



Final Project

SNMP

Introduction

- ❑ Use SNMP to collect system information and graph with RRDTool
- ❑ Prerequisites
 - SNMP software
 - net-mgmt/net-snmp
 - Graphing
 - databases/rrdtool

Net-SNMP

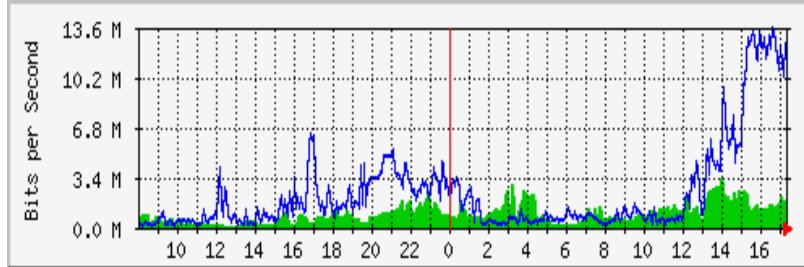
- ❑ An extendable SNMP implementation
- ❑ Command
 - snmpget
 - snmpset
 - snmpwalk
 - ...etc
- ❑ Turotials
 - <http://www.net-snmp.org/wiki/index.php/Tutorials>

RRDTool

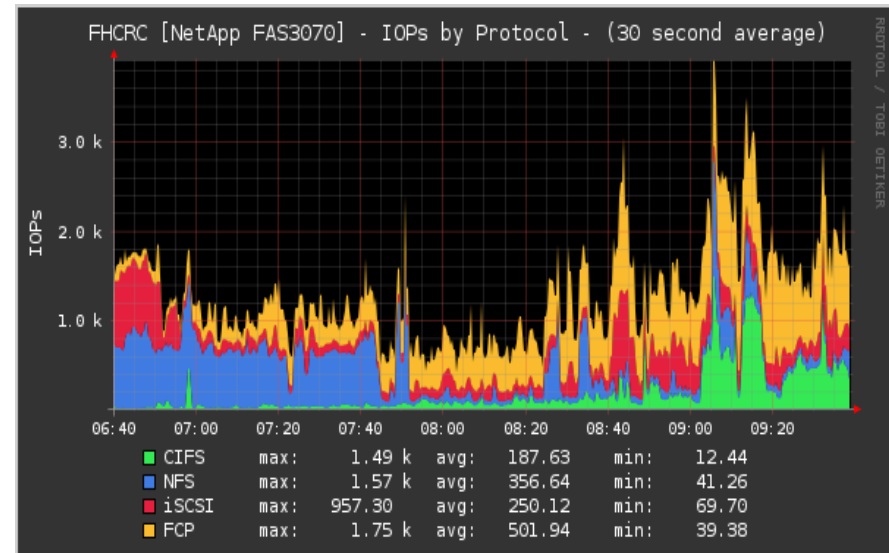
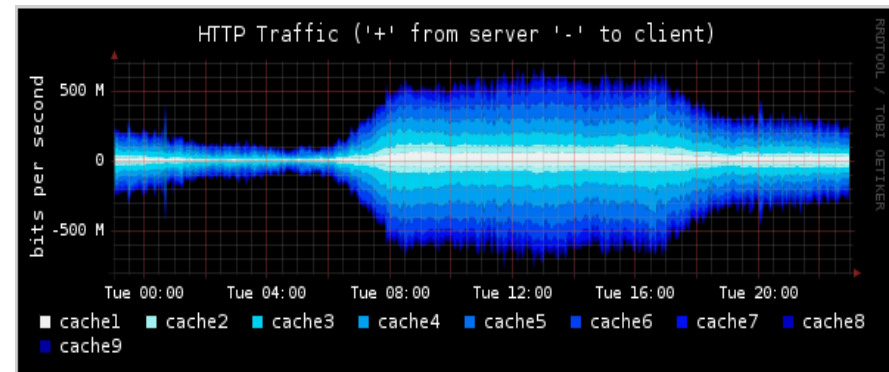
- ❑ Round-robin database
- ❑ Data logging / graphing
 - Known for its pretty graphing
- ❑ Easy integration
 - Bindings for Python, Perl, Ruby, Lua ...
 - Command line tools also enable integration with shell scripts
- ❑ Documentation
 - <http://oss.oetiker.ch/rrdtool/doc/index.en.html>

RRDTool – Compared with MRTG

❑ MRTG



❑ RRDTool



RRDTool – Flow

❑ Create

- Create a new RRD
- `$ rrdtool create`

❑ Fetch data

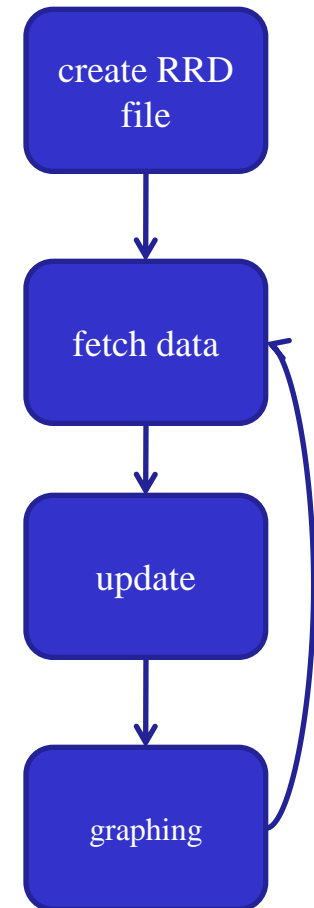
- Via SNMP, external programs... etc

❑ Update

- Update the data
- `$ rrdtool update`

❑ Graph

- Graph the result
- `$ rrdtool graph`



RRDTool – Create

```
/usr/local/bin/rrdtool create \  
/usr/local/share/cacti/rra/ggyy.rrd \  
--step 300 \  
DS:5min_cpu:GAUGE:600:0:100 \  
RRA:AVERAGE:0.5:1:600 \  
RRA:AVERAGE:0.5:6:700 \  
RRA:AVERAGE:0.5:24:775 \  
RRA:AVERAGE:0.5:288:797 \  
RRA:MAX:0.5:1:600 \  
RRA:MAX:0.5:6:700 \  
RRA:MAX:0.5:24:775 \  
RRA:MAX:0.5:288:797 \  

```

RRDTool – Create (Cont.)

❑ Data source (DS)

- DS:ds-name:DS Type:DST arguments
- e.g. DS:5min_cpu:GAUGE:600:0:100

❑ Round-robin archive (RRA)

- RRA:Consolidation Function:CF arguments
- e.g. RRA:AVERAGE:0.5:288:797

RRDTool – Update

❑ Use SNMP or other external program to get the value

- Inflow=`snmpget -c public 127.0.0.1 ifInOctets.1`
- data=`hexdump -n4 -e\"%u\" /dev/random`

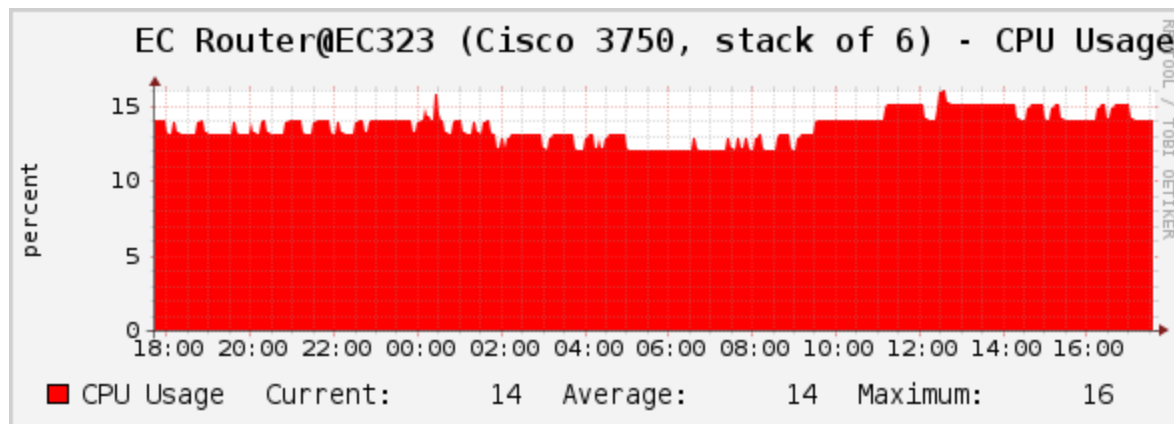
❑ Updating would be combined with graphing

- This poller should be invoked every $\{\text{step}\}$ sec.

```
##### update.sh #####  
  
# update  
Data=`get some value`  
  
# graph  
rrdtool graph  $\{\text{PIC}\}$  ...
```

RRDTool – Graph

```
/usr/local/bin/rrdtool graph \  
Aabbabc.png \  
--title='Router' \  
DEF:a="/usr/local/share/cacti/rra/gggy.rrd":5min_cpu:AVERAGE \  
AREA:a#FF0000FF:"CPU Usage" \  
GPRINT:a:LAST:"Current\:%8.0lf" \  
GPRINT:a:AVERAGE:"Average\:%8.0lf" \  
GPRINT:a:MAX:"Maximum\:%8.0lf\n"
```



Requirement

- ❑ Access control
 - Use difference community name for RO / RW
- ❑ Use RRDTool to monitor & graph host's status
 - CPU usage
 - Memory usage
 - Uptime
 - Interface netflow (input/output)
- ❑ Enable snmptrapd to receive traps
 - Specify and implement a handler for a specific OID

Bonus – Cacti with Plugin Architecture

- ❑ Install Cacti with PA support
- ❑ Import and organize existing RRDs
 - <http://goo.gl/5ga6G>

Hand-in

- Due
 - 6/23
- Demo
 - TBA

Appendix

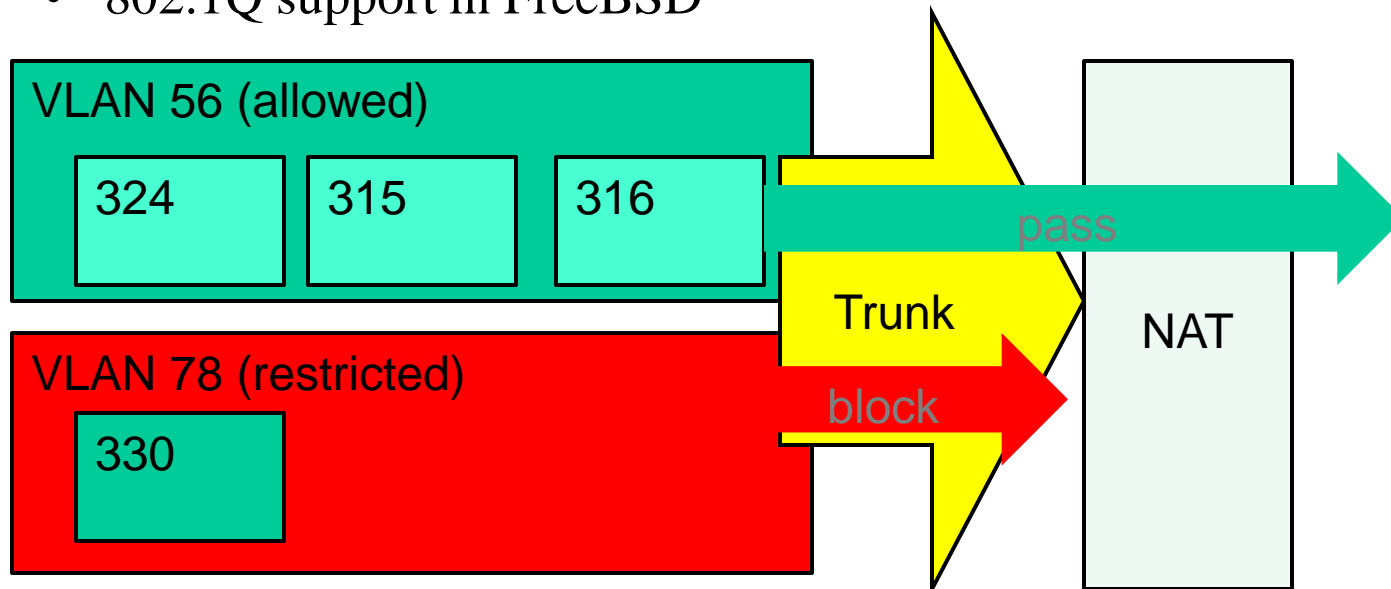
SNMP related use case in CSCC

Switch Management – Interface Shutdown

- ❑ 情境: 電資有小白在衝 ip
- ❑ Solution 1
 - 拔他線
 - 電資超遠, 下雨天不想出門...
- ❑ Solution 2
 - 從上層 ban 掉他 mac
 - 同一台 L2 switch 下的使用者表示遺憾...
- ❑ Solution 3
 - 從 switch 上 ban 掉!
 - `$ snmpset -v1 -c letmein 140.113.235.1 interfaces.ifTable.ifEntry.ifAdminStatus.123 i 2`

Switch Management – 斷網

- ❑ Similar to shutting down an interface
- ❑ Move some ports to restricted VLANs
 - Only do NAT for non-restricted VLANs
 - 802.1Q support in FreeBSD



Monitoring – Cacti

❑ 50+ switches...

