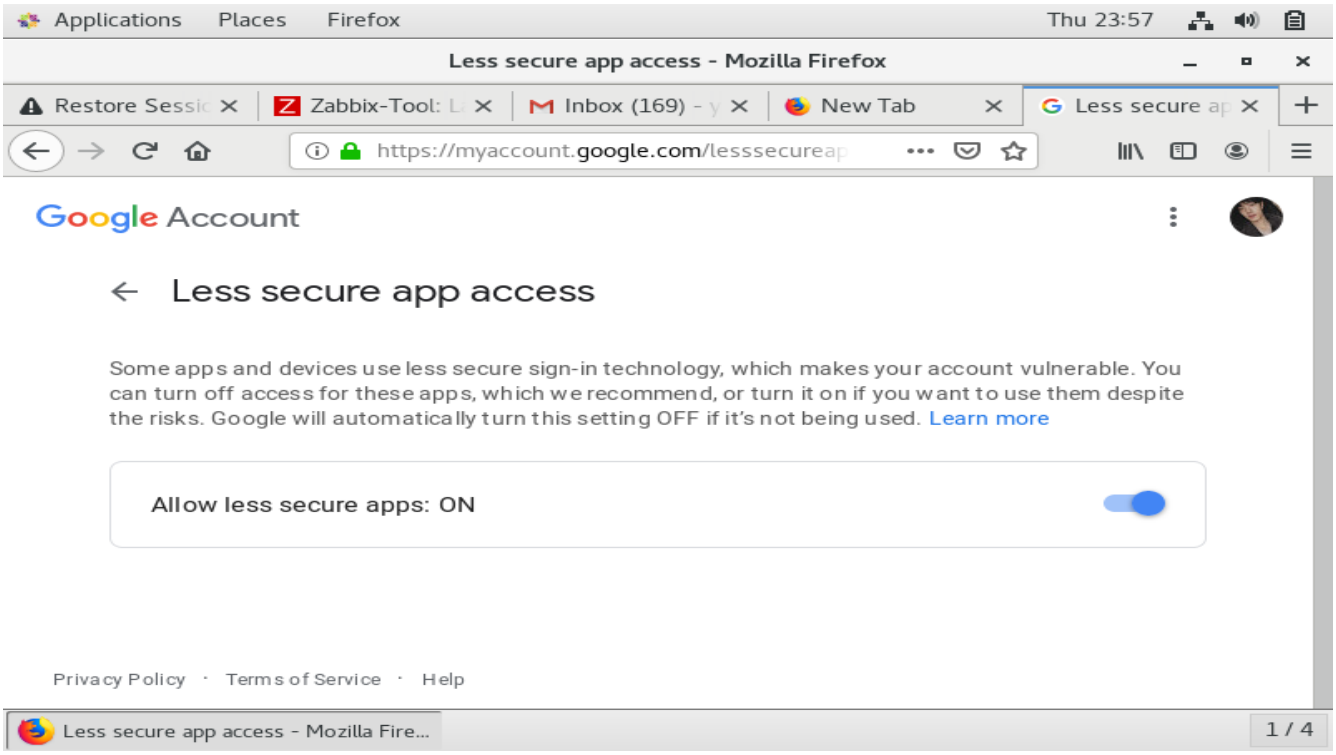
mailhub=smtp.gmail.com:465

FromLineverride=YES

UseTLS=YES

And save the file

Next, you need to turn on Gmail account

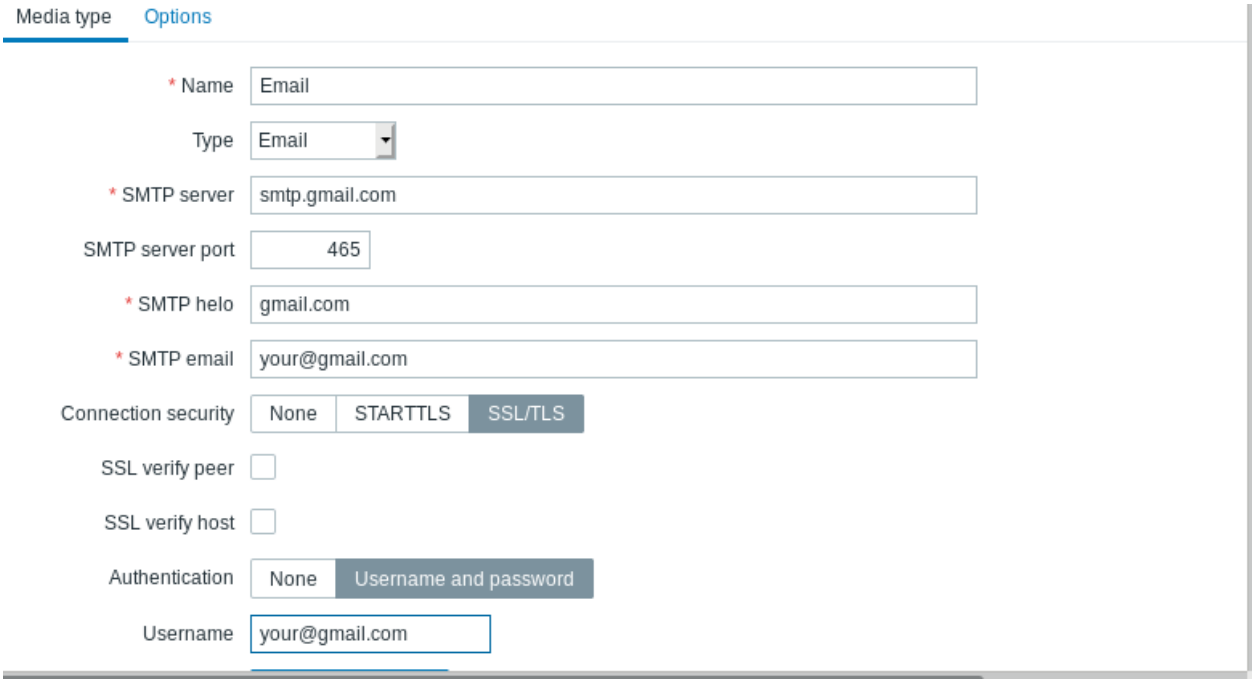


To configure the parameters for sending emails, do the following:

1.Open **Administration** | Media types

2 Click on **Email** in the **Name** column

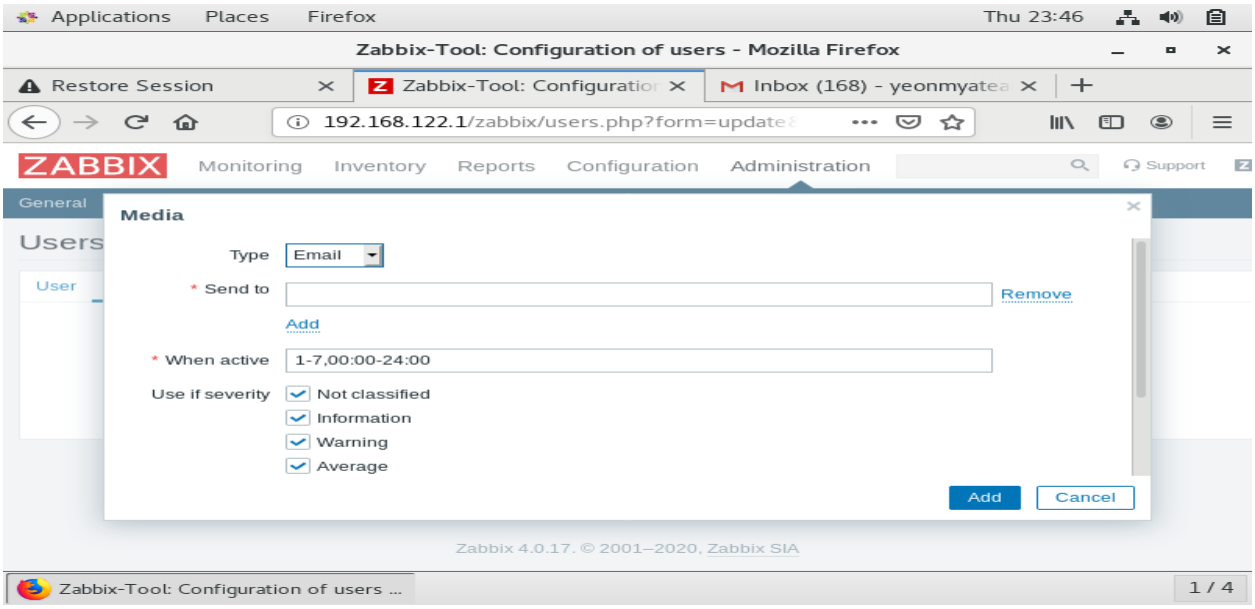
Fill like the following :



To assign an email address to a user, take the following steps:

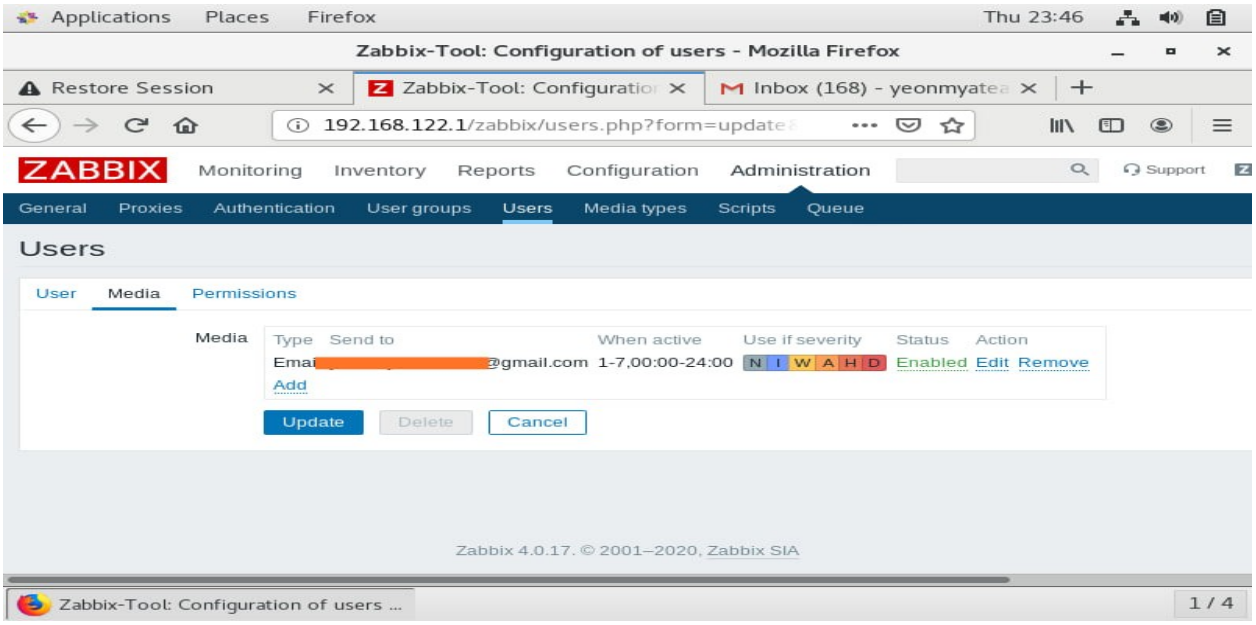
1.Open **Administration** | Users. You should see only two users: **Admin** and **Guest**

2 Click on **Admin** in the **Alias** column and switch to the **Media** tab, as follow :



Send to: fill the yourmail@gmail.com.

Here is the summary of the Admin user-email configuration.



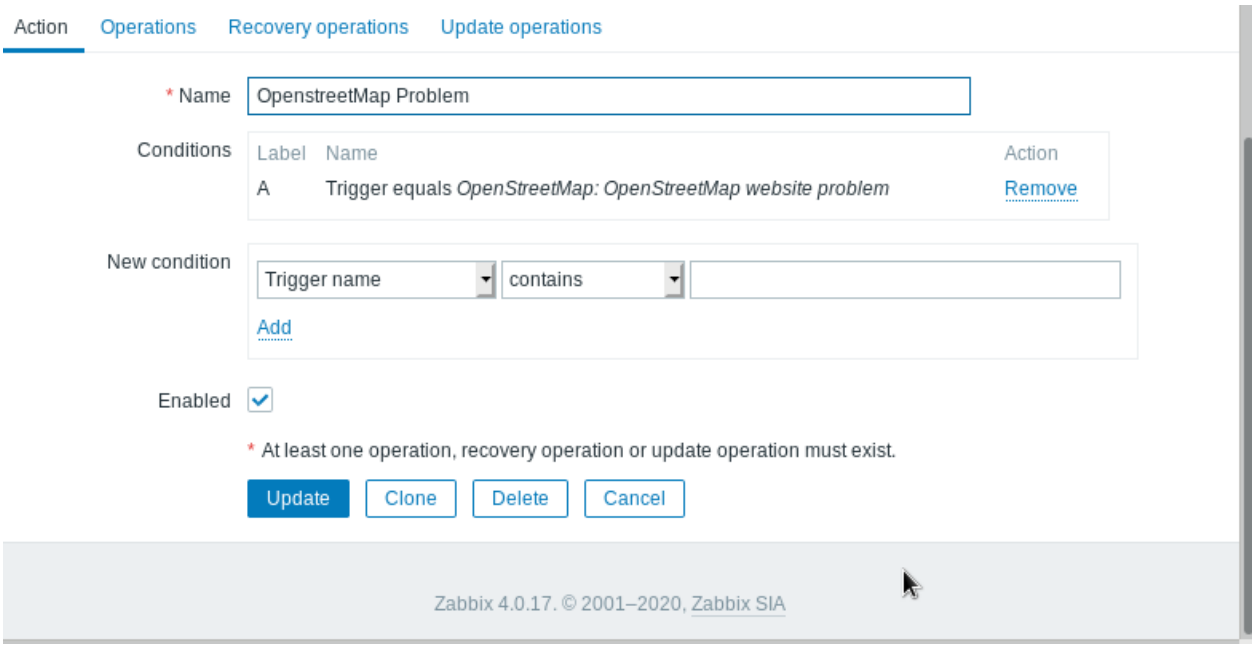
Now we set up email for the notification about the problem of website.

4.4.3 Creation Action

1.Go to the **Monitroing** in the Navigation bar and click **Action** tab

2.Click on **Create action**. (Make sure that the drop-down box **Event source** in the top-right corner has **Triggers** selected.

A form is presented that lets you configure preconditions and the action to take



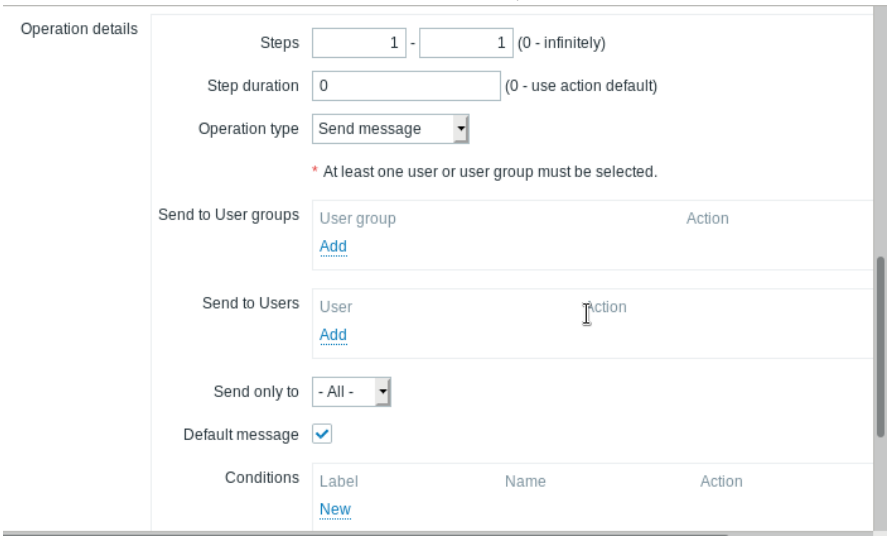
3.First, enter a name for your new action, such as Test action, and add a new condition by selecting **Trigger** and =.

4.Next, use the Select button to select the trigger that you made on your test host.(The trigger created above)

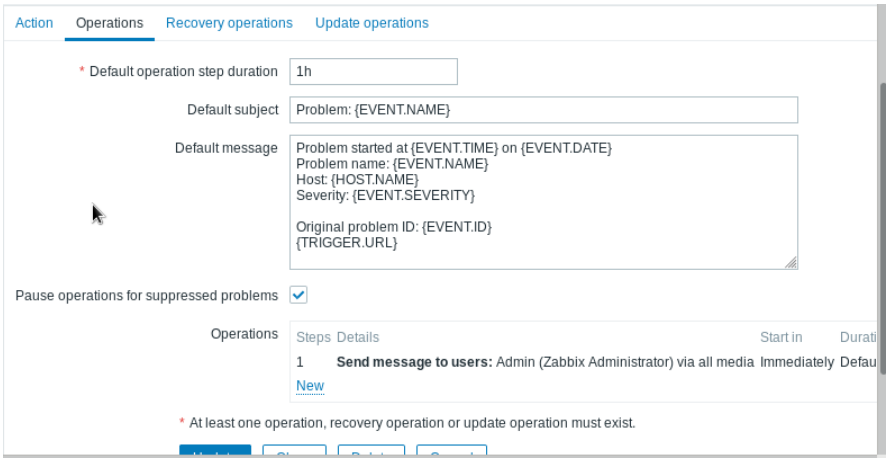
5.Click Add, then select the **Operations** checkbox, and select **Send message** for **Operation type**.

6. Next, select **Admin** as the user to send the recovery message under **Send to Users** and click **Add**:

And do like this for **Recovery operation:**



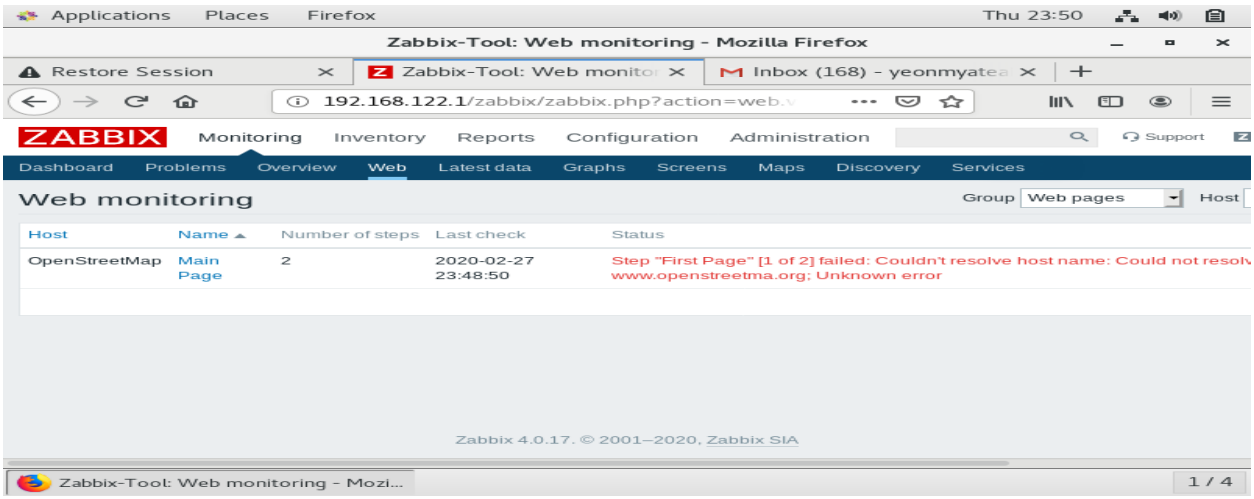
The result is like this



In the configuration,

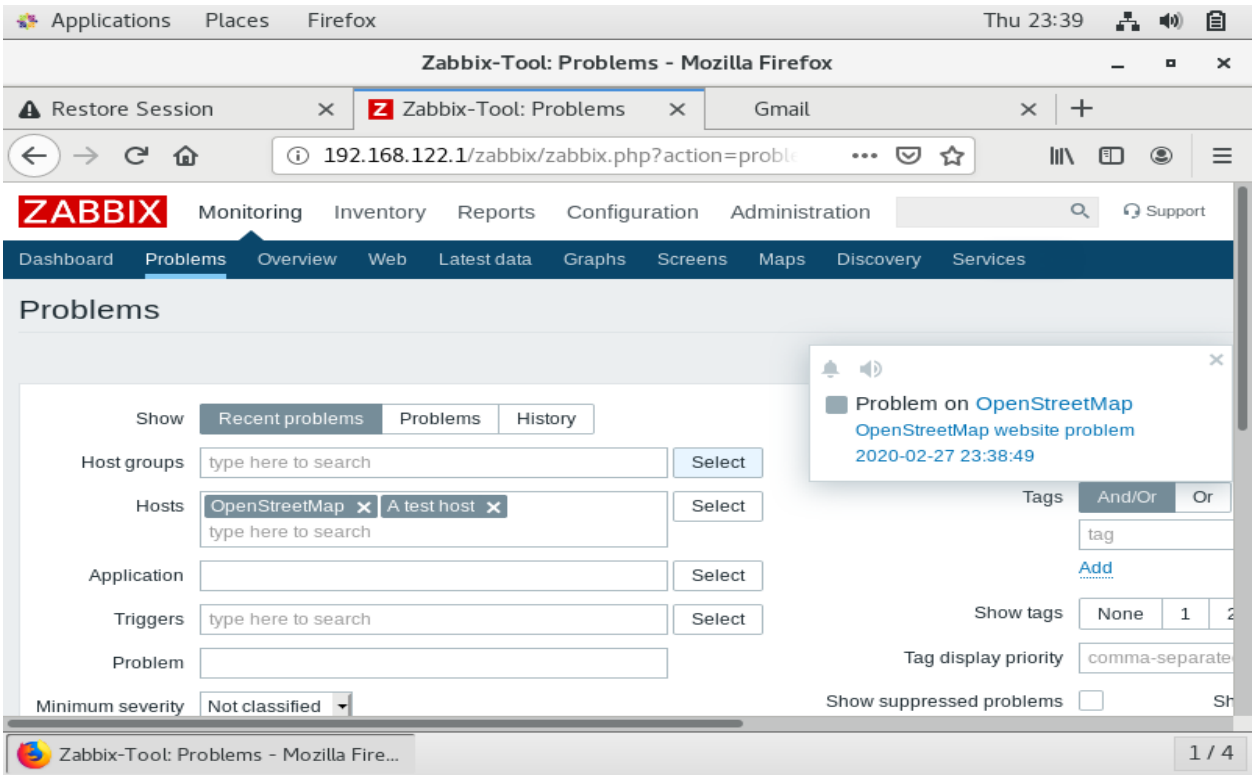
- We create a host(OpenStreetMap), which contains an item (**web.test.fail**, default 6 items for web monitoring).
- A trigger reference this item. Whenever the trigger expression matches the current item value, the trigger switches to the **PROBLEM** state.
- When it cease to match, it switches back to the **OK** state.

4.4.4 Causing problem in web scenario

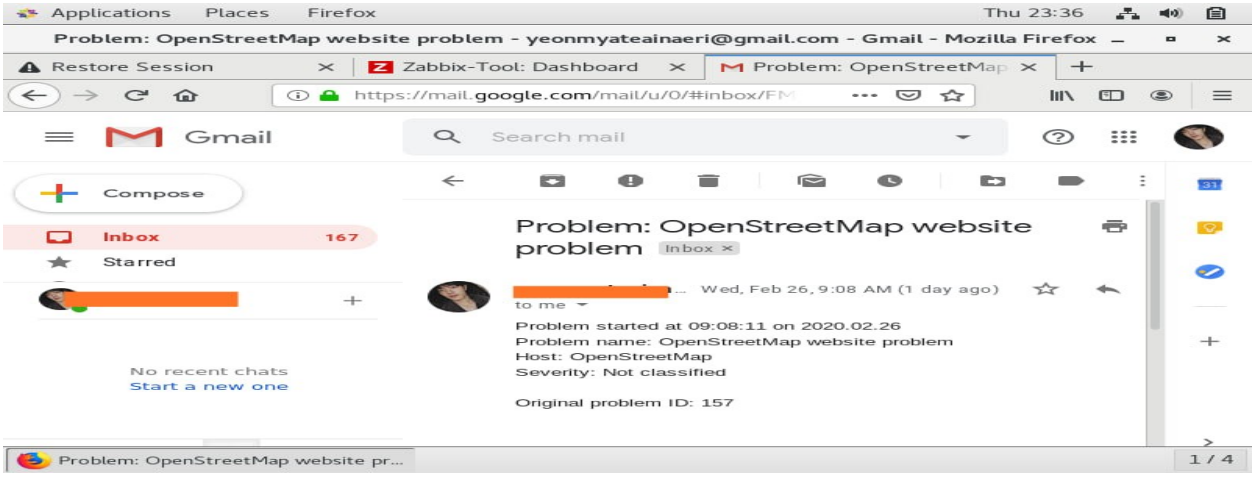


In this figure, the **URL** link in the steps of scenario is not correct. So, Status column like this message and the the step is fail .

Next, alarm-box will be appear like this

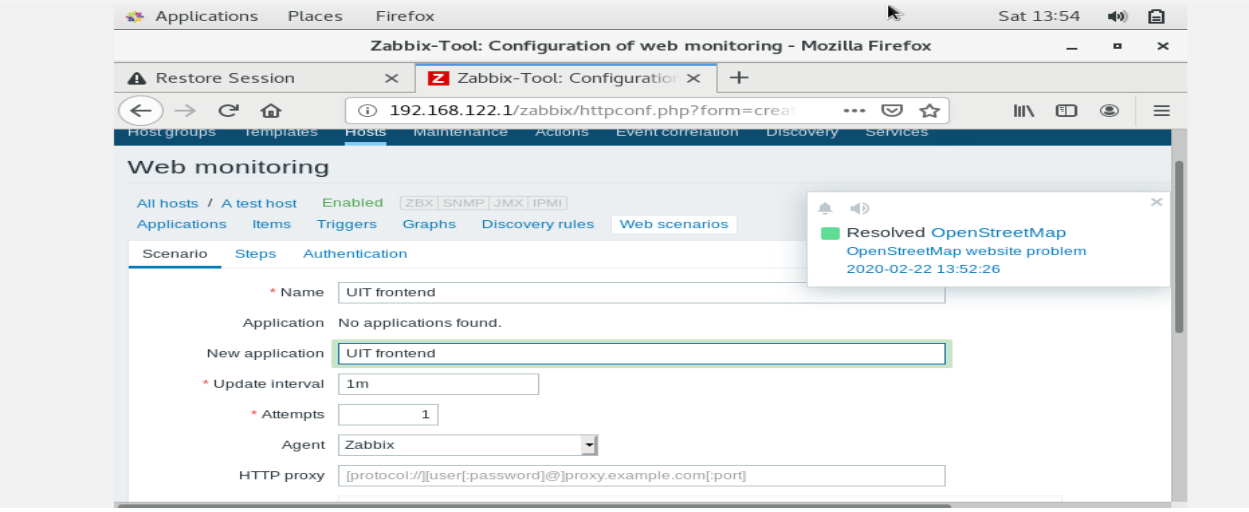


And ,the email will be sent :

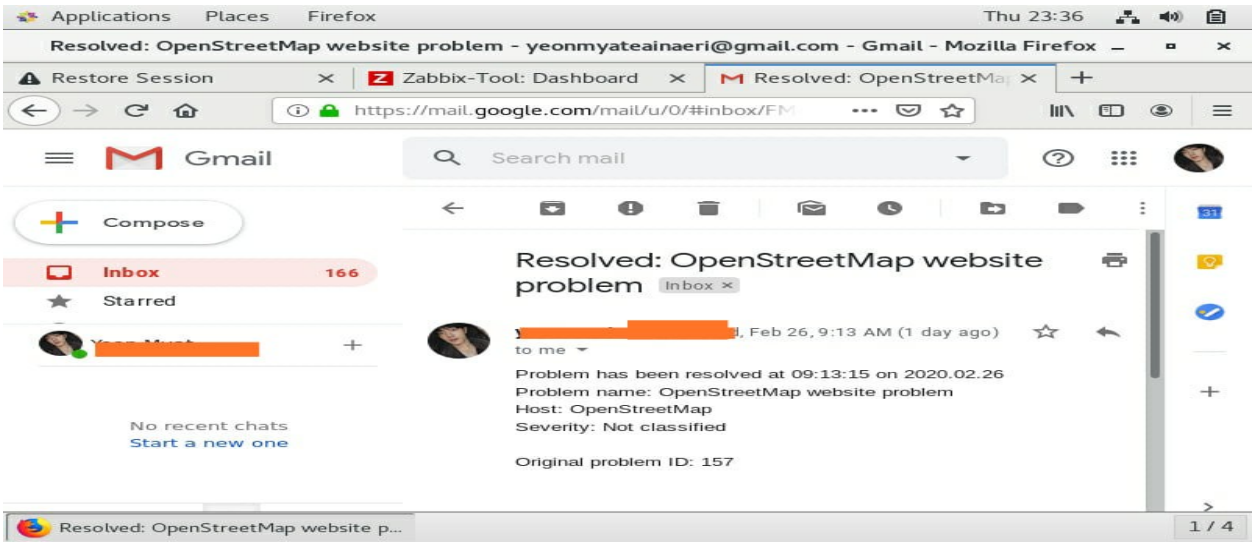


So, we need to check the steps and URL links

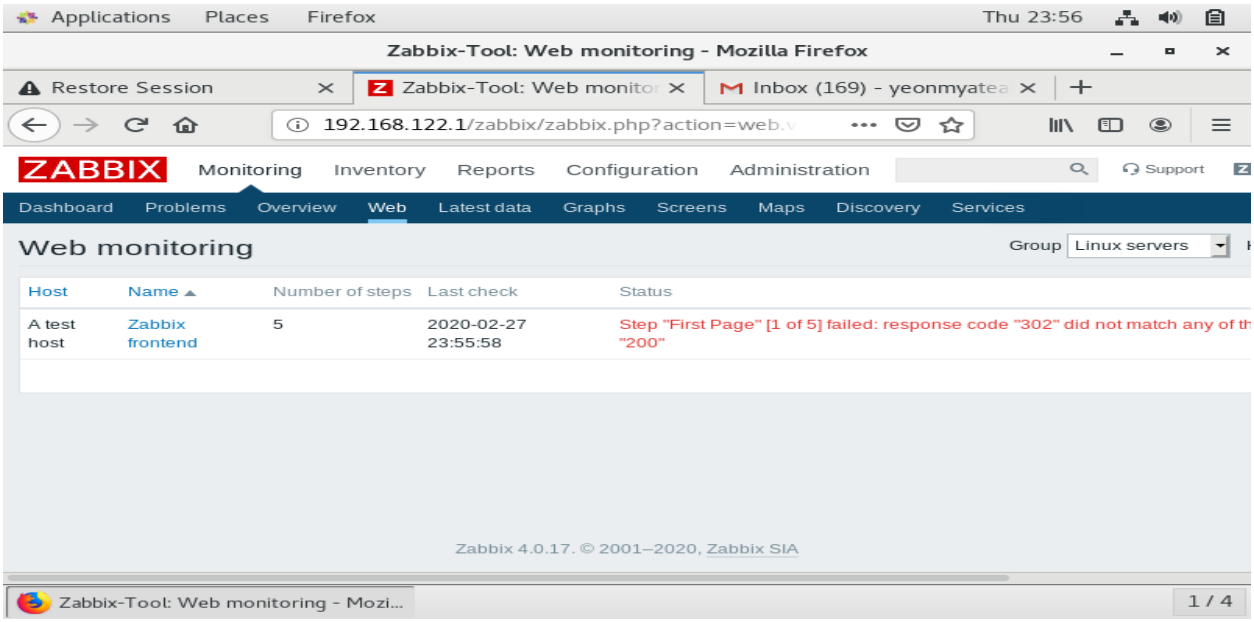
When we solved the problem and the notification is delivered.



In the Email,



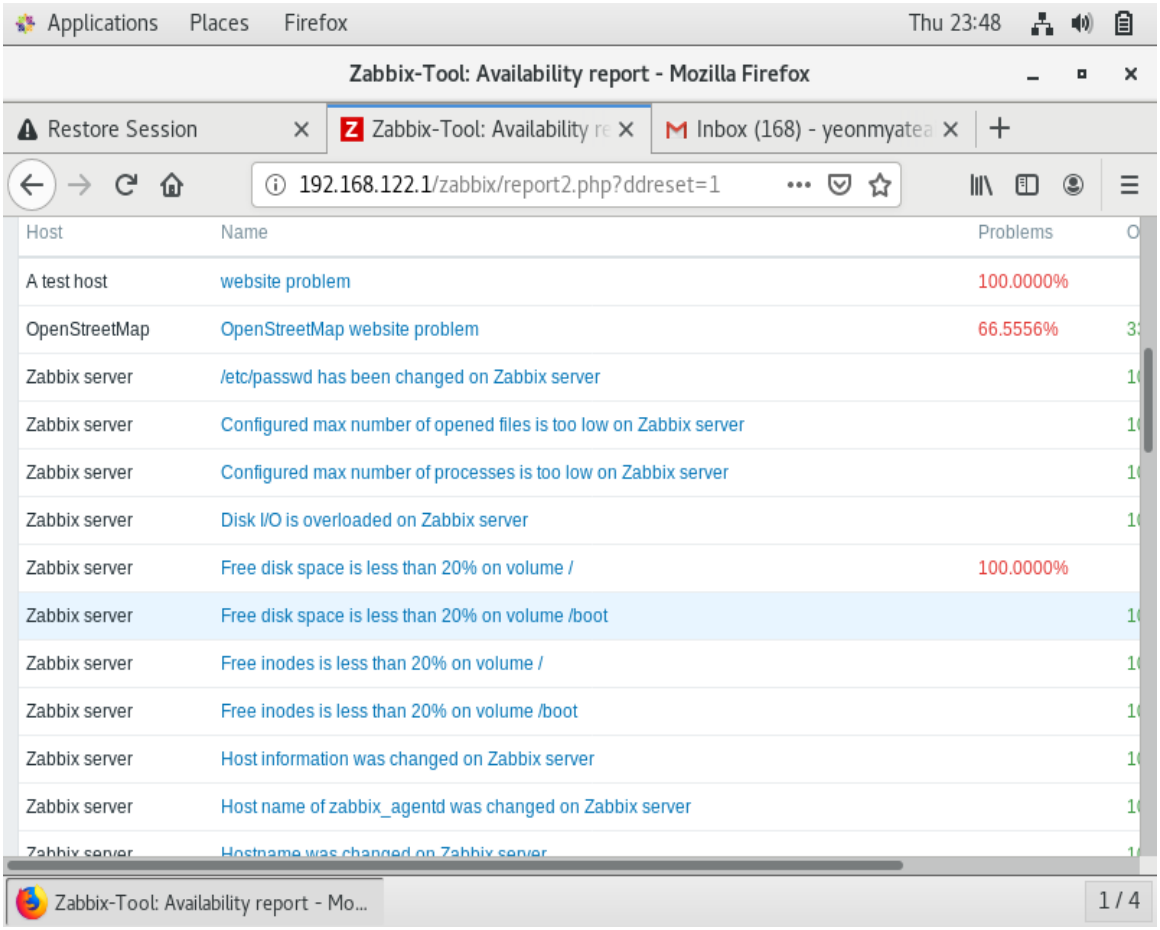
Another error may be :



Here, We need to know List of HTTP status code – Status codes are issued by a server in response to a client's request made to the server. There are five classes defined by the standard

- ***1xx informational response*** – the request was received, continuing process
- ***3xx redirection*** – further action needs to be taken in order to complete the request
- ***4xx client error*** – the request contains bad syntax or cannot be fulfilled
- ***5xx server error*** – the server failed to fulfil an apparently valid request

Now we can see the problem in Available report like this



Note: You need to access Internet in the whole configuration

There are many monitoring things by Zabbix Tool like network, system, service and so on.

You can also search and monitor other network.

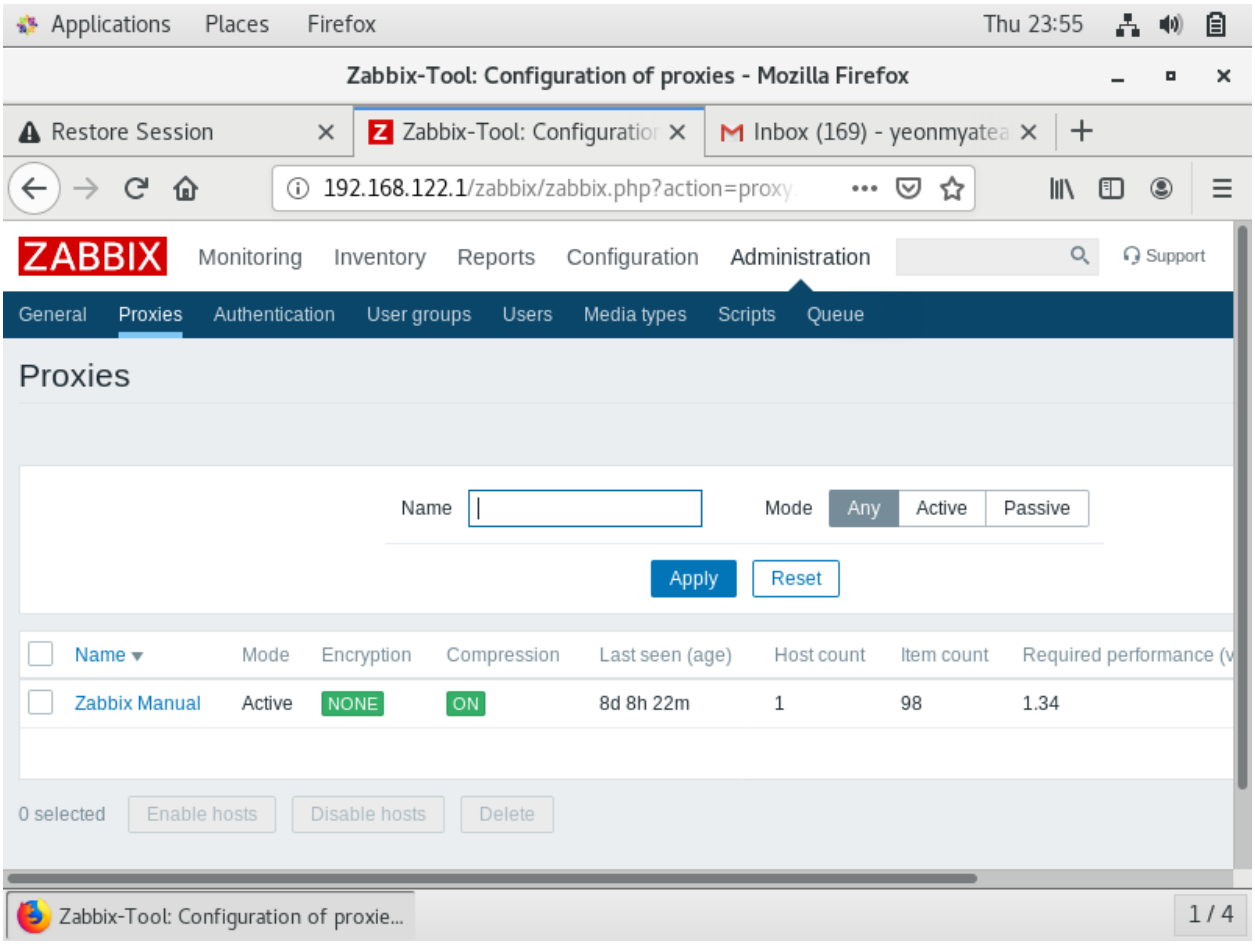
From above web monitoring, we can know

- The availability of website(like response code “200” is OK and “400” means the website is down).
- Performance of the website
- The header(HTTP) content of webpage

- The speed of website

We also learn trigger, item and action and how to monitor the remote network using zabbix agent and zabbix proxy.

4.5.Zabbix Proxy



We install proxy in terminal and can choose mode in configuration file.

5. Current Application of Zabbix

5.1.Companies using Zabbix

Companies around the world rely on Zabbix monitoring solution owing to its advanced features and robust performance. Among Zabbix customers and users are institutions and enterprises of different sizes operating in such industries as Finance and Insurance, IT&T, Healthcare and Public Sector, Food and Manufacture, Education and Retail and many other economy sectors.

- ARI network services 2, Inc USA (http://www.arinet.com/)
- ziw Telecom and media UAE (https://www.ziwo.io/)
- Alya S.r.l Italy (http://www.alya.it/)

5.1.1.Companies Providing Zabbix services in Myanmar

1.One Cloud Company Limited (http://www.1cloudtechnology.com/)
2.NEX4 (https://nex4.net/)

6.Pros & Cons

6.1.Pros of Zabbix

- easy to understand.
- scale without limits. provide installation on virtualization platforms.
- monitor and graph anything with built-templates.
- can monitor both Linux and Windows environments.

monitoring, sending alerts by email, integration with other tools, solid community.

- provides the configurability and granularity that enterprises demand, and delivers fast discovery.

6.2.Cons of Zabbix

- requires a lot of manual configuration and has some limits on exportable reports.
- Building out Zabbix metrics that suit your environment can be very time consuming.
- no window version for zabbix proxy.
- steep learning curve.

- resource hungry.

7.Reference

- https://www.zabbix.com/documentation/current/manual
- https://www.fosslinux.com/7705/how-to-install-and-configure-zabbix-on-centos-7.htm
- https://en.wikipedia.org/wiki/Zabbix
- Zabbix 4 network Monitoring pdf