



Network debugging never was easier

Job Snijders

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NANOG 56 – Dallas, TX, US

# Who am I?

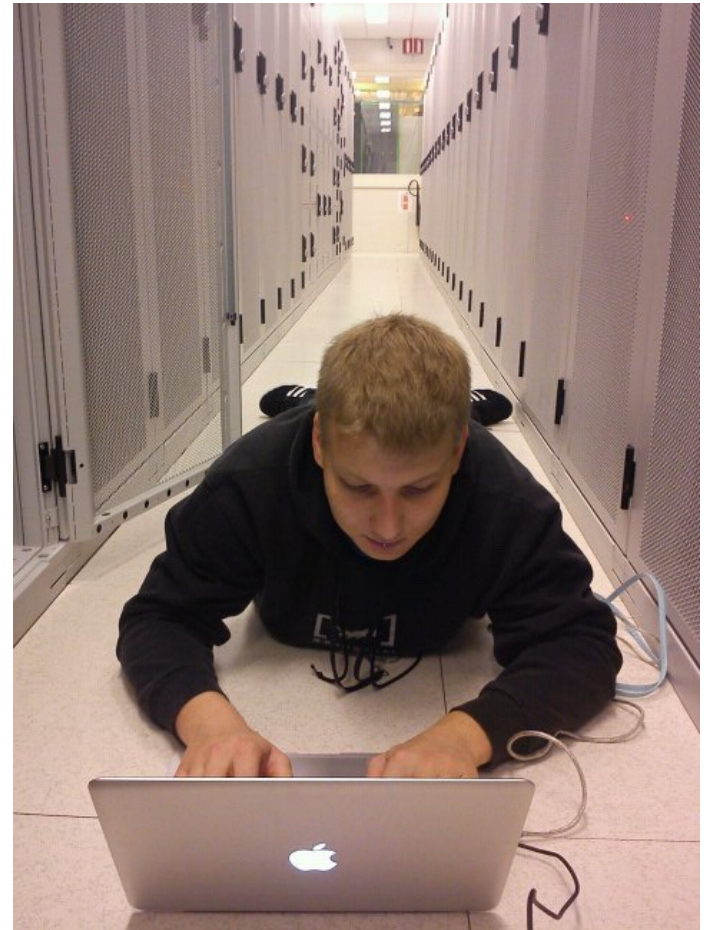
## Job Snijders

Network engineer @  
AS 5580 (Atrato IP Networks)

Twitter: @JobSnijders

Hobbies: IP Routing, LISP, MPLS, IPv6, RING

Shoe size: 45/EU



# What's NLNOG?



*This is where  
It started!*

- Loosely connected group of Dutch network operators
- Drink beer once a year
- Active IRC channel
- mostly dormant mailing-list

# So, what's this RING thing?

Metaphysical definition:

*“Awesome network debugging platform”*

Foundation:

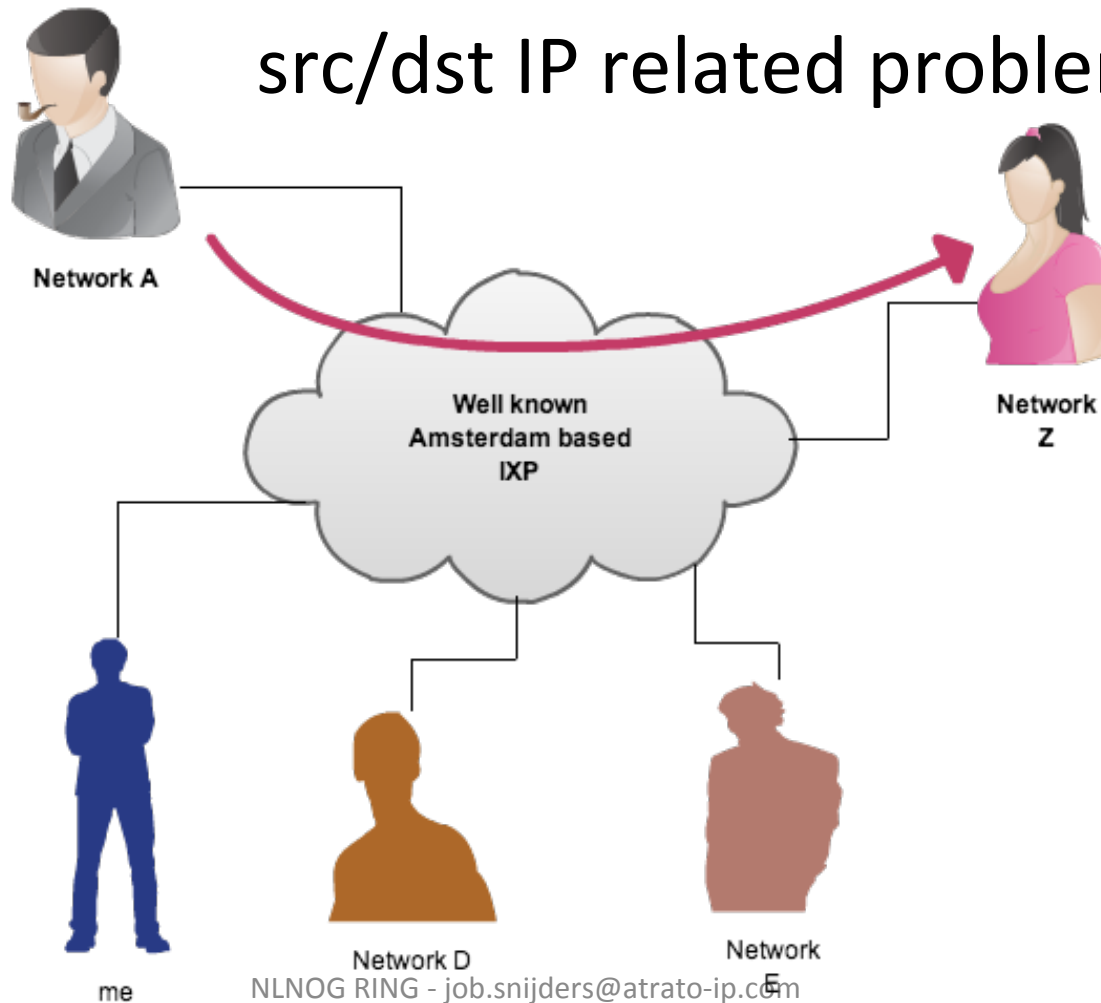
*Trust – I trust you with access to my resources,  
as you trust me with access to your resources*

# Agenda

- How the RING came to be
- Current state of the RING
- CLI interface
- Web interface
- RING Governance
- How to join!

# How did it start? (1/3)

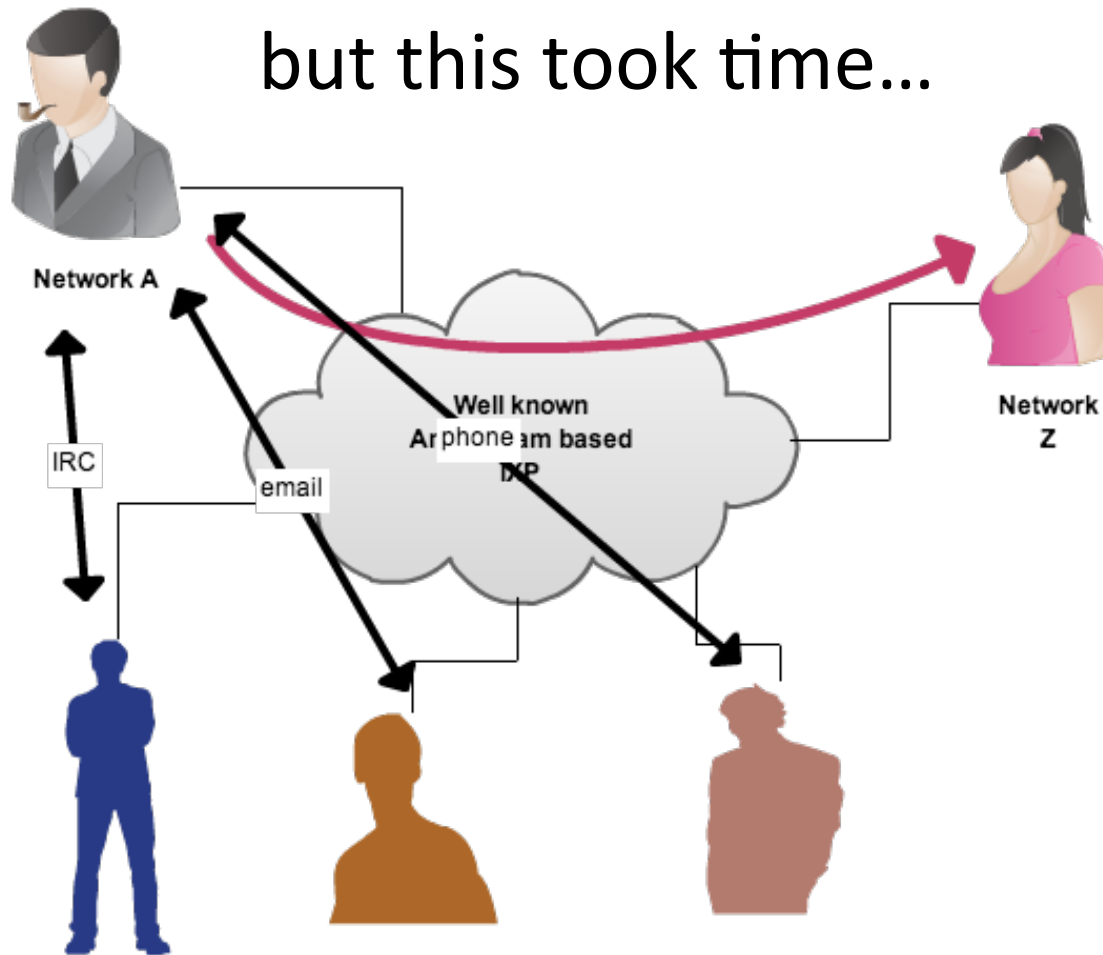
In December 2010 a friend of mine had some src/dst IP related problems

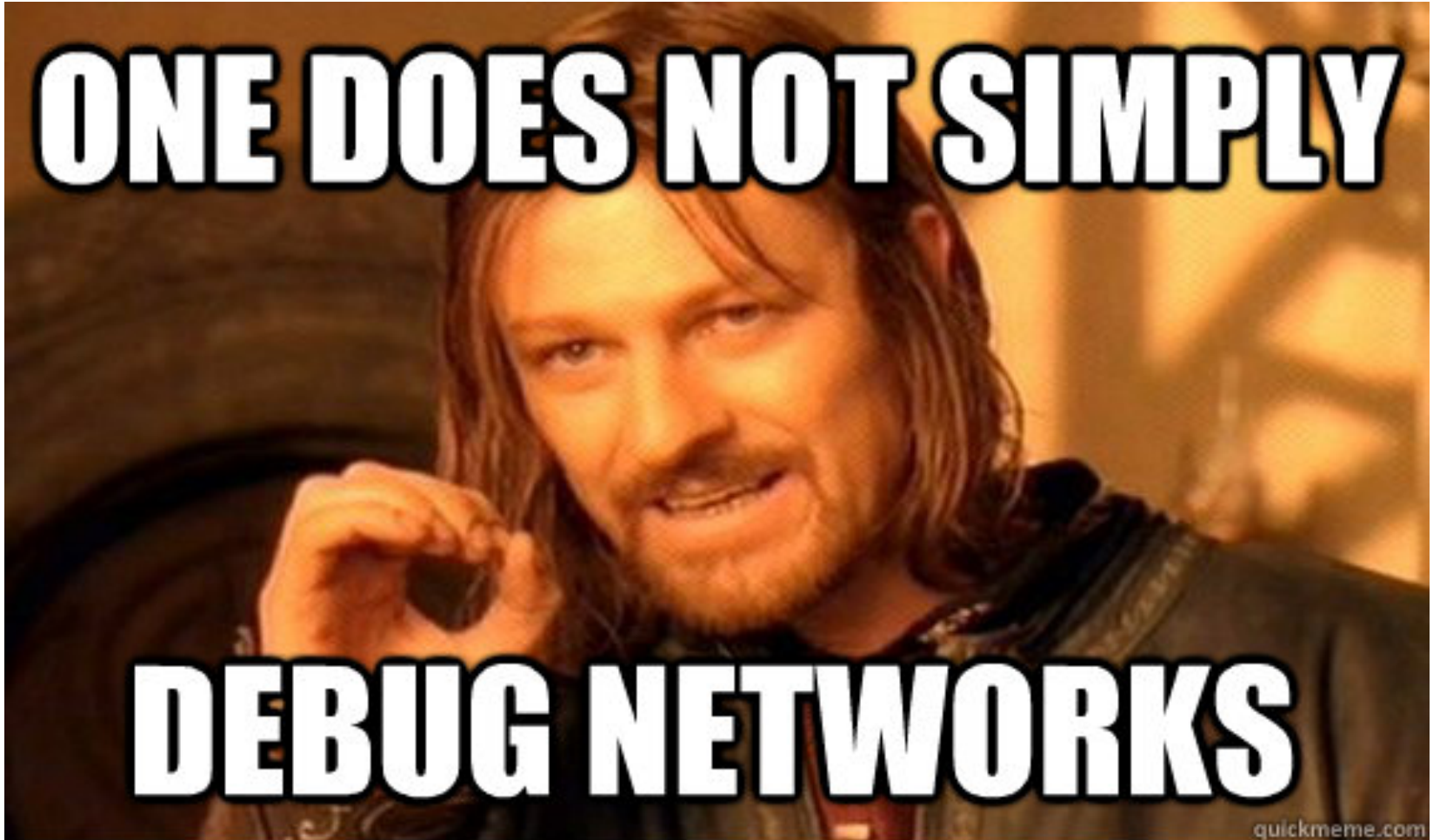


# How did it start? (2/3)

He asked for help (pingsweep, traceroute, etc),

but this took time...

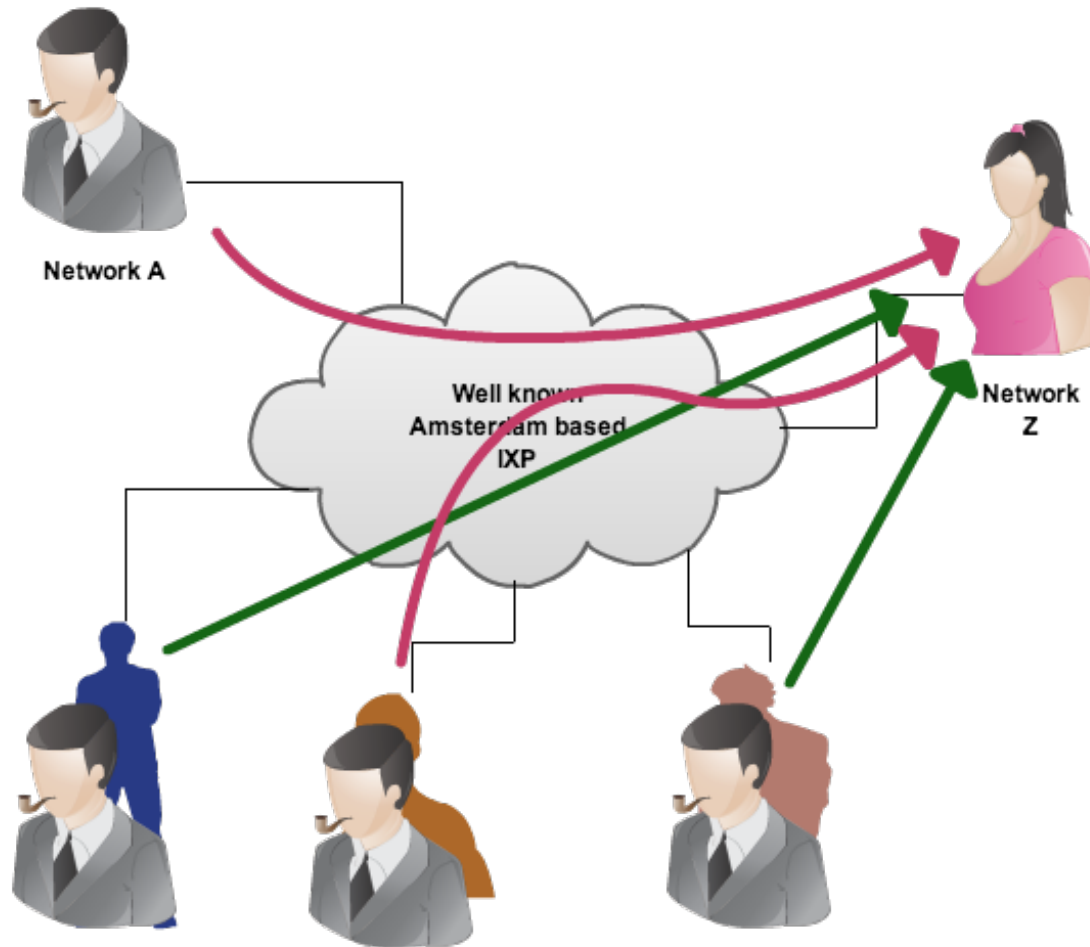






# How did it start? (3/3)

But wouldn't DIY be much nicer?



# State of the RING – Oct 2012

156 nodes

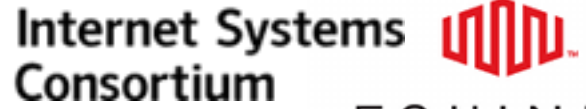
33 countries

132 Autonomous Systems

Still growing!



Participants from all walks of life,  
a random selection



# CLI example – step 1

```
atrato@atrato01:~$ ring-ping www.iij.ad.jp  
occiad01 connect: Network is unreachable  
www.iij.ad.jp - 148 servers: 246ms average  
www.iij.ad.jp - unreachable via: occaid01
```

IPv4-only  
test!

IPv6-only  
test!

```
job@atrato01:~$ ring-ping -6 www.iij.ad.jp  
www.iij.ad.jp - 146 servers: 286ms average  
www.iij.ad.jp - unreachable via: rezopole01 nexellent01  
atrato@atrato01:~$
```

# CLI example – step 1

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atrato@atrato01:~$ ring-ping www.iij.ad.jp  
occiad01 connect: Network is unreachable  
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IPv4-only  
test!

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```

IPv6-only  
test!

# CLI example – step 1

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occiad01 connect: Network is unreachable  
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IPv4-only  
test!

IPv6-only  
test!

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job@atrato01:~$ ring-ping -6 www.iij.ad.jp  
www.iij.ad.jp - 146 servers: 286ms average  
www.iij.ad.jp - unreachable via: rezopole01 nexellent01  
atrato@atrato01:~$
```

# CLI example – step 2

```
Alice:~ job$ ssh rezopole01.ring.nlnog.net mtr -r6wc 10 www.iij.ad.jp
```

```
HOST: rezopole01.ring.nlnog.net      Loss%   Snt    Last    Avg    Best  Wrst  StDev
 1. |-- 2001:7f8:47:40::1             0.0%    10     0.7    0.7    0.5   1.4   0.3
 2. |-- c2821-12b-v22.rezopole.net    0.0%    10     6.1    1.9    1.2   6.1   1.5
 3. |-- 2a01:240:400:2::1             0.0%    10     1.8    1.8    1.5   3.1   0.5
 4. |-- ams-ix-1.ip.tiscali.net       0.0%    10    22.0   22.2   22.0  23.4   0.4
 5. |-- ams-ix-1.ip.tiscali.net       0.0%    10    22.3   24.3   22.0  43.3   6.7
 6. |-- xe-4-2-0.nyc20.ip6.tinet.net  0.0%    10   102.7  102.5  102.3 102.7   0.1
 7. |-- ???                          100.0   10     0.0    0.0    0.0   0.0   0.0
```

```
Alice:~ job$
```



# Other CLI uses

- Use dig to check nameservers from 133 ASNs
  - \$ ring-all 'dig +short ring.nlnog.net @127.0.0.1'
- Traceroute from 156 nodes to your target
  - \$ ring-all 'mtr -wrc 10 [www.nanog.org](http://www.nanog.org)'
- MTU testing, L2/L2 loadbalancing,
- **Anything!**

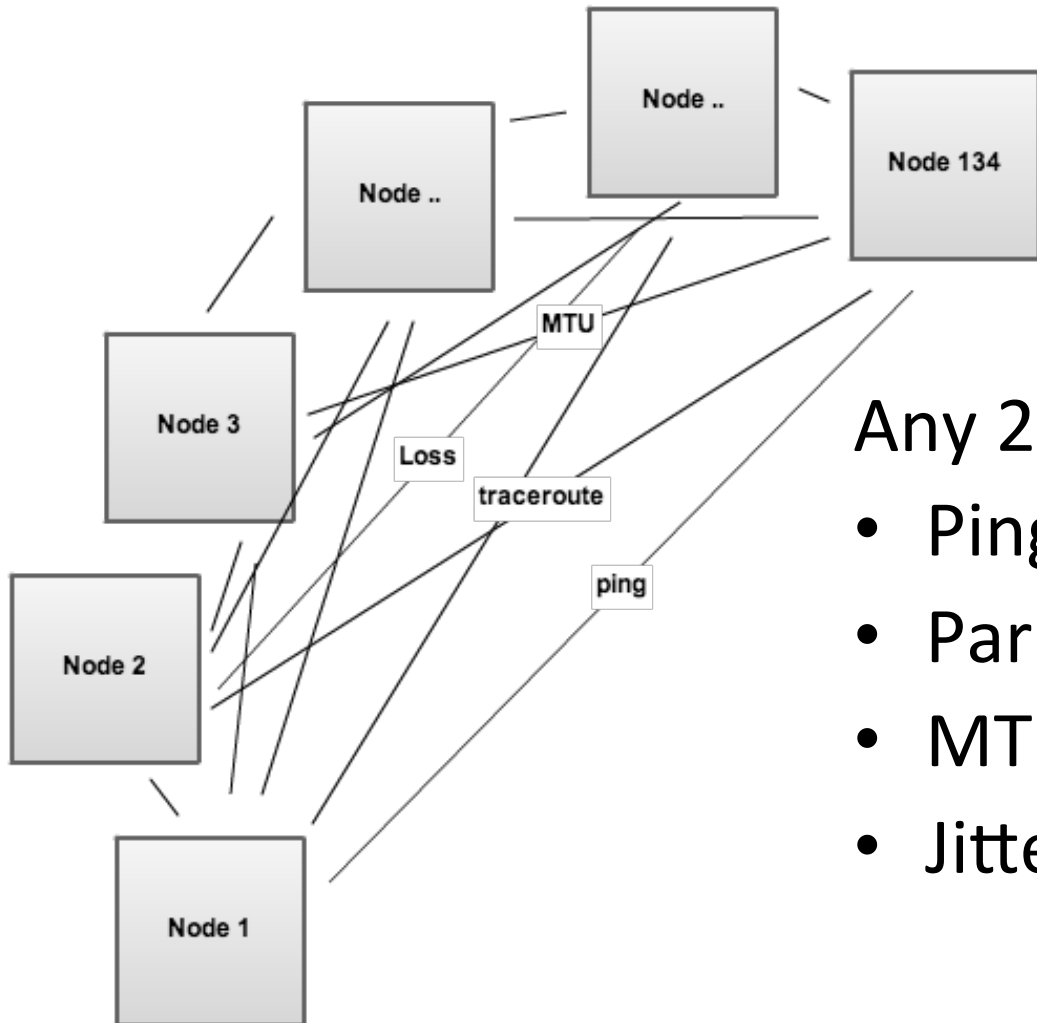


# RING Web interface

- AMP (Active Measurement Project)
  - Developed by WAND Network Research Group
  - Same guys as scamper & friends
  - Big thanks to Brendon Jones for his support
  - Info: <http://wand.cs.waikato.ac.nz/projects/details/amp>
- In beta phase, bear with us while we scale 😊

<http://amp.ring.nlnog.net/>

# AMP concept



Any 2 any (v4 + v6):

- Ping
- Paris Traceroute
- MTU testing
- Jitter, loss, etc



# IPv6 Loss US <-> US

ipv4

ipv6

latency

loss

hops

mtu

Destination:

Source: amazon01 amazon05 amazon06 arpnetworks01 atrato02 bigwells01 isc01 merit01 netflix01 occaid01 softlayer01 softlayer02 softlayer03 softlayer04 softlayer05 towardex01 voxel01 webair01 yourorg01

amazon01		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
amazon05	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
amazon06	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
arpnetworks01	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
atrato02	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
bigwells01	11	0	0	0	0		0	0	0	0	22	22	0	0	0	0	0	33	0
isc01	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
merit01	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
netflix01	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
softlayer01	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
softlayer02	11	0	0	0	11	0	0	22	11	0	0		22	11	0	0	11	11	22
softlayer03	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
softlayer04	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
softlayer05	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
towardex01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
voxel01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		11	0
webair01	0	22	22	11	0	11	11	0	11	0	11	11	11	11	11	0	0		0
yourorg01	0	0	0	0	0	11	0	0	0	0	0	0	11	0	0	0	0	0	

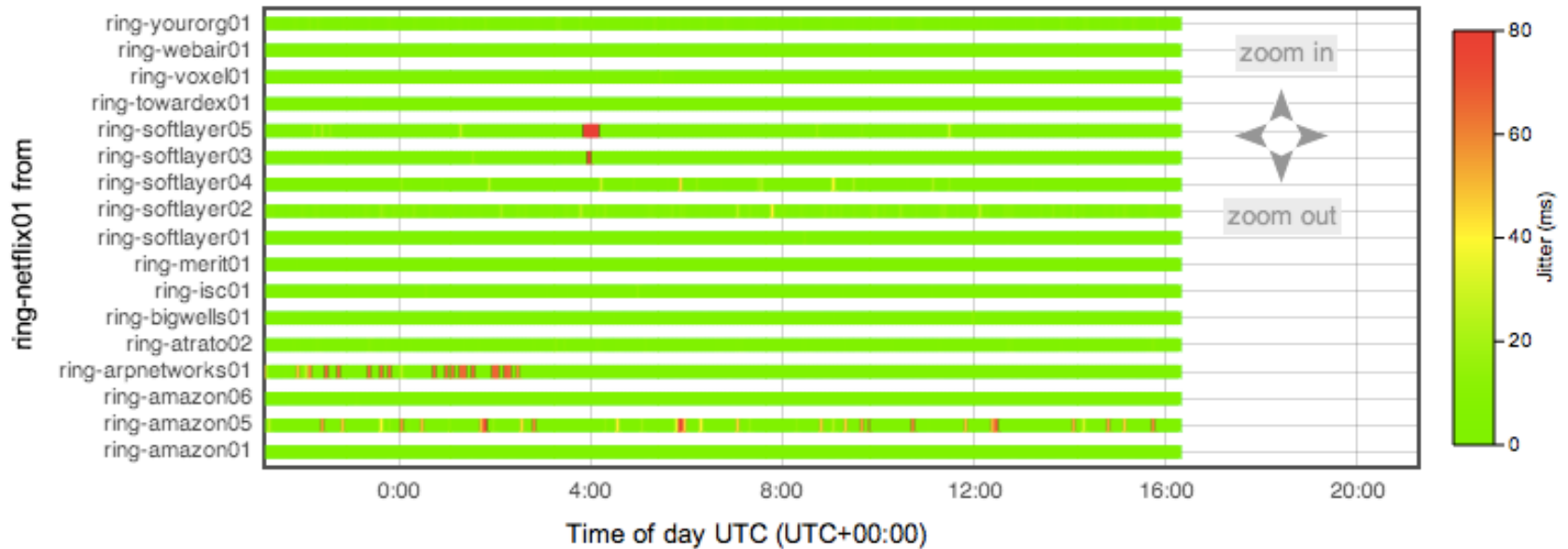




# Historic graphs (jitter / loss/ latency)

Sun Oct 21 2012 to Mon Oct 22 2012

ring-netflix01 from US

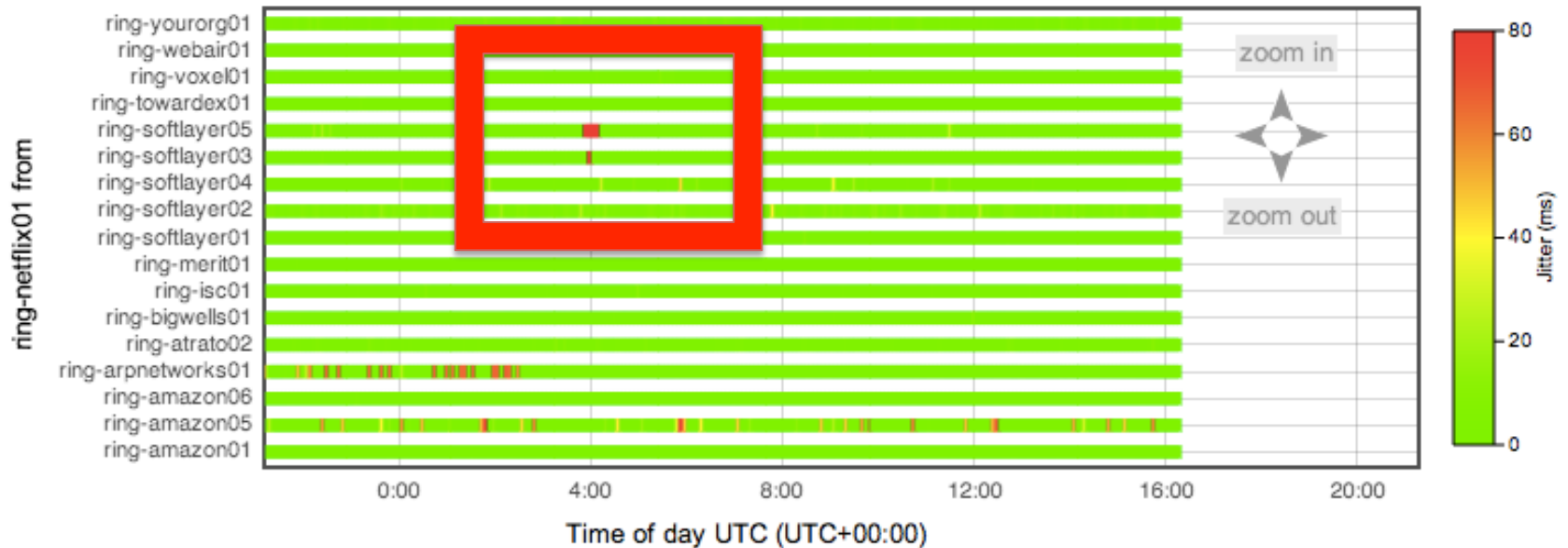


Snap Range:  | Jump To:    |

# Historic graphs (jitter / loss/ latency)

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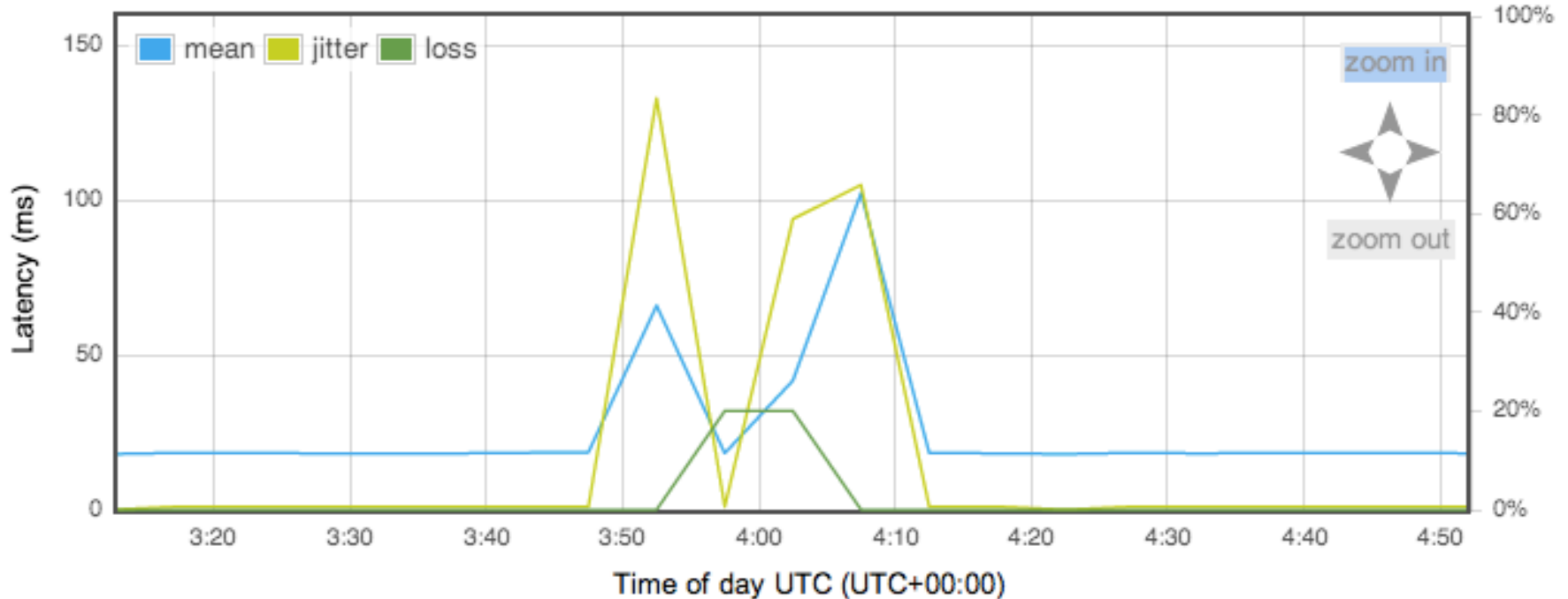


Snap Range:  | Jump To:    |



# Jitter / Latency / Loss graph from softlayer05 to netflix01

Mon Oct 22 2012 to Mon Oct 22 2012



Y-axis max:  | Latency:  max  min  mean  jitter | Other:  loss

Snap Range:  | Jump To:    |

**Mon Oct 22 04:00:00 2012 UTC**

<b>Hop</b>	<b>Name</b>	<b>Address</b>	<b>MTU</b>
0	50.23.130.225-static.reverse.softlayer.com	50.23.130.225	1500
1	ae12.dar01.sr01.sea01.networklayer.com	67.228.118.224	1500
2	unknown	unknown	unknown
3	ae0.bbr01.eq01.sjc02.networklayer.com	173.192.18.147	1500
4	r001.sjc001.ix.nc.nflxvideo.net	206.223.116.133	1500
5	netflix01	108.175.33.120	1500

**Mon Oct 22 04:15:00 2012 UTC**

<b>Hop</b>	<b>Name</b>	<b>Address</b>	<b>MTU</b>
0	50.23.130.225-static.reverse.softlayer.com	50.23.130.225	1500
1	ae12.dar01.sr01.sea01.networklayer.com	67.228.118.224	1500
2	ae8.bbr02.wb01.sea02.networklayer.com	173.192.18.142	1500
3	ae0.bbr01.eq01.sjc02.networklayer.com	173.192.18.147	1500
4	r001.sjc001.ix.nc.nflxvideo.net	206.223.116.133	1500
5	netflix01	108.175.33.120	1500

**Mon Oct 22 04:45:00 2012 UTC**

<b>Hop</b>	<b>Name</b>	<b>Address</b>	<b>MTU</b>
0	50.23.130.225-static.reverse.softlayer.com	50.23.130.225	1500
1	ae12.dar01.sr01.sea01.networklayer.com	67.228.118.224	1500
2	ae8.bbr01.wb01.sea02.networklayer.com	173.192.18.198	1500
3	ae7.bbr02.wb01.sea02.networklayer.com	173.192.18.187	1500
4	ae0.bbr01.eq01.sjc02.networklayer.com	173.192.18.147	1500
5	r001.sjc001.ix.nc.nflxvideo.net	206.223.116.133	1500
6	netflix01	108.175.33.120	1500

# RING governance

- 4 RING Administrators (install, update,..):  
Job Snijders, Martin Pels,  
Peter van Dijk, Edwin Hermans
- Rough consensus
- Very active community (software dev, ideas)
- All equipment & hosting comes from Sponsors

***The RING is a community effort, built by  
and for us, network engineers.***

# How to join?

Mega easy!

- Requirements
  - 1 machine (virtual is fine)
  - 1 IPv4 and 1 IPv6 address
  - Fresh install of Ubuntu 12.04 (64 bit)
  - You must be present in the DFZ with own ASN
  - Fill in application form on <https://ring.nlnog.net/>
- **BTW:** Treat it like any regular Colo/Access customer!

Gratis!