MRTG / RRDTool

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SNMP

- A query - response system
- Little network traffic initiated by agent
- Regular SNMP has primitive security system
- SNMPv2 was to have real security but working group fragmented.
- SNMPv3 now ready - very extensible, used much in enterprise management tools
- Uses database defined in MIB
- Can have "Vendor/ Enterprise" extensions to MIB
- SMI defines structure of MIB
- SMI defines data structure using ASN.1 (Abstract Syntax Notation)
MRTG...

- The Multi Router Traffic Grapher (MRTG) is a tool to monitor the traffic load on network-links. MRTG generates HTML pages containing PNG images which provide a LIVE visual representation of this traffic. Check http://www.stat.ee.ethz.ch/mrtg/ to see what it does.

- MRTG has been the most common network traffic measurement tool for all Service Providers

- MRTG uses simple SNMP queries on a regular interval to generate graphs
MRTG...

• External readers for MRTG graphs can create other interpretation of data.

• MRTG software can be used not only to measure network traffic on interfaces, but also build graphs of anything that has an equivalent SNMP MIB - like CPU load, Disk availability, Heat etc.

• MRTG can be extended to work with RRDTool
MRTG - Issues

• MRTG generates each graph (we are generating 582 graphs!) every 5 minutes, creating a lot of overhead.

• It also has very few customizable graphing options.

• Disk space is always an issue.

• MRTG management itself can be tedious work.
Running MRTG

- Get the required packages
- Compile and install the packages
- Make cfg files for router interfaces with cfgmaker
- Create html pages with indexmaker
- Trigger MRTG periodically from Cron or run it in daemon mode
RRDtool

- Round Robin Database for time series data storage
- Command line based
- From the author of MRTG
- Made to be faster and more flexible
- Includes CGI and Graphing tools, plus APIs
- Solves the Historical Trends and Simple Interface problems
Define Data Sources (Inputs)

- **DS:speed:COUNTER:600:U:U**
  - **DS** = Data Source
  - speed, fuel = “variable” names
  - COUNTER, GAUGE = variable type
  - 600 = heart beat – UNKNOWN returned for interval if nothing received after this amount of time
  - U:U = limits on minimum and maximum variable values (U means unknown and any value is permitted)

- **DS:fuel:GAUGE:600:U:U**
Define Archives (Outputs)

- **RRA:** Round Robin Archive
- **AVERAGE:** consolidation function
- **0.5:** up to 50% of consolidated points may be UNKNOWN

- **1:24:** this RRA keeps each sample (average over one 5 minute primary sample), 24 times (which is 2 hours worth)

- **6:10:** one RRA keeps an average over every six 5 minute primary samples (30 minutes), 10 times (which is 5 hours worth)

- **Clear as mud!**
  - all depends on original step size which defaults to 5 minutes
RRDtool Database Format

Recent data stored once every 5 minutes for the past 2 hours (1:24)

Old data averaged to one entry per day for the last 365 days (288:365)

Medium length data averaged to one entry per half hour for the last 5 hours (6:10)

--step 300 (5 minute input step size)

RRD File
Muddyyu


- `rrdtool create /var/nagios/rrd/apricot-INTL_Ping.rrd -s 300 DS:ping:GAUGE:600:0:U RRA:AVERAGE:0.5:1:50400 RRA:AVERAGE:0.5:60:43800`

Labs
MRTG

• In Ubuntu / Debian
  – Apt-get install mrtg
  – Configuration
    • /etc/mrtg/<device.mrtg>
    • Global directory : /var/www/mrtg/
    • Run MRTG against the configuration file from cron.
cfgmaker

• Uses snmpwalk and creates a mrtg configuration file
• /usr/bin/cfgmaker
  --output=/etc/mrtg/router.mrtg
  --global 'workdir: /var/www/mrtg'
  --global 'options[ ]: growright,bits'
  san0g@gw
sample

#Title[leased]: a 128K leased line
#PageTop[leased]: <H1>Our 128K link to the outside world</H1>
#Target[leased]: 1:public@router.localnet
#MaxBytes[leased]: 16000
Creating HTML with indexmaker

- /usr/bin/indexmaker
  --output=/var/www/mrtg/device.html
  /etc/mrtg/device.mrtg

If your mrtg configuration file is well commented, the html is nice and detailed.
Lab instructions

• Separate paper
RRDTool

- `#apt-get install rrdtool`
- `#apt-get install librrdp-perl`
- `# apt-get install librdds-perl`

- Add in your MRTG Configuration file
  - `/etc/mrtg/router.mrtg`
- `LogFormat : rrdtool`
- `Run mrtg`
- `Go see in /var/www/mrtg`