

Network Monitoring

Introduction

When you operate a network, you may want to know the status of each hosts on your network, the traffic rate flowing from and into each hosts, and so on. In short, you may want to know what is going on on the network so you can make decisions on what to do. TCP/IP suites provide a protocol called SNMP (Simple Network Management Protocol) to serve you with this purpose.

You can gather network information set host parameters remotely using SNMP. The SNMP works basically as follows (Figure 1): a host acting as the SNMP Manager sends a command to another host acting as an SNMP Agent. The Agent then returns the appropriate responds to the Manager.

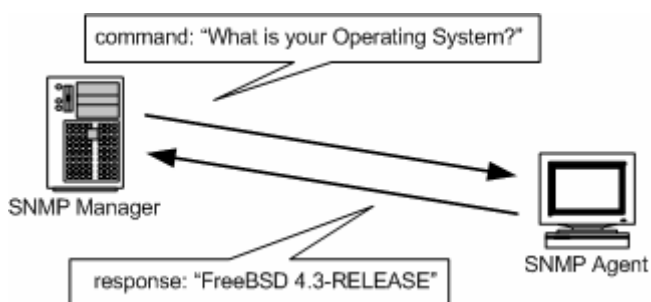


Figure 1: How SNMP works (Illustration)

With SNMP, you can get data such as:

1. a hosts' uptime
2. a hosts' system description
3. a hosts' available memory
4. the amount traffic flowing in and out of a network interface
5. a host process; i.e. you know whether the web server is up and running

This kind of data helps you to manage your network.

This document will explain step-by-step procedures to monitor your network using MRTG. To achieve this, you need these software:

1. UCD-SNMP or Net-SNMP;
2. Apache Web Server
3. Perl

4. MRTG

You can get these software from the source or get the binary packages. In this tutorial, I assume:

1. Apache web server and Perl are already available in your system
2. You will install Net-SNMP and MRTG from their sources.

SNMPD

This section explains the steps to run Net-SNMP, which is a freely available SNMP implementation.

Download the source

You can download the Net-SNMP by following this URL

<http://net-snmp.sourceforge.net/>

I assume that you get the Net-SNMP 5.0.6 release.

Extract the tarball

```
% tar zxvf net-snmp-5.0.6.tar.gz
```

Go to the source directory

```
% cd net-snmp-5.0.6
```

You may want to check the README, INSTALL, and FAQ files

Configure

```
% sh ./configure
```

You will be asked for several information. Enter the appropriate answers.

Compile the sources

```
% make
```

Install the binary

You must run the next commands as root

```
# umask 022
```

```
# make install
```

Create the configuration file

You need to create a configuration file before you run the snmp daemon. You may want to create the snmpd configuration file from the example configuration file.

```
# cp EXAMPLE.conf /usr/local/share/snmp/snmpd.conf
```

Edit /usr/local/share/snmp/snmpd.conf using your favorite text editor

Change these two lines

```
com2sec local    localhost    COMMUNITY
com2sec mynetwork NETWORK/24    COMMUNITY
```

into

```
com2sec local 127.0.0.1 soi_asia
com2sec mynetwork 202.249.24.0/22 soi_asia
```

Run the snmp daemon

```
# /usr/local/sbin/snmpd
```

Check whether the snmp daemon is running okay

```
# snmpwalk -v 1 -c soi_asia localhost system
```

If you see some lines that describe your system, then the snmpd should be working fine.

Finish

Go to the upper directory

```
# cd ..
```

Running the snmpd each time the server starts

You can make the snmpd runs by writing a script to run the snmpd at the `/usr/local/etc/rc.d/` or you can add the command in the `/etc/rc.local`

Now you have enabled an SNMP Agent at your host.

MRTG

MRTG is a popular SNMP Manager application that allows you to get data from SNMP Agents and display the data graphically. This section explains how to install and run MRTG to monitor a network device.

Preparation

Before installing MRTG, you need to install:

1. `gd`
a basic graph drawing library
2. `libpng`
required by `gd` to produce PNG graphs
3. `zlib`
a library to compress data; required by `libpng`

If you do not have `zlib` installed:

Download `zlib` from <http://www.gzip.org/zlib/zlib-1.1.4.tar.gz>

```
% tar xzvf zlib-1.1.4.tar.gz
% mv zlib-1.1.4 zlib
% cd zlib
% ./configure
% make
% cd ..
```

If you do not have libpng installed

Download libpng from <http://www.libpng.org/pub/png/src/libpng-1.0.15.tar.gz>

```
% tar zxvf libpng-1.0.15.tar.g
% mv libpng-1.0.15 libpng
% cd libpng
% make -f scripts/makefile.std CC=gcc ZLIBLIB=../zlib ZLIBINC=../zlib
% cd ..
```

Now compile gd

Download from <http://www.boutell.com/gd/http/gd-1.8.3.tar.gz>

```
% tar xzvf gd-1.8.3.tar.gz
% mv gd-1.8.3 gd
% cd gd
% make INCLUDEDIRS="-I. -I../zlib -I../libpng" ¥
    LIBDIRS="-L../zlib -L. -L../libpng" ¥
    LIBS="-lgd -lpng -lz -lm"
% cd ..
```

As root, install the above libraries

```
# cd zlib
# make install
# cd ../libpng
# make -f scripts/makefile.std install
# cd ../gd
# make install
# cd ..
```

Download the source

You can download the Net-SNMP by following this URL

<http://people.ee.ethz.ch/~oetiker/webtools/mrtg/>

I assume that you download the MRTG 2.9.25

Extract the tarball

```
% tar zxvf mrtg.tar.gz
```

Go to the source directory

```
% cd mrtg-2.9.25
```

Configure

```
% sh ./configure --prefix=/usr/local/mrtg-2 ¥  
--with-gd-lib=/usr/local/lib --with-gd-inc=/usr/local/inc
```

Compile the source

```
% make
```

Install MRTG

Run the next command as root

```
# make install
```

Now you are ready to configure and run your MRTG

Configure MRTG

As user mrtg, run `cfgmaker` to configure mrtg to monitor a network device

```
% /usr/local/mrtg-2/bin/cfgmaker --global 'WorkDir: /home/httpd/mrtg' ¥  
--global 'Options[_]: bits,growright' ¥  
--output /home/mrtg/cfg/mrtg.cfg ¥  
community@router.abc.xyz
```

The above example will create an MRTG configuration file named `mrtg.cfg` containing the entries of `router.abc.xyz`. For further information, you can read the `cfgmaker` man page.

Running MRTG

After you have created the MRTG configuration file, you can run your MRTG to monitor network devices. Run this command as user mrtg

```
% /usr/local/mrtg-2/bin/mrtg /home/mrtg/cfg/mrtg.cfg
```

In most cases, you will use `crontab` to run MRTG periodically. To run MRTG using `/home/mrtg/cfg/mrtg.conf` as your config file, run `crontab -e` and insert the following lines:

```
*/5 * * * * /usr/local/mrtg-2/bin/mrtg /home/mrtg/cfg/mrtg.cfg
```

To see the MRTG results, all you have to do is to configure your Apache web server to give access to the MRTG `WorkDir` directory.

SOI-ASIA Network Monitoring System

SOI-ASIA is also developing a network monitoring system for its special purposes. This system add some capabilities to monitor special data in SOI-ASIA sites:

1. multicast traffic rate
2. SONY SNR-PS1000 UDL receiver box status

SOI-ASIA Network Monitoring System collects data from each site and store them in a database. Since the data is stored in a database, SOI-ASIA operators can get the previous data for analysis.

For further information, see the SOI-ASIA Network Monitoring System manuals.