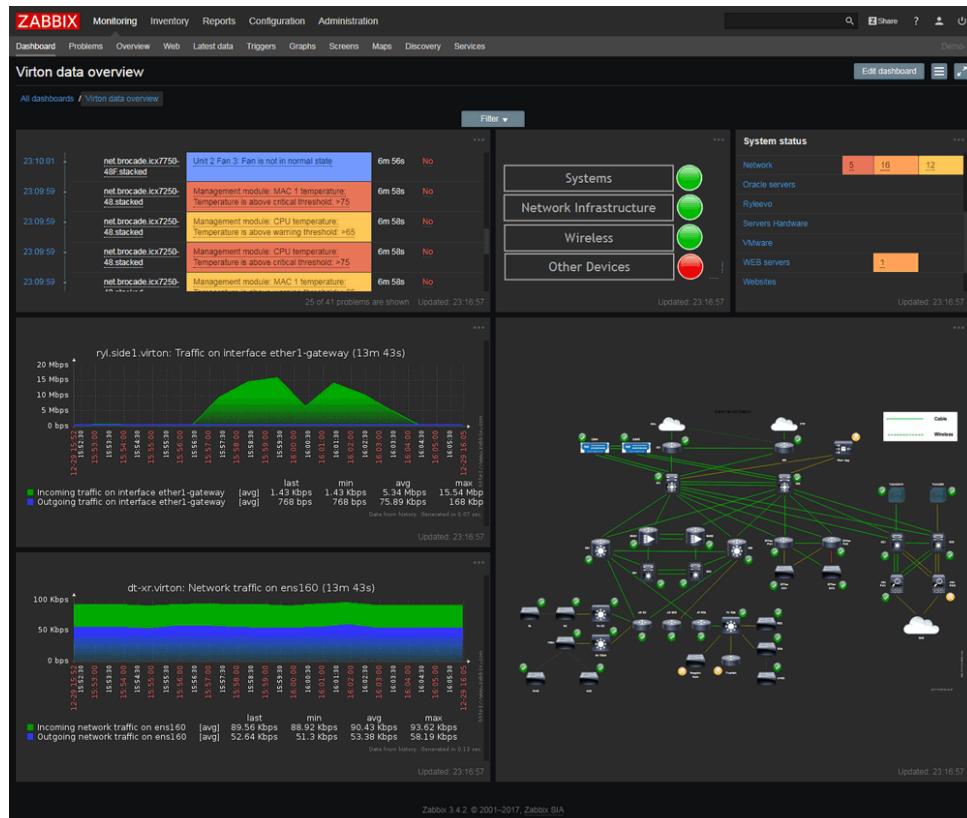




Zabbix: Monitor Cisco Switch or Router with SNMP template

Do you need to monitor Cisco switch or router with SNMP? Are you looking for 100% free open-source network monitoring software for that job?

Well then, you are in the right place, because in this tutorial I will show you how can you monitor network performance on Cisco routers and switches using [Zabbix](#) monitoring tool!



Picture showing user dashboard on Zabbix monitoring software

We will monitor network traffic (bandwidth), CPU utilization, power supply and serial numbers on Cisco switches and routers that use classic IOS (like Cisco Catalyst 3650, 3750, 3850, 2960, 2950, 2801, 2911 or routers 1841, 1921, etc.).

Keep in mind that you can also use this tutorial to monitor routers that use IOS-XR (like CRS series, 12000 series, and ASR9000 series, etc.) or Nexus switches (like series 7000, 9000, etc.)

Why this guide? My friend asked me to help him with Zabbix. He needed to monitoring Cisco routers and switches. I was like: “Why me? There are zillion tutorials online for that!”. He replied: “But there is no guide for total beginners with zero Linux experience”.

And he was right! It can be hard to find the right tutorial for network monitoring that will **guide you from scratch**.

So without further ado let's get started!

We will configure Zabbix to monitor Cisco switch and router with SNMP protocol (Don't know what is SNMP protocol? [Learn step by step: MIB, OID, Agent, Manager](#)).

Step 1: Configure SNMP on the Cisco device

Configure SNMPv2c on Cisco routers and switches with one command as shown below:

```
switch> enable
switch# configure terminal
switch(config)# snmp-server community MyCommunity RO
switch(config)# exit
switch# copy running-config startup-config
```

That will cover most Cisco devices, but if you need to use SNMPv3 or configure Nexus or ASA firewall then [read this short tutorial](#).

My favorite tool for testing SNMP is Net-SNMP. On Ubuntu/Debian you can install Net-SNMP tools with one simple command: “`apt-get install snmp`”, or if you have CentOS/RHEL you can use “`yum install net-snmp net-snmp-utils`”.

Run the following Net-SNMP command from Linux machine to **verify that SNMP is working as configured** on the device:

```
snmpwalk -v2c -c MyCommunity 192.168.1.1 1.3.6.1.2.1.1.1
iso.3.6.1.2.1.1.0 = STRING: "Cisco IOS Software, Catalyst 4500 L3 Switch
Software (cat4500-ENTSERVICESK9-M), Version 12.2(54)SG1, RELEASE SOFTWARE
(fcl)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2011 by Cisco Systems, Inc.
Compiled Thu 27-Jan-11 11:39 "
```

If your snmpwalk fails, then make sure that the network or local firewall on the device is not blocking UDP port 161.

Need more examples for Net-SNMP tool usage? Check out my post about [snmpwalk / snmpget examples](#).

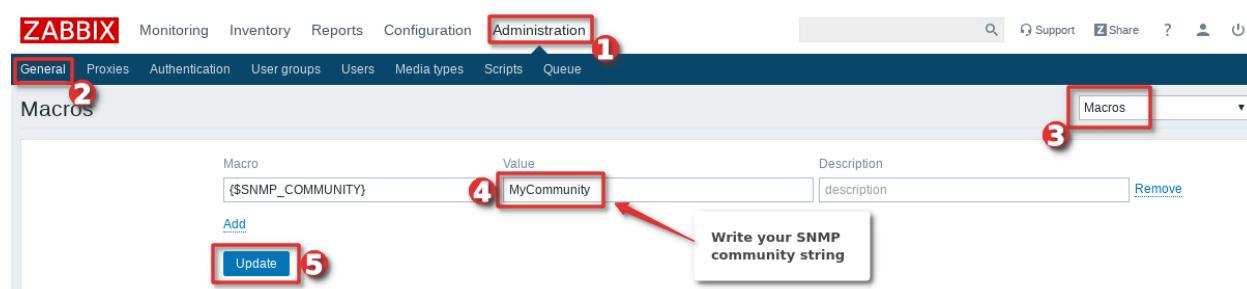
Step 2: Install Zabbix server

You can install Zabbix in 10 minutes. Depending on your operating system (OS) preferences you can follow [CentOS/RHEL](#), [Ubuntu](#), [Debian](#), [Raspberry Pi \(Rasbian\)](#) tutorial.

Step 3: Change global SNMP community string for all devices

Zabbix needs SNMP community string to retrieve data from SNMP enabled devices. A community string is like a password. Global SNMP community string in Zabbix is “`public`” and if you are using something else than you need to change it.

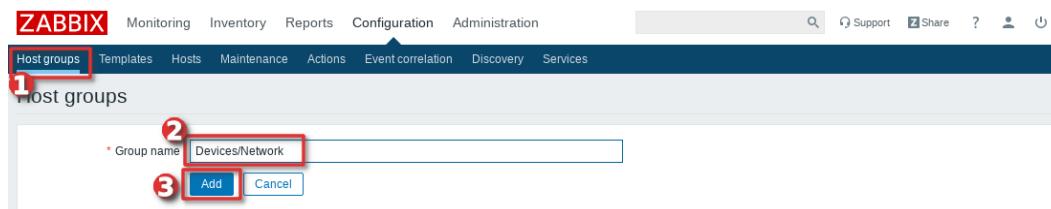
You can change community string for all devices by changing value for macro “`{$SNMP_COMMUNITY}`” under Administration→General→Macros just as shown in the picture below.



Picture showing how to change global macro `{$SNMP_COMMUNITY}` on Zabbix

Step 4: Create hostgroup

You can add a host to some existing hostgroup or you can create new hostgroups for your devices. I will create hostgroup “Devices/Network”:



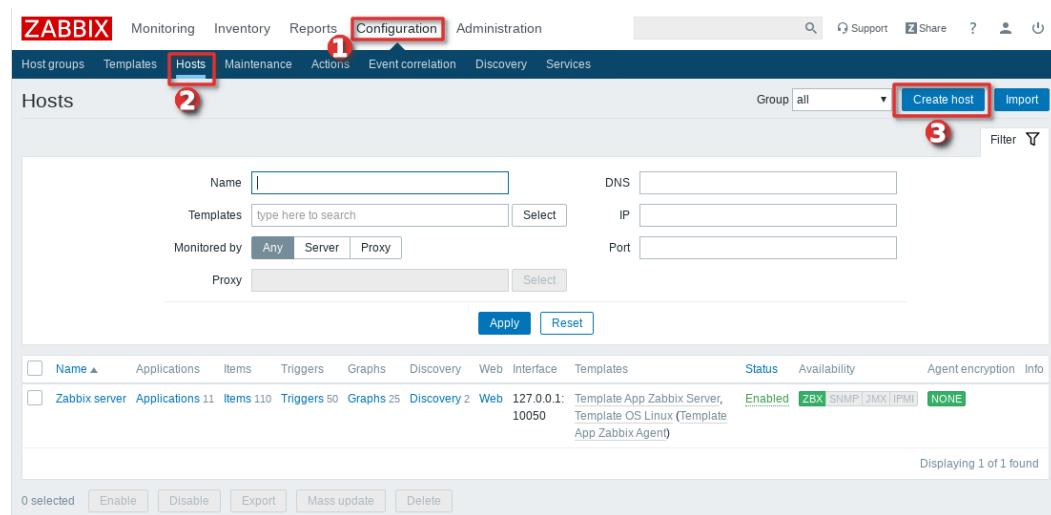
Picture showing how to create hostgroup on Zabbix

WELL DONE!

SNMP is enabled on the device and Zabbix is ready for monitoring. Now it's time to add that device to Zabbix.

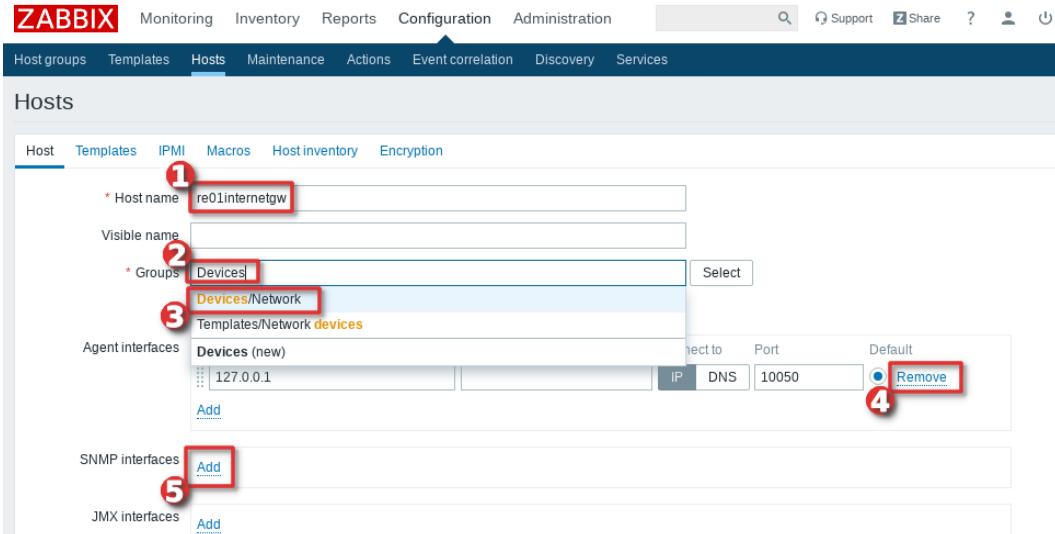
Step 5: Add host to Zabbix with appropriate SNMP template

Go to “Host” menu under “Configuration” tab and then click “Create host” option to create a host in Zabbix:



Picture showing how to create host on Zabbix – Step 1

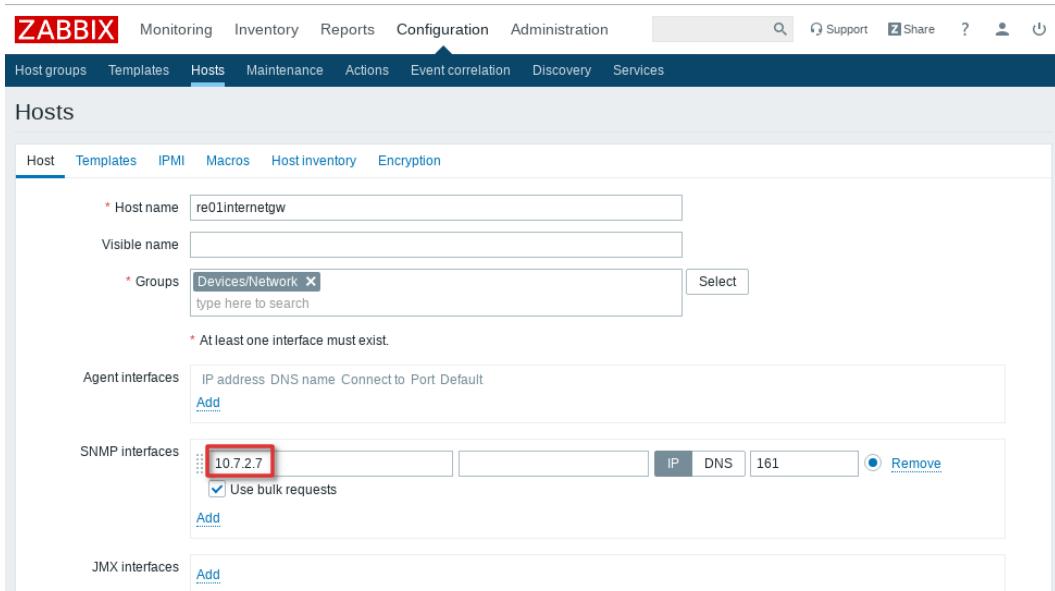
Define “Hostname” and set “Groups” using your newly created hostgroup. Then remove “Agent interfaces” (because we can’t use Zabbix agent on router or switch) and add “SNMP interfaces“:



The screenshot shows the Zabbix interface for creating a new host. The 'Host' tab is selected. Step 1 highlights the 'Host name' field with the value 're01internetgw'. Step 2 highlights the 'Groups' dropdown menu, which is open and shows 'Devices' and 'Devices/Network'. Step 3 highlights the 'Devices/Network' option in the dropdown. Step 4 highlights the 'Remove' button for an Agent interface entry. Step 5 highlights the 'Add' button under the 'SNMP interfaces' section.

Picture showing how to create host on Zabbix – Step 2

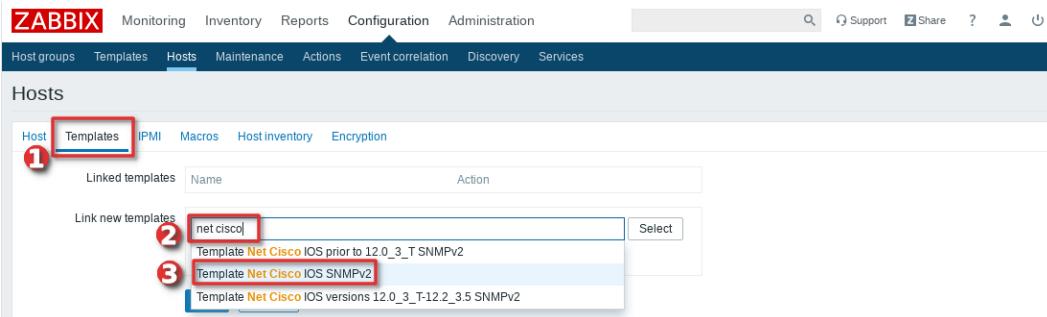
Under the “SNMP interfaces” set the management IP address or DNS name of the device:



The screenshot shows the Zabbix interface for creating a new host. The 'Host' tab is selected. The 'Host name' field contains 're01internetgw'. The 'Groups' dropdown menu is open, showing 'Devices/Network' with a delete icon. Step 6 highlights the 'IP' input field in the SNMP interfaces section, which contains '10.7.2.7'. Step 7 highlights the 'Add' button under the 'SNMP interfaces' section.

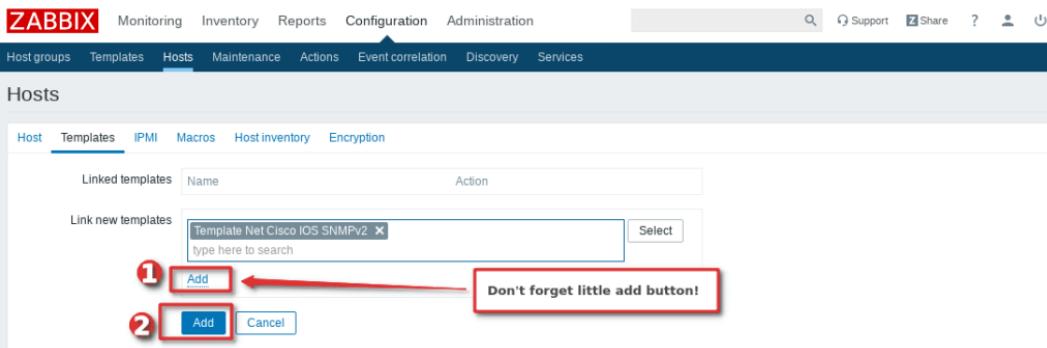
Picture showing how to create host on Zabbix – Step 3

Then switch to tab “*Templates*” and choose the appropriate template for your Cisco device under section “*Link new template*” by typing “net cisco”. Use “*Template Net Cisco IOS SNMPv2*” if you are not sure what to choose:



Picture showing how to create host on Zabbix – Step 4

After you have selected appropriate template click little “*Add*” button to link the template with the device and then press the big “*Add*” button:



Picture showing how to create host on Zabbix – Step 5

CONGRATULATIONS!

You have successfully configured Zabbix and your device is monitored.

CONTINUE TO LEARN MORE:

How to use Clone option? Changing community string per host. Force instant data collection. Configure screen with graphs for every host...

Step 6: Tips and tricks (optional)

This step is optional, but I strongly recommend the tips and tricks from this section, as they will ease your host administration in Zabbix.

Use Clone option

After you have added your first device you can add other similar devices very fast by using “Clone” option. Clicking on “Clone” will retain all host parameters and template linkage (don’t use “Full clone” option because it will retain directly attached entities: applications, items, triggers, graphs, low-level discovery rules, and web scenarios).

Steps for cloning are very simple. Find the host that you want to clone with the “Search” option:

The screenshot shows the Zabbix web interface. At the top, there is a navigation bar with links: Monitoring, Inventory, Reports, Configuration, Administration, Support, Share, Help, and Logout. A red box labeled '1' highlights the search bar which contains the text 're01internetgw'. Below the navigation bar is a secondary menu with links: Dashboard, Problems, Overview, Web, Latest data, Graphs, Screens, Maps, Discovery, and Services. A red box labeled '2' highlights the 're01internetgw' host entry in the search results table. The table has columns: Host, IP, DNS, Latest data, Problems, Graphs, Screens, Web, Applications, Items, Triggers, Graphs, Discovery, and Web. The host 're01internetgw' is listed with IP 10.7.2.7. The bottom right corner of the table area says 'Displaying 1 of 1 found'.

Picture showing how to clone a host in Zabbix – Step 1

Click on the “Clone” option, then change the “Host name” and “IP address” and add a new host by pressing “Add” button:

The screenshot shows the Zabbix interface for managing hosts. The top navigation bar includes links for Monitoring, Inventory, Reports, Configuration, Administration, and various support and sharing options. Below this is a secondary navigation bar with tabs for Host groups, Templates, Hosts (which is selected), Maintenance, Actions, Event correlation, Discovery, and Services.

The main content area is titled "Hosts" and shows a list of hosts. A search bar and filter options (All hosts / re01internetgw, Enabled, ZBX, SNMP, JMX, IPMI) are at the top of the list. Below the list are links for Applications (9), Items (14), Triggers (6), Graphs, Discovery rules (8), and Web scenarios.

The "Host" tab is active, showing fields for creating a new host:

- Host name:** re01internetgbackup (highlighted with a red box and labeled 3)
- Visible name:** (empty field)
- Groups:** Devices/Network (with a remove icon) (highlighted with a red box and labeled 2)
- Agent interfaces:** (empty field with an "Add" button)
- SNMP interfaces:** IP address: 10.7.2.8 (highlighted with a red box and labeled 1)
- JMX interfaces:** (empty field with an "Add" button)
- IPMI interfaces:** (empty field with an "Add" button)
- Description:** (empty text area)
- Monitored by proxy:** (no proxy)
- Enabled:** (checked checkbox)

At the bottom of the form are several buttons: **Update**, **Clone** (highlighted with a red box and labeled 4), **Full clone**, **Delete**, and **Cancel**. A callout bubble points to the "Clone" button with the instruction: "Hit the \"Add\" button after you clone the host and change the Host name / IP address".

Picture showing how to clone a host in Zabbix – Step 2

Use “Check now” to force instant data collection

It will take some time before Zabbix discovers components (interfaces, power supply, serial number, etc.) on the newly added device. Usually, it takes around 1 hour, but if you are impatient you can speed things up by using the “Check now” option.

Find the host that you want to force an instant check with “Search” option and click on “Discovery”:

ZABBIX Monitoring Inventory Reports Configuration Administration **re01internetgw** Support Share ?

Dashboard Problems Overview Web Latest data Graphs Screens Maps Discovery Services

Search: re01internetgw

Hosts													
Host	IP	DNS	Latest data	Problems	Graphs	Screens	Web	Applications	Items	Triggers	Graphs	Discovery	Web
re01internetgw	10.7.2.7		Latest data	Problems	Graphs	Screens	Web	Applications 9	Items 14	Triggers 6	Graphs	Discovery 8	Web

Displaying 1 of 1 found

Picture showing how to instantly check all the items and LLD discoverys on Zabbix host – Step 1

Select all discoveries and click “Check now”:

ZABBIX Monitoring Inventory Reports Configuration Administration Support Share ?

Host groups Templates Hosts Maintenance Actions Event correlation Discovery Services

Discovery rules [Create discovery rule](#)

All hosts / re01internetgw Enabled ZBX SNMP JMX IPMI

Applications 9 Items 14 Triggers 6 Graphs Discovery rules 8 Web scenarios

<input checked="" type="checkbox"/>	Name	Items	Triggers	Graphs	Hosts	Key	Interval	Type	Status	Info
<input checked="" type="checkbox"/>	Template Module Cisco CISCO-PROCESS-MIB SNMPv2: CPU Discovery	Item prototypes 1	Trigger prototypes 1	Graph prototypes 1	Host prototypes	cpu.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Cisco Inventory SNMPv2: Entity Serial Numbers Discovery	Item prototypes 1	Trigger prototypes 1	Graph prototypes	Host prototypes	entity_sn.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module EtherLike-MIB SNMPv2: EtherLike-MIB Discovery	Item prototypes 1	Trigger prototypes 1	Graph prototypes	Host prototypes	net.if.duplex.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Cisco CISCO-ENVMON-MIB SNMPv2: FAN Discovery	Item prototypes 1	Trigger prototypes 2	Graph prototypes	Host prototypes	fan.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Cisco CISCO-MEMORY-POOL-MIB SNMPv2: Memory Discovery	Item prototypes 3	Trigger prototypes 1	Graph prototypes 1	Host prototypes	memory.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Interfaces SNMPv2: Network Interfaces Discovery	Item prototypes 9	Trigger prototypes 4	Graph prototypes 1	Host prototypes	net.if.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Cisco CISCO-ENVMON-MIB SNMPv2: PSU Discovery	Item prototypes 1	Trigger prototypes 2	Graph prototypes	Host prototypes	psu.discovery	1h	SNMPv2	Enabled agent	
<input checked="" type="checkbox"/>	Template Module Cisco CISCO-ENVMON-MIB SNMPv2: Temperature Discovery	Item prototypes 2	Trigger prototypes 3	Graph prototypes	Host prototypes	temperature.discovery	1h	SNMPv2	Enabled agent	

Displaying 8 of 8 found

8 selected [Enable](#) [Disable](#) **Check now** [Delete](#)

Picture showing how to instantly check all the items and LLD discoverys on Zabbix host – Step 2

Items have faster polling intervals (around 1 minute) so there is no need to use “Check now” on them. However, you can force instant check even for them. Move to “Items” sections and do the same: select all items (ignore “SNMP trap” and “Zabbix Trapper” item types) and click “Check now”:

The screenshot shows the Zabbix interface for managing items. At the top, the navigation bar includes links for Monitoring, Inventory, Reports, Configuration, and Administration. Below the navigation bar, the main menu has tabs for Host groups, Templates, Hosts, Maintenance, Actions, Event correlation, Discovery, and Services. The 'Hosts' tab is selected.

In the center, the 'Items' section is displayed. At the top of this section, there is a search bar and several filters. A red box labeled '1' highlights the 'Applications 9' and 'Items 14' buttons. Below these buttons are search fields for Host group, Host, Application, Name, and Key, along with dropdowns for Type, Type of information, State, History, Status, Trends, Triggers, Template, and Discovery. Buttons for 'Apply' and 'Reset' are also present.

Below the search area, there is a subfilter note: "Subfilter affects only filtered data". Under the 'APPLICATIONS' heading, there are links for General 5, Inventory 3, and Status 5. A red box labeled '2' highlights the 'Simple check 3' button, which is part of a group of buttons: 'Simple check 3', 'SNMP trap +1', 'SNMPv2 agent 9', and 'Zabbix internal 1'. A tooltip for this group says: "Select all item types except: SNMP trap and Zabbix Trapper".

Further down, under 'TYPE OF INFORMATION', there are links for Character 8, Log 0, Numeric (float) 2, and Numeric (unsigned) 3. Under 'WITH TRIGGERS', there are links for Without triggers 7 and With triggers 6. Under 'HISTORY', there are links for 7d 3, 14d 10, and 1y 3. Under 'TRENDS', there are links for 0 2, 1y 3. Under 'INTERVAL', there are links for 30s 1, 1m 4, 1h 8.

The main table lists items. A red box labeled '3' highlights the 'Wizard' checkbox. A red arrow labeled '4' points from the 'Check now' tooltip to the bottom of the table, where a callout says: "Click 'Check now' option on the bottom!". The table columns include: Wizard, Name ▲, Triggers, Key, Interval, History, Trends, Type, Applications, Status, Info. The table contains several rows, each with a checkbox and a link to its configuration page.

Picture showing how to instantly check all the items and LLD discoverys on Zabbix host – Step 3

Change SNMP community string per host

What if one device has a different SNMP community string and – for some reason – you can't change it on the device? No problem, you can set different SNMP community on any host in Zabbix.

Find the host that that is using different SNMP community with the "Search" option:

Host	IP	DNS	Latest data	Problems	Graphs	Screens	Web	Applications	Items	Triggers	Graphs	Discovery	Web
re01internetgw	10.7.2.7		Latest data	Problems	Graphs	Screens	Web	Applications 9	Items 14	Triggers 6	Graphs	Discovery 8	Web

Picture showing how to change the SNMP community string only for one host – Step 1

Under host configuration select "Macros" and change tab to "Inherited and host macros". Click "Change" on macro "{\$SNMP_COMMUNITY}" and enter your new community string. Hit the "Update" button after changing the SNMP community.

Macro	Effective value	Template value	Global value (configure)
{\$CPU_UTIL_MAX}	90	Change ← Template Module Cisco CISCO-PROCESS...	
{\$FAN_CRIT_STATUS:"critical"}	3	Change ← Template Module Cisco CISCO-ENVMON...	
{\$FAN_CRIT_STATUS:"shutdown"}	4	Change ← Template Module Cisco CISCO-ENVMON...	
{\$FAN_WARN_STATUS:"notFunc"}	6	Change ← Template Module Cisco CISCO-ENVMON...	
{\$FAN_WARN_STATUS:"warning"}	2	Change ← Template Module Cisco CISCO-ENVMON...	
{\$ICMP_LOSS_WARN}	20	Change ← Template Module ICMP Ping: "20"	
{\$ICMP_RESPONSE_TIME_WARN}	0.15	Change ← Template Module ICMP Ping: "0.15"	
{\$IFCONTROL}	1	Change ← Template Module Interfaces SNMPv2: "1"	
{\$IF_ERRORS_WARN}	2	Change ← Template Module Interfaces SNMPv2: "2"	
{\$IF_UTIL_MAX}	90	Change ← Template Module Interfaces SNMPv2: "90"	
{\$MEMORY_UTIL_MAX}	90	Change ← Template Module Cisco CISCO-MEMORY-P...	
{\$PSU_CRIT_STATUS:"critical"}	3	Change ← Template Module Cisco CISCO-ENVMON...	
{\$PSU_CRIT_STATUS:"shutdown"}	4	Change ← Template Module Cisco CISCO-ENVMON...	
{\$PSU_WARN_STATUS:"notFunc"}	6	Change ← Temp Hit "Update" button after changing the SNMP community	
{\$PSU_WARN_STATUS:"warning"}	2	Change ← Template Module Cisco CISCO-ENVMON...	
{\$SNMP_COMMUNITY}	MyCommunity	Change ← "MyCommunity"	
{\$SNMP_TIMEOUT}	3m	Change ← Template Module Generic SNMPv2: "3m"	

Picture showing how to change the SNMP community string only for one host – Step 2

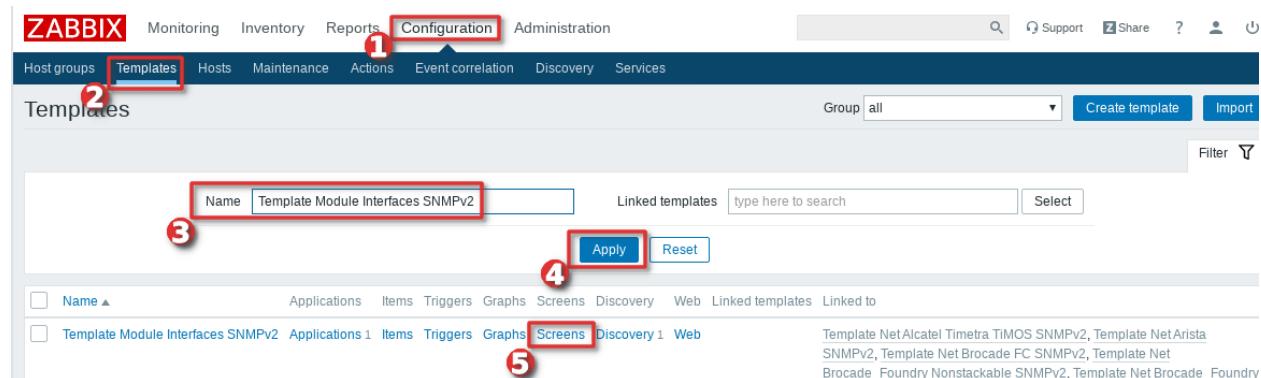
Configure screen with graphs for every host

Default Zabbix template “Template Module Interfaces SNMPv2” for monitoring network interface traffic is not bad, but it needs lots of improvement. Checking graphs on a host by selecting one by one is just painful and awkwardly implemented.

I will show you how can you configure that default template to show all the graphs that some host has on one screen (check out the last screenshot under this chapter)

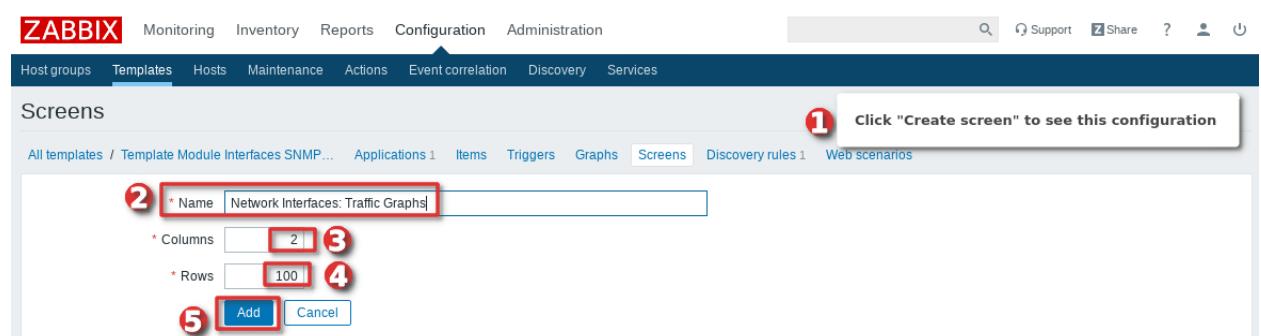
“Template Module Interfaces SNMPv2” is linked with all SNMP templates, including the Cisco template that we used in this tutorial so you will only need to do this change once.

Go to “Configuration”→“Templates”, enter in name filter “Template Module Interfaces SNMPv2”, click “Apply” and select “Screens”.



Picture showing how to configure screen on hosts using template – Step 1

Click on “Create screen“, define the “Name” for screen, set “Columns” to 2 and “Rows” to 100 and click “Add” button.



Picture showing how to configure screen on hosts using template – Step 2

Configure graphs on the screen by selecting “Constructor” option.

ZABBIX Monitoring Inventory Reports Configuration Administration

Screens

Name	Dimension (cols x rows)	Actions	Properties
Network Interfaces: Traffic Graphs	2 x 100		Constructor 1

Picture showing how to configure screen on hosts using template – Step 3

Click on “Change” in the first row.

ZABBIX Monitoring Inventory Reports Configuration Administration

Screens: Network Interfaces: Traffic Graphs

Change	Change	Change
Change	Change	Change

Picture showing how to configure screen on hosts using template – Step 4

Choose “Graph prototype” from dropdown menu “Resource”; select “Network traffic” protograph for “Graph prototype”; set 2 for “Max columns”, 600 for “Width”, 140 for “Height”, 2 for “Column span” and 1 for “Row span”.

ZABBIX Monitoring Inventory Reports Configuration Administration

Screens: Network Interfaces: Traffic Graphs

Resource: Graph prototype ①

Graph prototype: Template Module Interfaces SNMPv2: Interface (#IFNAME)(#IFALIAS): Network ②

Max columns: 2 ③

Width: 600

Height: 140

Horizontal align: Left Centre Right

Vertical align: Top Middle Bottom

Column span: 2 ④

Row span: 1

Add ⑤ Cancel

Picture showing how to configure screen on hosts using template – Step 5

That's it! Now you can view graphs in one place.

ZABBIX Monitoring Inventory Reports Configuration Administration

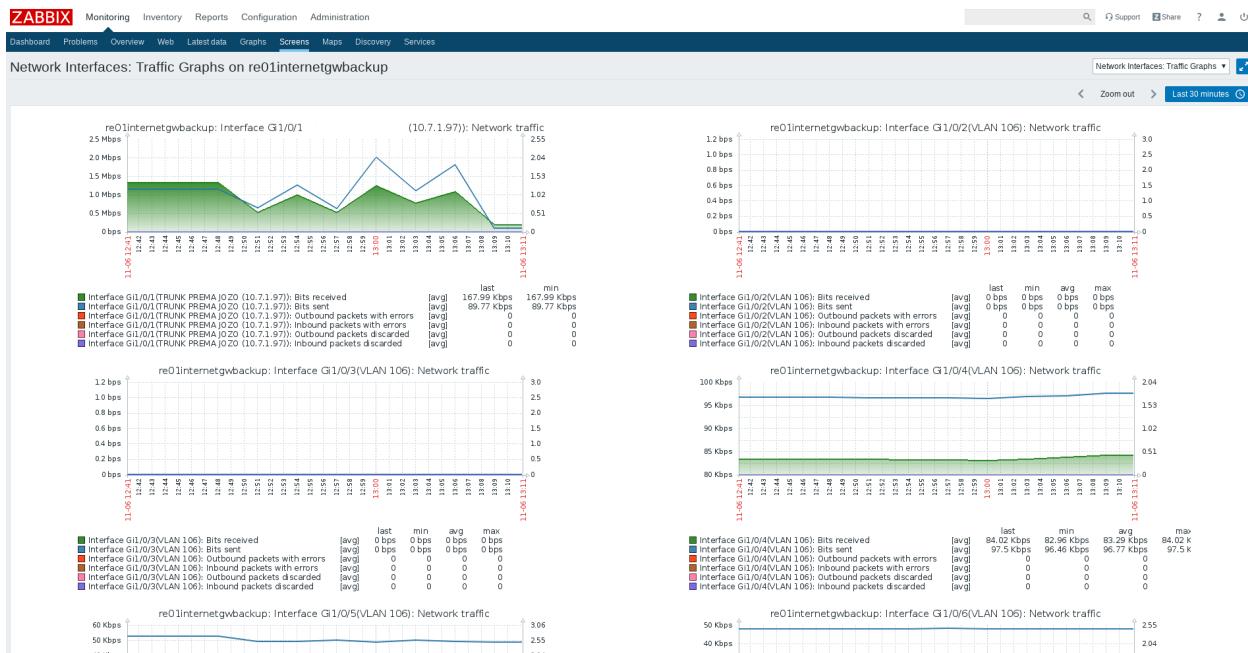
Search: re01internetgwbackup

Hosts

Host	IP	DNS	Latest data	Problems	Graphs	Screens	Web	Applications	Items	Triggers	Graphs	Discovery	Web
re01internetgwbackup	10.7.1.95		Latest data	Problems	Graphs	Screens	Web	Applications 9	Items 269	Triggers 127	Graphs 30	Discovery 8	Web

Displaying 1 of 1 found

Picture showing how to view graphs on host using screen – Step 1



Picture showing how to view graphs on host using screen – Step 2

Thank you for reading.

Now, that you have your routers and switches monitored, you can try out [Zabbix interactive topology maps!](#)