



NICK BOUWHUIS @ NOG.FI - 2026-06-16

NLNOG TOOLS DEEP-DIVE

QUICK INTRO

- ▶ Nick Bouwhuis
- ▶ Board member since 2024
- ▶ Network Engineer @ Speakup
- ▶ Behind various side-hustles

ABOUT NLNOG

- ▶ Started in 2002 with a mailing list
- ▶ Formal foundation since 2015
- ▶ 3 events per year
 - ▶ New Years Drink
 - ▶ Summer event (2 weeks ago)
 - ▶ NLNOG day

ABOUT NLNOG

- ▶ IRC: IRCnet - irc.nlnog.net - #nlnog
- ▶ Discord: <https://nlnog.net/discord/>
- ▶ Mailing List / other channels: nlnog.net

TOOLS

- ▶ RING
- ▶ RING Looking Glass
- ▶ IRRexplorer
- ▶ BGP Filter Guide
- ▶ Ride Share (new!)



THE PROBLEM

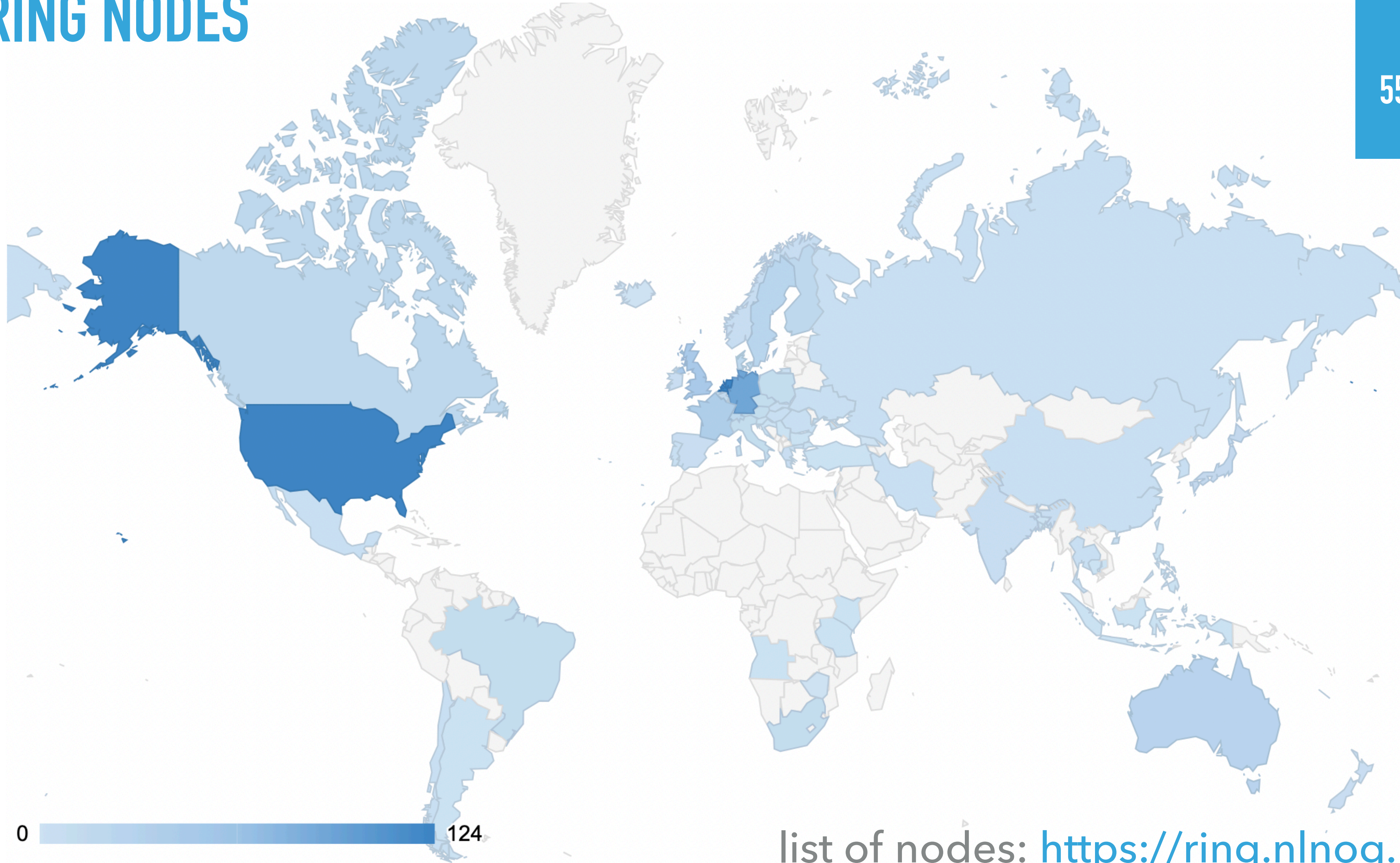
- ▶ Debugging network-related issues between networks can be hard
- ▶ Having vantage points in many different networks can help
- ▶ Having proper debugging tools helps even more!

THE SOLUTION: THE NLNOG RING

- ▶ You provide a (virtual) machine in your network
- ▶ You get shell (SSH) access to machines of all participants in return
- ▶ ... and access to some cool tools to do debugging and testing

NLNOG RING NODES

700+ NODES
50+ ASNS
55+ COUNTRIES



NLNOG RING TOOLS

- ▶ **ring-ping**: ping a specified target from a number of RING nodes
- ▶ **ring-trace**: visualise traceroutes to a target from a selection of RING nodes in a diagram
- ▶ **ring-http**: compare answers to HTTP requests to a specified URL
- ▶ **ring-sqa**: alert on sudden changes in the number of other RING nodes that can be reached
- ▶ **ring-all**: perform any available Linux CLI command on a set of nodes and gather all results
- ▶ And of course: there's an extensive set of CLI tools available, for example: **mtr**, **traceroute**, **tcptraceroute**, **ping**, **curl**, **dig**, **python**, etc

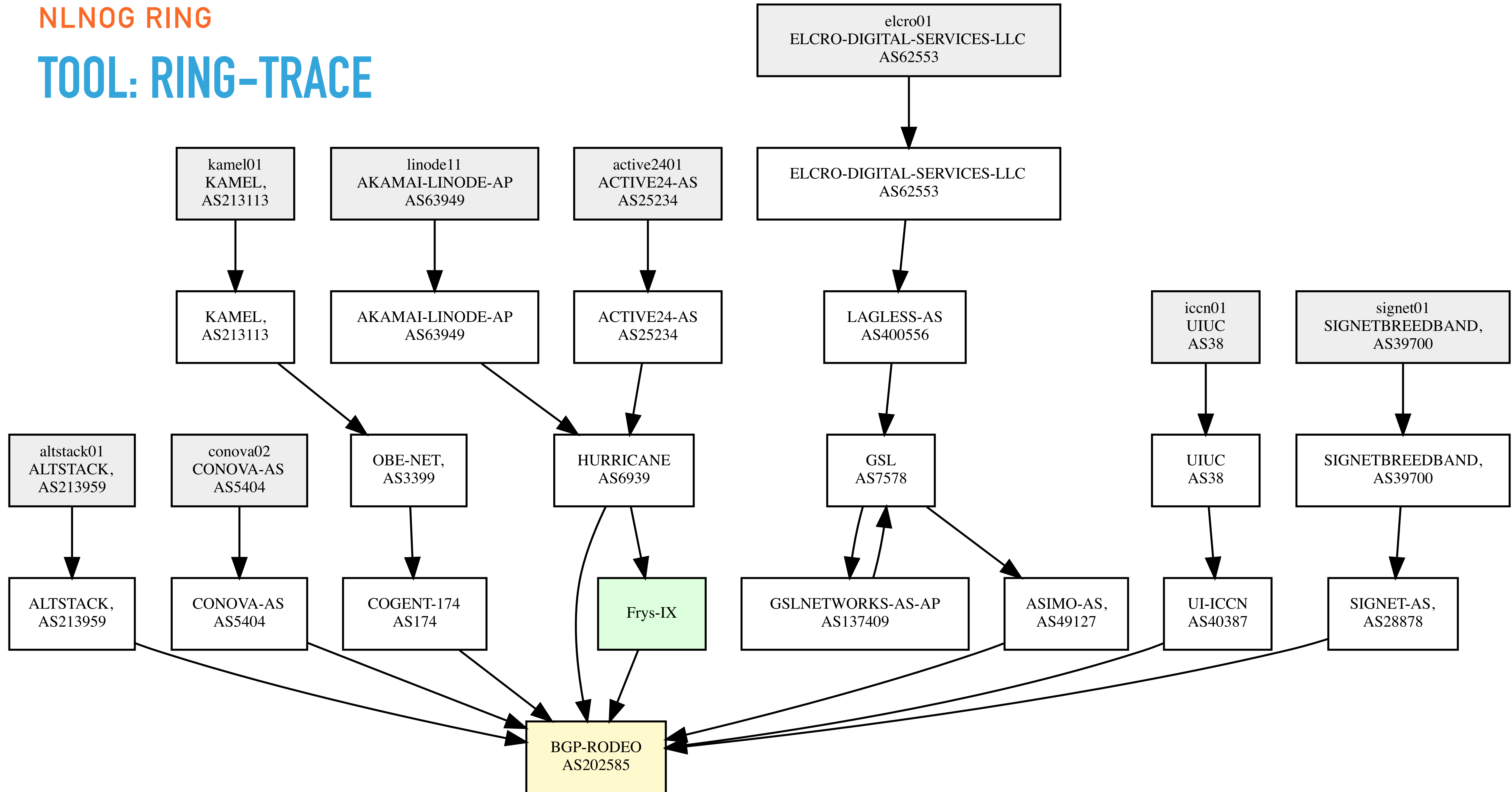
TOOL: RING-PING

Ping a target from a random selection of nodes:

```
bouwhuis@bouwhuis01: ~  
bouwhuis@bouwhuis01:~$ ring-ping -vi -n 10 www.nlnog.net  
amazon13:          105.006      [ Canada - AS16509 (arin, AMAZON-02 - Amazon.com, Inc.)  
nynex01:           6.983       [ Germany - AS62023 (ripenc, NYNEX NYNEX satellite 0H  
franceix01:        10.306      [ France - AS57734 (ripenc, FRANCEIX, FR) ]  
elastx01:          19.561      [ Sweden - AS48579 (ripenc, ELASTX, SE) ]  
vultr26:           14.810      [ United Kingdom - AS20473 (arin, AS-VULTR - The Const  
plurimedia01:      11.157      [ France - AS8839 (ripenc, SDV-AS SdV Plurimedia, FR)  
vultr29:           21.876      [ Sweden - AS20473 (arin, AS-VULTR - The Constant Comp  
neptune01:         75.062      [ New York, United States - AS21700 (arin, NEPTUNE-NET  
redpilllinpro01:   19.318      [ Norway - AS39029 (ripenc, REDPILL-LINPRO Redpill Li  
fasttrackcomm01:   121.854     [ Colorado, United States - AS30688 (arin, FASTTRACK-M  
10 servers: 40.59ms average 19.44ms median  
bouwhuis@bouwhuis01:~$
```

NLNOG RING

TOOL: RING-TRACE



TOOLS: RING-HTTP AND AN EXTENSIVE LINUX SSH TOOLSET

```

teun@bit01: ~ (ssh)
teun@bit01:~$ ring-http -v https://nllog.net
riepert01:          OK
greenmini01:        OK
perke01:            curl: (7) Couldn't connect to server
celya01:            OK
krasa01:            curl: (7) Couldn't connect to server
lamdahellix01:      OK
anexia01:           OK
kampde01:           OK
edgoo05:            OK
angolacables06:    OK
tdc01:              OK
vultr13:            OK
sabay01:            OK
chaosdarmstadt01:  OK
exanetworks01:     OK
teamix01:           OK
elastx01:           OK
amazon14:           OK
eolas01:            OK
gandi01:            OK
bittenbytes01:     OK
vultr14:            OK
v4less02:           OK
pdxnet01:           OK
iway01:             OK
lay...
aus...
sbt...

teun@perke01: ~ (ssh)
teun@perke01:~$ telnet nllog.net 443
Trying 2a00:f10:400:2:435:64ff:fe00:70a...
Connected to nllog.net.
Escape character is '^]'.
^]
telnet> q
Connection closed.
teun@perke01:~$ dig +short nllog.net A
185.107.224.30
teun@perke01:~$ dig +short nllog.net AAAA
2a00:f10:400:2:435:64ff:fe00:70a
teun@perke01:~$ ping -4 nllog.net -c 1
ping: connect: Network is unreachable
teun@perke01:~$ ping -6 nllog.net -c 1
PING nllog.net(2a00:f10:400:2:435:64ff:fe00:70a (2a00:f10:400:2:435:64ff:fe00:70a)) 56 data byt
es
64 bytes from 2a00:f10:400:2:435:64ff:fe00:70a (2a00:f10:400:2:435:64ff:fe00:70a): icmp_seq=1 t
tl=53 time=25.8 ms

--- nllog.net ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 25.796/25.796/25.796/0.000 ms
teun@perke01:~$ █
    
```

THE RING-HTTP TOOL SHOWS FAILED HTTP REQUESTS FROM SOME NODES

LOGGING INTO ONE OF THE NODES WITH PROBLEMS WE CAN USE STANDARD CLI TOOLS TO DEBUG THE ISSUE (IN THIS CASE: THIS NODE IS IPV6-ONLY AND RING-HTTP DEFAULTS TO IPV4)

RING NODE REQUIREMENTS

- ▶ A physical or virtual machine running Ubuntu 22.04
- ▶ You represent the ASN hosting the RING node and provide working contact information for this ASN
- ▶ A publicly accessible IPv6 address (and optionally IPv4)
- ▶ At least 20GB disk space and 2GB RAM
- ▶ No firewalling to and from the internet
- ▶ NLNOG RING Admins get full control (sudo access)

MORE INFORMATION, APPLICATION & CONTACT

- ▶ Information and application form: <https://ring.nlnog.net>
- ▶ Email: ring-admins@nlnog.net
- ▶ IRC Channel: **#ring** on the IRCNet network
- ▶ Discord Channel: **#ring** on NLNOG's Discord server (<https://nlnog.net/discord>)
- ▶ Configurations, code and playbooks: <https://github.com/nlnog/ring-ansible>



NLNOG Looking Glass

Please enter an IP address, prefix or hostname to look up in our routing tables.

Search

2001:db8::/32

Exact match

on

All peers (311)

Show routes

IPv4: 157 peers up, 51 down, 147,821,326 prefixes received

IPv6: 162 peers up, 57 down, 34,740,014 prefixes received

20 BITTERBAL1-v4

AS-Path 200995 202585 via next-hop [212.72.236.1](#)

Origin validation state valid

ASPA validation state unknown

Only To Customer (OTC) yes, ASN: 200995

Origin IGP

MED 0

Last update 2026-03-31 09:55:27 UTC (03w6d23h ago)

NLNOG RING LOOKING GLASS

69 **KAPSI1-v4**

AS-Path [57692](#) [199508](#) [1299](#) [57866](#) [202585](#) via next-hop [91.232.154.62](#)

Origin validation state **valid**

ASPA validation state **unknown**

Only To Customer (OTC) yes, ASN: [57692](#)

Origin IGP

MED 0

Last update 2026-04-22 13:21:28 UTC (5d20h24m ago)

Communities [1299:30000](#) (EU Customers)



IRR EXPLORER SHOWS THE ROUTING, IRR AND RPKI STATUS FOR RESOURCES, AND HIGHLIGHTS POTENTIAL ISSUES.

[Data source status](#) Reduced colour mode Show

Report for prefix 193.169.138.0/23

What does the prefix table show?

Explanation of different messages

Directly overlapping prefixes of 193.169.138.0/23

Prefix ▼	RIR ◆	BGP ◆	RPKI ◆	RIPE ◆	Advice ◆
193.169.138.0/23	RIPE NCC	49627	49627 ▶/24	49627 ✓	✓ Everything looks good
193.169.138.0/24	RIPE NCC			49627 ✓	ⓘ Route objects exist, but prefix not seen in DFZ
193.169.139.0/24	RIPE NCC			49627 ✓	ⓘ Route objects exist, but prefix not seen in DFZ

Report for ASN AS49627

What does the prefix table show?

Explanation of different messages

Prefixes originated by AS49627

Prefix ▼	RIR ⬆	BGP ⬆	RPKI ⬆	RIPE ⬆	Advice ⬆
91.232.130.0/24	RIPE NCC	49627	49627 ▶/24	49627 ✓	✓ Everything looks good
185.68.160.0/22	RIPE NCC	49627	49627 ▶/24	49627 ✓	✓ Everything looks good
185.68.160.0/24	RIPE NCC			49627 ✓	⚠ Route objects exist, but prefix not se
185.68.161.0/24	RIPE NCC			49627 ✓	⚠ Route objects exist, but prefix not se
185.68.162.0/24	RIPE NCC			49627 ✓	⚠ Route objects exist, but prefix not se
185.68.163.0/24	RIPE NCC			49627 ✓	⚠ Route objects exist, but prefix not se
193.169.138.0/23	RIPE NCC	49627	49627 ▶/24	49627 ✓	✓ Everything looks good
193.169.138.0/24	RIPE NCC			49627 ✓	⚠ Route objects exist, but prefix not se



Prefix, IP, ASN or AS/route-set

Search

[Data source status](#)

Report for prefix 2a07:cd40::/32

What does the prefix table show?

Explanation of different messages

Directly overlapping prefixes of 2a07:cd40::/32

Prefix ▼	RIR ⚡	BGP ⚡	RPKI ⚡	RIPE ⚡	Advice ⚡
2a07:cd40::/29	RIPE NCC			213822	<ul style="list-style-type: none"> Route objects exist, but prefix not seen in DFZ No (covering) RPKI ROA found for route objects
2a07:cd40::/32	RIPE NCC	213822	213822 ▶/32		<ul style="list-style-type: none"> No route objects match DFZ origin

All overlaps of least specific match 2a07:cd40::/29

Prefix ▼	RIR ⚡	BGP ⚡	RPKI ⚡	RIPE ⚡	Advice ⚡
2a07:cd40::/32	RIPE NCC	213822	213822 ▶/32		<ul style="list-style-type: none"> No route objects match DFZ origin
2a07:cd40::/29	RIPE NCC			213822	<ul style="list-style-type: none"> Route objects exist, but prefix not seen in DFZ No (covering) RPKI ROA found for route objects



Prefix, IP, ASN or AS/route-set

Search

[Data source status](#)

Report for prefix 2a07:cd40::/32

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Directly overlapping prefixes of 2a07:cd40::/32

Prefix ▼	RIR ⬆	BGP ⬆	RPKI ⬆	RIPE ⬆	Advice ⬆
2a07:cd40::/29	RIPE NCC			213822	🚩 Route objects exist, but prefix not seen in DFZ 🚩 No (covering) RPKI ROA found for route objects
2a07:cd40::/32	RIPE NCC	213822	213822 ▶/32	213822 ✓	🟢 Everything looks good

All overlaps of least specific match 2a07:cd40::/29

Prefix ▼	RIR ⬆	BGP ⬆	RPKI ⬆	RIPE ⬆	Advice ⬆
2a07:cd40::/32	RIPE NCC	213822	213822 ▶/32	213822 ✓	🟢 Everything looks good

Included in the following AS sets

Name	ARIN	RIPE
AS-31576-PEERS		✔
AS-ATOM86CUST4		✔
AS-ATOM86CUST6		✔
AS-ECHELON-PEERS		✔
AS-EUROACCESS		✔
AS-EUROACCESS-V6		✔
AS-FRYS-IX-CONNECTED		✔
AS-IX		✔

Source	Last update
BGP and RIRstats	40 minutes ago (2026-04-28 08:46 UTC)
AFRINIC	an hour ago (2026-04-28 08:25 UTC)
ALTDB	8 hours ago (2026-04-28 01:38 UTC)
APNIC	an hour ago (2026-04-28 08:23 UTC)
ARIN	an hour ago (2026-04-28 08:23 UTC)
BBOI	4 days ago (2026-04-24 19:04 UTC)
BEI I	6 days ago (2026-04-22 11:08 UTC)

IRR EXPLORER

```
nick@mbp:~  
→ curl -s https://irrexplorer.nlnog.net/api/prefixes/asn/49627 | jq  
{  
  "directOrigin": [  
    {  
      "prefix": "91.232.130.0/24",  
      "rir": "RIPE NCC",  
      "rpkiRoutes": [  
        {  
          "asn": 49627,  
          "rpslText": "route:          91.232.130.0/24\ndescr:          RPKI ROA for 91.232.130.0/24 / AS49627\  
remarks:      This AS49627 route object represents routing data retrieved\  
              from the RPKI. This route object is the result of an automated\  
              RPKI-to-IRR conversion process performed by IRRd  
.\nmax-length:   24\norigin:       AS49627\nsource:       RPKI # Trust Anchor: ripe\n",  
          "rpslPk": "91.232.130.0/24AS49627/ML24",  
          "rpkiStatus": "VALID",  
          "rpkiMaxLength": 24  
        }  
      ],  
      "bgpOrigins": [  
        49627  
      ],  
      "irrRoutes": {  
        "RIPE": [  
          {  
            "asn": 49627
```



BGP Filter Guide

Guidance on BGP Filtering

[Guides](#)

[News](#)

[About](#)

BGP Filter Guides

RPKI

Rejecting RPKI invalid BGP Routes: [reject_invalids](#).

[RPKI FAQ](#) at the RPKI Documentation project

Locally attest well-known Trust Anchor publication point prefixes [slurm_ta](#).

Bogon ASN filtering

Rejecting routes which have a Bogon ASN anywhere in the AS_PATH: [bogon_asn](#).

Rejecting RPKI Invalid BGP Routes

- Reject RPKI Invalid BGP Routes
 - Purpose
- Configuration Examples
 - OpenBGPD on OpenBSD
 - Junos
 - Cisco classic IOS and IOS XE
 - Cisco IOS-XR
 - BIRD
 - Nokia SR OS
 - Configure RTR to the RPKI validator(s)
 - Drop invalid prefixes
 - FRR (vtysh)
 - VyOS
 - Mikrotik
 - RouterOS v7
 - Huawei VRP
 - Arista EOS

BIRD

BIRD 2.0 supports RTR. However, the current implementation does not perform an automatic revalidation of routes upon receipt of new ROAs.

The RPKI-RTR protocol receives and maintains a set of ROAs from a cache server (also called validator). You can validate routes (RFC 6483) using function `roa_check()` in filter and set it as import filter at the BGP protocol. BIRD should re-validate all of affected routes after RPKI update by RFC 6811, but we don't support it yet! You can use a BIRD's client command `reload` in `bgp_protocol_name` for manual call of revalidation of all routes. (https://bird.network.cz/?get_doc&v=20&f=bird-6.html#ss6.13)

BIRD 3.0 *does* support automatic revalidation. It is [enabled by default \(`rpki reload on`\)](#), but, for BGP channels, you must configure [import table yes](#) and/or [export table yes](#), for respective direction.

The [rtrsub](#) utility can be used to generate static ROA tables for BIRD 1.6.

Set up RTR as following:

```
roa4 table r4;
roa6 table r6;

protocol rpki {
  roa4 {
    table r4;
  };
  roa6 {
    table r6;
  };
  remote "10.1.1.6" port 323;
}
```

**EASY WAY FOR NLNOG EVENT VISITORS
TO FIND OR OFFER RIDES TO/FROM NLNOG EVENTS**



Dashboard

Event: **nl-nog-day-2026**

Edit my ride

Request a ride

You have **1** pending seat request. [Review](#)

Rides offered

Driver	Direction	Location	Departure	Return	Seats	
Pieter Janssen	round trip	Groningen, P+R Hoogkerk	Thu 10 Sep 06:30	Thu 10 Sep 19:00	2/3 free	Details
Sanne de Vries	to event	Eindhoven Centraal (Kiss & Ride)	Thu 10 Sep 07:15	-	2/2 free	Details
Jeroen van der Berg	round trip	Amsterdam Sloterdijk P+R	Thu 10 Sep 07:45	Thu 10 Sep 18:30	2/3 free (yours) 1 pending	Details

Ride requests

Who	Direction	Location	When	Notes
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UPCOMING NLNOG EVENTS

- ▶ NLNOG Day: 4 september, Gooiland Theater, Hilversum, NL
- ▶ NLNOG New Years Drink: January 2027 (probably) Utrecht, NL
- ▶ NLNOG Summer Event (with BBQ!): June 2027
- ▶ Check nlnog.net for details

THANK YOU!

<https://nlno.org.net/get-involved>