



**RIPE  
NCC**

# **Network Measurements & Tools for Researchers and Operators**

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Mirjam Kühne, RIPE NCC

- What is the RIPE NCC
  - Services, partners, service region
- Network measurements:
  - RIPE Atlas
- Accessing data and statistics:
  - RIPEstat
- Pulling it all together
  - RIPE Labs
- Further reading



# Introduction to the RIPE NCC

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**RIPE**  
NCC

- Established in 1992 by the RIPE community
  - Initially part of the academic network association
  - Since 1997 a membership association under Dutch law
  - Not for profit, independent, neutral, open
  - Main offices in Amsterdam; staff in Dubai and Moscow
- Funded by the membership
  - 11,500 members from 76 countries
  - Initially mostly ISPs and universities
  - Now also traditional industries, small Internet companies
- One of five Regional Internet Registries

- Member services

- Resource distribution (IPv4, IPv6, ASNs)
- Resource Certification (RPKI)
- Trainings

- Public services

- RIPE Database
- Reverse DNS
- Operating K-root server
- Operator tools
- Data sharing
- Open meetings

# Regional Internet Registries





# **RIPE Atlas: Active Network Measurements**

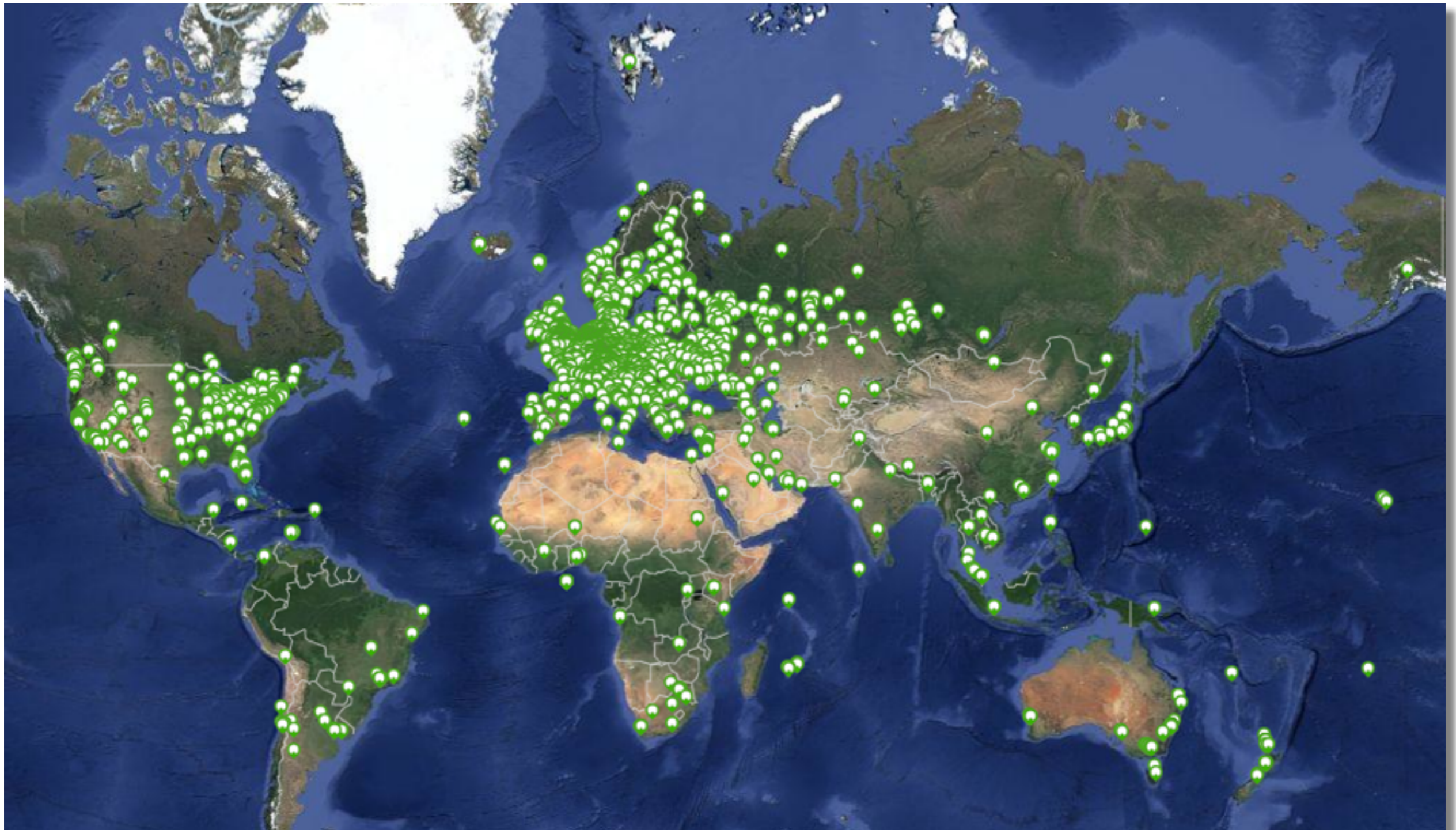
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**RIPE**  
NCC

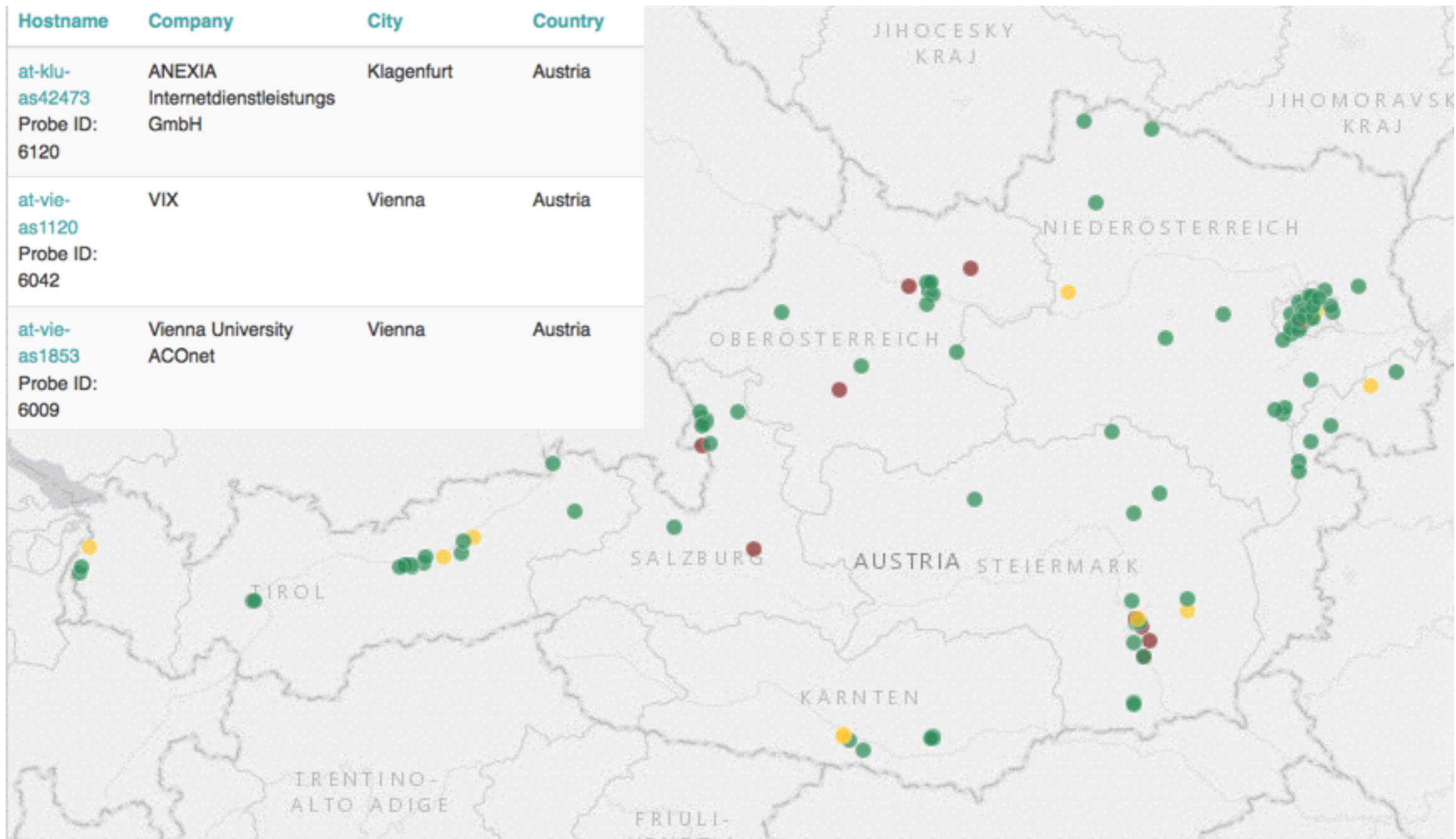
- Instead of small individual measurement networks, build one global, common platform
- Thousands of measurement devices (probes)
- Hosted by volunteers
- Probes run difference measurements
  - Ping, traceroute, DNS, SSL/TLS and **NTP** (new)
- Users can run customised measurements
- Data publicly available
  - For research, operations etc.





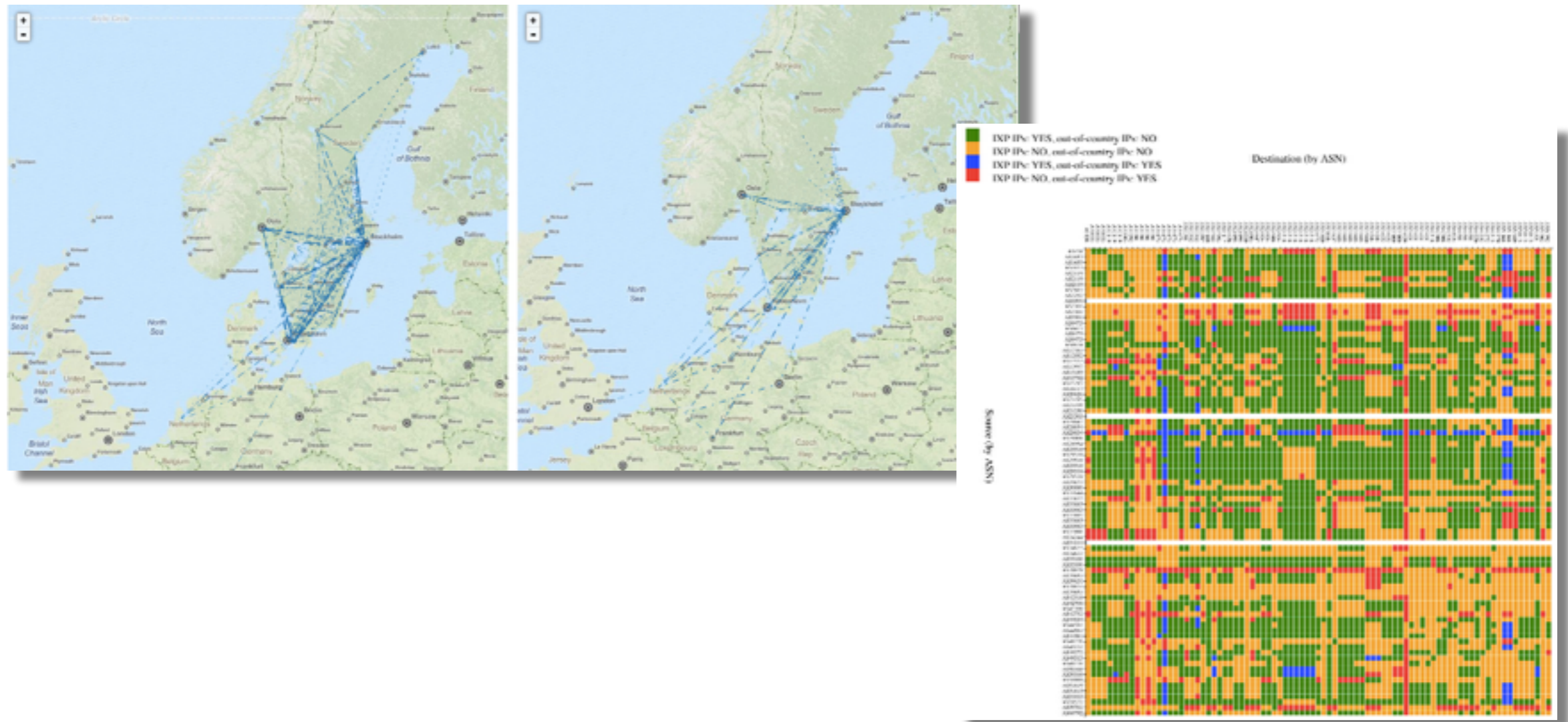
# RIPE Atlas in Austria (Probes & Anchors)

Hostname	Company	City	Country
at-klu-as42473 Probe ID: 6120	ANEXIA Internetdienstleistungs GmbH	Klagenfurt	Austria
at-vie-as1120 Probe ID: 6042	VIX	Vienna	Austria
at-vie-as1853 Probe ID: 6009	Vienna University ACOnet	Vienna	Austria

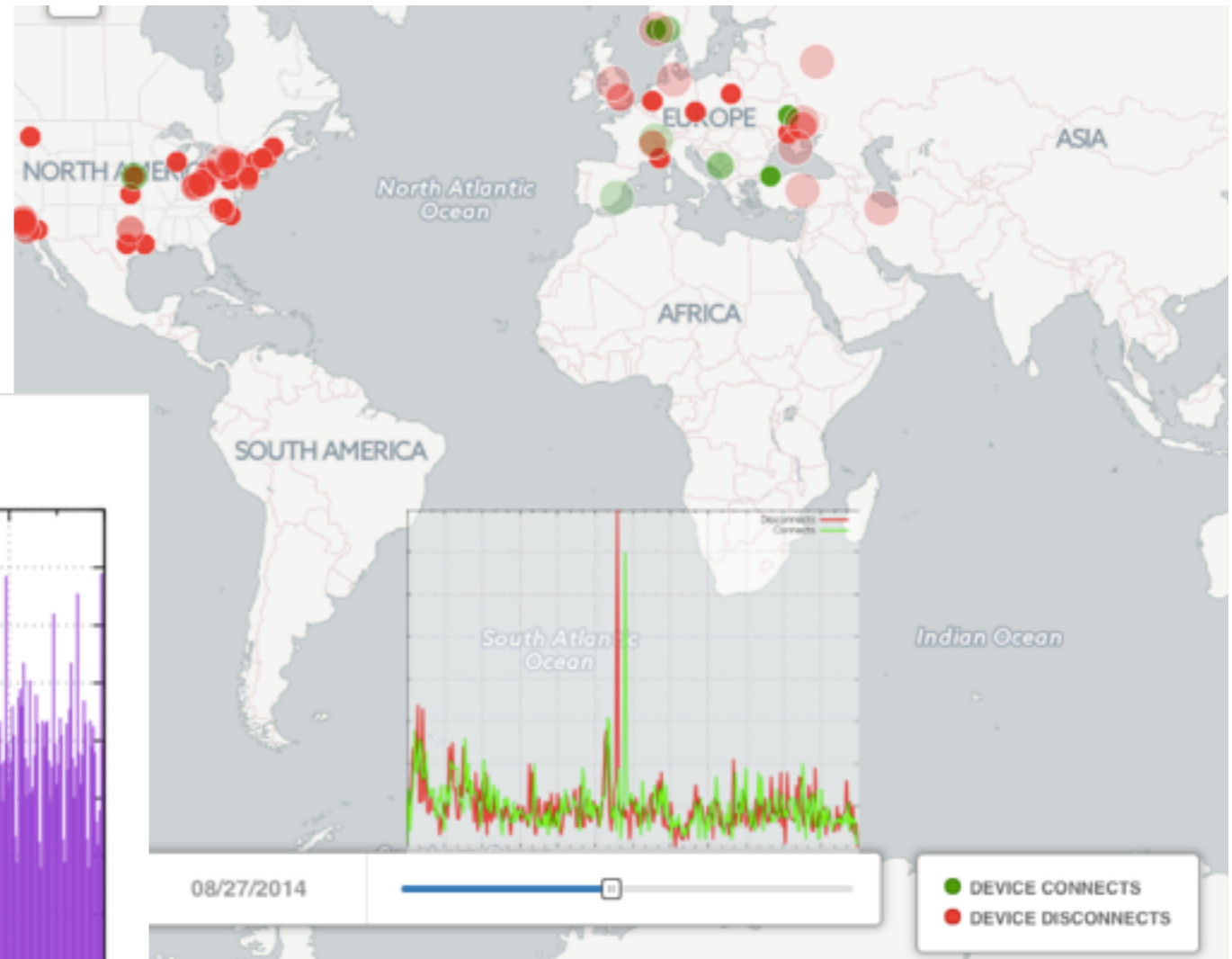


**Connected: 158** **Disconnected: 18** **Abandoned: 17**

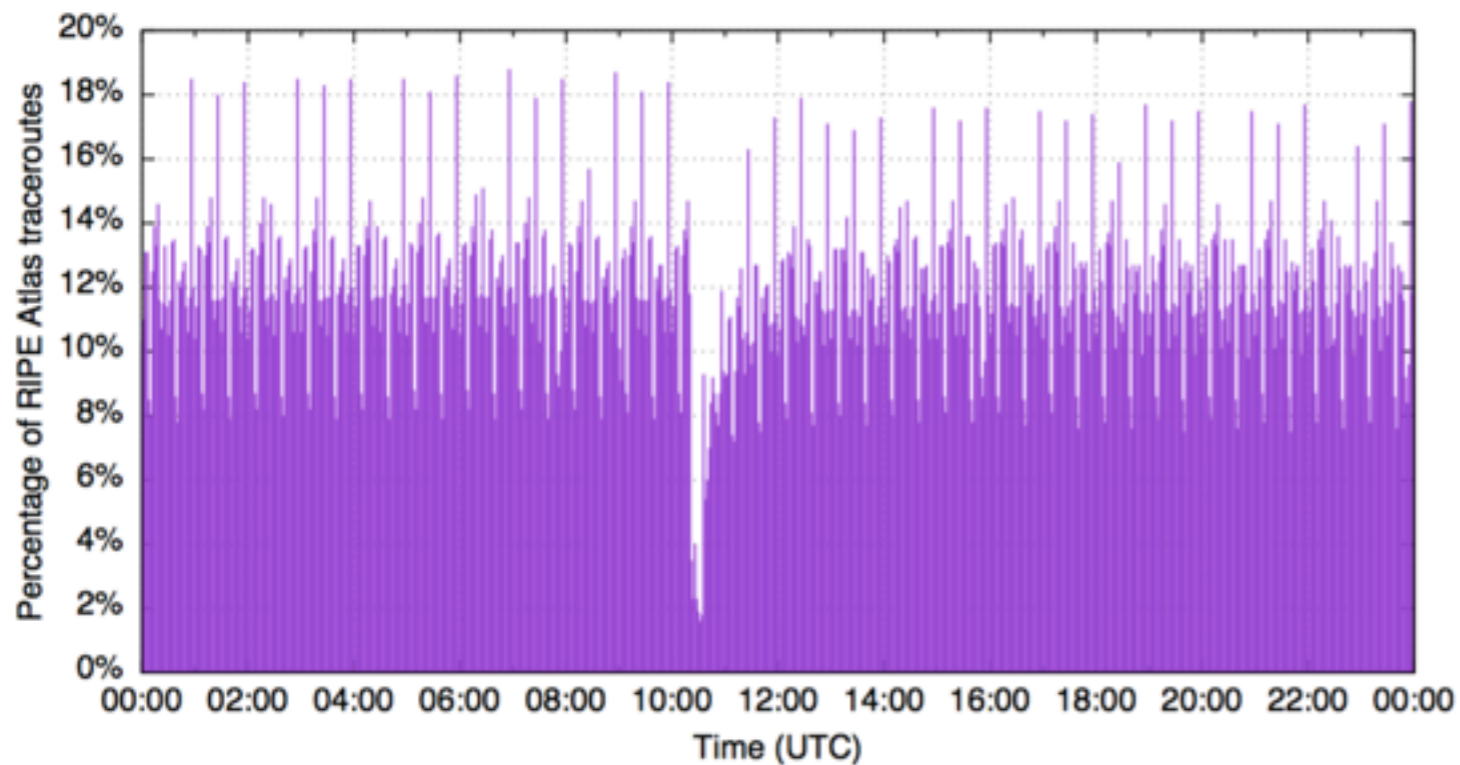
- IXP-Country-Jedi



- <https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas>



Percentage of RIPE Atlas traces seeing AMS-IX peering LAN  
2015-05-13



- <https://labs.ripe.net/Members/kistel/the-ams-ix-outage-as-seen-with-ripe-atlas>
- [https://labs.ripe.net/Members/andreas\\_strikos/amsterdam-power-outage-as-seen-by-ripe-atlas](https://labs.ripe.net/Members/andreas_strikos/amsterdam-power-outage-as-seen-by-ripe-atlas)



# **RIPEstat: Accessing Data and Providing Statistics**

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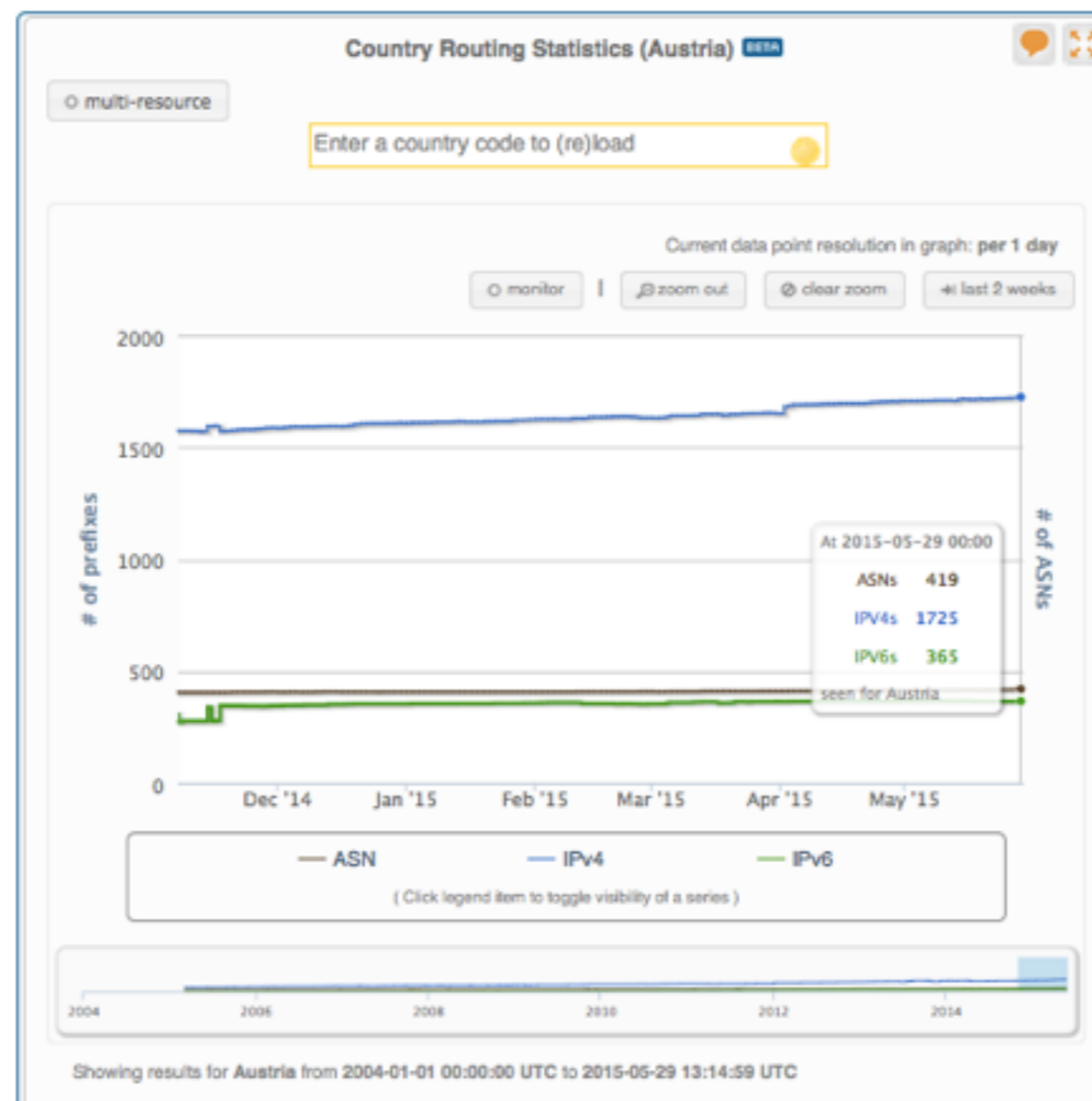
The screenshot shows the RIPEstat website interface. At the top, there is a search bar with the text "RIPE stat" and a search icon. Below the search bar, it says "Your network: AS3333, 2001:67c:2e8::/48" and "e.g. IPv4 prefix/range, IPv6, ASN". A welcome message for "Mirjam Kühne" with a "sign out" link is visible in the top right. The main content area is divided into several widgets:

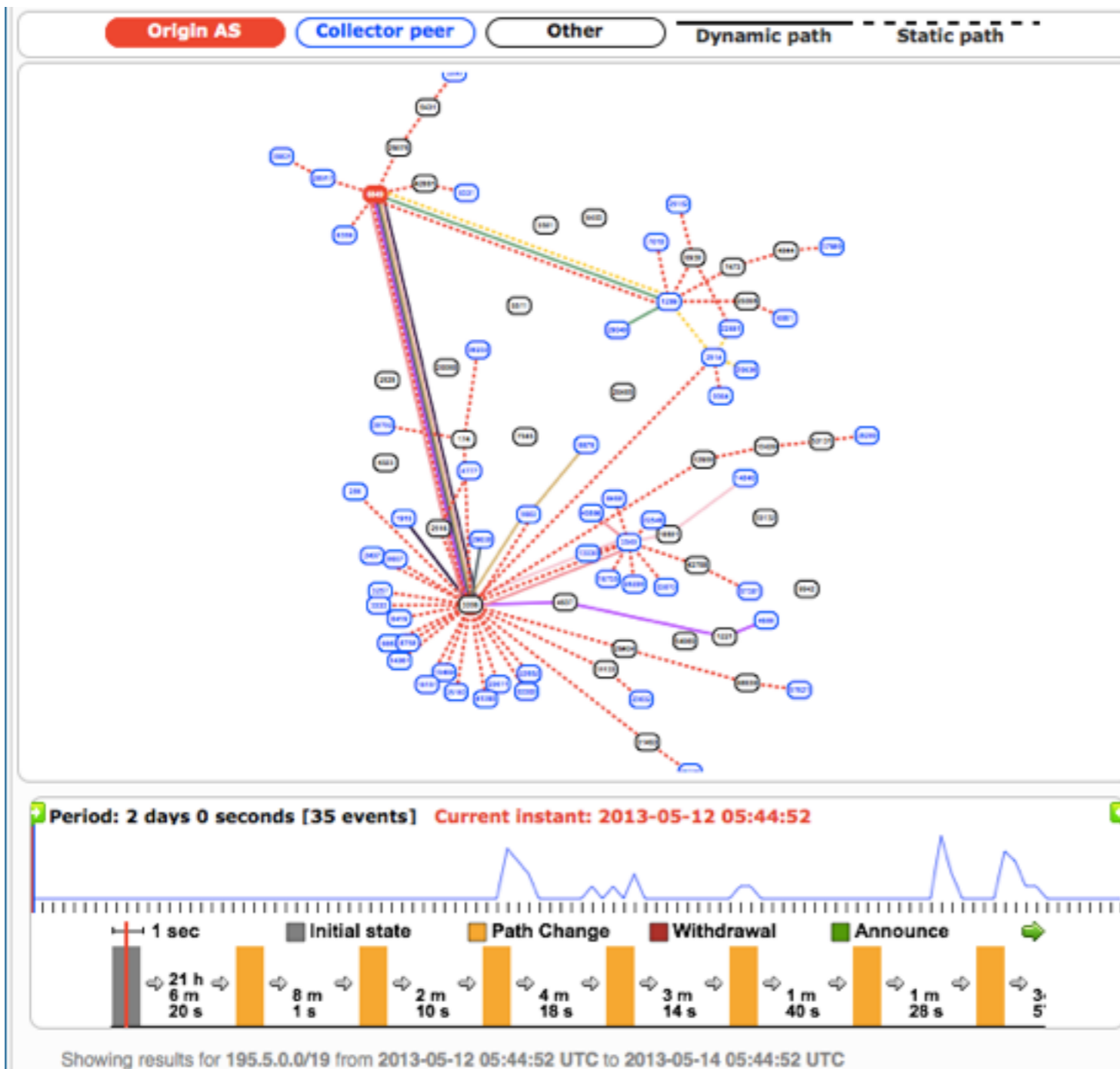
- At a Glance (4)**: A sidebar menu with links to Routing (7), DNS (1), Anti Abuse (1), Database (9), and Geographic (2).
- Resource Overview (2001:67c:2e8::/48)**: Shows that the prefix is announced by AS3333, RIPE-NCC-AS - Reseaux IP Europeens Network Coordination Centre (RIPE NCC). It includes a "source data" link and "embed code", "permalink", and "info" options.
- Geoloc (2001:67c:2e8::/48)**: Features a map of Europe and Africa. It indicates that 100.00% of the address space has geographic information. It includes a "source data" link and "embed code", "permalink", and "info" options.
- Registry Browser (2001:67c:2e8::/48)**: Displays a table of registry information for the network. The table has a yellow background and contains the following data:

inet6num:	2001:67c:2e8::/48
netname	RIPE-NCC-NET
descr	Reseaux IP Europeens Network Coordination Centre (RIPE NCC)
org	ORG-RIEN1-RIPE
country	NL
admin-c	JDR-RIPE
admin-c	BRD-RIPE
tech-c	OPS4-RIPE
status	ASSIGNED PI
mnt-by	RIPE-NCC-END-MNT
mnt-lower	RIPE-NCC-END-MNT
mnt-by	RIPE-NCC-MNT
mnt-routes	RIPE-NCC-MNT
mnt-domains	RIPE-NCC-MNT
- Routing Status (2001:67c:2e8::/48)**: Shows that the network is 100% visible by 88 of 88 RIS full peers. It notes that it was first ever seen announced by AS3333 on 2010-09-28 16:00:00Z. It also indicates it was originated by AS3333 (valid route object in RIPE) and that there are no less-specific covering prefixes. It includes a "Compare" button set to "1 week" and "earlier". It also has a "source data" link and "embed code", "permalink", and "info" options.

- Toolbox
- All data in one place
- Routing, IP, geoloc, black lists, history
- Graphical interface
- Organised as widgets
- Can be customised

- IPv4, IPv6, ASNs in a given country over time
- Comparison of countries possible

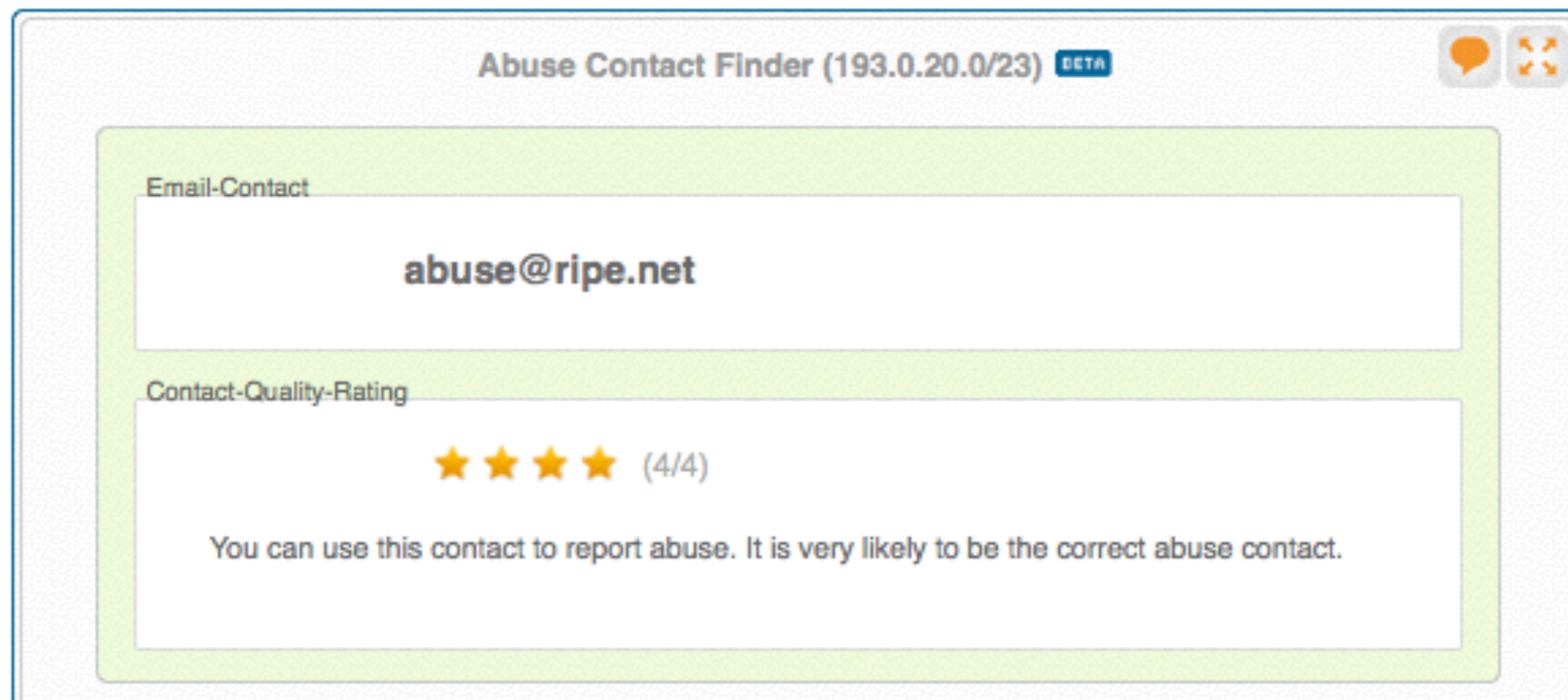




- Graphical visualisation of BGP updates
- Animated graphs of routing activity
- Collaboration with Roma Tre University



- Finds potential contacts to report network abuse
- Rates quality of information found
- Abuse contacts required in RIPE Database





# **RIPE Labs: Information for Researchers and Operators**

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- A website (blog), but more importantly, a community platform
- You can:
  - Test and evaluate new tools and prototypes
  - Contribute new ideas and research results
  - Provide feedback and discuss with others

<https://labs.ripe.net>



## TagCloud

allocation api ases  
atlas certification  
country cpe  
database  
datarepository ddos dns  
dnssec geolocation  
ipv4 ipv6 ipv6day  
ipv6launch ixp k-root  
lirs measurements  
meetings membership  
operational policy  
reputation rex ripestat  
root-servers  
routing security  
statistics syria tools  
transfers visualisation

- Statistics, measurements
- Research
  - Routing, IP, networking, security
- Tools
  - RIPE Atlas, RIPEstat, RIPE Database, APIs
- Many external contributions

## RIPE NCC Statistics

**11,665**  
Number of LIRs



**8,870**  
LIRs with IPv6



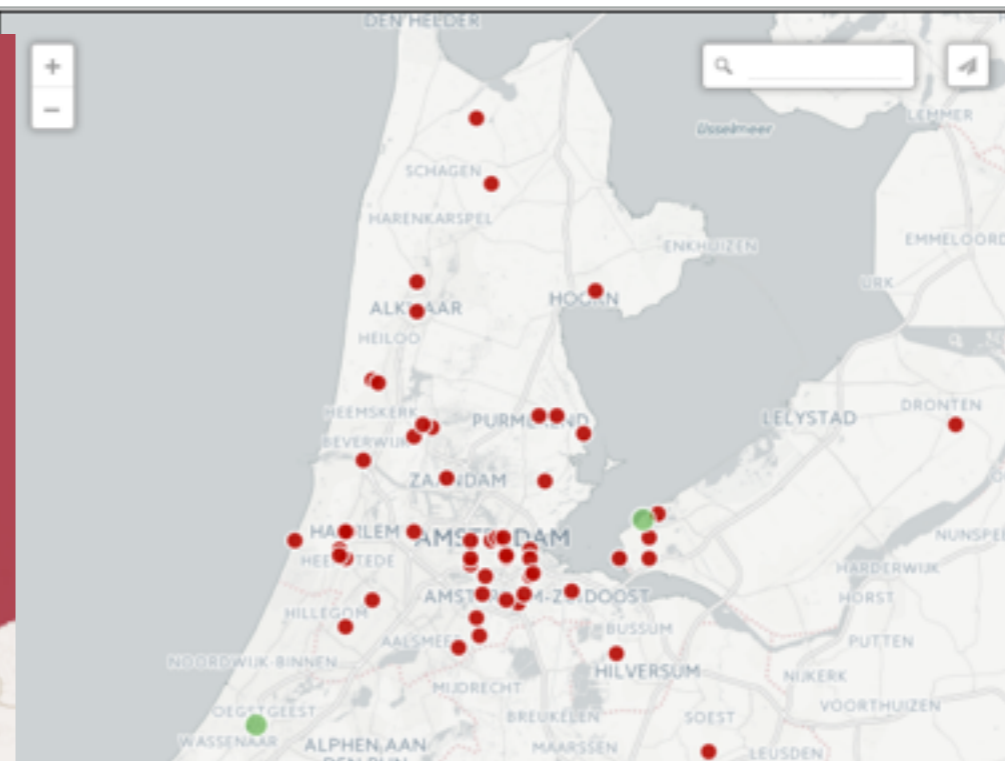
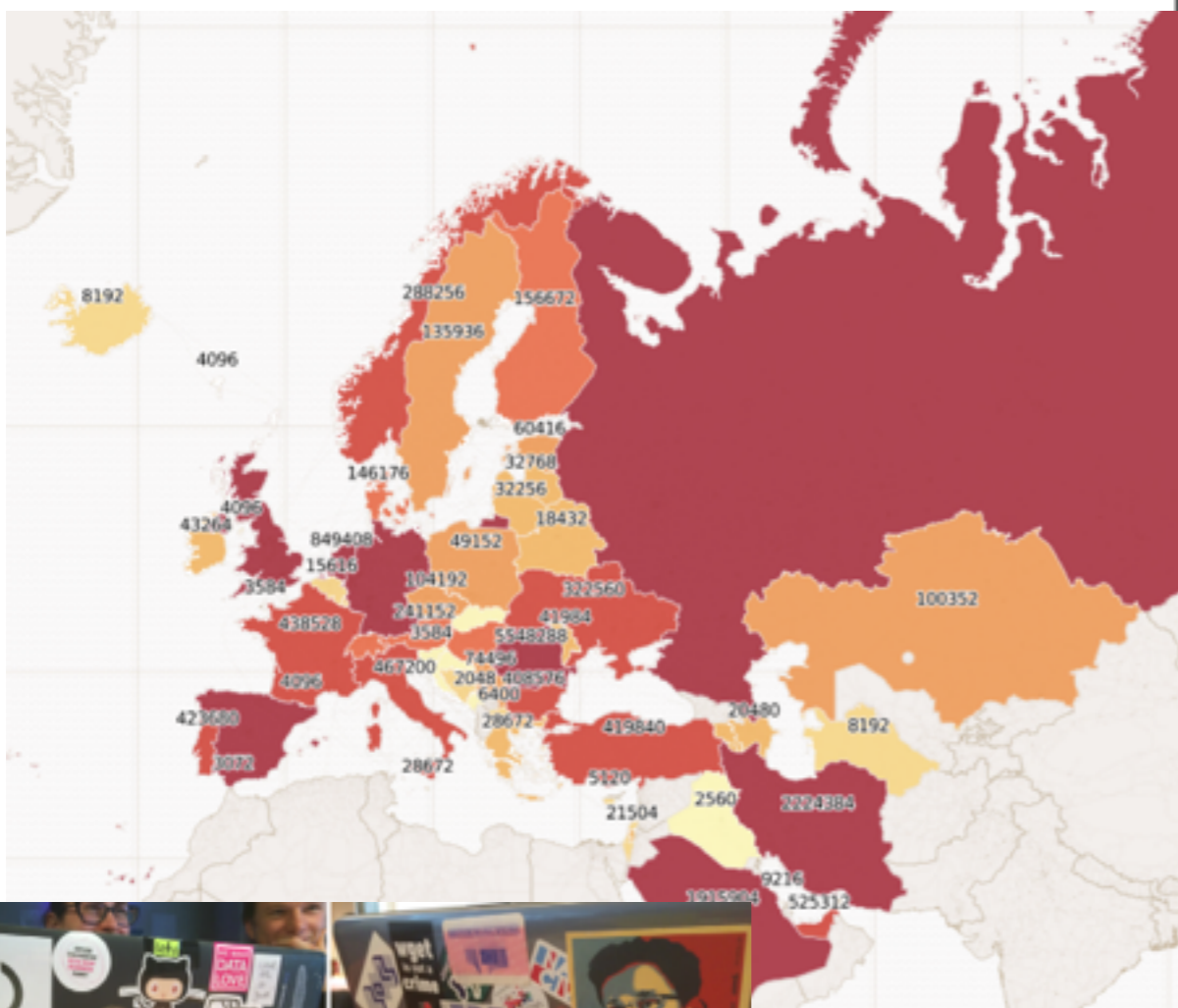
**674,304**  
Number of IPv4  
addresses transferred  
last month



[View more  
statistics](#)



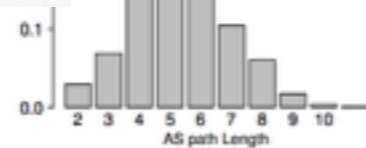
# RIPE Labs Examples



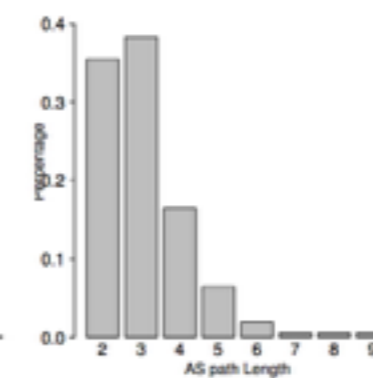
a) West Africa (WAF): 815 v4 paths

(b) ZA: 420 v4 paths

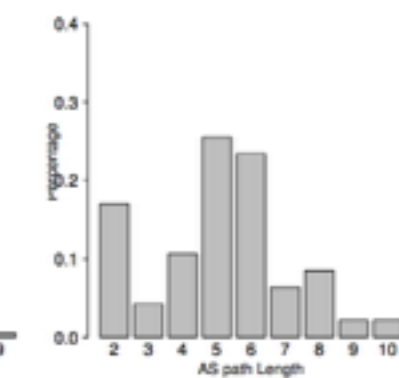
(c) Same WAF countries: 47 v4 paths



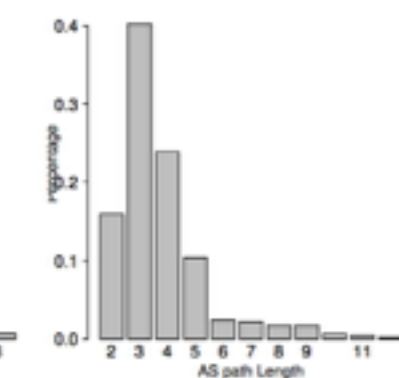
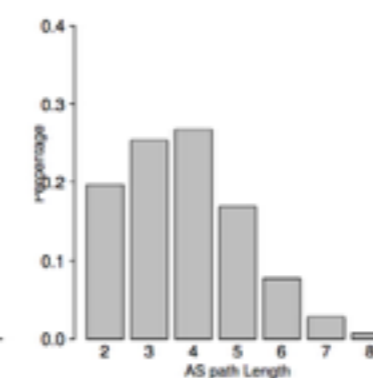
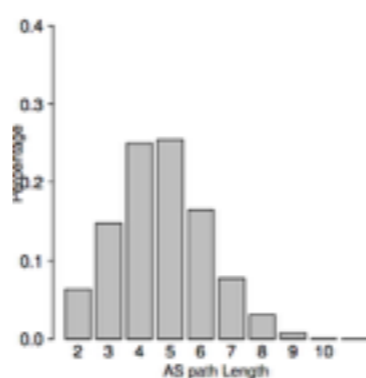
(d) within Africa: 4,293 v4 paths



(e) Southern Africa (SAF): 142 v6 paths



(f) Same SAF countries: 452 v4 paths



- We're looking for talented students/researchers in I'net technology field to share their ideas with the RIPE community
- Receive funding to attend RIPE Meetings or a RIPE NCC Regional Meeting (meeting ticket, travel and accommodation) and present your research
- Application open year-round
- Must be in the RIPE NCC service region
- [ripe.net/ripe/raci](http://ripe.net/ripe/raci)

- RIPE & RIPE NCC
  - <http://www.ripe.net>
- RIPE Atlas
  - <https://atlas.ripe.net>
- RIPEstat
  - <https://stat.ripe.net>
- RIPE Labs
  - <https://labs.ripe.net>
- RACI
  - <https://www.ripe.net/ripe/raci>

