



Network Management & Monitoring

Measuring Delay with



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Introduction

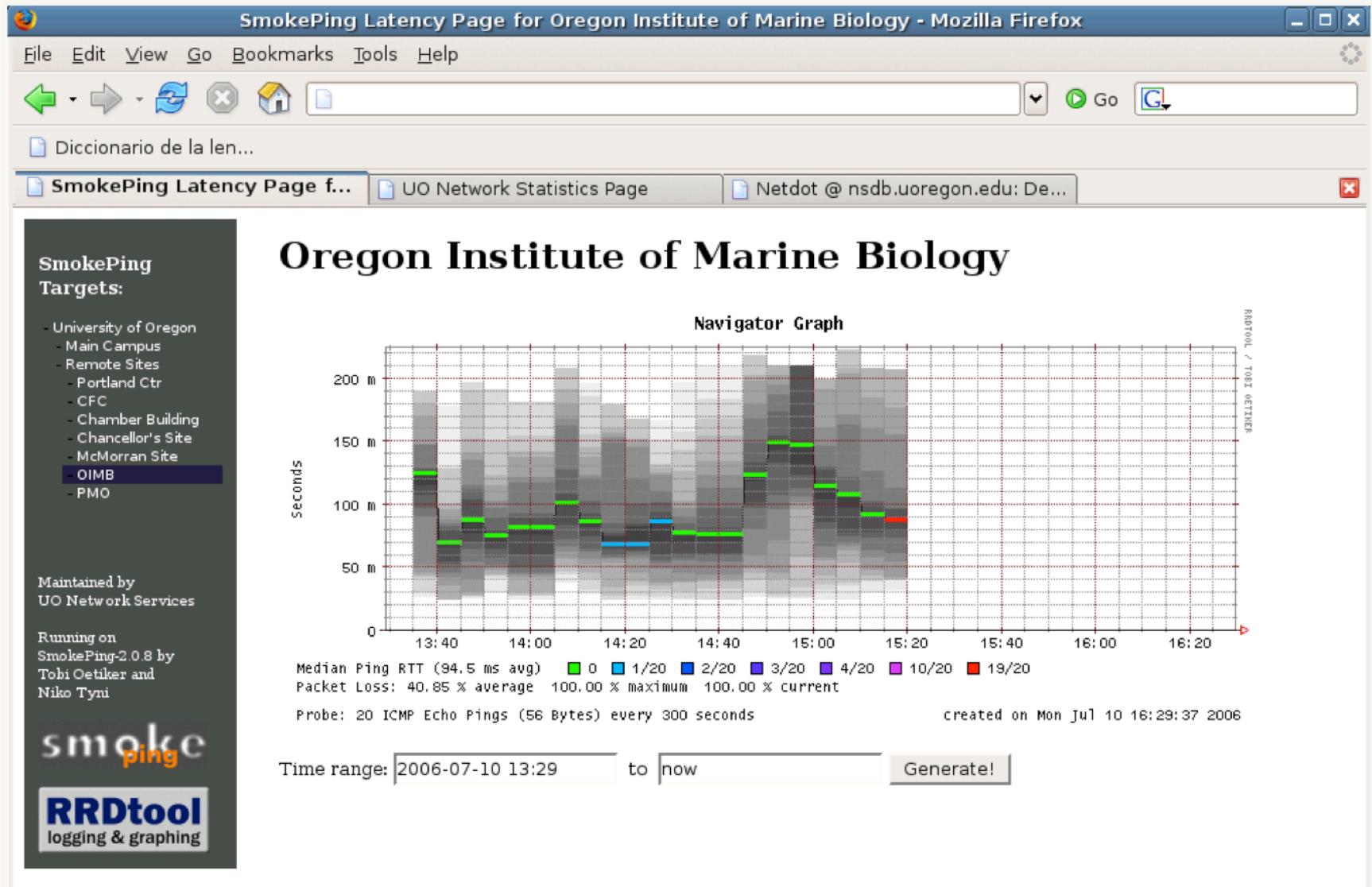
- Based on RRDTool (the same author)
- Measures ICMP delay and can measure status of services such as HTTP, DNS, SMTP, SSH, LDAP, etc.
- Define ranges on statistics and generate alarms.
- Written in Perl for portability
- Easy to install harder to configure.

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”

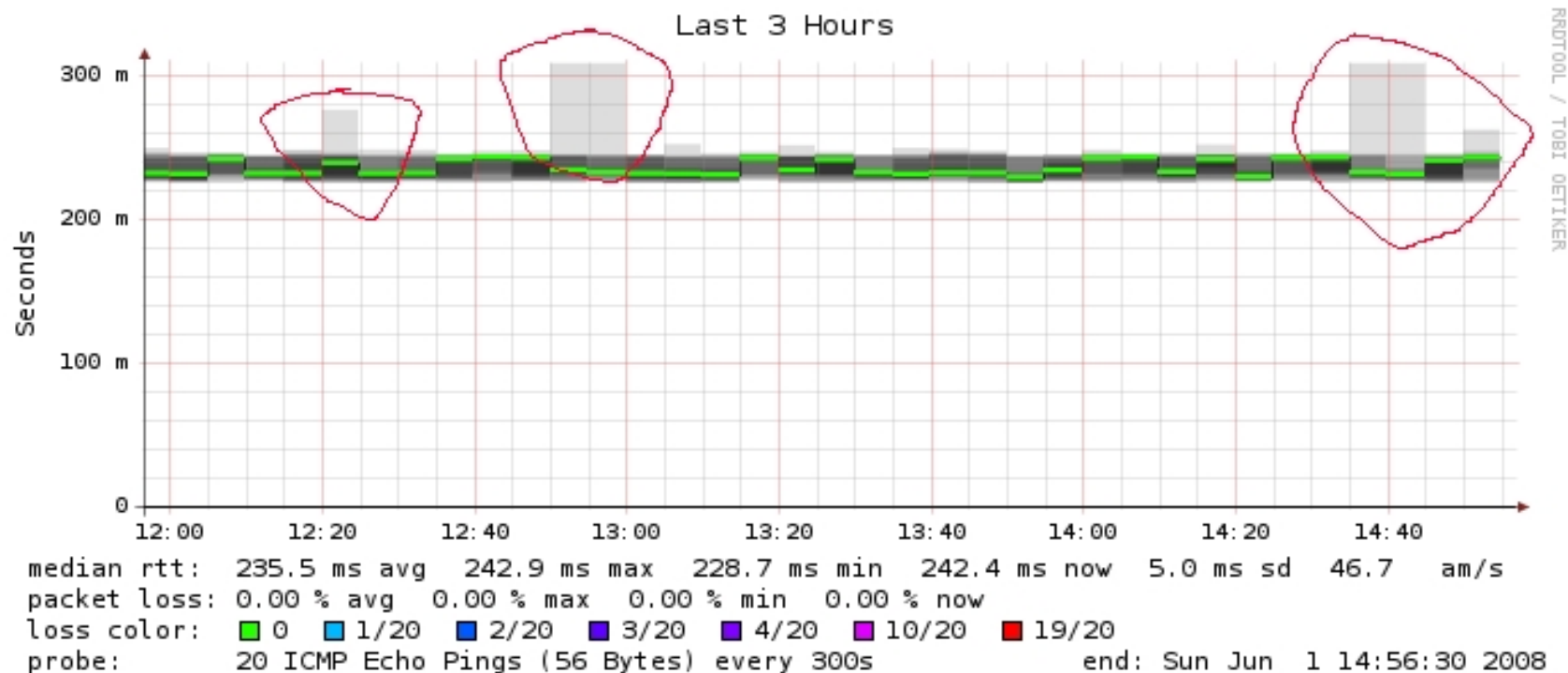


How to Read Smokeping Graphs

- Smokeping sends multiple 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

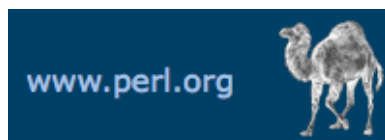
African Network Operators Group



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:
 - **`/etc/init.d/smokeping restart`**
 - **`/etc/init.d/smokeping reload`**
 - **`service smokeping restart/reload`**

Smokeping Installation

You will find Smokeping running here:

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

SmokePing
Targets:

Filter:

- Charts
- Local

Maintained by
Joe Random

Running on
SmokePing-2.3.6 by
Tobi Oetiker and
Niko Tyni

smoke
ping

RRDtool
logging & graphing

Network Latency Grapher

Welcome to the SmokePing website of 'A poorly maintained site running Debian.'

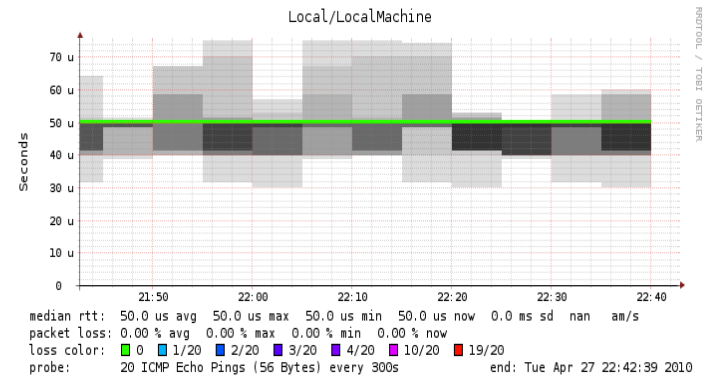
SmokePing
Targets:

Filter:

Charts
- Loss
- by Max
- by Median
- Std Deviation
- Local

The most interesting destinations

Top Standard Deviation



Configuration

Smokeping configuration files in Ubuntu 10.04 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

Update:

- owner → NOC
- contact → sysadm@localhost
- cgiurl → <http://localhost/cgi-bin/smokeping.cgi>
- mailhost → localhost
- syslogfacility → local5

```
*** General ***

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

# Please edit this to suit your installation
owner      = NOC
contact    = sysadm@localhost
cgiurl     = http://localhost/cgi-bin/smokeping.cgi
mailhost   = localhost
# 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
```

Configuration: pathnames

Normally you should not need to update this file:

```
sendmail = /usr/sbin/sendmail
imgcache = /var/www/smokeping
imgurl   = ../smokeping
datadir  = /var/lib/smokeping
dyndir   = /var/lib/smokeping/___cgi
piddir   = /var/run/smokeping
smokemail = /etc/smokeping/smokemail
tmail    = /etc/smokeping/tmail
precreateperms = 2775
```

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

+ 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: 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 = net@localhost
from = smokeping-alert@localhost

+bigloss
type = loss
# in percent
pattern = ==0%,==0%,==0%,==0%,>0%,>0%,>0%
comment = suddenly there is packet loss

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

Remember this goes to our RT queue.

Ubuntu-specific alert. The name is misleading as the alert is for any loss when there was none previously.

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: Probes

Smokeying 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 = /

+ EchoPingSmtip
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.

Configuration: Slaves

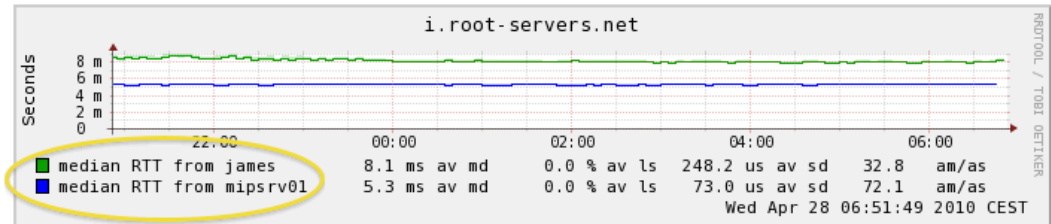
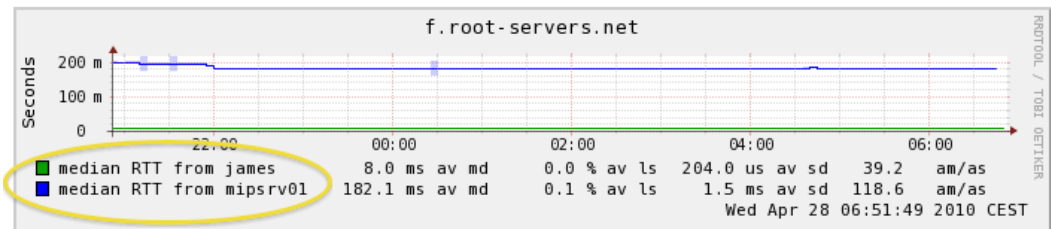
Smokeping slave servers allow for multi-viewpoint monitoring and graphing of the same services, machines or links. Details here:

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

```
# *** Slaves ***
#
## make sure this is not world-readable!
## secrets=/etc/smokeping/slave-secrets
#
# +slave1
# display_name=slave_name
# color=0000ff
```

That is, you can externally monitor your network!

Root Name Server System



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
```

Default Probe: FPing

- Probing for delay and jitter (ping)
- Performance and availability probe of a server.
- Entry belongs in the Targets file:

Latency

```
+++ LocalMachine
```

```
menu = localhost
```

```
title = Our local machine
```

```
host = localhost
```

```
alerts = startloss,someloss,bigloss,rttdetect
```

Probe: DNS Check

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

DNS Latency

```
++ DNS
```

```
probe = DNS
```

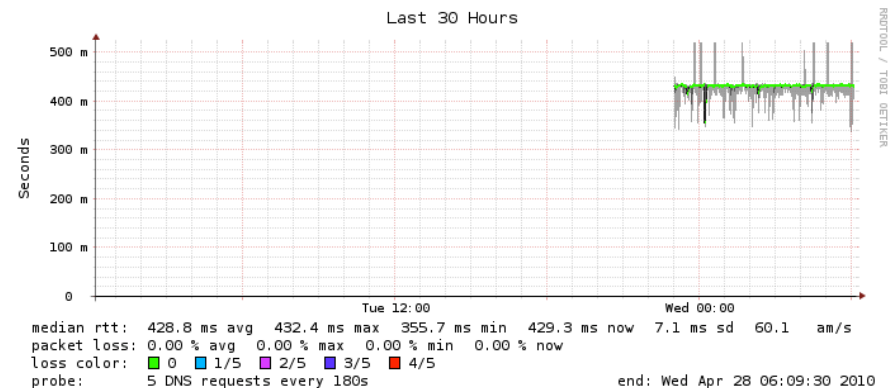
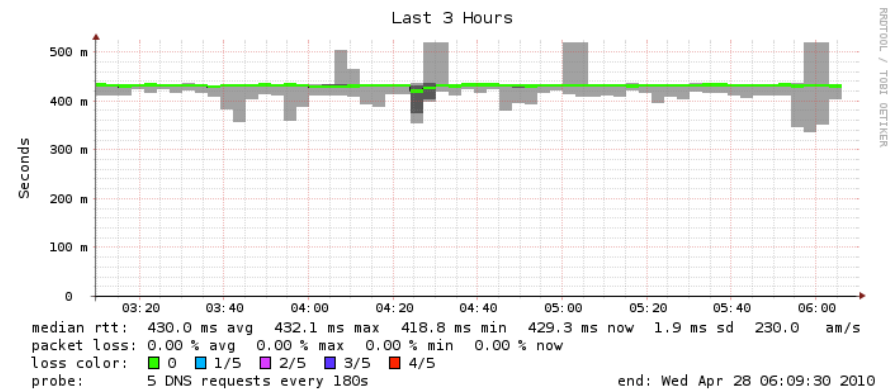
```
menu = External DNS Check
```

```
title = DNS Latency
```

```
+++ nsrc
```

```
host = nsrc.org
```

nsrc.org



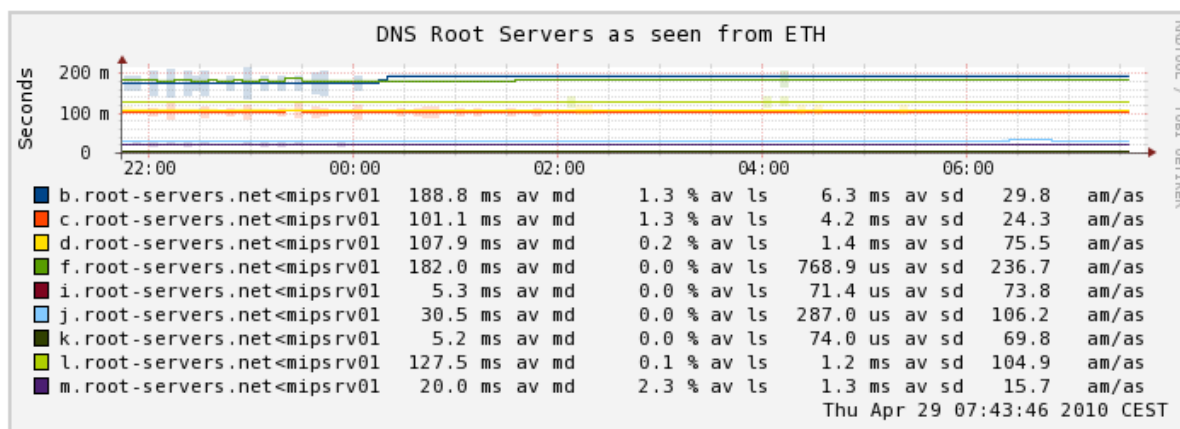
MultiHost Graphing

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-rtr /Local/Routers/rtr1
      /Local/Routers/rtr2
```



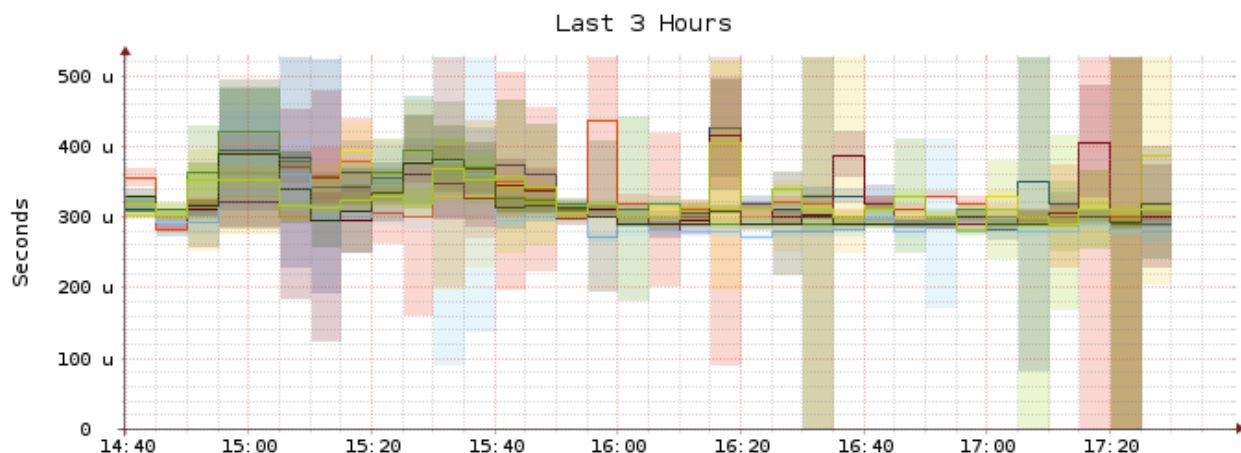
Example Multihost Graph

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



RRDTOOL / TOBI OETIKER

■ pc33	331.8 us av md	0.0 % av ls	0.0 ms sd	4.3 am/as
■ pc34	330.0 us av md	0.0 % av ls	0.0 ms sd	1.4 am/as
■ pc35	322.0 us av md	0.0 % av ls	0.0 ms sd	2.7 am/as
■ pc36	326.5 us av md	0.0 % av ls	0.0 ms sd	2.9 am/as
■ pc37	318.4 us av md	0.0 % av ls	0.0 ms sd	2.9 am/as
■ pc38	305.0 us av md	0.0 % av ls	0.0 ms sd	4.8 am/as
■ pc39	314.3 us av md	0.0 % av ls	0.0 ms sd	2.3 am/as
■ pc40	322.1 us av md	0.0 % av ls	0.0 ms sd	2.2 am/as

ICMP Echo Pings (56 Bytes) end: Mon May 31 17:39:39 2010

More Types of Probes

More information available here:

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

A few more probes...

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

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