



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

What is the RIPE NCC?

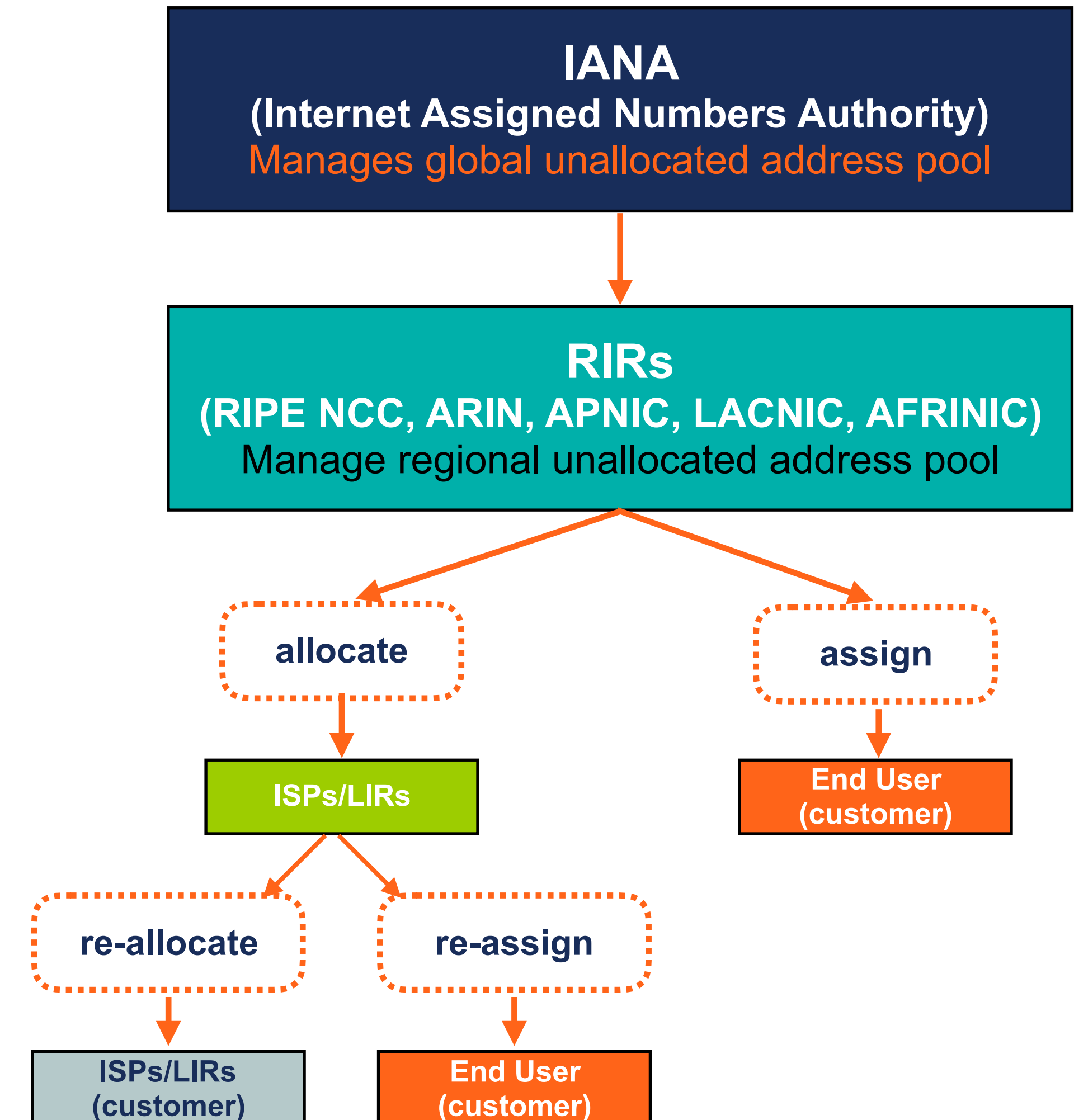
(Hopefully) useful information about
our tools, data and services

Suzanne Taylor | 16 July 2019 | ATNOG

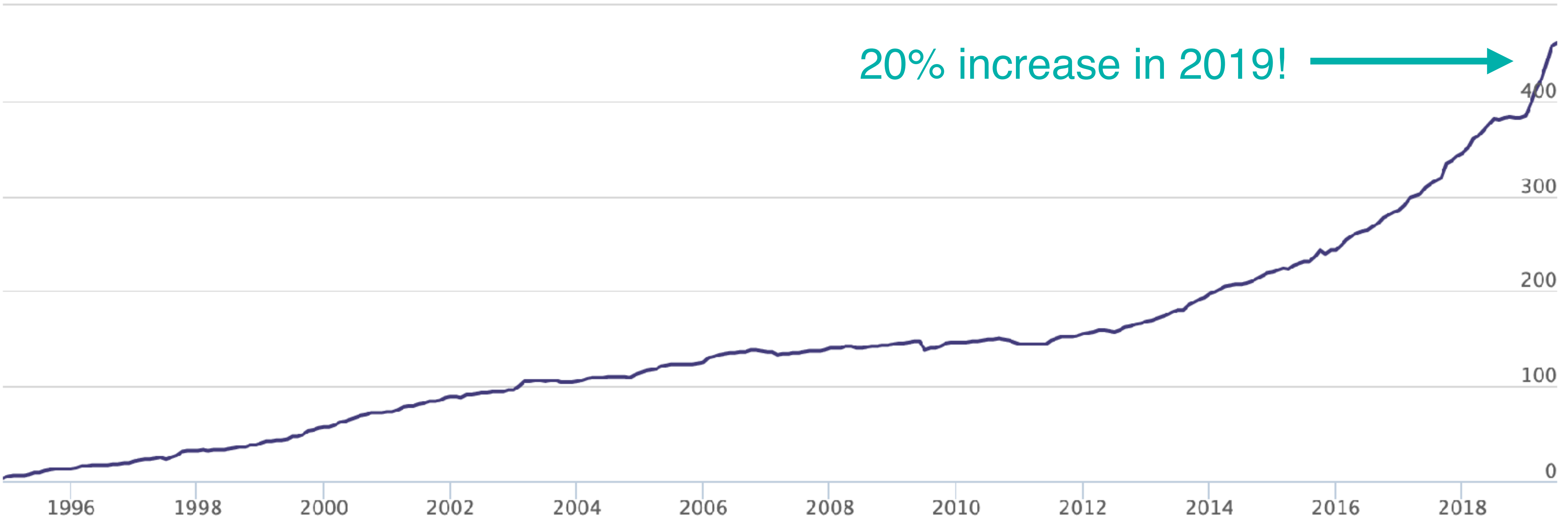
What is the RIPE NCC?



- One of five Regional Internet Registries (RIRs)
 - Distribute and maintain registry of Internet address space for Europe, the Middle East and parts of Central Asia
 - Members include ISPs and other large network operators
- Not-for-profit membership association based in Amsterdam



Membership Growth in Austria



What do we do?



- Secretariat for the **RIPE community**
 - Open to anyone interested in Internet number resources
 - Community develops policies; RIPE NCC implements them
 - Organise events, develop tools and services to support community
- Provide **technical services and tools**, including K-root
- Source of **technical expertise** for a range of stakeholders
- Participate in **Internet governance** processes
- Follow Internet **regulation** developments

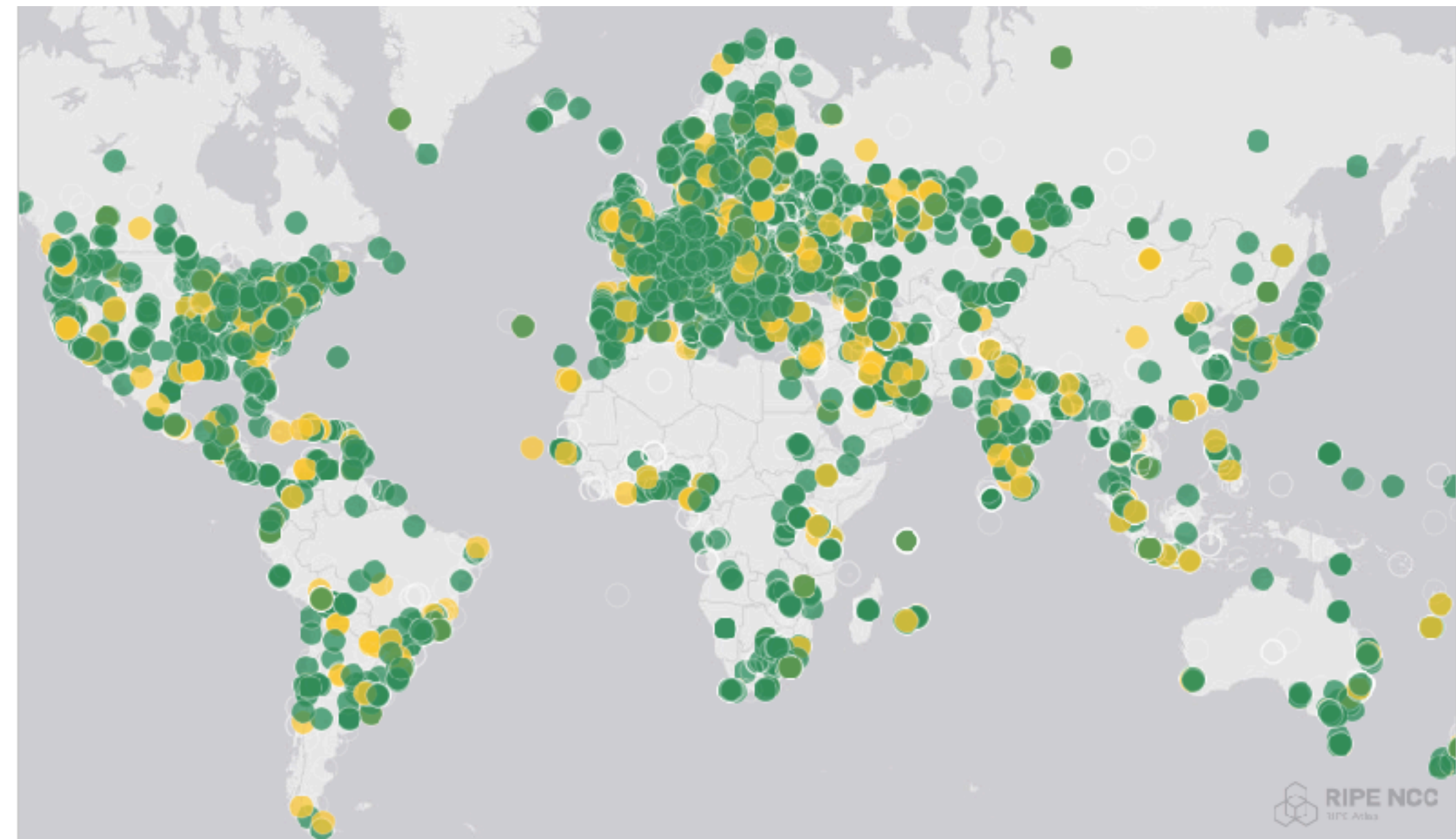


Tools & Data

RIPE Atlas



- Global Internet measurement platform
- More than 10,000 probes collecting nearly 8,000 results/sec
- Active measurements:
 - Ping
 - Traceroute
 - DNS
 - SSL/TLS
 - NTP
 - HTTP(S)



<https://atlas.ripe.net>

RIPE Atlas



- You can:
 - Monitor network reachability from thousands of global vantage points
 - Troubleshoot network issues with quick connectivity checks
 - Create alarms that work with your own monitoring tools
 - Check responsiveness of DNS infrastructure, such as root name servers
 - Test IPv6 connectivity

RIPE Atlas



- Check out RIPE Labs for ideas:

- <https://labs.ripe.net/atlas>



- Apply for a probe!

- <https://atlas.ripe.net/get-involved/become-a-host/>

RIPE Atlas



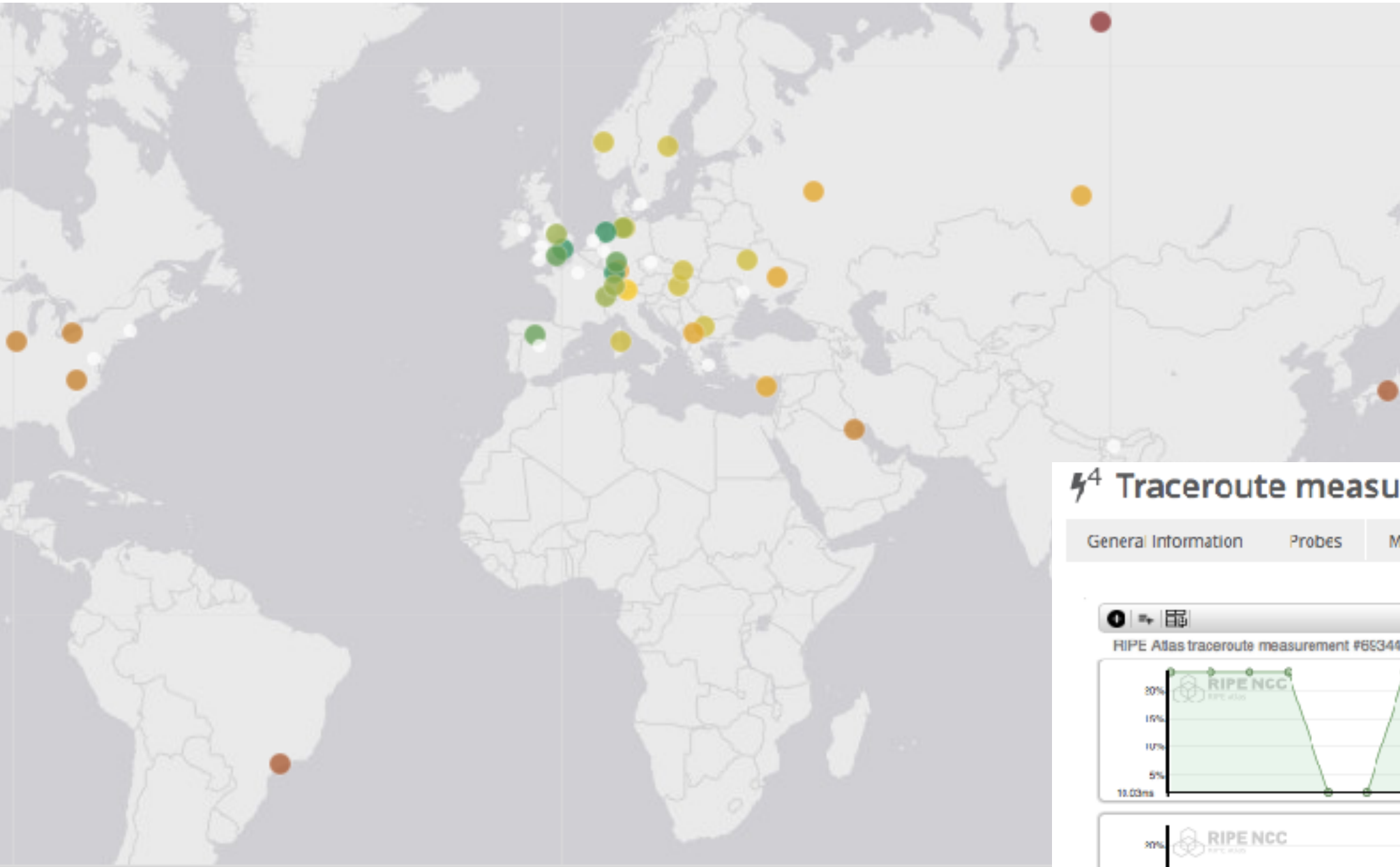
Step 1 Definitions

+ Ping + Traceroute + DNS + SSL + HTTP + NTP

▼ Ping measurement ✕

Target: <input type="text"/> An IP address or hostname	Description: <input type="text" value="Ping measurement"/>
Address Family*: <input type="text" value="IPv4"/>	Interval: <input type="text" value="240"/> How often this should be done (seconds between samples). Note that this value is ignored for one-off measurements.
Packets: <input type="text" value="3"/>	Resolve on Probe: <input type="checkbox"/> Force the probe to do DNS resolution
Size: <input type="text" value="48"/>	
▼ Advanced Options	
Packet interval: <input type="text"/> Time between packets (ms)	Spread: <input type="text"/> Spread of uniformly distributed random probe start time phase
Skip DNS check: <input type="checkbox"/> Disables target DNS check on measurement creation	

RIPE Atlas



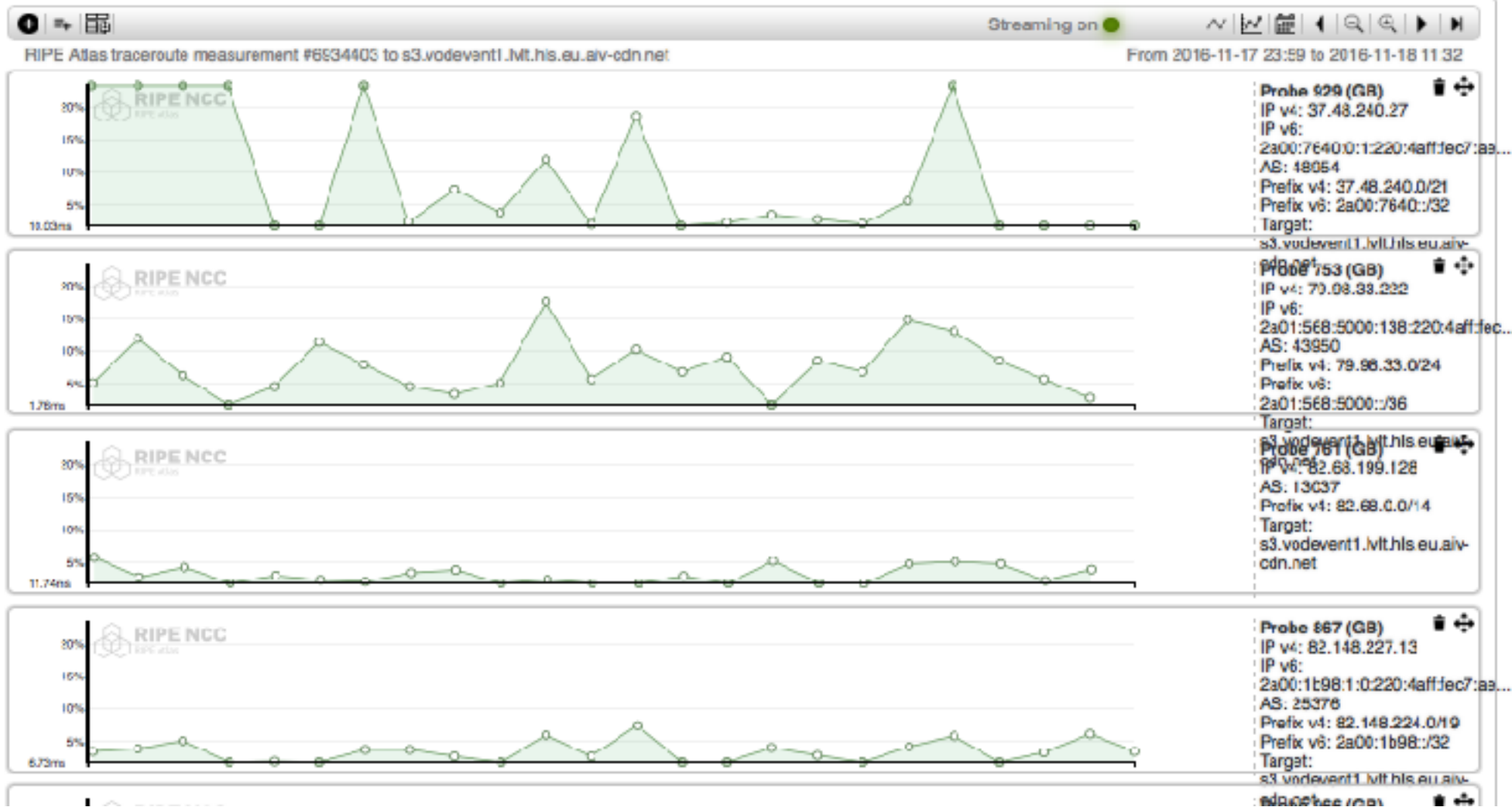
< 10 ms: 3 < 20 ms: 3 < 30 ms: 4 < 40 ms: 8 < 50 ms: 1 < 100 ms: 6 < 200 ms: 5

General Information	Probes	Map	LatencyMON	OpenIPMap Prototype	Results	Modification
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Probe	ASN (IPv4)	ASN (IPv6)		Time (UTC)	RTT	Hops
2713	60706	60706		2016-11-18 10:52	33.192	14
2941	25394			2016-11-18 10:51	50.783	20
3055	6412			2016-11-18 10:53	150.683	15
3222	6829			2016-11-18 10:49	36.686	24
4166	50581			2016-11-18 10:52	39.533	16
4554	6703			2016-11-18 10:51	82.704	19
4952	3244			2016-11-18 10:51	35.700	19
6078	202040	202040		2016-11-18 10:47	9.279	14
6091	5459	5459		2016-11-18 10:50	9.719	14

Traceroute measurement to s3.vodevent1.lvt.hls.eu.aiv-cdn.net

General Information	Probes	Map	LatencyMON	OpenIPMap Prototype	Results	Modification Log
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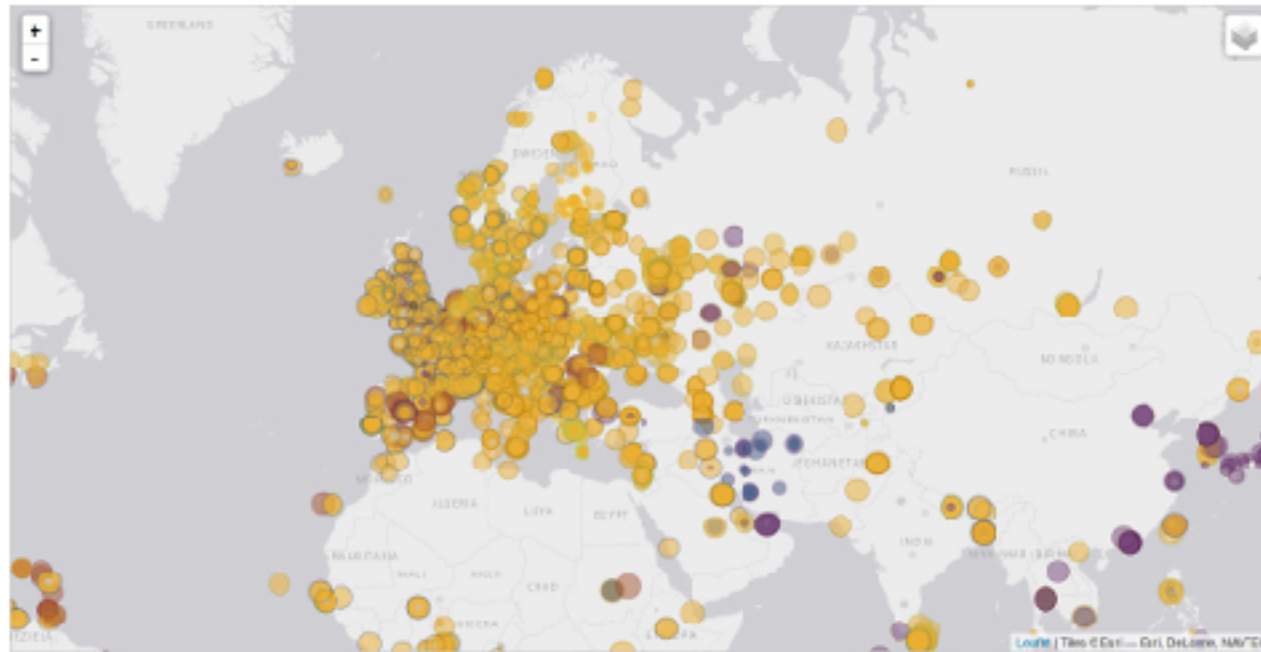


3.767		11
16.946		19
0.850		19
2.699		11
16.443		29

Internet Maps



DNS Root Instances



Comparative DNS Root RTT



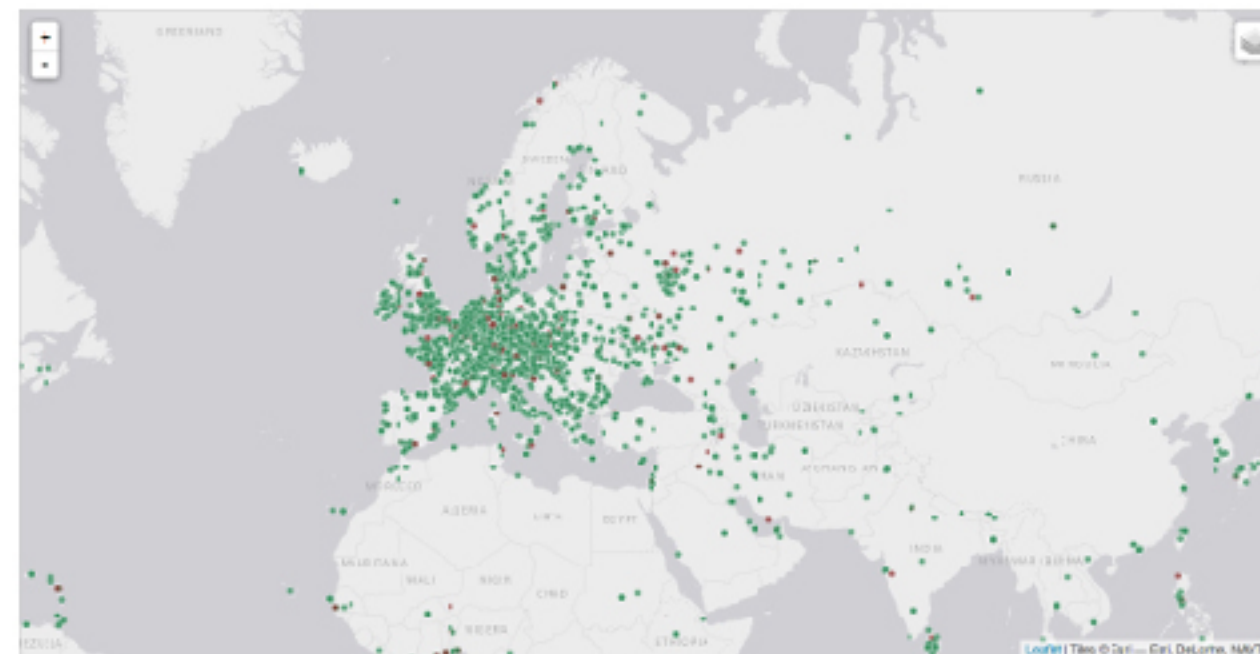
Root Server Performance



RTT to Fixed Destinations



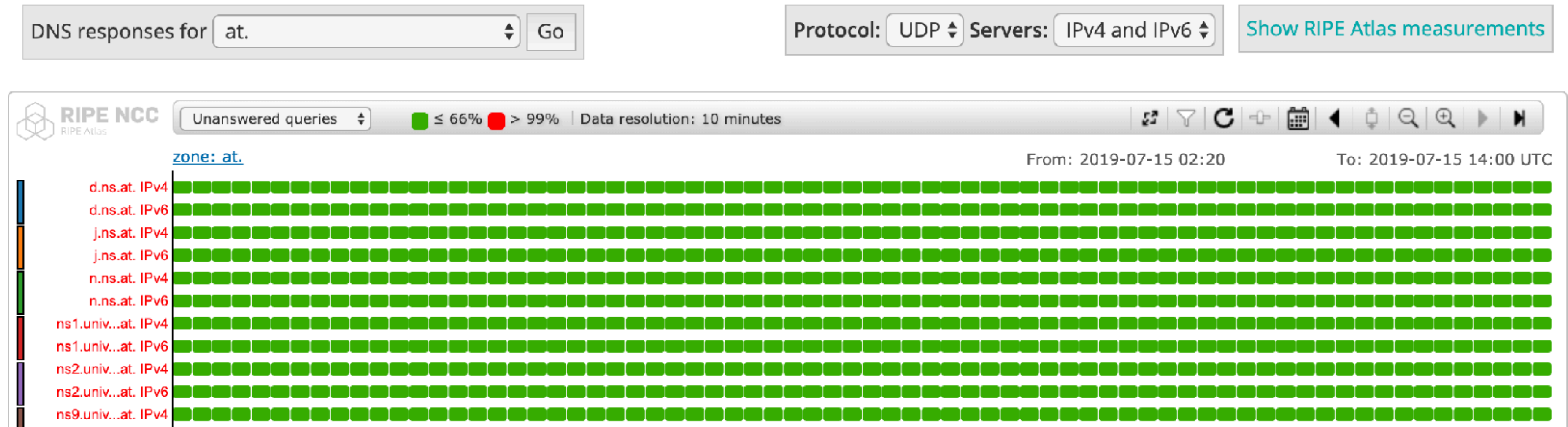
Reachability of Fixed Destinations



Tools Based on RIPE Atlas



- **DNSMON:** Overview of quality of service offered by all DNS root and many TLD name servers

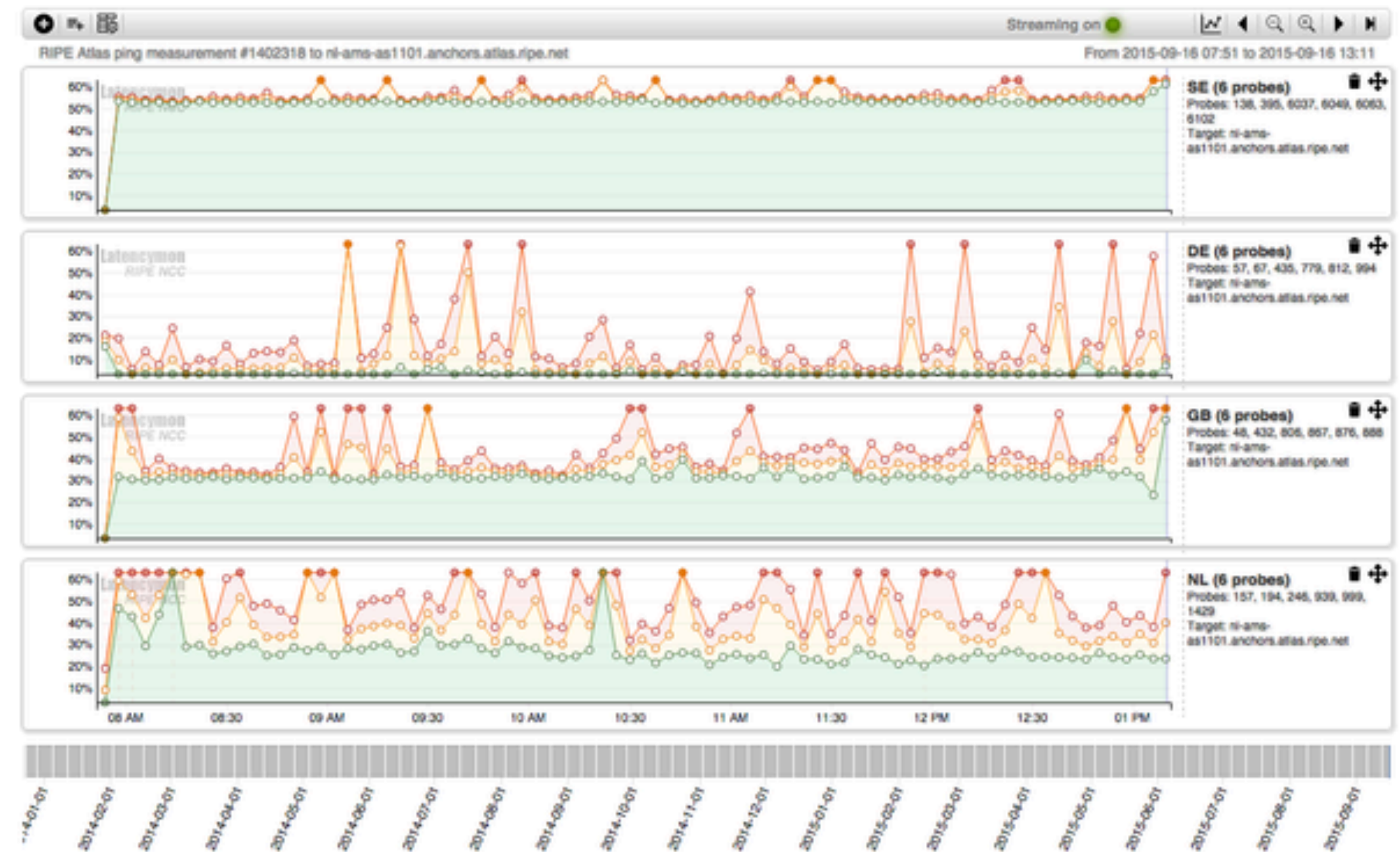


- **DomainMON:** Monitor DNS name servers for your own domain names

Tools Based on RIPE Atlas



- **LatencyMON:** Visualise and compare latency trends
 - Performance comparisons reaching a service or website from different countries or providers
 - Comparing multiple ISPs or hosting providers at the same time, from vantage points with characteristics similar to those at the user or customer end
 - Measuring the spread of a network outage



https://labs.ripe.net/Members/massimo_candela/new-ripe-atlas-tool-latencymon

Tools Based on RIPE Atlas



- **TraceMON:** Investigate reachability and performance of targets in a network
 - Aggregates data from many sources (resource holder contacts, latency, Whois, BGP visibility, IP geolocation, IXP detection, reverse DNS lookup)
 - Provides information about each resource along the path
 - Detects IXPs traversed



https://labs.ripe.net/Members/massimo_candela/tracemon-traceroute-visualisation-network-debugging-tool

RIPEstat



- Everything you want to know about Internet number resources

RIPEstat

Enter an IP address/prefix, ASN, country code or hostname

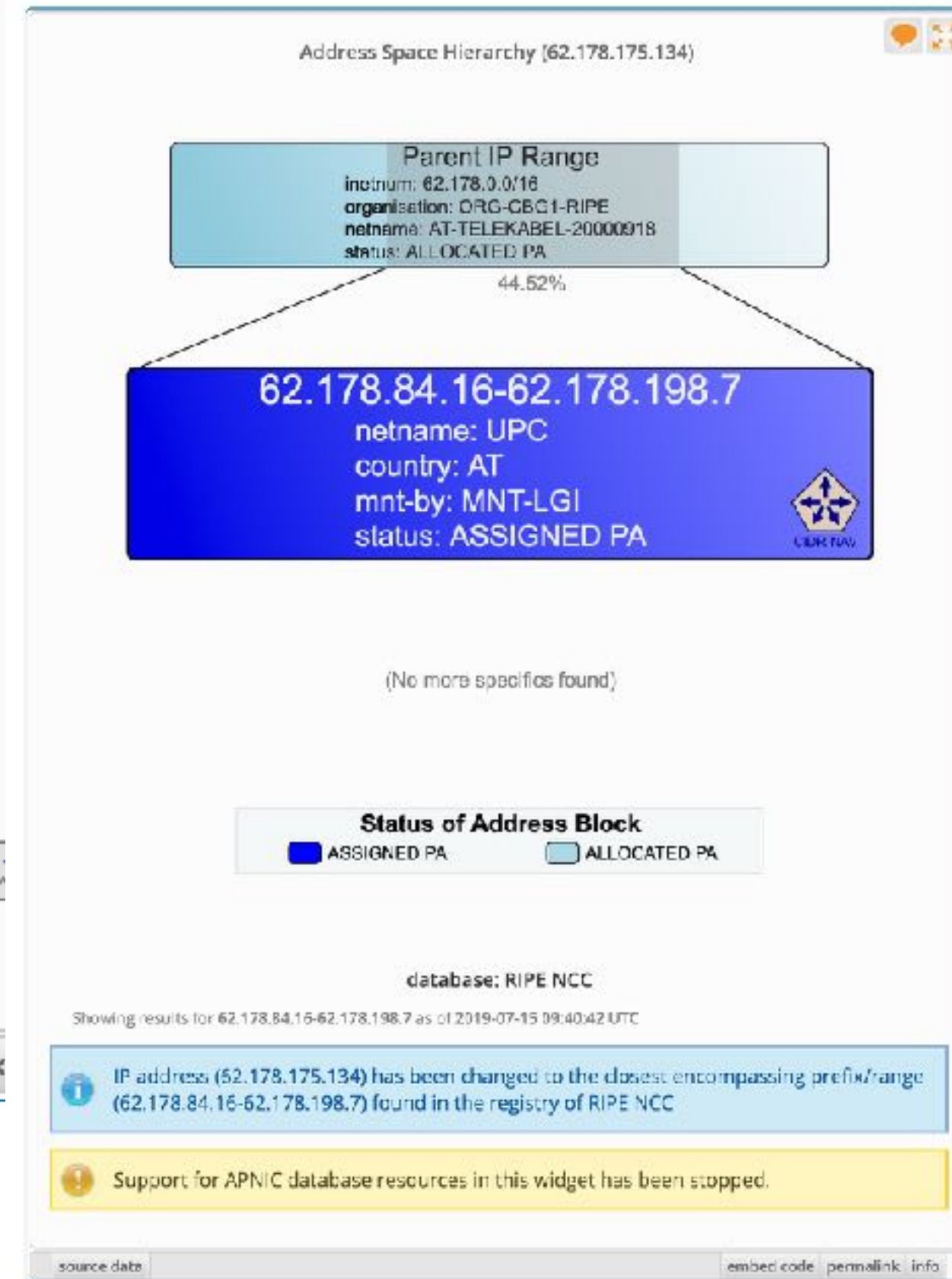
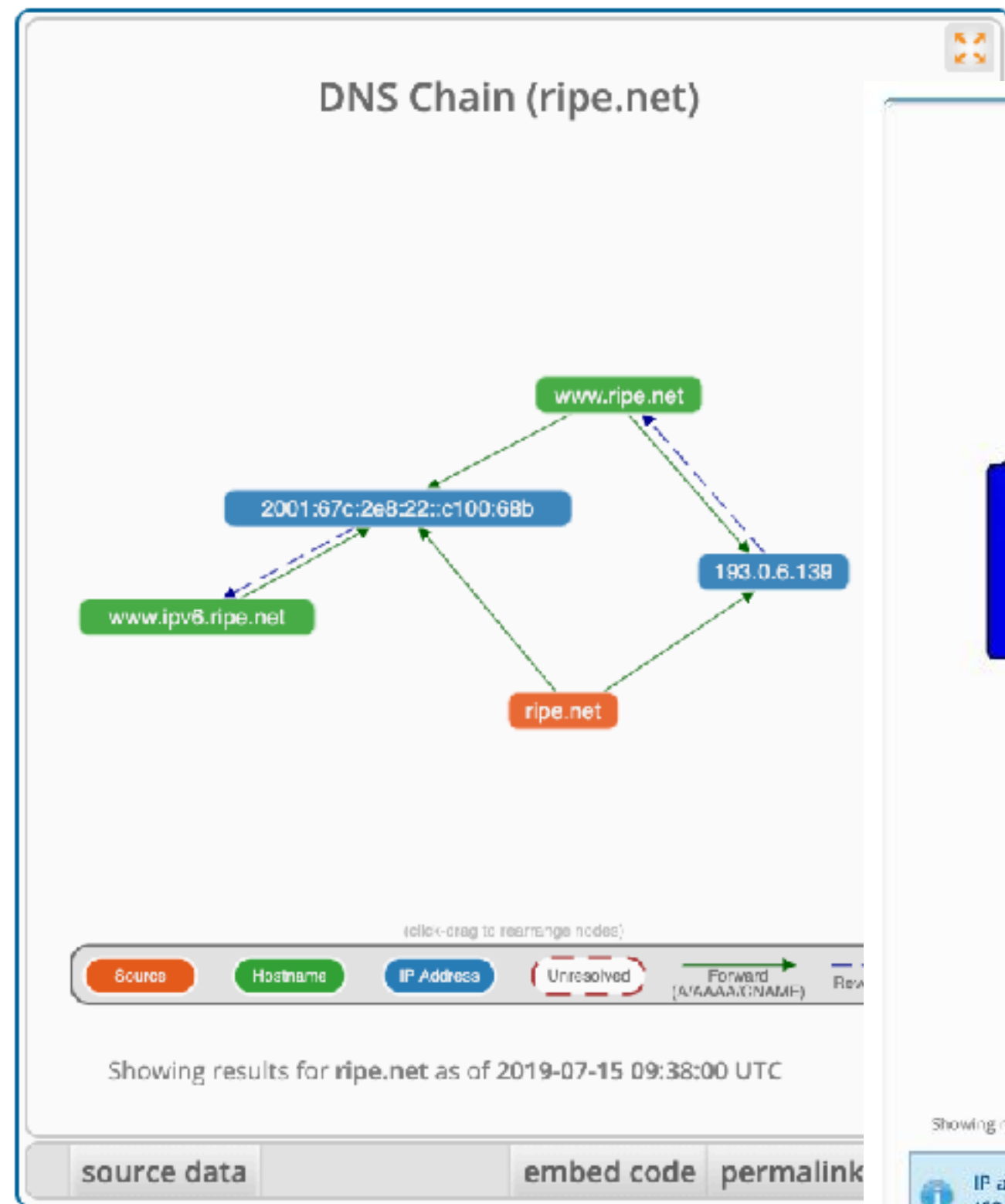
Your network: AS3333, 193.0.20.0/23

Try one of these: [IPv4 prefix](#), [IPv4 range](#), [IPv6](#), [ASN](#)

- Available data:
 - Registry data
 - Routing data
 - DNS data
 - Geolocation data
 - Abuse contacts

<https://stat.ripe.net>

RIPEstat



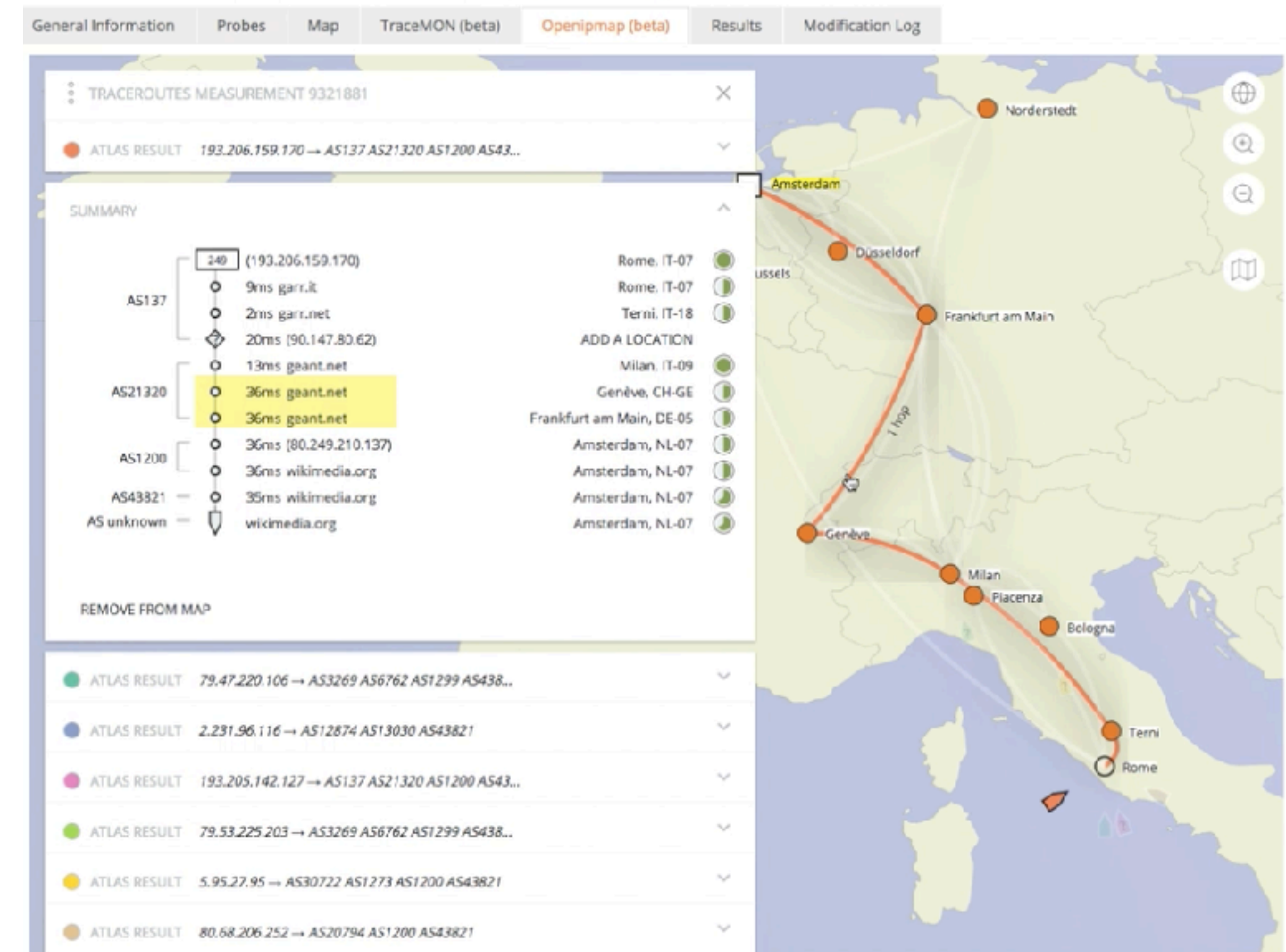
RIPE IPmap



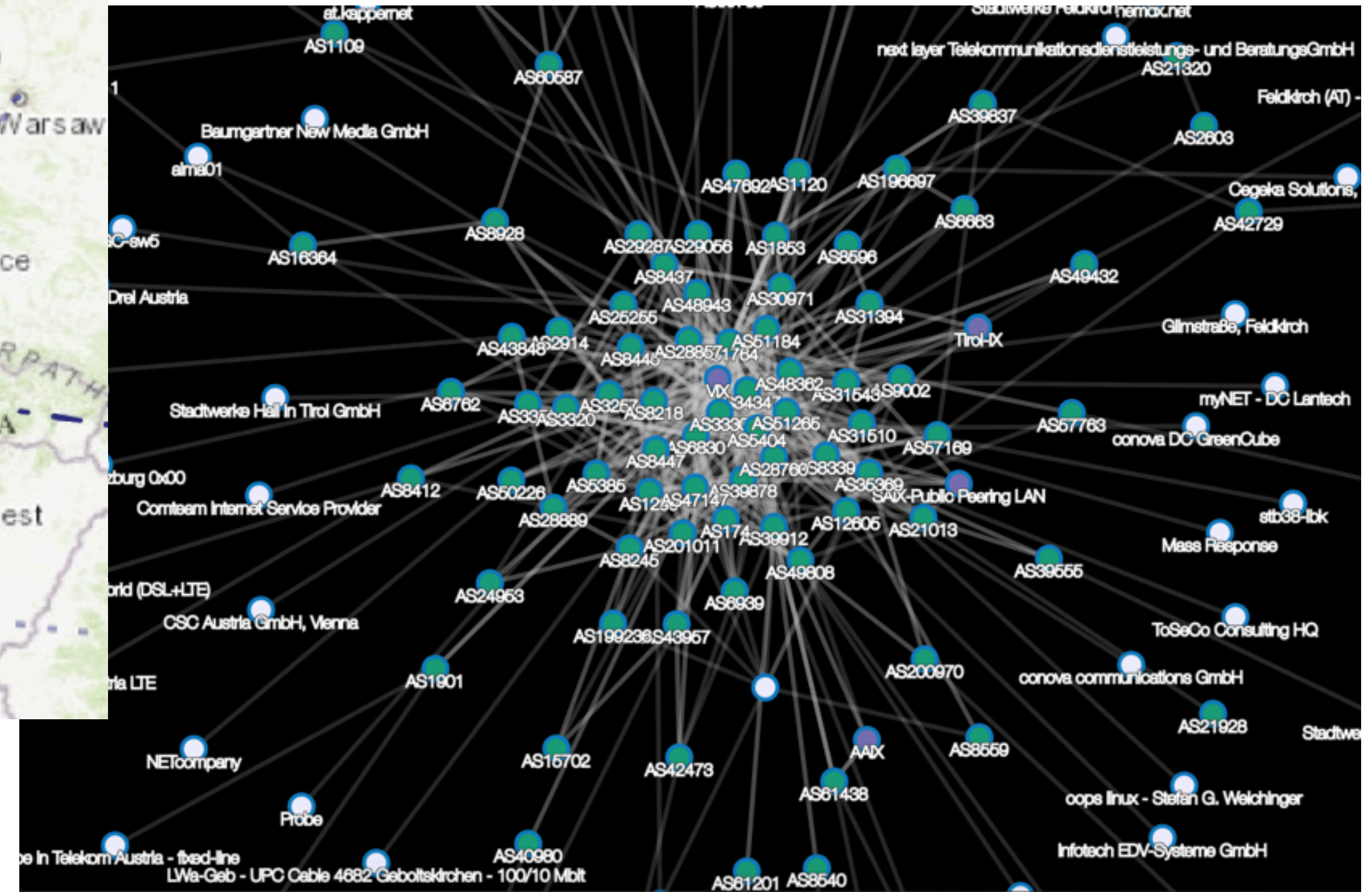
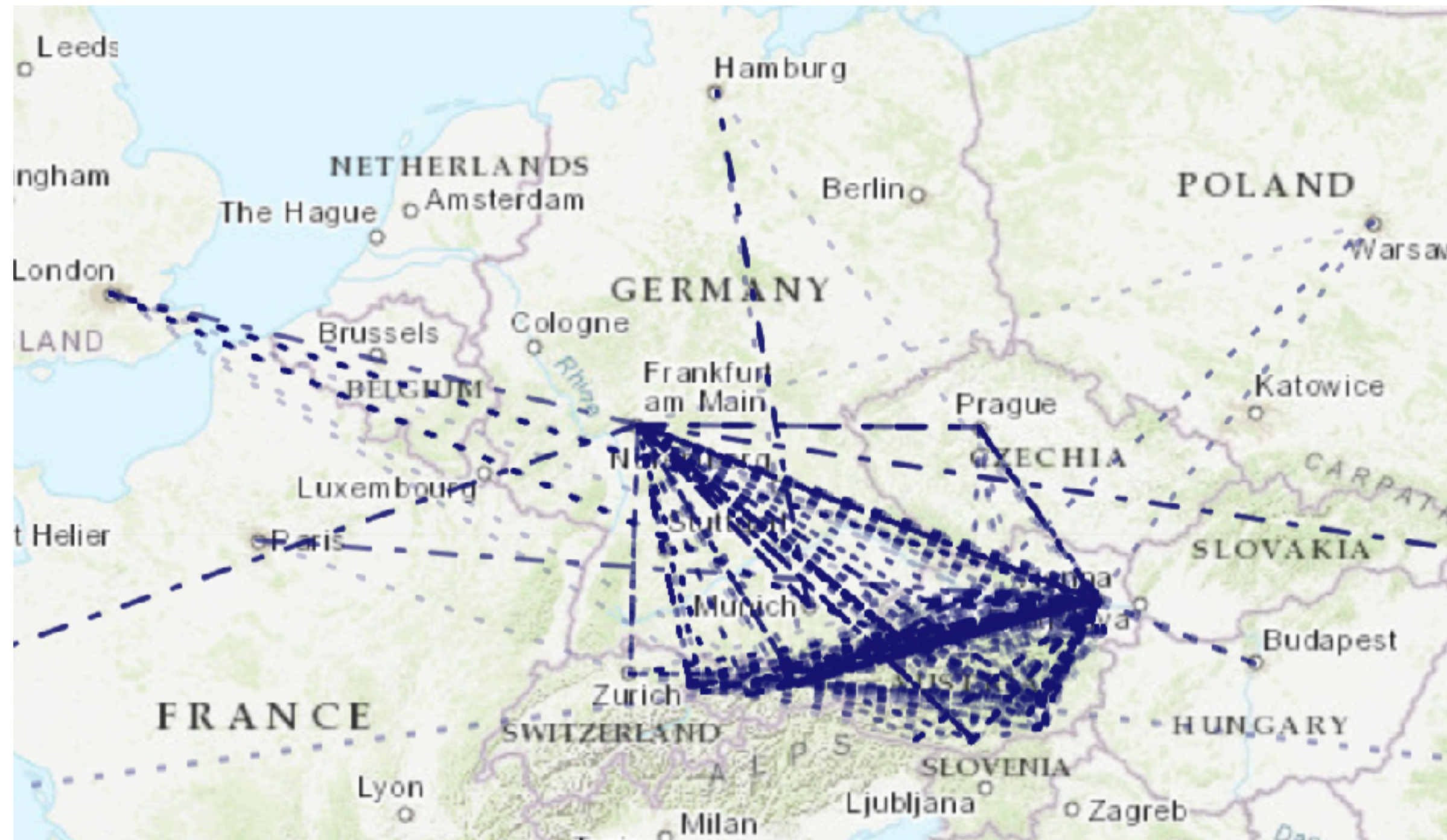
- Open, crowdsourced mapping of Internet infrastructure
 - There is an infrastructure gap in commercial geolocation products

<https://ipmap.ripe.net>

https://labs.ripe.net/Members/massimo_candela/ripe-ipmap-whats-under-the-hood



IXP Country Jedi

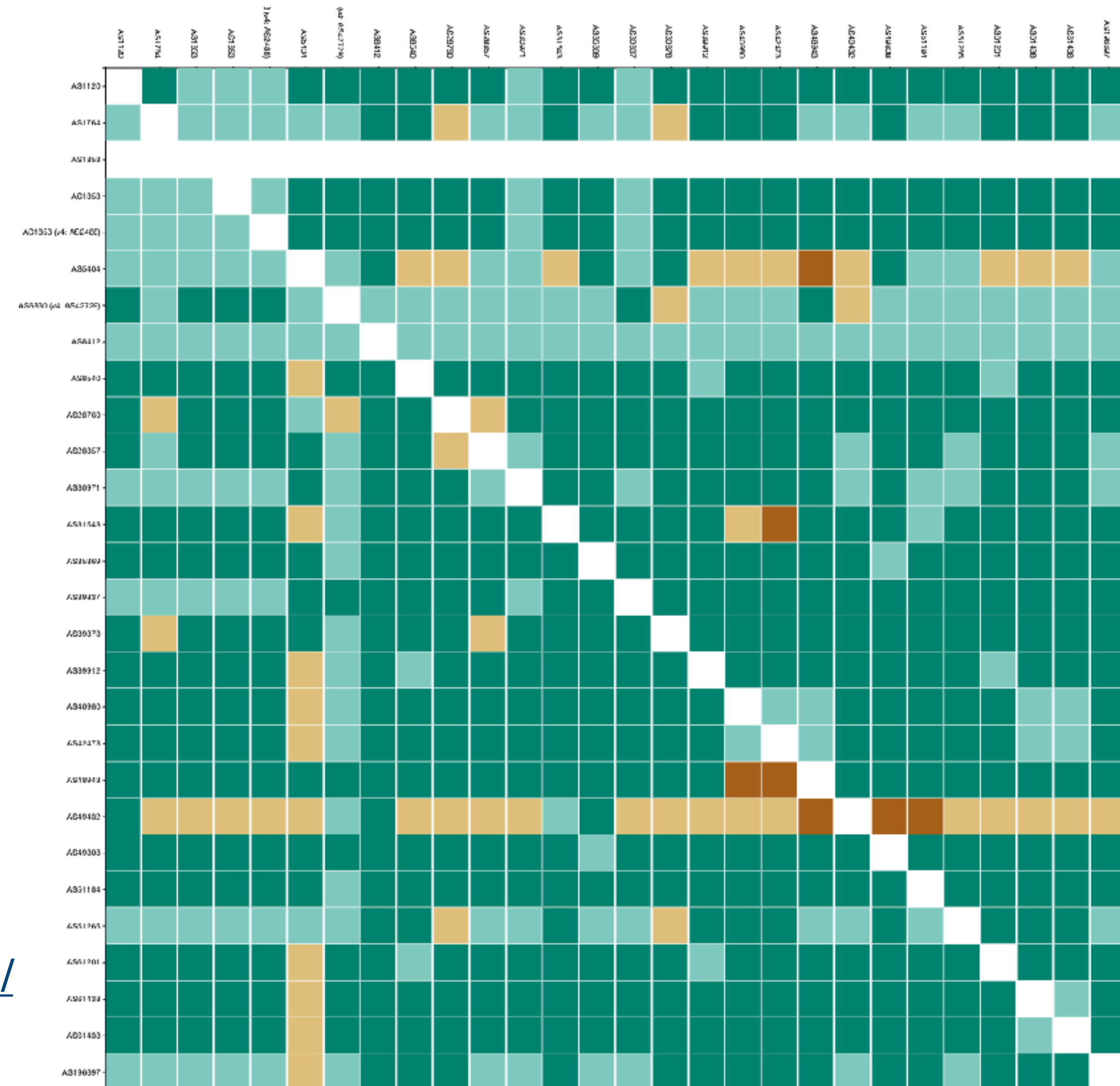


<http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2019-06-01/AT/>

IXP Country Jedi

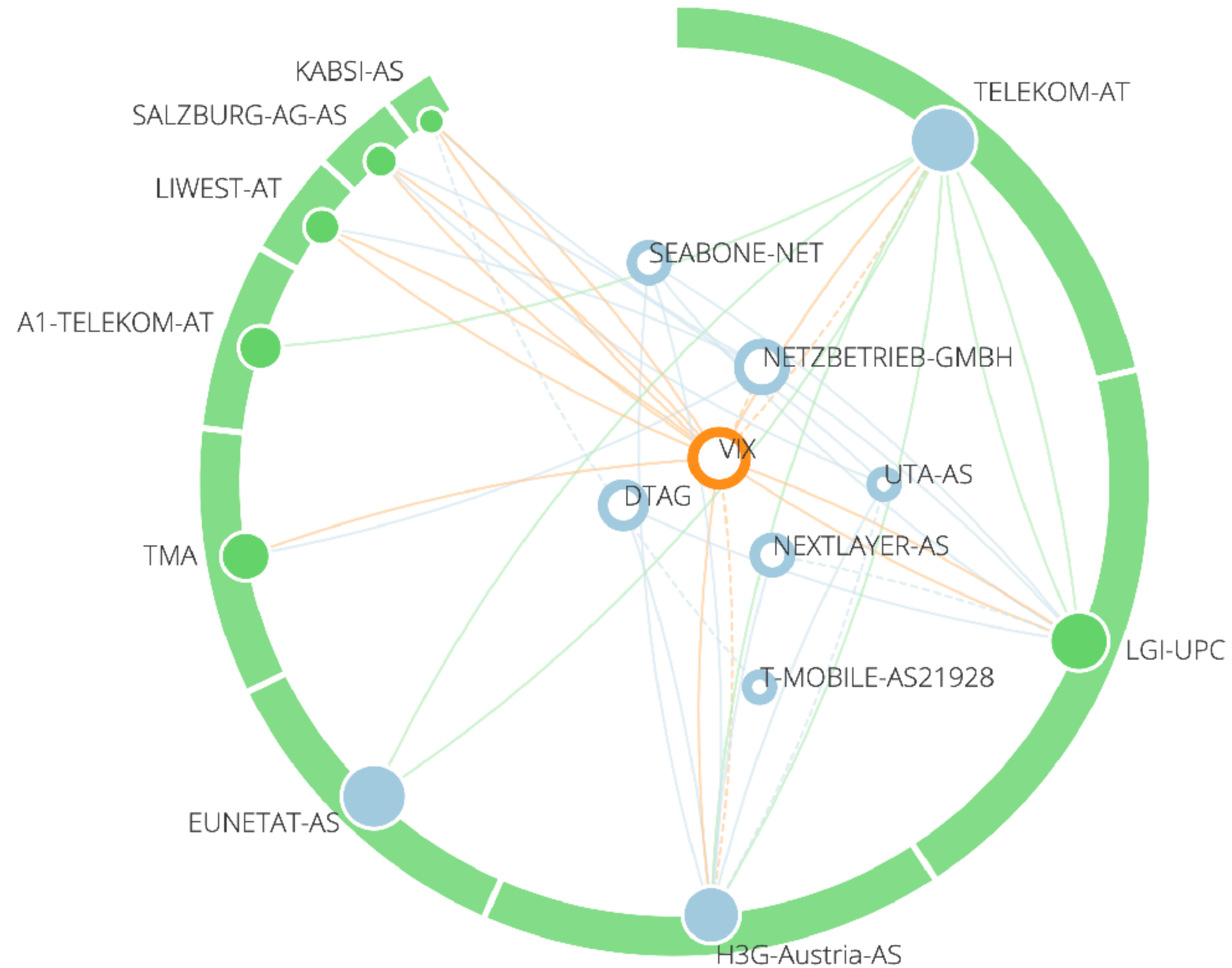


- Local IXP found: YES, out-of-country IPs: NO
- Local IXP found: YES, out-of-country IPs: YES
- Local IXP found: NO, out-of-country IPs: NO
- Local IXP found: NO, out-of-country IPs: YES



<http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2019-06-01/AT/ixpcountry/index.html?ipv=v6>

Peer-to-Peer Connections



RPKI



- **Resource Public Key Infrastructure**
- Community solution to inaccuracies in (or lack of) IRRs
- Operated by RIRs since 2008
- Uses digital certificates to verify who holds IPs/ASNs
 - Route Origin Authorisations (ROAs)
 - Members can create a ROA for each of their IP address ranges
 - Can create multiple ROAs that overlap

<https://www.ripe.net/manage-ips-and-asns/resource-management/certification>

RPKI: Creating ROAs



RPKI Dashboard

9 CERTIFIED RESOURCES

NO ALERT EMAIL CONFIGURED

41 BGP Announcements

4 Valid

1 Invalid

36 Unknown

4 ROAs

3 OK

1 Causing problems

BGP Announcements

Route Origin Authorisations (ROAs)

History

Search...

⌵

Create ROAs for selected BGP Announcements

Valid

Invalid

Unknown

<input type="checkbox"/>	Origin AS	Prefix	Current Status	
<input type="checkbox"/>	AS12654	2001:7fb:fe01::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:fe0c::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:fe0f::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff00::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff01::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff02::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff03::/48	UNKNOWN	

RPKI: Reviewing Changes



RPKI Dashboard

9 CERTIFIED RESOURCES

NO ALERT EMAIL CONFIGURED

41 BGP Announcements

4 Valid1 Invalid36 Unknown

4 ROAs

3 OK1 Causing problems

BGP AnnouncementsRoute Origin Authorisations (ROAs)History

Search...

Create ROAs for selected BGP Announcements

ValidInvalidUnknown

	Origin AS	Prefix	Current Status	Future Status	
<input type="checkbox"/>	AS12654	2001:7fb:fe01::/48	UNKNOWN	VALID	
<input type="checkbox"/>	AS12654	2001:7fb:fe0c::/48	UNKNOWN	VALID	
<input type="checkbox"/>	AS12654	2001:7fb:fe0f::/48	UNKNOWN	VALID	
<input type="checkbox"/>	AS12654	2001:7fb:ff00::/48	UNKNOWN		
<input type="checkbox"/>	AS12654	2001:7fb:ff01::/48	UNKNOWN		
<input type="checkbox"/>	AS12654	2001:7fb:ff02::/48	UNKNOWN		
<input type="checkbox"/>	AS12654	2001:7fb:ff03::/48	UNKNOWN		

Review and publish changes

3

RPKI: Checking the Effects



RPKI Dashboard

9 CERTIFIED RESOURCES

NO ALERT EMAIL CONFIGURED

41 BGP Announcements

7 Valid

1 Invalid

33 Unknown

7 ROAs

6 OK

1 Causing problems

BGP Announcements

Route Origin Authorisations (ROAs)

History

Search...

↕

Create ROAs for selected BGP Announcements

Valid

Invalid

Unknown

<input type="checkbox"/>	Origin AS	Prefix	Current Status	
<input type="checkbox"/>	AS12654	2001:7fb:ff00::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff01::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff02::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff03::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff04::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff05::/48	UNKNOWN	
<input type="checkbox"/>	AS12654	2001:7fb:ff07::/48	UNKNOWN	

Help Us Help You



- Keep RIPE Database records up-to-date
- Help us maintain our datasets:
 - Keep PeeringDB records up-to-date
 - Add and maintain data to RIPE IPMap
 - TraceMON contains a number of update buttons



Services

RIPE Community Project Fund



- The RIPE NCC has a long history of supporting projects and innovative ideas
- €250,000 a year to support non-commercial projects supporting the operation and resilience of the Internet
- Preference given to projects from our service region

<https://www.ripe.net/support/cpf>

Assisted Registry Check



- Help our members to keep their data up-to-date
- Identify inconsistencies between Routing Registry entries and BGP announcements
- Assist with locating and fixing lame reverse DNS delegations

<https://www.ripe.net/manage-ips-and-asns/resource-management/assisted-registry-check>

Training Courses



- Face-to-face training courses
 - RIPE Database / IPv6 / BGP / Measurement tools
 - Course material available online
- Online learning
 - RIPE NCC Academy
 - RIPE NCC::Educa online events
 - Webinars: RPKI / IPv6 / IRR / RIPE Database / RIPE Atlas / RPKI

<https://www.ripe.net/support/training>



Events

Where we went in 2018



Events: RIPE Meetings



- Two RIPE Meetings per year
 - Working Groups and plenary sessions
 - Remote participation
- New members get free tickets
- Fellowship program available



Events: RIPE Meetings



Tuesday, 21 May 09:00 - 10:30

Next Gen Blackholing to Counter DDoS
Matthias Wichtlhuber, DE-CIX Management GmbH



A First Joint Look at DoS Attacks and BGP Blackholing in the Wild
Mattijs Jonker, University of Twente



DDoS Clearing House: Solving DDoS Attacks in the Netherlands, Europe, and Beyond by Facilitating Bridging Solutions and Stakeholders
Koen van Hove, University of Twente



Tuesday, 21 May 11:00 - 12:30

Revisiting the Root
David Huberman, ICANN



OpenINTEL: Long-Term Active Measurements for DNS Research
Roland van Rijswijk, NLnet Labs



That KSK Roll
Geoff Huston, APNIC





Join us at

RIPE79

Rotterdam, Netherlands
14 - 18 October, 2019

Events



- Regional Meetings

- SEE (South East Europe)
- ENOG (Eurasia)
- MENOG (Middle East)
- Fellowships available

- Member Lunches

- Hackathons

- IoT hackathon in Rotterdam: 12-13 October
- <https://www.ripe.net/participate/forms/apply/iot-hackathon-rotterdam/>





Get Involved

Get Involved



- Participate in a RIPE Working Group
 - Address Policy, DNS, RIPE Database, Routing, IPv6, IoT, Anti-Abuse and more
 - Join the mailing lists
- Attend a training course, webinar or take a course online
- Attend a RIPE or RIPE NCC Regional Meeting
- Apply for a RIPE Fellowship
- Host a RIPE Atlas probe
- Apply for a RIPE NCC Community Projects Fund grant

Today's biggest takeaway



- The RIPE NCC is here for you!
 - Training
 - NOG support
- Tell us what tools and data you need
 - We rely on your feedback for improvement
 - Tell us what's good and what isn't
 - Suggest new features
- We live for your feedback :)



Questions



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