Network Management & Monitoring

Measuring Delay with smoke ping

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 visualisation.
- Interactive graph explorer.
- Wide range of latency measurment 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
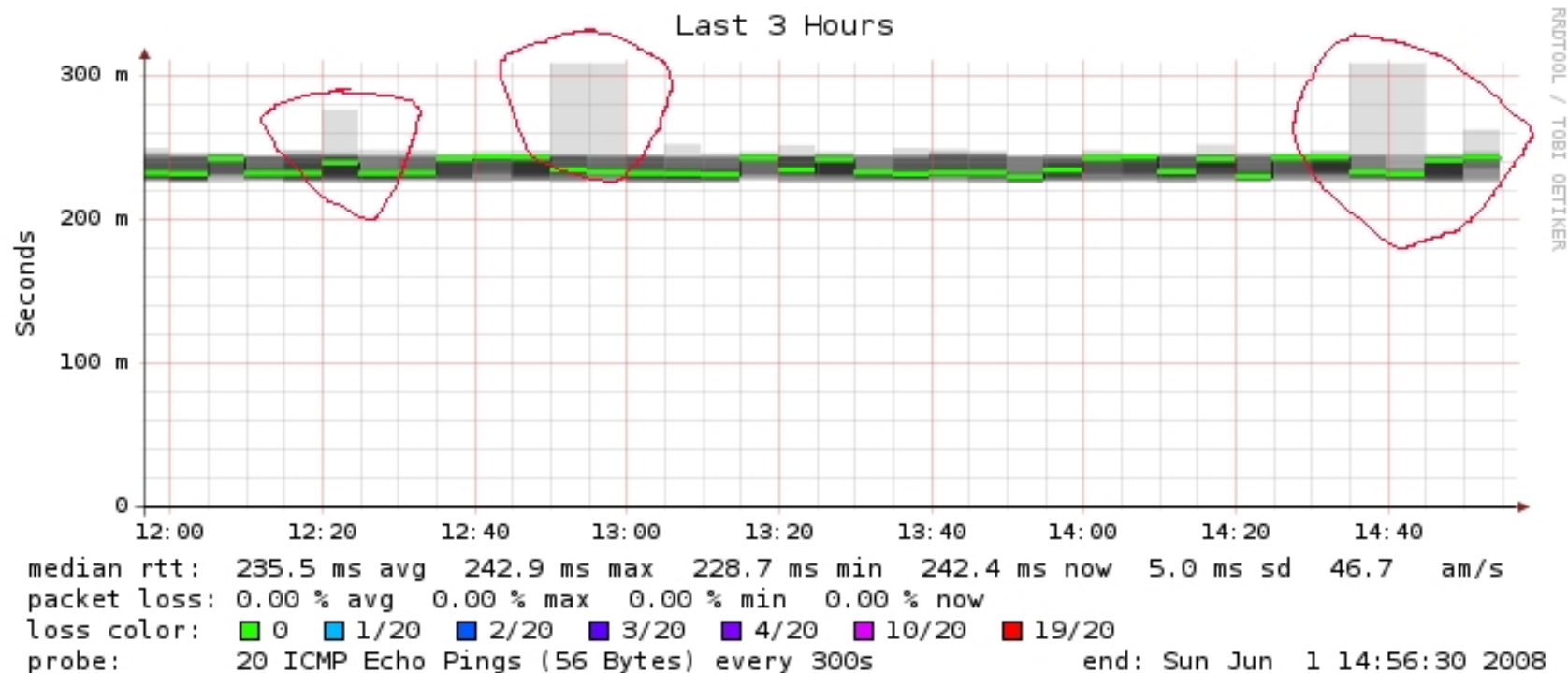
The "Smoke" and the "Pings"
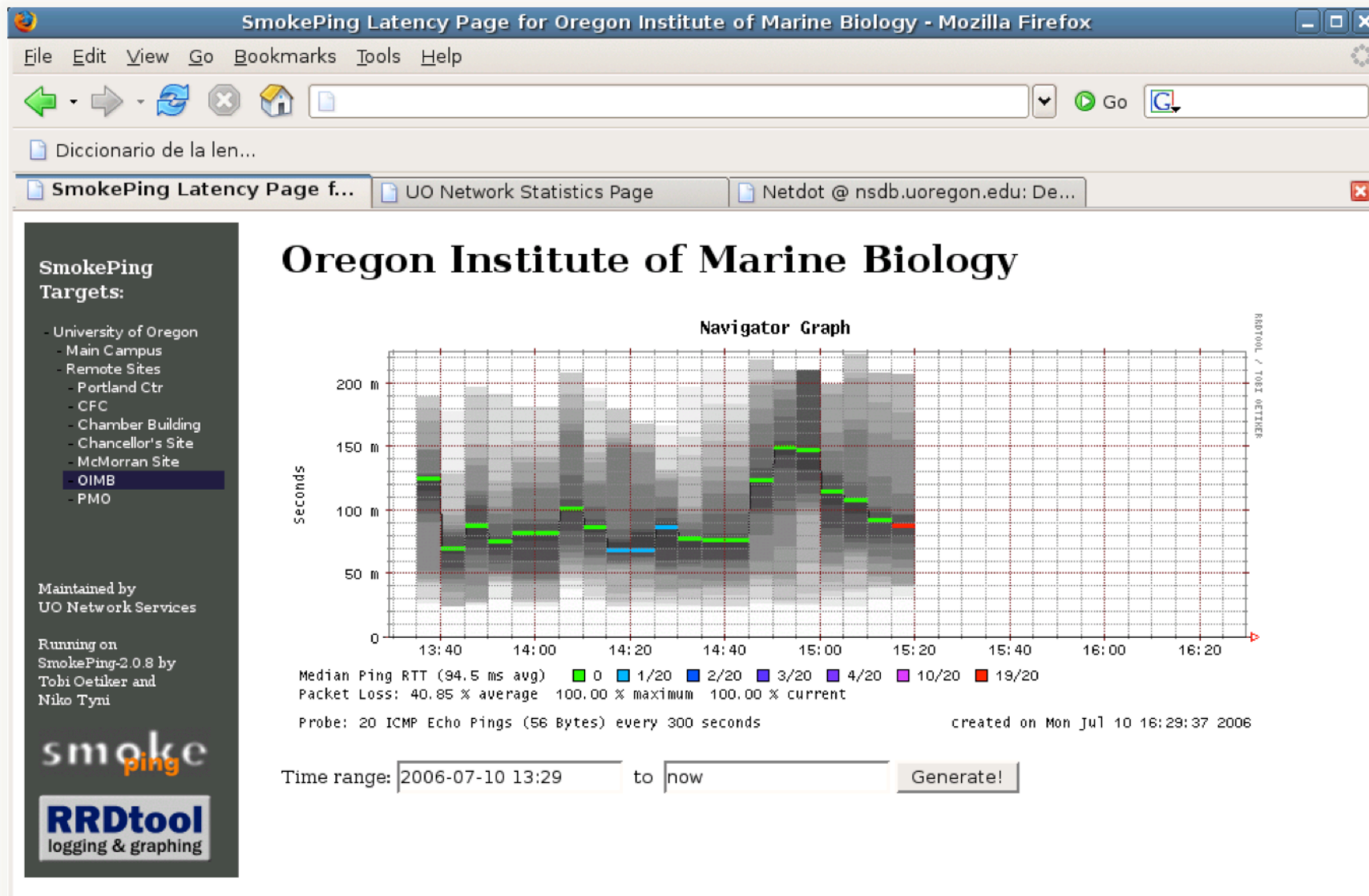
How to Read Smokeping Graphs

- 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.
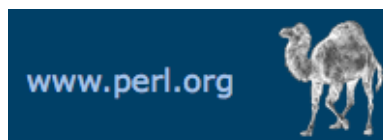
An Example

African Network Operators Group

Last 3 Hours

median rtt:	235.5 ms avg	242.9 ms max	228.7 ms min	242.4 ms now	5.0 ms sd	46.7	am/s

median rtt: 235.5 ms avg   242.9 ms max   228.7 ms min   242.4 ms now   5.0 ms sd   46.7   am/s
packet loss: 0.00 % avg   0.00 % max   0.00 % min   0.00 % now
loss color: ▪ 0   ▪ 1/20   ▪ 2/20   ▪ 3/20   ▪ 4/20   ▪ 10/20   ▪ 19/20
probe: 20 ICMP Echo Pings (56 Bytes) every 300s   end: Sun Jun 1 14:56:30 2008

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

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

```
*** 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 = local0
# 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

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.
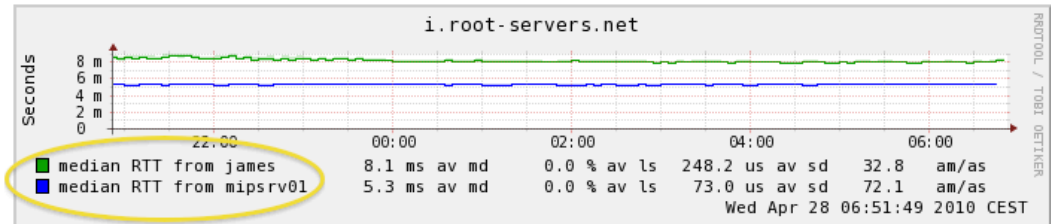
Configuration: Slaves

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
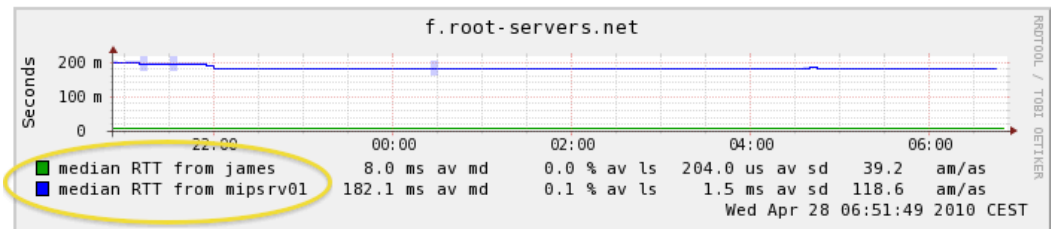
Configuration: Targets

- 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:
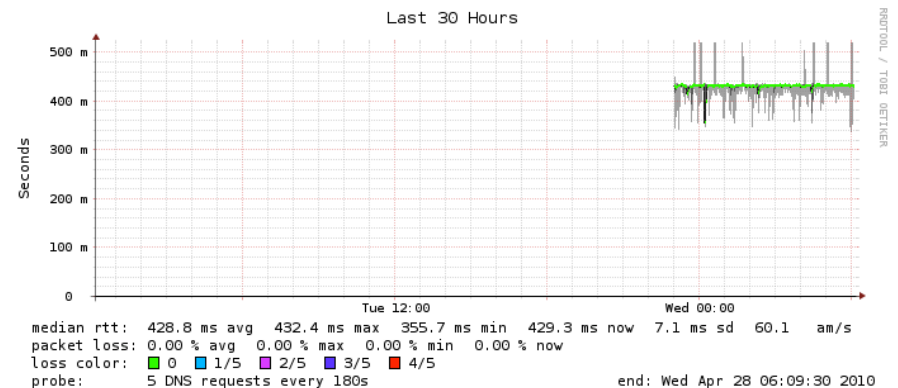
DNS Latency

```
++ DNS

probe = DNS

menu = External DNS Check

title = DNS Latency


+++ nsrc

host = nsrc.org
```

nsrc.org

Last 3 Hours

median rtt: 430.0 ms avg   432.1 ms max   418.8 ms min   429.3 ms now   1.9 ms sd   230.0   am/s
packet loss: 0.00 % avg   0.00 % max   0.00 % min   0.00 % now
loss color: ■ 0 ■ 1/5 ■ 2/5 ■ 3/5 ■ 4/5
probe: 5 DNS requests every 180s   end: Wed Apr 28 06:09:30 2010

Last 30 Hours

median rtt: 428.8 ms avg   432.4 ms max   355.7 ms min   429.3 ms now   7.1 ms sd   60.1   am/s
packet loss: 0.00 % avg   0.00 % max   0.00 % min   0.00 % now
loss color: ■ 0 ■ 1/5 ■ 2/5 ■ 3/5 ■ 4/5
probe: 5 DNS requests every 180s   end: Wed Apr 28 06:09:30 2010

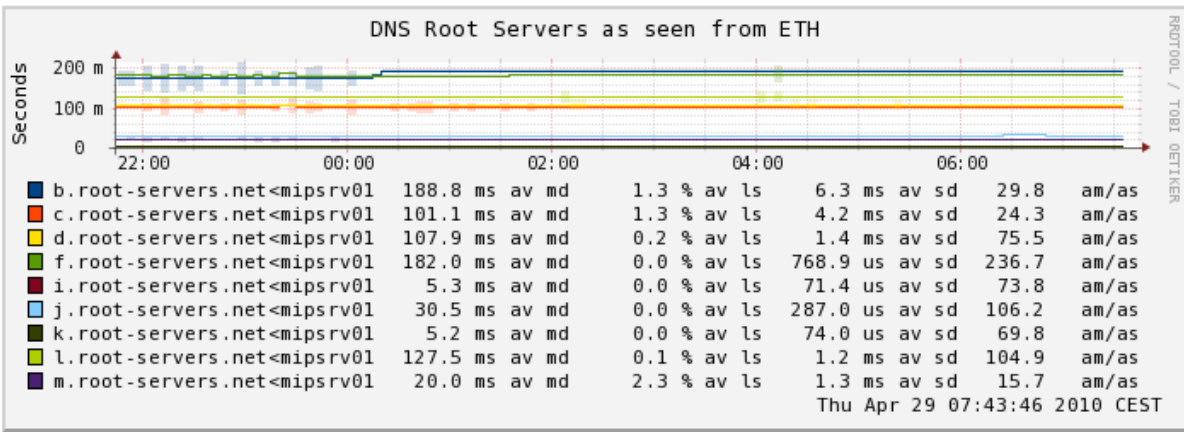# MultiHost Graphing

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
```
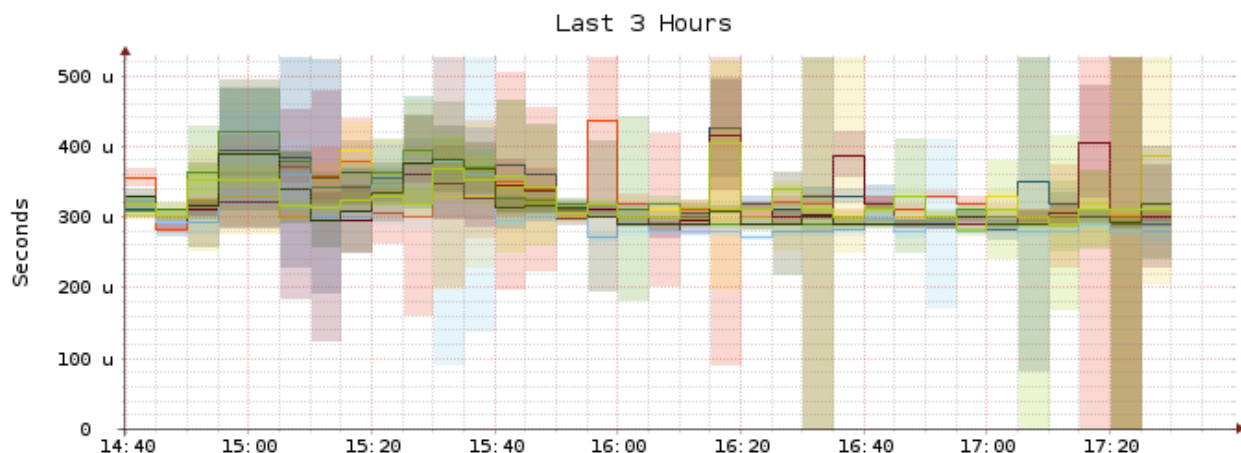

DNS Root Servers as seen from ETH

■ b.root-servers.net<mipsrv01	188.8 ms	av md	1.3 %	av ls	6.3 ms	av sd	29.8	am/as
■ c.root-servers.net<mipsrv01	101.1 ms	av md	1.3 %	av ls	4.2 ms	av sd	24.3	am/as
■ d.root-servers.net<mipsrv01	107.9 ms	av md	0.2 %	av ls	1.4 ms	av sd	75.5	am/as
■ f.root-servers.net<mipsrv01	182.0 ms	av md	0.0 %	av ls	768.9 us	av sd	236.7	am/as
■ i.root-servers.net<mipsrv01	5.3 ms	av md	0.0 %	av ls	71.4 us	av sd	73.8	am/as
■ j.root-servers.net<mipsrv01	30.5 ms	av md	0.0 %	av ls	287.0 us	av sd	106.2	am/as
■ k.root-servers.net<mipsrv01	5.2 ms	av md	0.0 %	av ls	74.0 us	av sd	69.8	am/as
■ l.root-servers.net<mipsrv01	127.5 ms	av md	0.1 %	av ls	1.2 ms	av sd	104.9	am/as
■ m.root-servers.net<mipsrv01	20.0 ms	av md	2.3 %	av ls	1.3 ms	av sd	15.7	am/as

Thu Apr 29 07:43:46 2010 CEST

Example Multihost Graph

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

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 use 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