Network Management & Monitoring

Measuring Delay with smokeping

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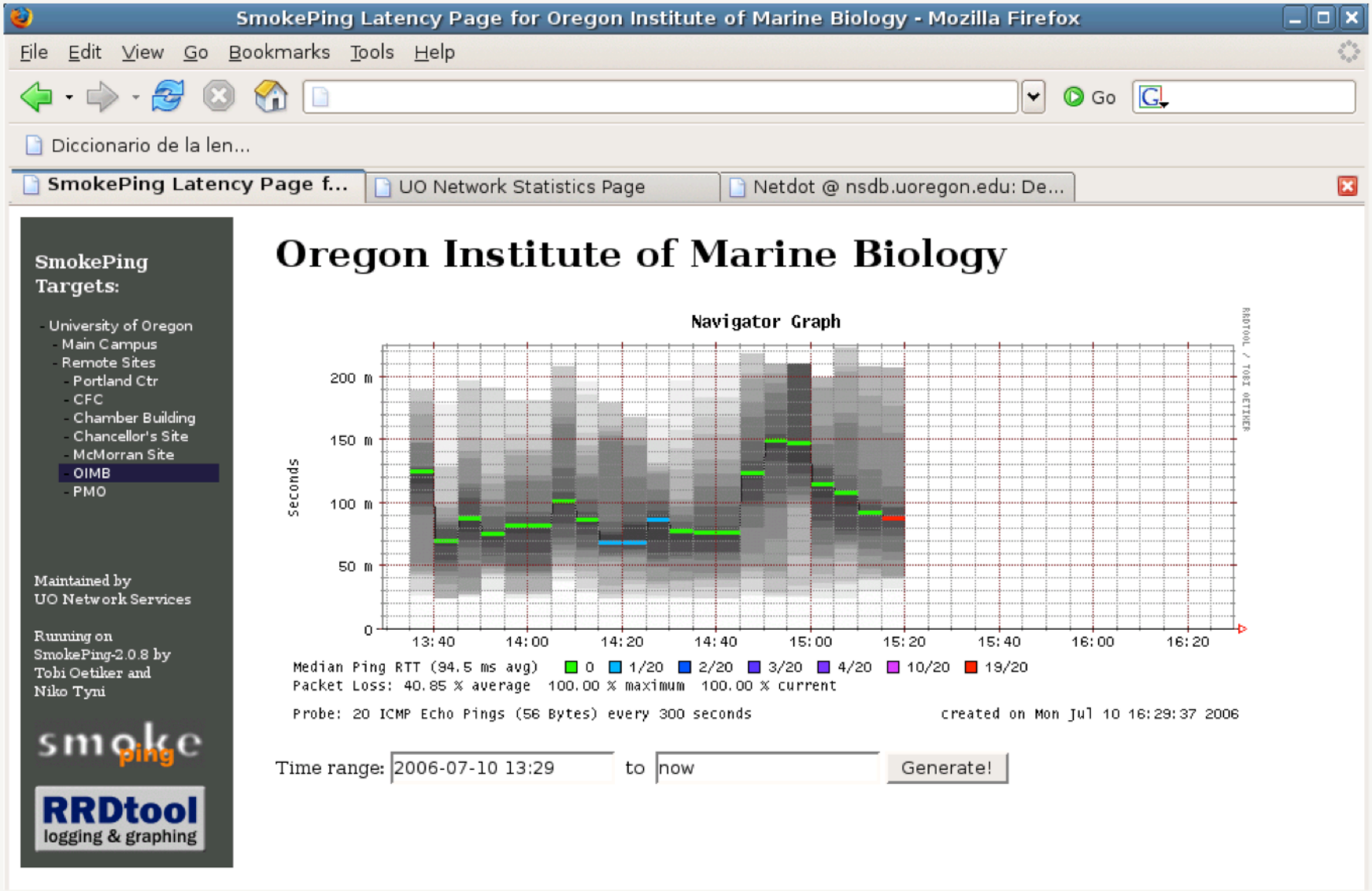
Introduction

- Based on RRDTool (the same author)
- Measures ICMP delay and can measure status of services such as HTTP, DNS, SMTP, SSH, LDAP, etc.
- Define ranges on statistics and generate alarms.
- Written in Perl for portability
- Easy to install - harder to configure.

Introduction: “Marketing”

- SmokePing keeps track of your network latency:
- Best of breed latency visualization.
- Interactive graph explorer.
- Wide range of latency measurement plugins.
- Master/Slave System for distributed measurement.
- Highly configurable alerting system.
- Live Latency Charts with the most 'interesting' graphs.
- Free and OpenSource Software written in Perl written by Tobi Oetiker, the creator of MRTG and RRDtool

The “Smoke” and the “Pings”

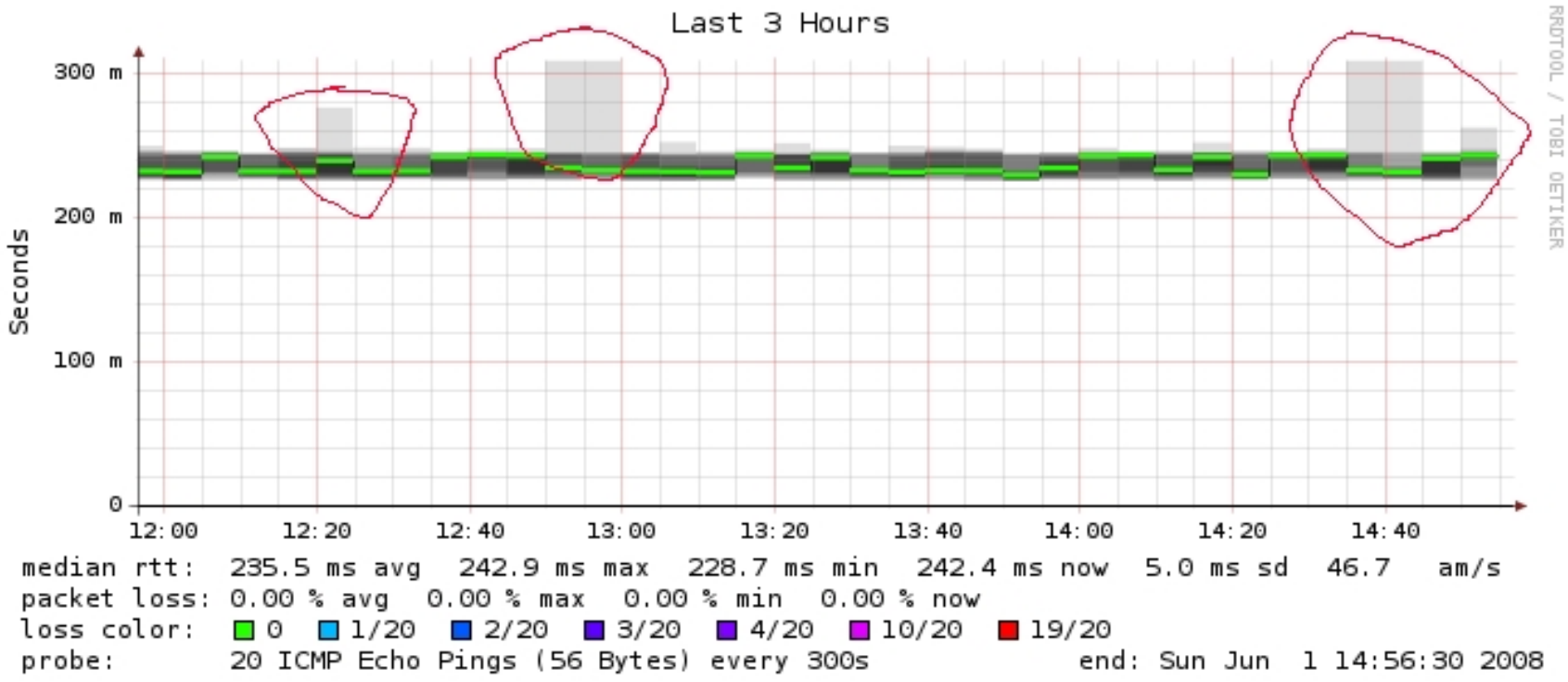


How to Read Smokeping Graphs

- Smokeping sends multiples tests (pings), makes note of RTT, orders these and selects the median.
- The different values of RTT are shown graphically as lighter and darker shades of grey (the “smoke”). This conveys the idea of variable round trip times or *jitter*.
- The number of lost packets (if any) changes the color of the horizontal line across the graph.

An Example

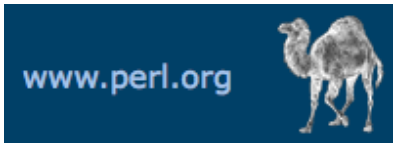
African Network Operators Group

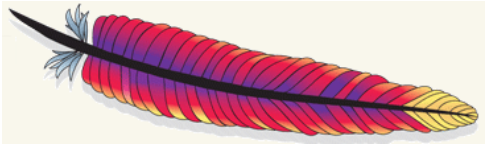


What makes it tick!

The following packages are needed or recommended:

- **rrdtool** http://oss.oetiker.ch/rrdtool/
- **fping** http://www.fping.com/
- **echoping** http://echoping.sourceforge.net/
- **speedyCGI** http://www.daemoninc.com/SpeedyCGI/
- **Apache** http://httpd.apache.org/
- **Perl** http://www.perl.org/





Smokeping: Installation

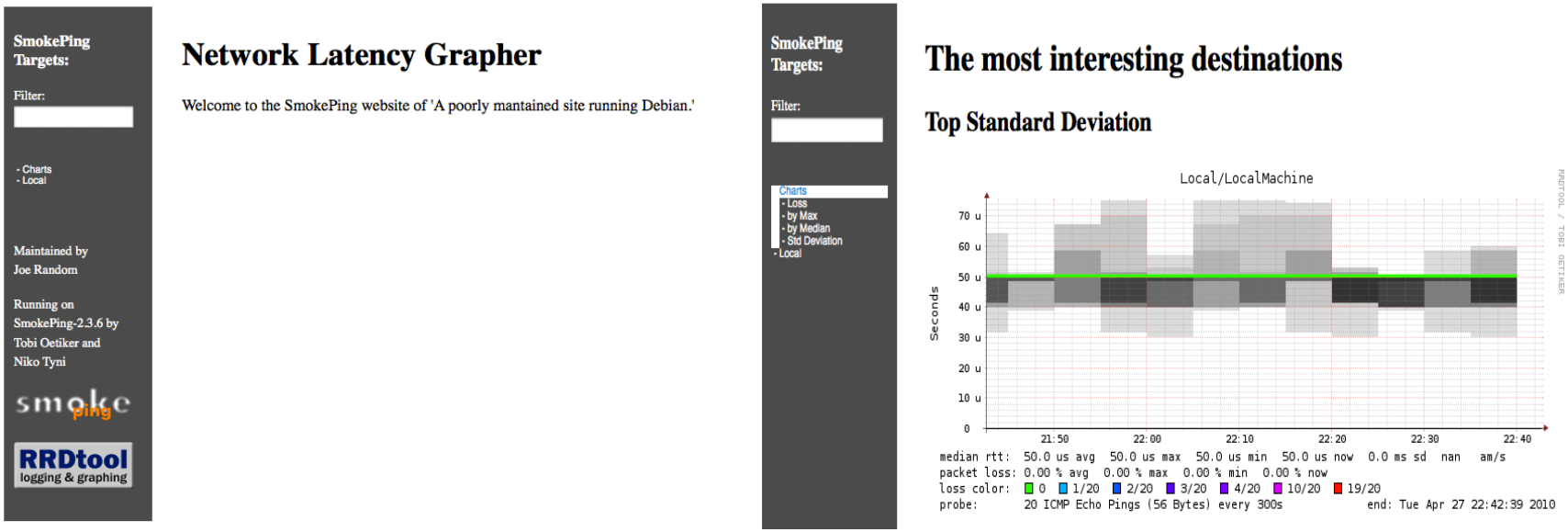
Debian/Ubuntu:

- `apt-get install smokeping`
- Configure **/etc/smokeping/config.d/***
- Change Smokeping's appearance here:
  - **/etc/smokeping/basepage.html**
- Restart the service:
  - `service smokeping {start|stop|restart|reload}`

Smokeping Installation

You will find Smokeping running here:

http://pcN.ws.nsrc.org/cgi-bin/smokeping.cgi



Configuration

Smokeping configuration files in Ubuntu 12.04 include:

```
/etc/smokeping/config.d/Alerts
/etc/smokeping/config.d/Database
/etc/smokeping/config.d/General
/etc/smokeping/config.d/pathnames
/etc/smokeping/config.d/Presentation
/etc/smokeping/config.d/Probes
/etc/smokeping/config.d/Slaves
/etc/smokeping/config.d/Targets
```

Generally we spend most of our time in Alerts, General, Probes and Targets.

Configuration: General

To be updated:

- owner ➔ NOC
- contact ➔ sysadm@pcN.ws.nsrc.org
- cgiurl ➔ http://pcN.ws.nsrc.org/cgi-bin/smokeping.cgi
- mailhost ➔ localhost
- syslogfacility ➔ local5

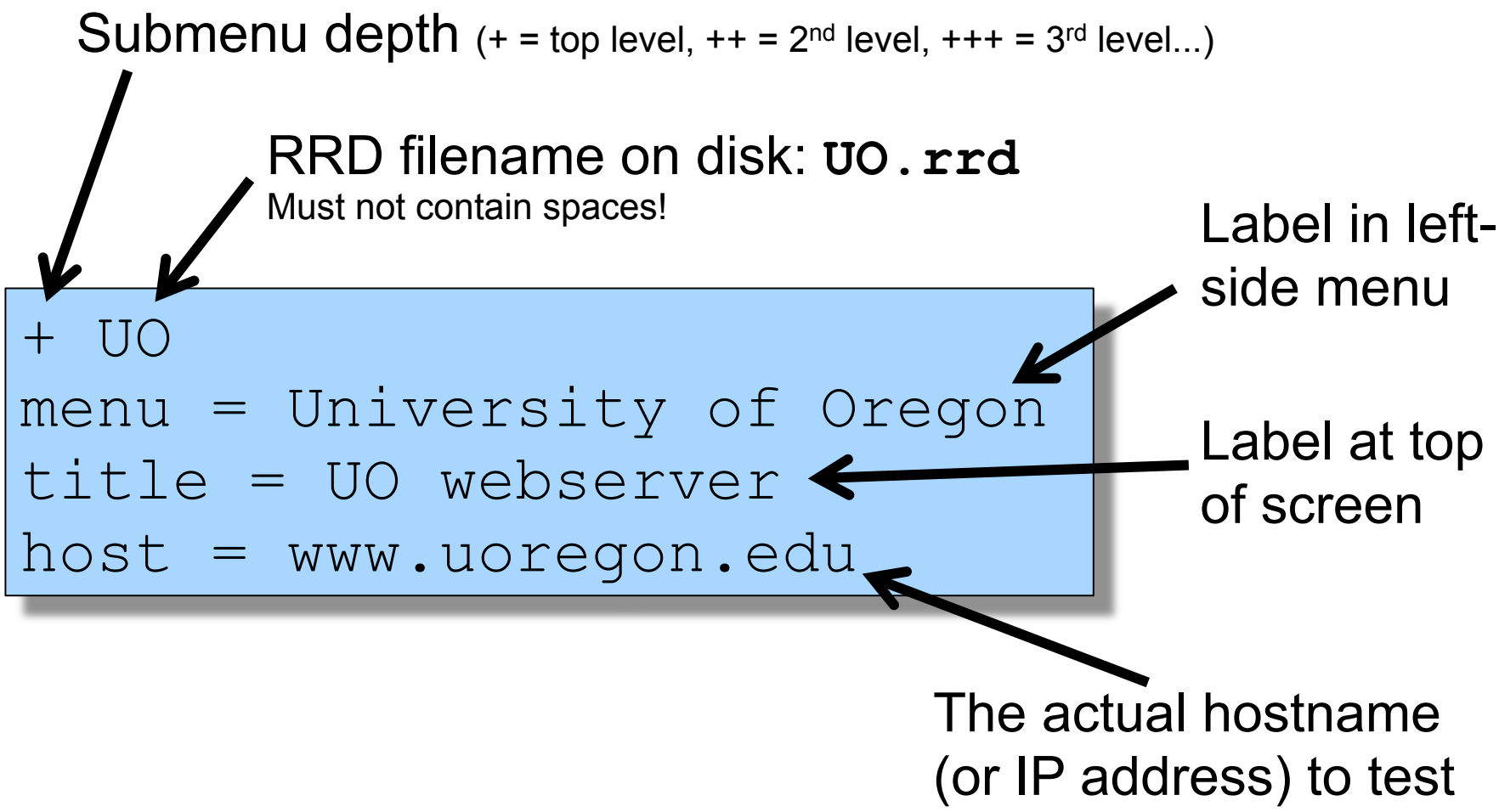
```
*** General ***

owner    = NOC
contact  = sysadm@pcN.ws.nsrc.org
mailhost = localhost
# NOTE: do not put the Image Cache below cgi-bin
# since all files under cgi-bin will be executed ... this is not
# good for images.
cgiurl   = http://pcN.ws.nsrc.org/cgi-bin/smokeping.cgi
# specify this to get syslog logging
syslogfacility = local5
# each probe is now run in its own process
# disable this to revert to the old behaviour
# concurrentprobes = no

@include /etc/smokeping/config.d/pathnames
```

Configuration: Targets

- Where we spend most of our time configuring Smokeping.
- Web menu hierarchy defined by “+”, “++”, etc.
- Each new *probe* statement resets the default probe in use.
- Probes have defaults set in the Probes config file. These can be overridden in Targets.

```
*** Targets ***

probe = FPing

menu = Top
title = Network Latency Grapher

+ UO
menu = University of Oregon
title = UO webserver
host = www.uoregon.edu

+ NSRC
menu = NSRC
title = Network Startup Resource Center
host = www.nsrc.org

++ HTTP
menu = HTTP
probe = EchoPingHttp

+++ www
menu = NSRC web
host = www.nsrc.org

++ DNS
menu = DNS
probe = DNS

+++ dns
menu = NSRC DNS
host = www.nsrc.org
```

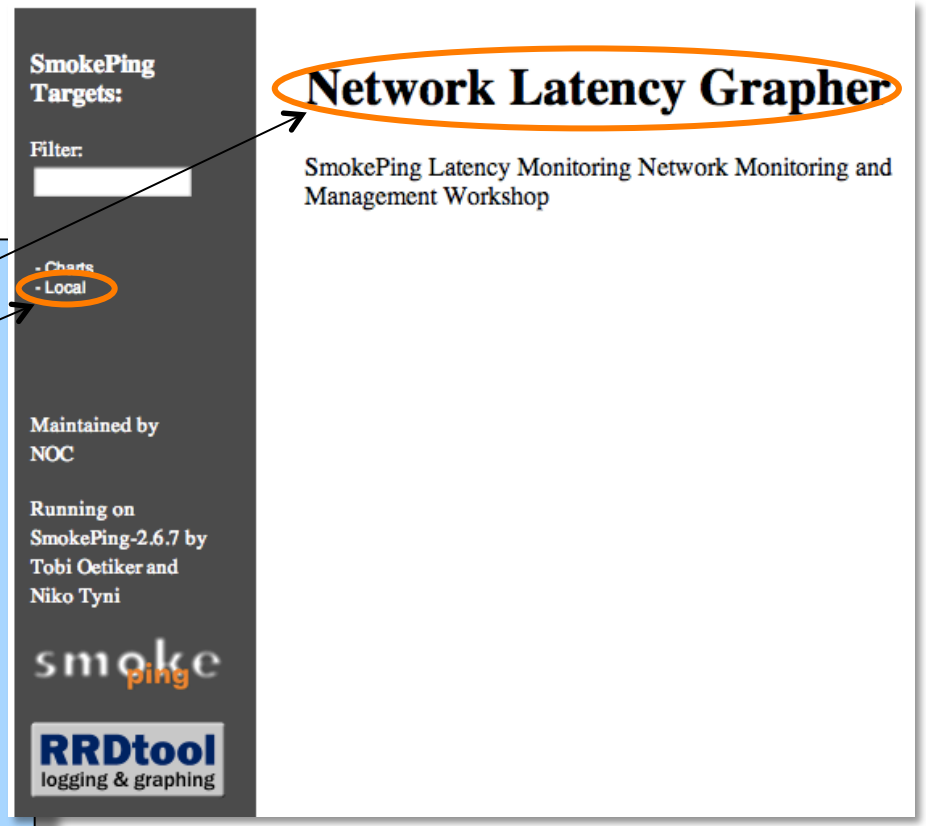
Target entry



Configuration: Targets Example

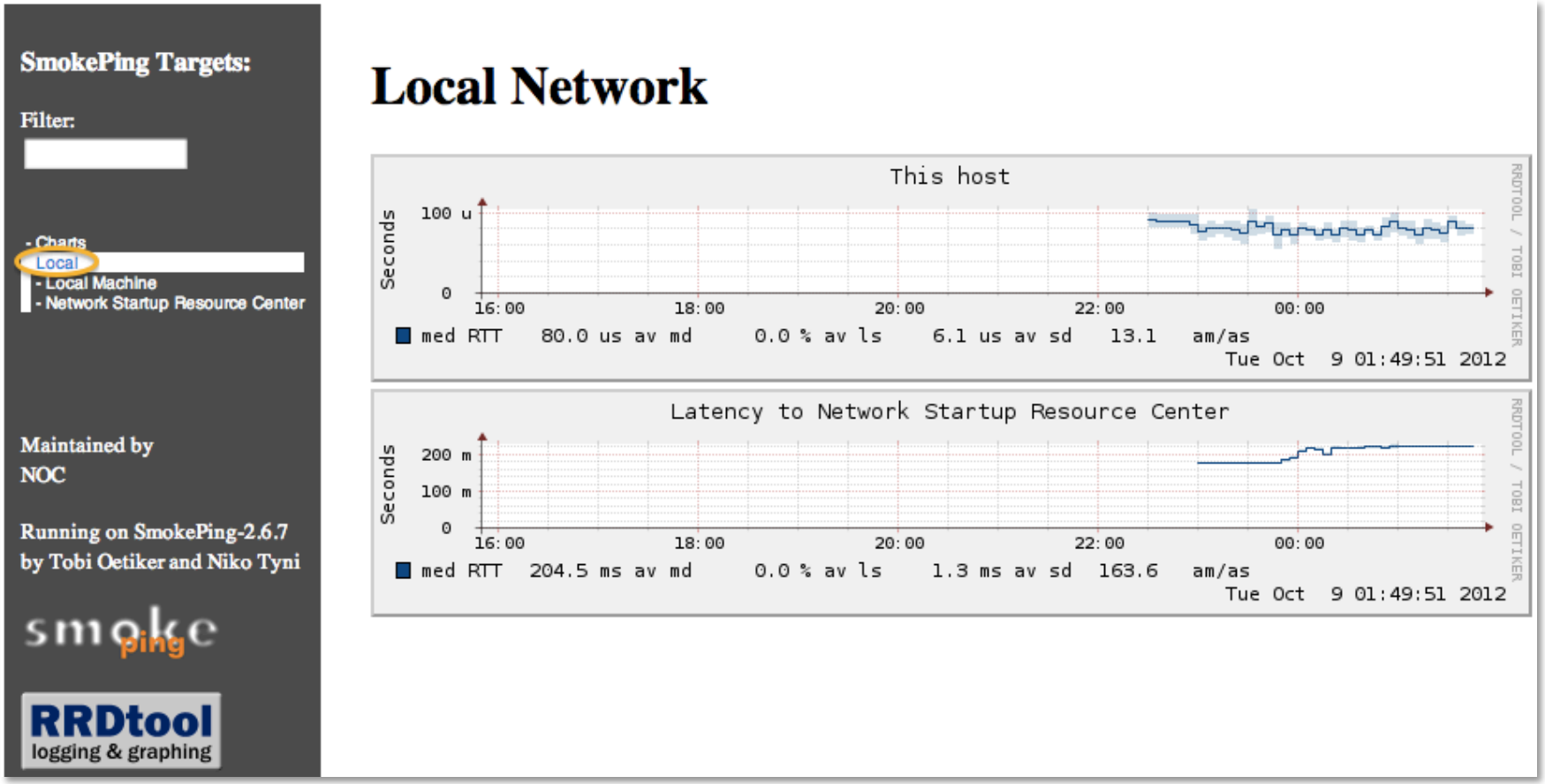
Targets file below produces the following default SmokePing page:

```
*** Targets ***

probe = FPing

menu = Top
title = Network Latency Grapher
remark = SmokePing Latency Monitoring \
         Network Monitoring and Management Workshop

+ Local

menu = Local
title = Local Network

++ LocalMachine

menu = Local Machine
title = This host
host = localhost

++ NSRC

menu = Network Startup Resource Center
title = Latency to Network Startup Resource Center
host = nsrc.org
```



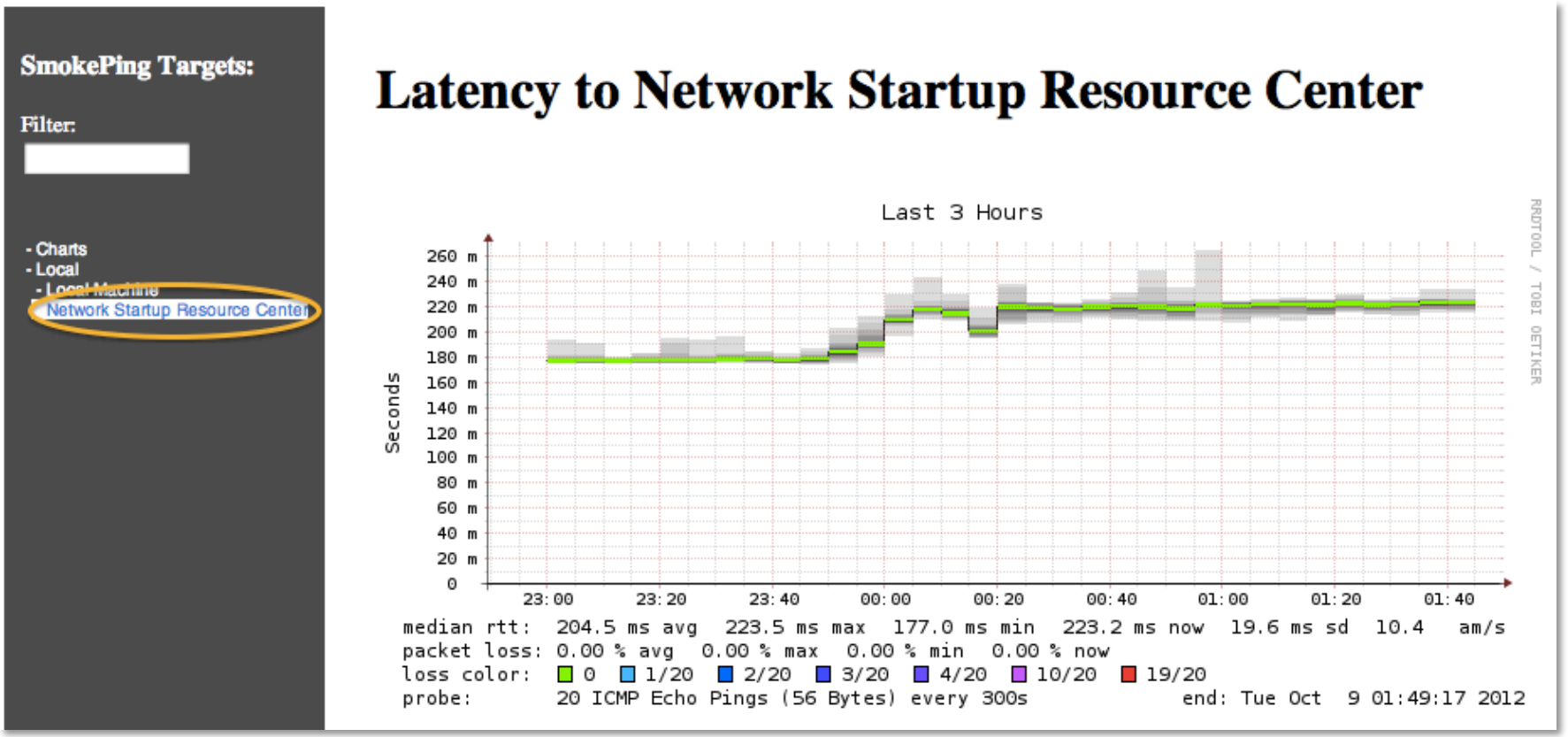
Configuration: Targets Example

Clicking on “Local” in the previous slide gives us:



Configuration: Targets Example

Clicking “Network Startup Resource Center” in the previous slides gives us:



Configuration: Targets Example

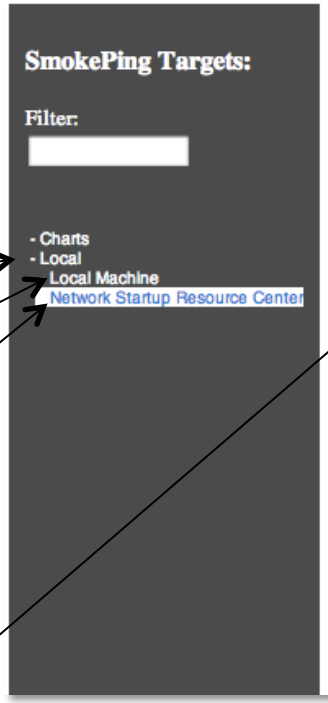
Hierarchy of web interface to Targets file explained:

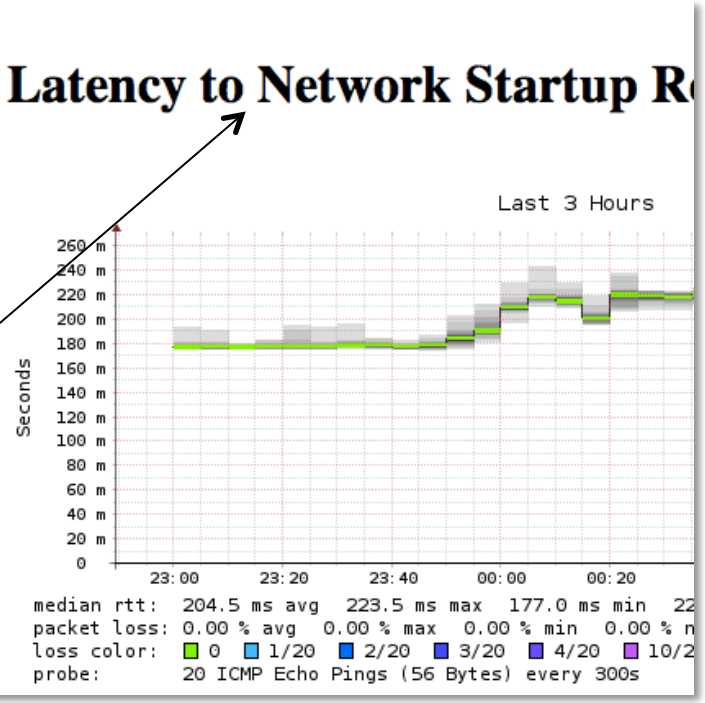
```
*** Targets ***

probe = FPing

menu = Top
title = Network Latency Grapher
remark = SmokePing Latency Monitor… \
         Network Monitoring and Mana…

+ Local

menu = Local
title = Local Network

++ LocalMachine

menu = Local Machine
title = This host
host = localhost

++ NSRC

menu = Network Startup Resource Center
title = Latency to Network Startup Re…
host = nsrc.org
```

1st level

2nd level

2nd level





+ Local → /var/lib/smokeping/Local

++ LocalMachine → /var/lib/smokeping/Local/LocalMachine.rrd

++ NSRC → /var/lib/smokeping/Local/NSRC.rrd

Questions?

Configuration: Alerts

- Very flexible. Create your own type of alert.
- Send alerts to ticket queues (RT using rt-mailgate, for instance)
- Somewhat complex to understand. Read the Alerts section of the Smokeping on-line configuration documentation:
  http://oss.oetiker.ch/smokeping/doc/smokeping_config.en.html

```
*** Alerts ***
to = root@localhost
from = smokeping-alert@localhost

+someloss
type = loss
# in percent
pattern = >0%,*12*,>0%,*12*,>0%
comment = loss 3 times in a row over 12 samples
```

This could go to a ticketing queue instead.

Target

```
++ LocalMachine
menu = localhost
title = This host
host = localhost
alerts = startloss,someloss,bigloss,rttdetect
```

Configuration: Probes

Smokeping is installed with a number of additional probes. They must, however, be specified here – including their default behaviors.

```
*** Probes ***

+ FPing
binary = /usr/sbin/fping

+ DNS
binary = /usr/bin/dig
lookup = nsrc.org
pings = 5
step = 180

+ EchoPingHttp
binary = /usr/bin/echoping
ignore_cache = yes
pings = 5
url = /

+ EchoPingHttps
binary = /usr/bin/echoping
pings = 5
url = /

+ EchoPingSmtp
binary = /usr/bin/echoping
forks = 5
```

Use the DNS probe to verify that your services are available and responding as expected.

We use ”nsrc.org” as a sample hostname to lookup, to verify that the DNS works.

Note: Initial Probes file only has FPing defined.

Default Probe: FPing

- **Probing for delay and jitter (ping)**
- **Entry belongs in the Targets file**

Network Latency

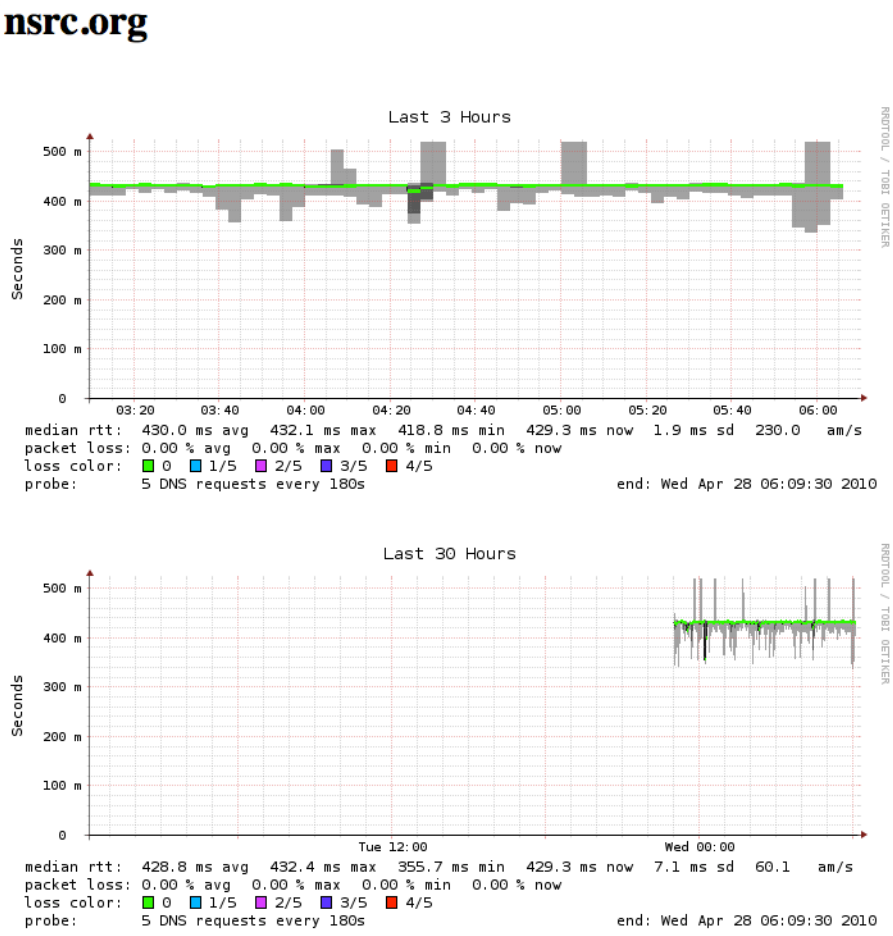
```
probe = FPing
...
++ LocalMachine
menu = localhost
title = This host
host = localhost
```

Probe: DNS Check

In /etc/smokeping/config.d/Targets:

DNS Latency

```
++ DNS
probe = DNS
menu = External DNS Check
title = DNS Latency

+++ GoogleA
menu = 8.8.8.8
Title = DNS Latency GoogleA
host = google-public-dns-
       a.google.com
```



More Types of Probes

More information available here:

`http://oss.oetiker.ch/smokeping/probe/index.en.html`

A few more probes...

- DNS - CiscoRTTMonDNS - Radius
- HTTP(S) - CiscoRTTMonTcpCon - IOS
- LDAP - Tacacs - FPing6
- Whois - WebProxyFilter - Etc.
- SMTP - WWW-Cache

Configuration: pathnames

Normally you should not need to update this file:

```
sendmail = /usr/sbin/sendmail
imgcache = /var/cache/smokeping/images
imgurl   = ../smokeping/images
datadir  = /var/lib/smokeping
piddir  = /var/run/smokeping
smokemail = /etc/smokeping/smokemail
tmail = /etc/smokeping/tmail
```

Configuration: Presentation

- If you wish to customize Smokeping's look and feel you can edit the file /etc/smokeping/basepage.html
- To change how Smokeping presents graphs you can edit this file.

```
*** Presentation ***

template = /etc/smokeping/basepage.html
charset  = utf-8

+ charts

menu = Charts
title = The most interesting destinations

++ stddev
sorter = StdDev(entries=>4)
title = Top Standard Deviation
menu = Std Deviation
format = Standard Deviation %f

++ max
sorter = Max(entries=>5)
title = Top Max Roundtrip Time
menu = by Max
format = Max Roundtrip Time %f seconds
```


File continues…

Configuration: Database

- Defines how RRDtool will save data over time in Round Robin Archives (RRAs)
- By default each step is 300 seconds (5 minutes).
- You cannot trivially change the step setting once data has been collected.
- Details on each column in the Database section of the Smokeping on-line
- configuration documentation:
  http://oss.oetiker.ch/smokeping/doc/smokeping_config.en.html

```
*** Database ***

step     = 300
pings    = 20

# consfn mrhb steps total

AVERAGE  0.5   1  1008
AVERAGE  0.5  12  4320
    MIN  0.5  12  4320
    MAX  0.5  12  4320
AVERAGE  0.5 144   720
    MAX  0.5 144   720
    MIN  0.5 144   720
```

consfn: Consolidation function
mrhb: Percent of consolidated steps that must be known to warrant an entry.
steps: How many steps to consolidate for each entry in the RRA.
total: Total number of rows to keep in the RRA. Use rows and steps to determine time data will be saved.

12 steps = 12 x 300 sec = 1 hour
4320 rows = 4320 hours = **180 days**

Configuration: Slaves

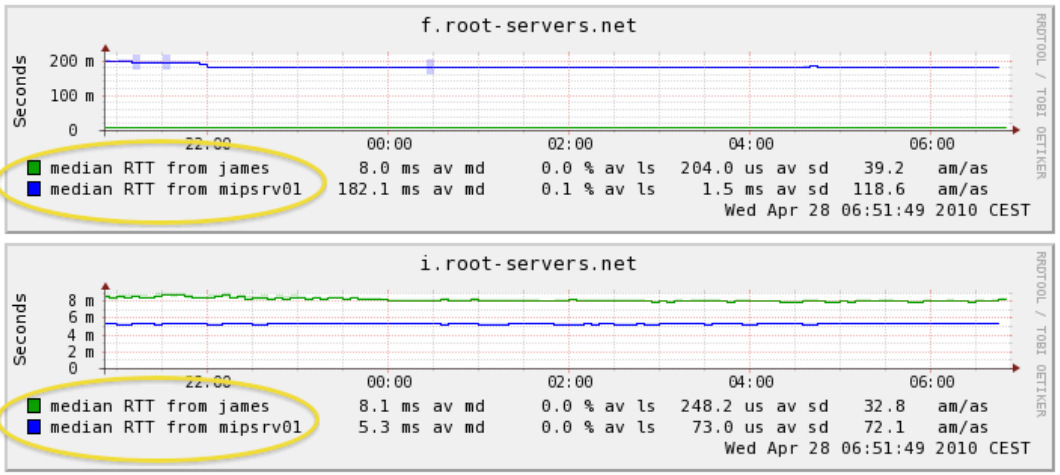
Smokeping slave servers allow for multi-viewpoint monitoring and graphing of the same services, machines or links. Details here:

http://oss.oetiker.ch/smokeping/doc/smokeping_master_slave.en.html

```
*** Slaves ***
secrets=/etc/smokeping/smokeping_secrets
#+boomer
#display_name=boomer
#color=0000ff

#+slave2
#display_name=another
#color=00ff00
```

That is, you can externally monitor your network!

Root Name Server System



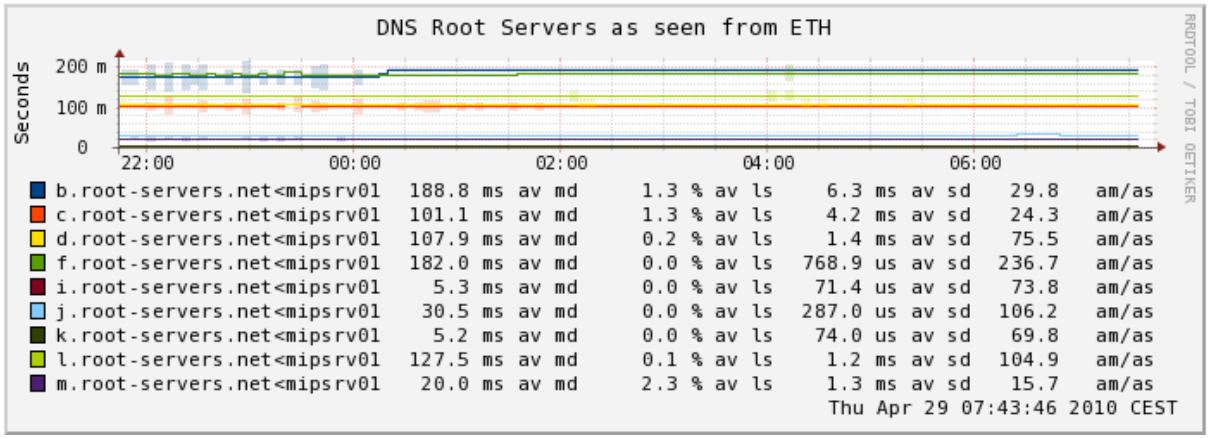
MultiHost Graphing

Solve the issue of multiple hosts, one probe and missing differences in the Y axis (time):

http://oss.oetiker.ch/smokeping/doc/smokeping_examples.en.html

Sample configuration

```
+++MultihostRouters
menu = MutihostRouters
title = Combined Router Results
host = /Local/Routers/gw /Local/Routers/rtr1
       /Local/Routers/rtr2
```



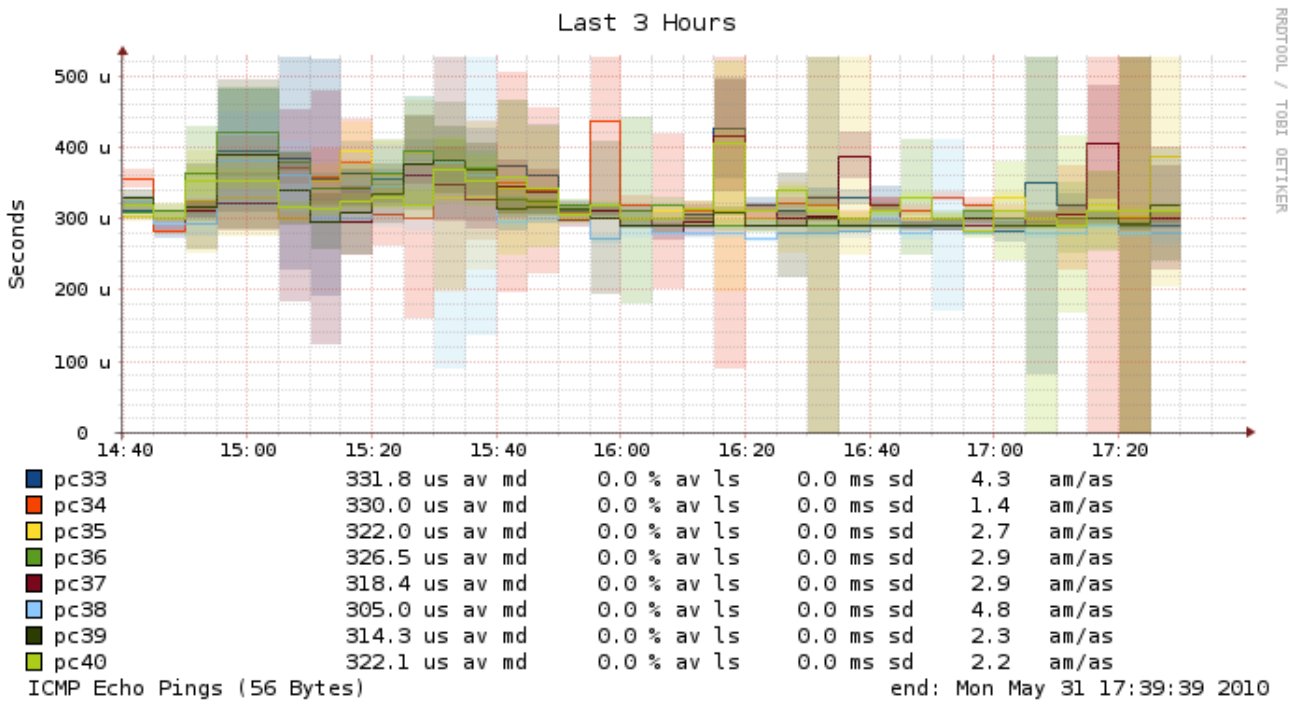
Example Multihost Graph

SmokePing Targets:

Filter:

- Charts
- Local
- Ping Check Tutorial
- Web Check Tutorial
- Router Ping Check
- Switch Ping Check
- MultiHost Ping Row1
- MultiHost Ping Row2
- DNS Check Tutorial

Consolidated Ping Response Time



Summary

- Simple but powerful network monitoring
- Monitor machines, services and link health
- Distributed instances for external views – often a paid-for service
- Easy to configure and customize, but very extensible.
- Can be used with Ticketing Systems to automate alerts
- Very small disk and CPU footprint

References

Smokeping website:

http://oss.oetiker.ch/smokeping/

Smokeping Demo:

http://oss.oetiker.ch/smokeping-demo/?target=Customers.OP

Good examples:

http://oss.oetiker.ch/smokeping/doc/smokeping_examples.en.html