

MRTG / RRDTool

Network Management Workshop

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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 an almost live visual representation of this traffic. Check <http://oss.oetiker.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, Temperature, etc...
- Data sources can be anything that provides a counter or gauge value – not necessarily SNMP.
 - For example, graphing round trip times
- MRTG can be extended to work with RRDTool

MRTG - Issues

- MRTG generates each graph (what if you have hundreds of 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 from the cfg files 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 : fuel : GAUGE : 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)

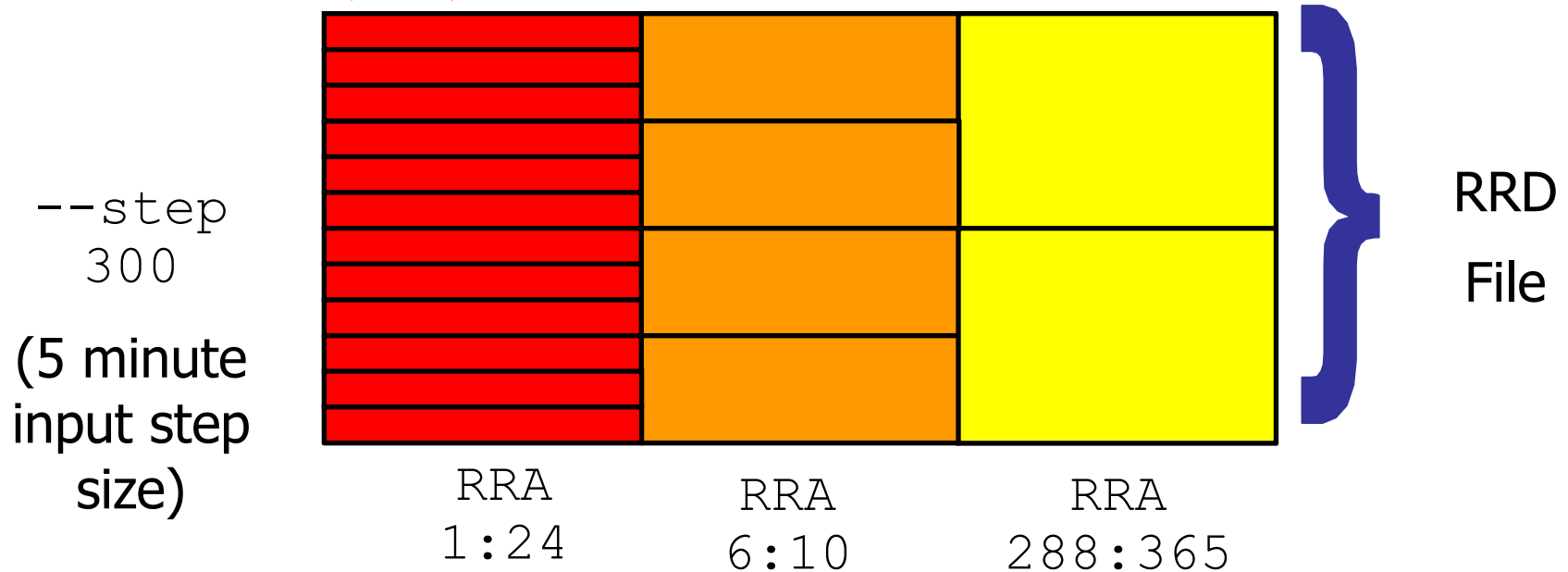
Define Archives (Outputs)

- RRA:AVERAGE:0.5:1:24
- RRA:AVERAGE:0.5:6:10
 - 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)

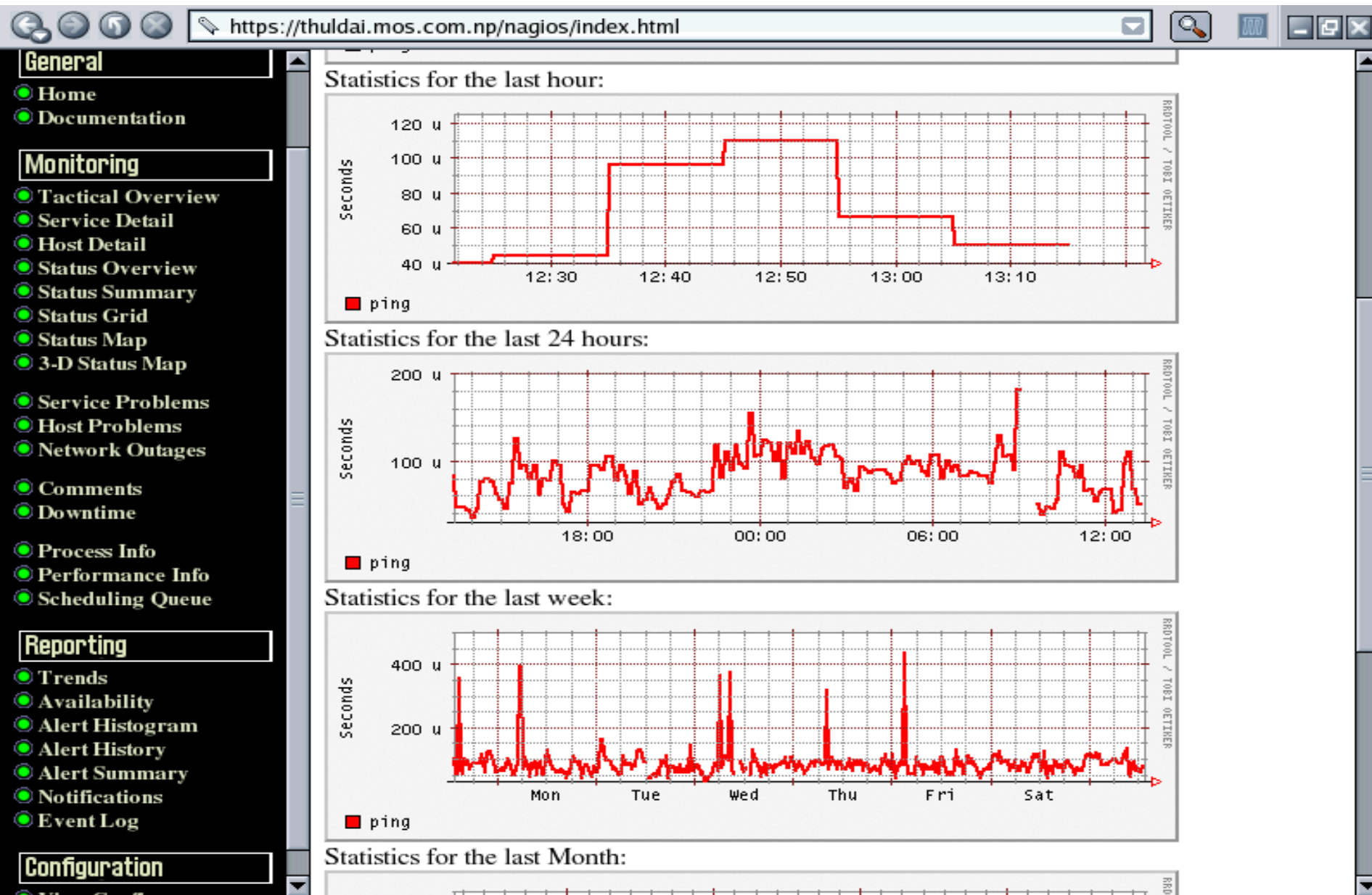


Medium length data averaged to one
entry per half hour for the last 5 hours
(6:10)

Isn't it simple ?!

- `rrdtool create /var/nagios/rrd/host0_load.rrd -s 600 DS:1MIN-Load:GAUGE:1200:0:100 DS:5MIN-Load:GAUGE:1200:0:100 DS:15MIN-Load:GAUGE:1200:0:100 RRA:AVERAGE:0.5:1:50400 RRA:AVERAGE:0.5:60:43800`
- `rrdtool create /var/nagios/rrd/host0_disk_usage.rrd -s 600 DS:root:GAUGE:1200:0:U DS:home:GAUGE:1200:0:U DS:usr:GAUGE:1200:0:U DS:var:GAUGE:1200:0:U RRA:AVERAGE:0.5:1:50400 RRA:AVERAGE:0.5:60:43800`
- `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`
- `rrdtool create /var/nagios/rrd/host0_total.rrd -s 300 DS:IN:COUNTER:1200:0:U DS:OUT:COUNTER:600:0:U RRA:AVERAGE:0.5:1:50400 RRA:AVERAGE:0.5:60:43800`

Ping Latency Graph Created by APAN from RRD Database



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'
apr1cot29@169.223.140.254

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