



RING: Network debugging never was easier

SQA: Blazing fast partial outage detection

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So, what's this RING thing?

Metaphysical definition:

“Awesome network debugging platform”

Foundation:

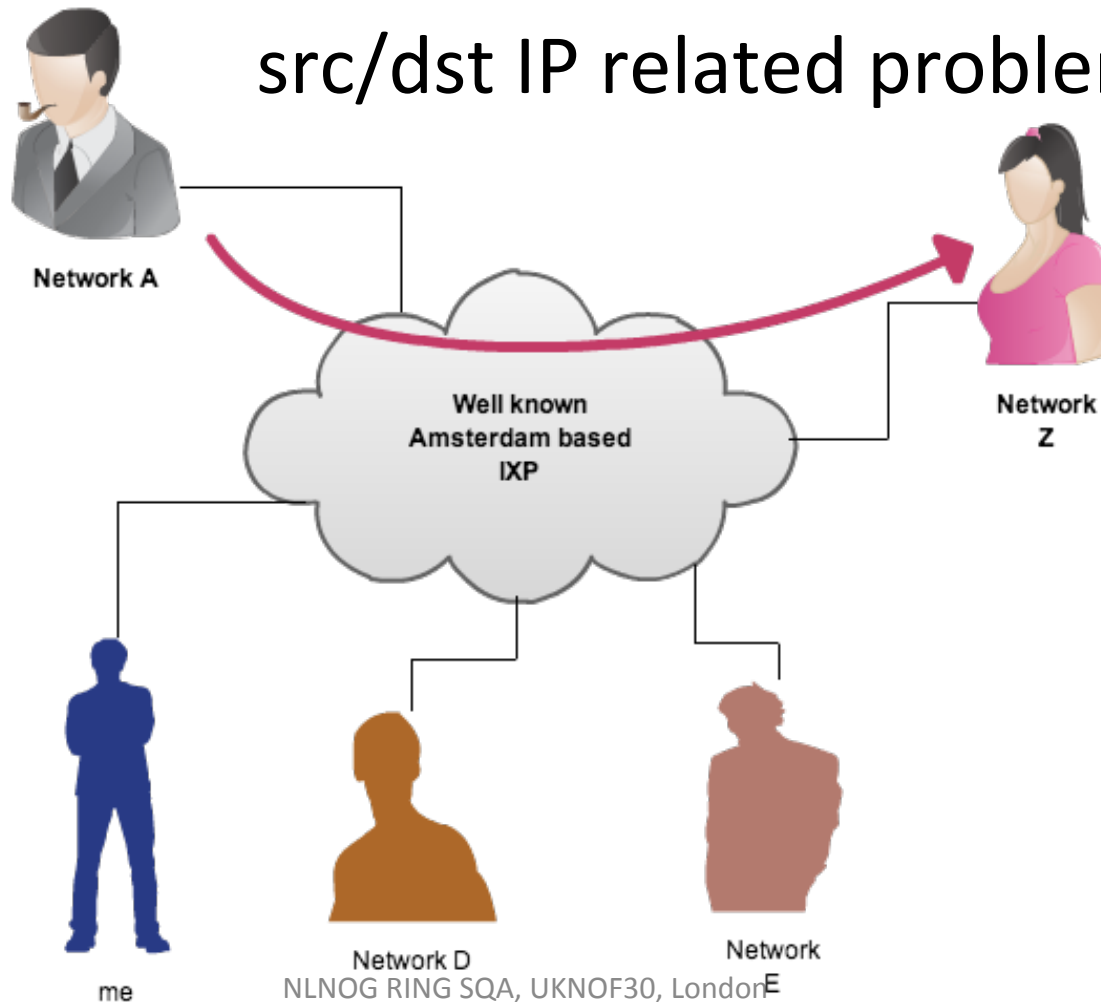
*Trust – I trust you with access to my resources,
as you trust me with access to your resources*

Agenda

- How the RING came to be
- Current state of the RING
- RING SQA
 - What is it?
 - How to use it?
- Invitation to join the RING

How did it start? (1/3)

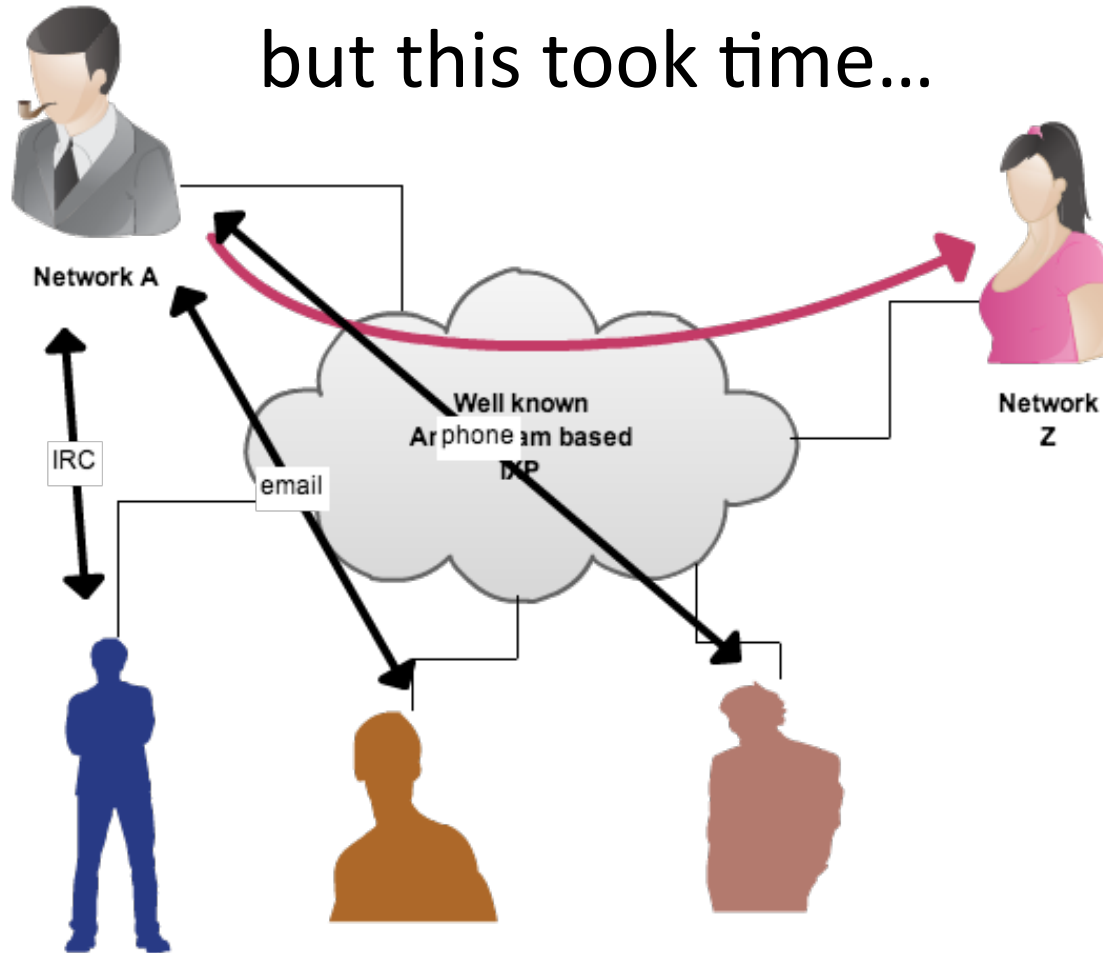
In December 2010 a friend of mine had some src/dst IP related problems

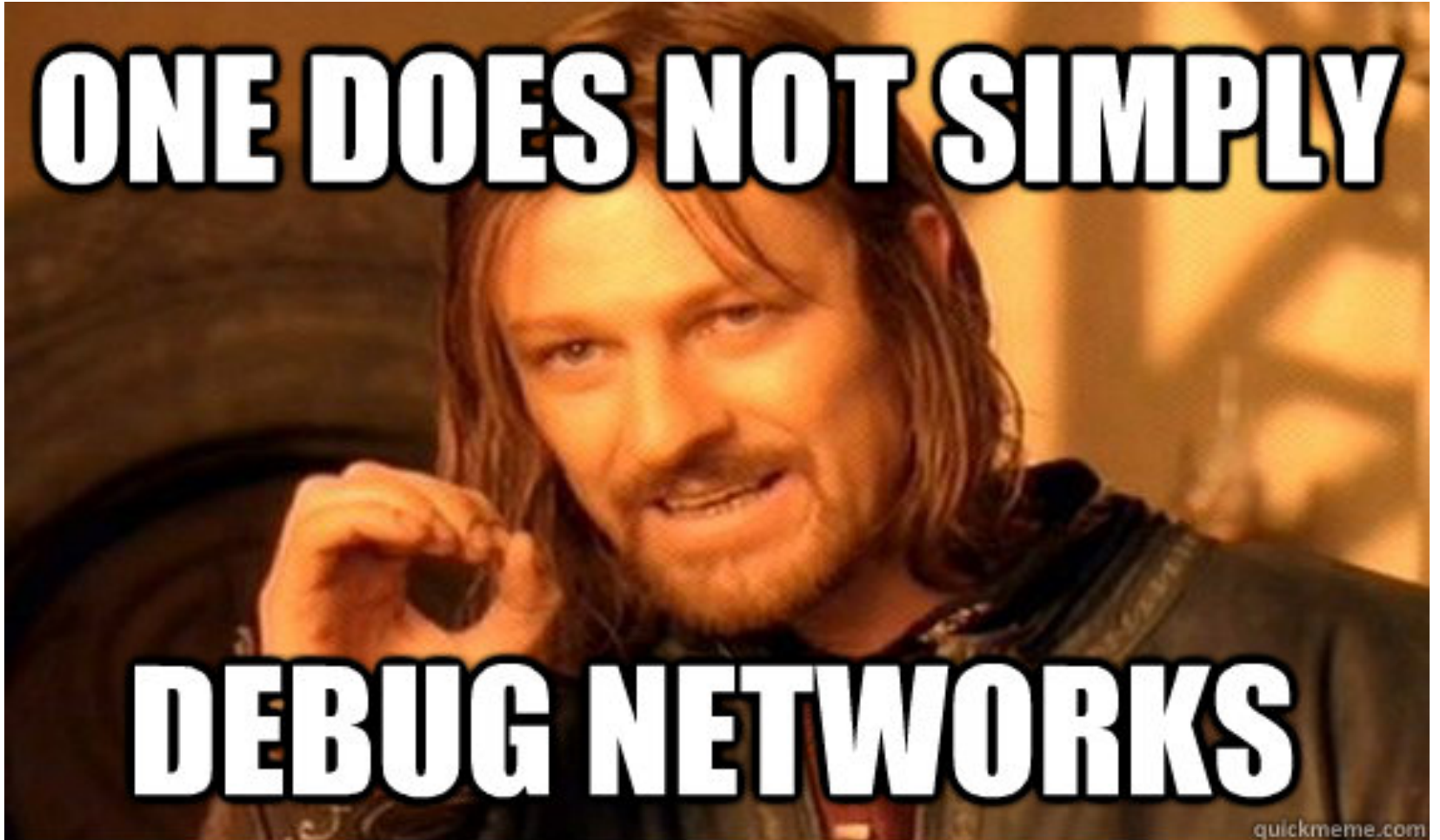


How did it start? (2/3)

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

but this took time...





State of the RING – Jan '15

334 nodes

46 countries

297 Autonomous Systems

Still growing!



Participants from all walks of life, a random selection



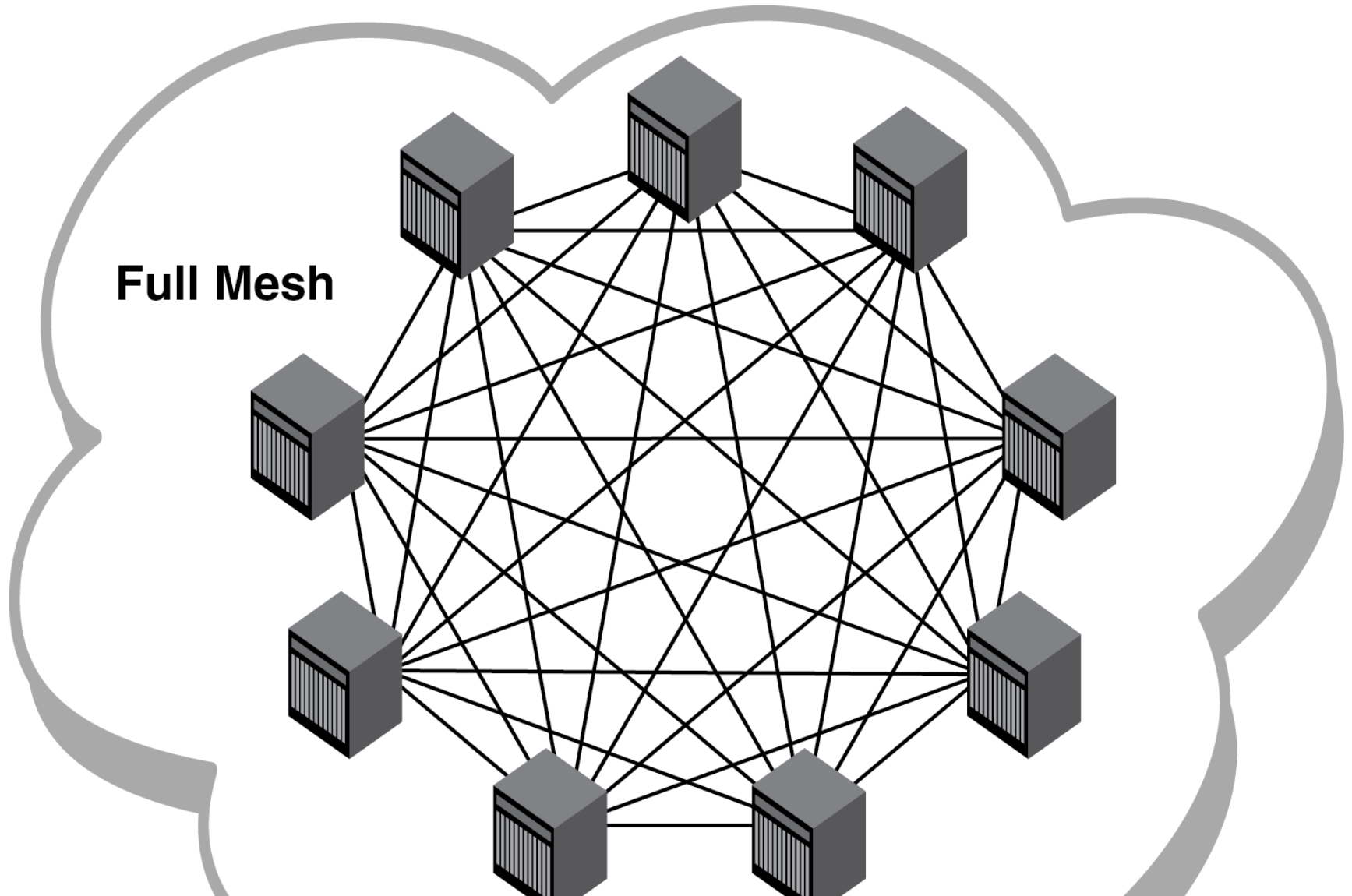
Other CLI uses

- Use dig to check nameservers from 300 ASNs
- Traceroute from 300+ nodes to your target
- MTU testing between you and others
- Port scanning
- Debug L2/L3 load balancing issues
- Anything!

RING SQA

- A new partial outage detector dubbed “RING SQA” is available to all RING participants. The purpose of the tool is to detect outages as fast as possible that only affect a subset of all internet destinations.
- RING SQA pings all other nodes (v4 + v6) every 30 seconds to derive a baseline, this baseline is compared to the last 3 minutes of measurements. If the median of the baseline is tripped for three consecutive minutes, an alarm is raised.

ANY TO ANY PROBING BABY!!!



Then what?

- When an alarm is raised, three MTRs are immediately launched towards destinations that previously were reachable, but suddenly not anymore. The purpose of these traces is to provide an investigation starting point for your NOC.
- All in all super fast outage detection. All participants are invited to use this system! Gratis! :-)

Nobody else offers this for free



From: sqa@companyname01.ring.nlnog.net
To: noc@ring_participating_company.org
Subject: RING ALERT raising ipv4 alarm - 16 new nodes down
Body:

Regarding: companyname01.ring.nlnog.net ipv4

This is an automated alert from the distributed partial outage monitoring system "RING SQA".

At 2014-07-27 10:18:05 UTC the following measurements were analysed as indicating that there is a high probability your NLNOG RING node cannot reach the entire internet. Possible causes could be an outage in your upstream's or peer's network.

The following nodes previously were reachable, but became unreachable over the course of the last 3 minutes:

- itps01.ring.nlnog.net	128.65.97.93	AS42010	GB
- fullsave01.ring.nlnog.net	141.0.202.201	AS39405	FR
- globalaxs01.ring.nlnog.net	176.10.80.10	AS 9009	GB
- kwaoo01.ring.nlnog.net	178.250.209.33	AS24904	CH
- suretec01.ring.nlnog.net	185.8.92.17	AS199659	GB
- swisscom01.ring.nlnog.net	193.247.170.254	AS 3303	CH
- <snip>			

As a debug starting point 3 traceroutes were launched right after detecting the event, they might assist in pinpointing what broke:

trueinternet01.ring.nlnog.net AS 7470 (TH)

mtr -i0.5 -c5 -r -w -n 203.144.167.57

1.	-- 109.233.156.241	0.0%	6	0.5	0.5	0.5	0.6	0.0
2.	-- 109.233.156.1	0.0%	5	0.8	0.9	0.8	1.1	0.1
3.	-- 109.233.156.2	0.0%	5	0.8	0.8	0.8	0.9	0.0
4.	-- 64.209.88.33	0.0%	5	0.9	1.0	0.9	1.5	0.3
5.	-- 159.63.23.198	60.0%	5	265.1	264.9	264.7	265.1	0.3
6.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0
7.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0
8.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0
9.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0
10.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0
11.	-- 203.144.144.30	80.0%	5	297.4	297.4	297.4	297.4	0.0
12.	-- ???	100.0	4	0.0	0.0	0.0	0.0	0.0

globalaxs01.ring.nlnog.net AS 9009 (GB)

mtr -i0.5 -c5 -r -w -n 176.10.80.10

1.	-- 109.233.156.241	0.0%	6	0.4	0.5	0.4	0.5	0.0
2.	-- 109.233.156.1	0.0%	5	0.9	1.8	0.7	5.3	1.9
3.	-- 81.201.115.41	0.0%	5	0.9	0.9	0.8	1.0	0.1
4.	-- 62.209.32.18	40.0%	5	1.3	1.2	1.2	1.3	0.1
5.	-- 80.81.192.165	0.0%	5	1.3	9.3	1.2	41.5	18.0
6.	-- 193.27.64.245	60.0%	5	191.9	108.1	24.3	191.9	118.5
7.	-- 193.27.64.66	80.0%	5	43.6	43.6	43.6	43.6	0.0
8.	-- ???	100.0	5	0.0	0.0	0.0	0.0	0.0

An alarm is raised under the following conditions: every 30 seconds your node pings all other nodes. The amount of nodes that cannot be reached is stored in a circular buffer, with each element representing a minute of measurements. In the event that the last three minutes are 1.2 above the median of the previous 27 measurement slots, a partial outage is assumed. The ring buffer's output is as following:

<snip>

```
11 min ago 41 measurements failed (baseline)
10 min ago 41 measurements failed (baseline)
 9 min ago 41 measurements failed (baseline)
 8 min ago 41 measurements failed (baseline)
 7 min ago 41 measurements failed (baseline)
 6 min ago 41 measurements failed (baseline)
 5 min ago 41 measurements failed (baseline)
 4 min ago 41 measurements failed (baseline)
 3 min ago 45 measurements failed (baseline)
 2 min ago 66 measurements failed (raised alarm)
 1 min ago 65 measurements failed (raised alarm)
 0 min ago 65 measurements failed (raised alarm)
```


How to get SQA?

If you are already are a NLNOG RING participant:

- Edit **`/etc/ring-sqa/alarm.conf`**
- **`sudo restart ring-sqa4`**
- **`sudo restart ring-sqa6`**

When you aren't a NLNOG RING participant:

- Join the NLNOG RING!

How to use it?

- Intergrate RING SQA with your NOC workflow!
- Investigate every alert, so far almost zero false positives, we did see:
 - Transit provider outage
 - IXP Maintenance (DE-CIX DE couple of times)
 - DDoS
 - Broken VM setups
- So... Put a NLNOG RING node in all your major hubs!

How to join?

- 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/>

Mega easy!

Gratis!

RING governance

- Rough consensus
- Very active community (software dev, ideas)
- All equipment & hosting comes from Sponsors
- Backed by the NLNOG Foundation

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