

How to simulate network devices using the Verax SNMP Simulator (Linux/Windows)

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Abstract

This publication provides an overview on how to simulate devices using the Verax SNMP Simulator and it's intended for developers implementing SNMP solutions, QA specialists involved in testing SNMP tools or other IT personnel involved in maintenance, testing and demonstrating SNMP tools, such as network management systems.

Agenda

1. Verax SNMP Simulator installation
2. Extracting SNMP record files from a physical device
3. Adding a device to the list of simulated devices in SNMP Simulator
4. Starting the Verax SNMP Simulator
5. Adding a simulated device to Verax NMS

System requirements

- 32 or 64 bit Linux distributions including: SuSE, RedHat Enterprise and Debian using i386 and x64 architectures.
- 32 or 64 bit Microsoft Windows systems including: XP, Server 2003, Vista, 7 and higher.
- RAM: at least 128 MB (depending on the number of simulated SNMP agents).
- Disk space: at least 100 MB (depending on the number of simulated SNMP agents).
- TCP/IP network connection.
- Java 1.6 or higher installed.

Notation used

The following logotypes are used to flag information relevant to a particular operating system:



Linux



Microsoft Windows

1. Verax SNMP Simulator installation

In order to install the Verax SNMP Simulator, perform the following actions:

1. Download the Verax SNMP Agent Simulator package.
2. Unzip the package content to the installation directory (the directory must be created manually). Recommended installation directory for the simulator is:

LINUX /usr/local/vxsnmpsimulator

WIN C:/Program Files/vxsnmpsimulator

3. Create and move **simulator.conf** file to the following directory:

LINUX /etc/verax.d/

WIN %SYSTEMROOT%\etc\verax.d
(where %SYSTEMROOT% indicates location where Windows system is installed; usually C:\Windows)

4. Open the **simulator.conf** file, find the line with the **SIMULATOR_HOME** variable and change the variable to point to the installation directory, e.g.

SIMULATOR_HOME=/usr/local/vxsnmpsimulator

SIMULATOR_HOME= C:"Program Files"\vxsnmpsimulator

5. Open the **simulator.conf** file and make sure that java.exe is in the PATH environment variable or specify which java to use by setting the **JRE_HOME** variable in **simulator.conf**, e.g.

JRE_HOME=/usr/local/java/jdk1.6.0_14/bin/

JRE_HOME= C:"Program Files"\Java\jdk1.6.0_14\bin

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6. If running on Linux, pay attention to the name of the interface (e.g. 'eth1') which is used to create interface aliases (e.g. 'eth1:0', 'eth1:1', etc.). The primary interface must be present before the Verax SNMP Simulator starts, e.g.

PRIMARY_INTERFACE='eth1'

7. If running on Linux, copy the **simulatord** file to the **/etc/init.d** directory.
8. If running on Linux, give execute permission to the following files:
 - `chmod +x /etc/init.d/simulatord`
 - `chmod +x /usr/local/vxsnmpsimulator/conf/stop`
 - `chmod +x /usr/local/vxsnmpsimulator/conf/vlan_up`
 - `chmod +x /usr/local/vxsnmpsimulator/conf/vlan_down`

2. Extracting SNMP record files from a physical device

Extracting SNMP record files from a physical device can be done using the **snmpwalk** command. Therefore, in order to extract SNMP record files from an existing device, the SNMP tools allowing for executing snmpwalk command should be installed, e.g. NET-SNMP.

NET-SNMP can be downloaded for free from: <http://sourceforge.net/projects/net-snmp>

1. Open the Command Line and go to the NET-SNMP installation directory (e.g. C:\user\bin).
2. If running on Linux, open the terminal window (shell).
3. If running on Windows, open the Command Line and go to the NET-SNMP installation directory (e.g. C:\user\bin).
4. In order to prepare SNMP record file reflecting actual SNMP agent available at given IP address, use the SNMP tools and issue the following command:

```
snmpwalk -On -Oe -OU -v2c -c public address > [destination folder]\filename.txt
```

e.g.

```
snmpwalk -On -Oe -OU -v2c -c public 192.168.100.8 > C:\Program Files\vxsnmpsimulator\device\  
cisco-snmprecordfile.txt
```

5. The **cisco-snmprecordfile.txt** file containing OIDs of the real device will be stored in the device directory.

3. Adding device to the list of simulated devices in SNMP simulator

1. Go to the vxsnmpsimulator directory.
2. Navigate to the **conf** directory, open **devices.conf.xml**, and add a new <type> record for a simulated device.
3. In order to add a new device, you have to provide a path to a recently generated file (cisco-snmpprecordfile.txt) and add a new IP address. Remember that the new IP address must be virtual (see APPENDIX).

e.g.

```
<type filepath="..\device\cisco-snmpprecordfile.txt">
```

```
    <devices>
```

```
        <device ip="192.168.160.34" netmask="24" port="161"></device>
```

```
    </devices>
```

```
</type>
```

4. The **cisco-snmpprecordfile.txt** file containing OIDs of the real device will be stored in the device directory.

4. Starting the Verax SNMP Simulator

Before running the Verax SNMP Simulator, make sure that port 161 is available. If not, stop any process using port 161.

1. In order to start the Verax SNMP Simulator, perform the following steps:



1. Run the **simulator.bat**.
2. A menu is displayed with the following options:
 1. **Start Simulator**
 2. **Stop Simulator**
 3. **Connect console to simulator**
 4. **Show status**
 5. **Quit**
3. Choose option 1 (**Start Simulator**).



- Issue the following command in a terminal window (shell):
- ```
service simulatord start
```

Please note that starting the service initiates the process of loading network configuration and creating virtual interfaces (on Linux).

All errors and main activities of the simulator service are logged into the application log file. The log file **SimulatorSNMP.log** is located in the installation directory. On Linux, the simulation process runs as a background daemon and can be managed as any other service (e.g. can be configured to be run upon system startup). On Windows, it runs as a foreground process started by the **simulator.bat** batch file.

2. Connect console to simulator.



- Choose option 3 (**Connect console to simulator**).



- Issue the following command in the terminal window shell:
- ```
service simulatord console
```


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- The Management Console will ask for connection details (it may connect to multiple simulators). By default, the simulator service process is running on the same server as the Management Console – in such a case confirm the default parameters by pressing “y” at the prompt:

Do you want to connect to default simulator server? [y/n]

The default connection parameters are 127.0.0.1:43500 (localhost as the host name and 43500 for TCP port).

- Use the **SHOW** command to list simulated devices.
- A list of simulated devices is displayed.

```
1624938286 : /root/simulator/conf/../../device/upc/cmts.txt
-----
Dev Id      IP Address      Netmask Port  STATE      Interface IPs
-----
684449774   192.168.112.113 24      161      Running    192.168.112.113
-----
1980091231 : /root/simulator/conf/../../device/cisco-snmprecordfile.txt
-----
Dev Id      IP Address      Netmask Port  STATE      Interface IPs
-----
1665641068  192.168.160.34  24      161      Running    192.168.160.34
-----
936105727  : /root/simulator/conf/../../device/juniper/juniper_firewall.txt
-----
Dev Id      IP Address      Netmask Port  STATE      Interface IPs
-----
1220417232  192.168.112.18  24      161      Running    192.168.112.18
-----
2144255135 : /root/simulator/conf/../../device/juniper/juniper ERX Series.txt
-----
Dev Id      IP Address      Netmask Port  STATE      Interface IPs
-----
1870207216  192.168.112.242 24      161      Running    192.168.112.242
\>
```

Figure 1: List of simulated devices

- Make sure your simulated devices are in the “**Running**” state. If not, check if the simulator is able to bind the interface or examine the log file.

5. Adding simulated device to Verax NMS

To add a simulated device to Verax NMS, perform the following steps:

1. Make sure that SNMP simulator is started.
2. Open Verax NMS.
3. Navigate to the **Network** view using the main menu and select the **Device list** tab.

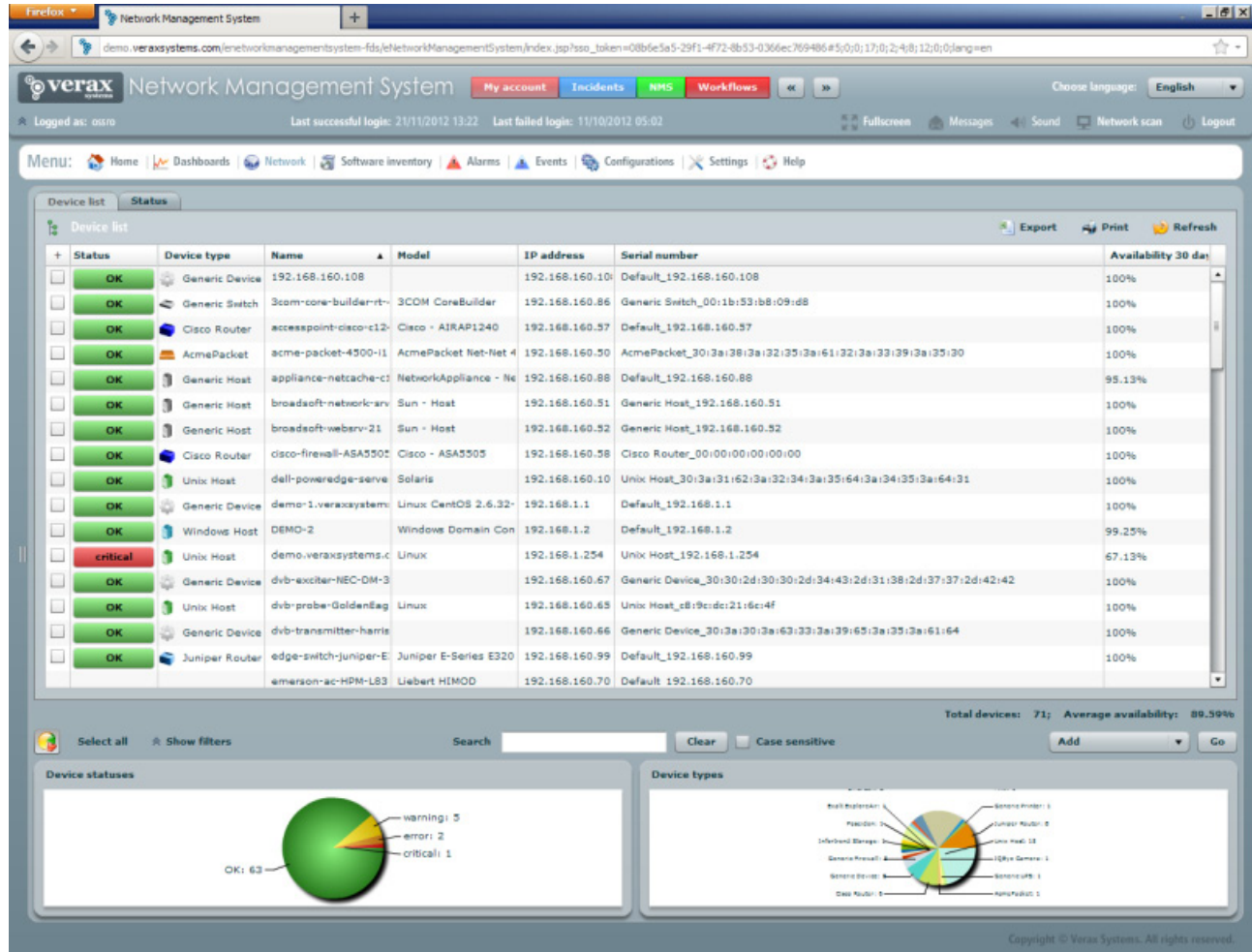


Figure 2: Devices list view

4. Select **Add** from the global action menu and click **Go**.
5. Once the data has been loaded, the edit window appears with the device attributes ready for input.

NOTE: Provide IP address of device simulated by SNMP simulator.

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The screenshot shows a dialog box titled "Add new device" with a close button (X) in the top right corner. It has two tabs: "Device details" and "Asset information". The "Asset information" tab is selected. The form contains the following fields and controls:

- Name ***: An empty text input field with a red border.
- Address ***: A text input field containing "0 . 0 . 0 . 0".
- SNMP login credential**: A dropdown menu showing "No login credential".
- Add**: A small button to the right of the SNMP login credential dropdown.
- Model**: An empty text input field.
- Category**: A dropdown menu showing "Wireless AP".
- Type**: A dropdown menu showing "Default".
- Group**: A dropdown menu showing "All groups".
- Description**: A large empty text area.
- Add**: A button with a green arrow icon at the bottom left.
- Cancel**: A button with a red X icon at the bottom right.

Figure 3: Adding a new device dialog

6. Click the **Add** button.
7. System will ask whether to rediscover newly added device, click **Yes** to accept.
8. The device has been successfully added to the list of devices monitored by Verax NMS.

The screenshot shows the "Device list" view in Verax NMS. It has two tabs: "Device list" and "Status". The "Device list" tab is active. Below the tabs is a tree view icon and the text "Device list". The main area contains a table with the following data:

	Status	Device type	Name	Model	IP address
<input type="checkbox"/>	OK	Cisco Switch	Ericsson_SW1	Cisco - Catalyst 37xxStack	192.168.160.241
<input checked="" type="checkbox"/>	OK	Cisco Switch	disco-switch-Cisco4900_Core_SW-3_Simulated	Cisco - Catalyst 4900M	192.168.160.34
<input type="checkbox"/>	OK	Cisco Switch	disco-switch-Cisco4900_Core_SW-3	Cisco - Catalyst 4900M	192.168.160.8

Figure 4: Simulated device view

APPENDIX

How to configure Virtual IP Address in Windows XP/2000/ME/2003

Important: This procedure can be performed only by a user with admin privilege.

1. Click **Start**, select **Settings** and **Network Connections**.
2. Select **Local Area Connection** and click **Properties**.
3. In the Local Area Connection Properties dialog box, click **Internet Protocol (TCP/IP)**, and then **Properties**.
4. Click **Advanced**. The Advanced TCP/IP settings dialog box is displayed showing all configured IP addresses.
5. Click **Add** below the IP Addresses section and add a new IP address along with a corresponding subnet mask (you may add as many addresses as required).
6. Restart the system for changes to take effect.