RIPE NETWORK COORDINATION CENTRE

RIPE Atlas

Large Scale Internet Measurement Infrastructure

Emile Aben | ITU-D Broadband Services and Infrastructure Mapping

Introduction to the RIPE NCC

- Five Regional Internet Registries worldwide:
  - Distribute Internet number resources (IP addresses, ASNs)
  - Not-for-profit organisations, funded by membership fees
  - Policies decided by regional communities
  - Neutral, impartial, open, transparent

RIPE Atlas Overview

- Measuring Internet infrastructure
  - For the community
  - By the community
  - Since 2010

- Instead of small, private infrastructures, build a HUGE common infrastructure that serves private and public community goals

- https://atlas.ripe.net/

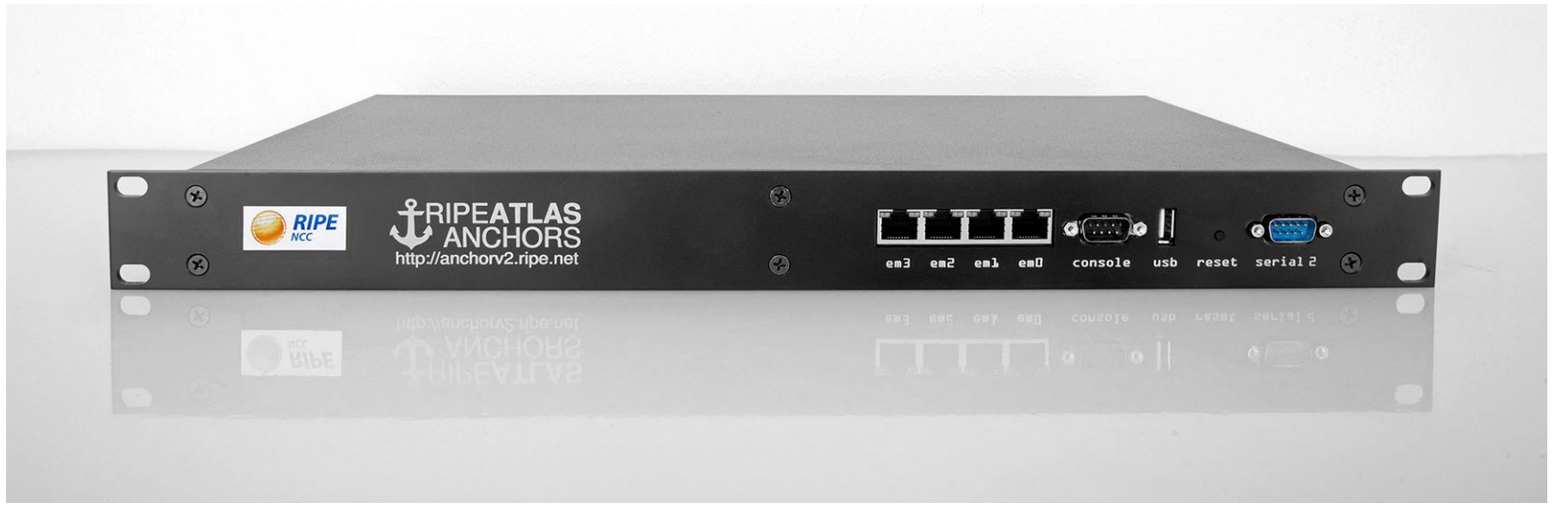
Hardware

- Need many vantage points for accurate mapping
  - Small devices called probes
  - Easily deployable (USB power)
  - 24 x 365 capable

- Hosted or sponsored by:
  - ISPs, IXPs, individuals, …
  - Free of charge for volunteers who host individual probes
  - Anyone can apply: https://atlas.ripe.net/apply

RIPE Atlas Anchors

- More powerful than regular probes
- Deployed in data centres for stability
- Both measurement devices and targets
- IPv4 and IPv6 mandatory



Measurements

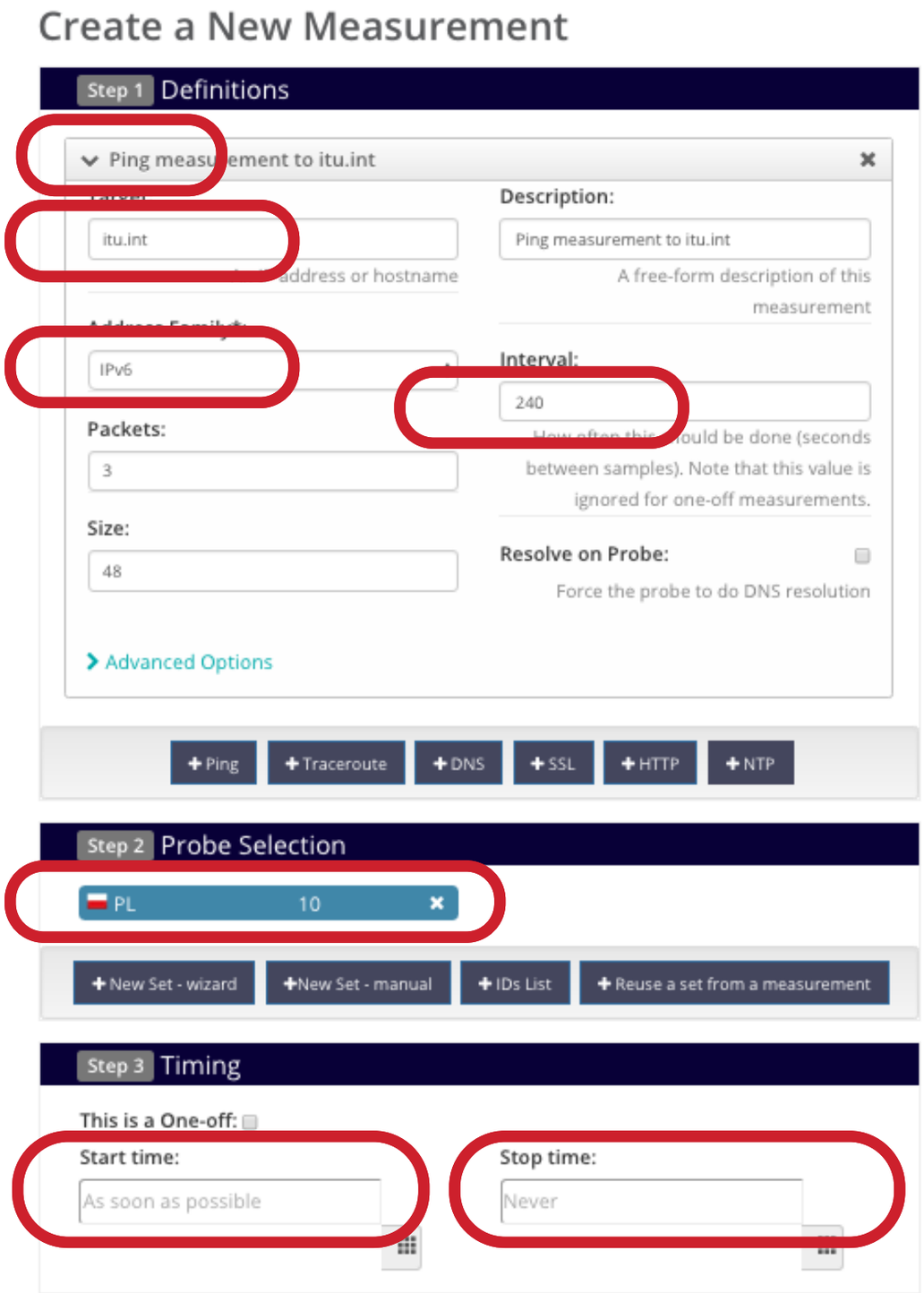
- Various measurement types available:
  - Ping: latency
  - Traceroute: IP path and latency of components
  - DNS, SSL, NTP, HTTP: protocol-specific measurements
- Layer 3: IP (v4 and v6) and up

Measurements

- Built-in measurements
  - Ping, traceroute, DNS to root servers from all devices
  - Mesh ping and traceroute between anchors
  - Ping and traceroute from regular probes to anchors
  - DNSMON
- All data available to everyone
  - Raw data via APIs
  - Visualisations: https://atlas.ripe.net/results/maps/
  - Tools: https://atlas.ripe.net/measurements-and-tools/tools/

Measurements

- User-defined measurements
  - Users get “credits” for hosting probes, sponsorship, research, …
  - Users spend “credits” on measurements

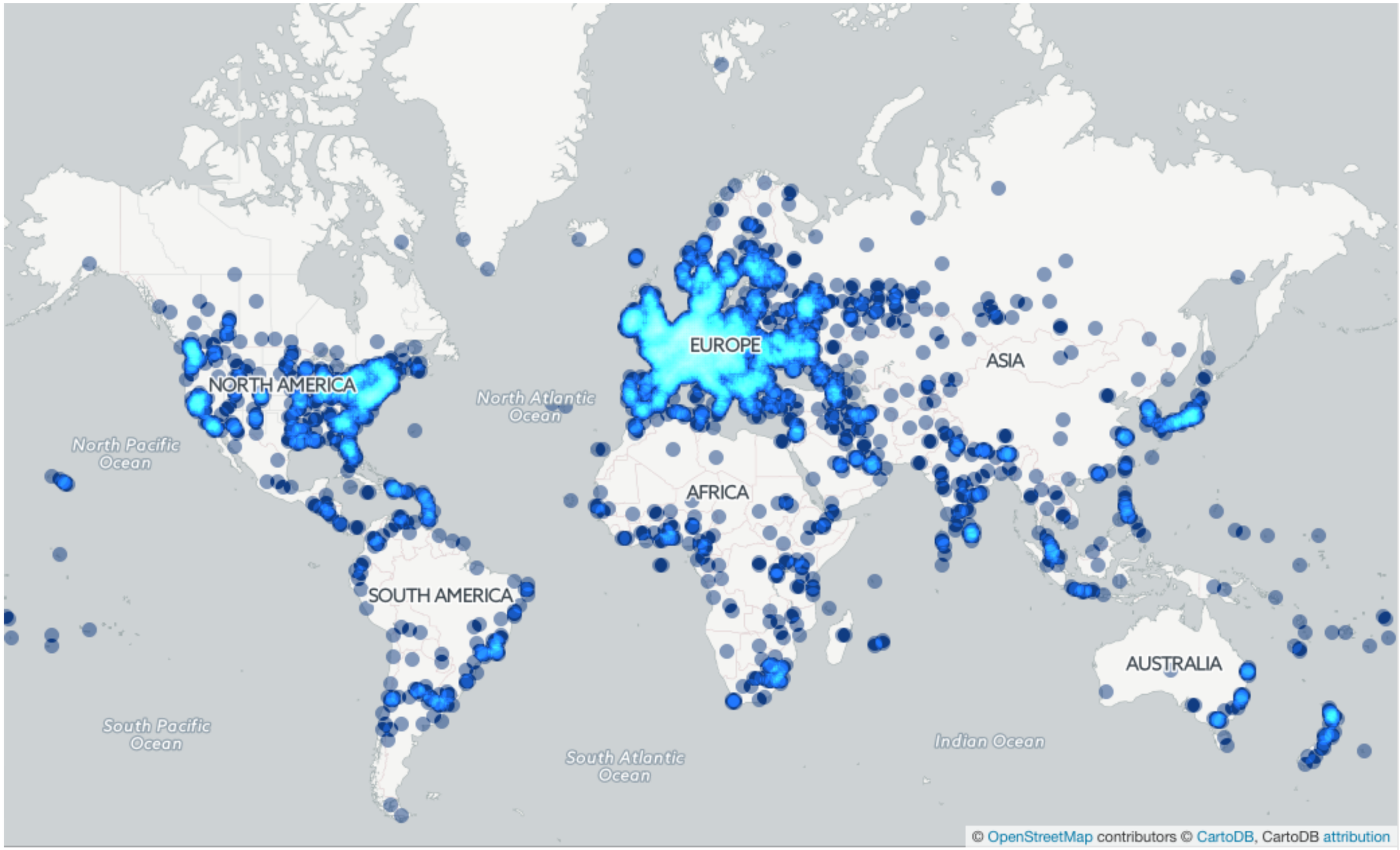


Deployed Base - Size Matters

- 9,356 devices connected
- 188 anchors
- 3.8k measurement results/second collected
- IPv4 networks covered: 3,380 (6%)
- IPv6 networks covered: 1,228 (11%)
- Countries covered: 181 (92%)

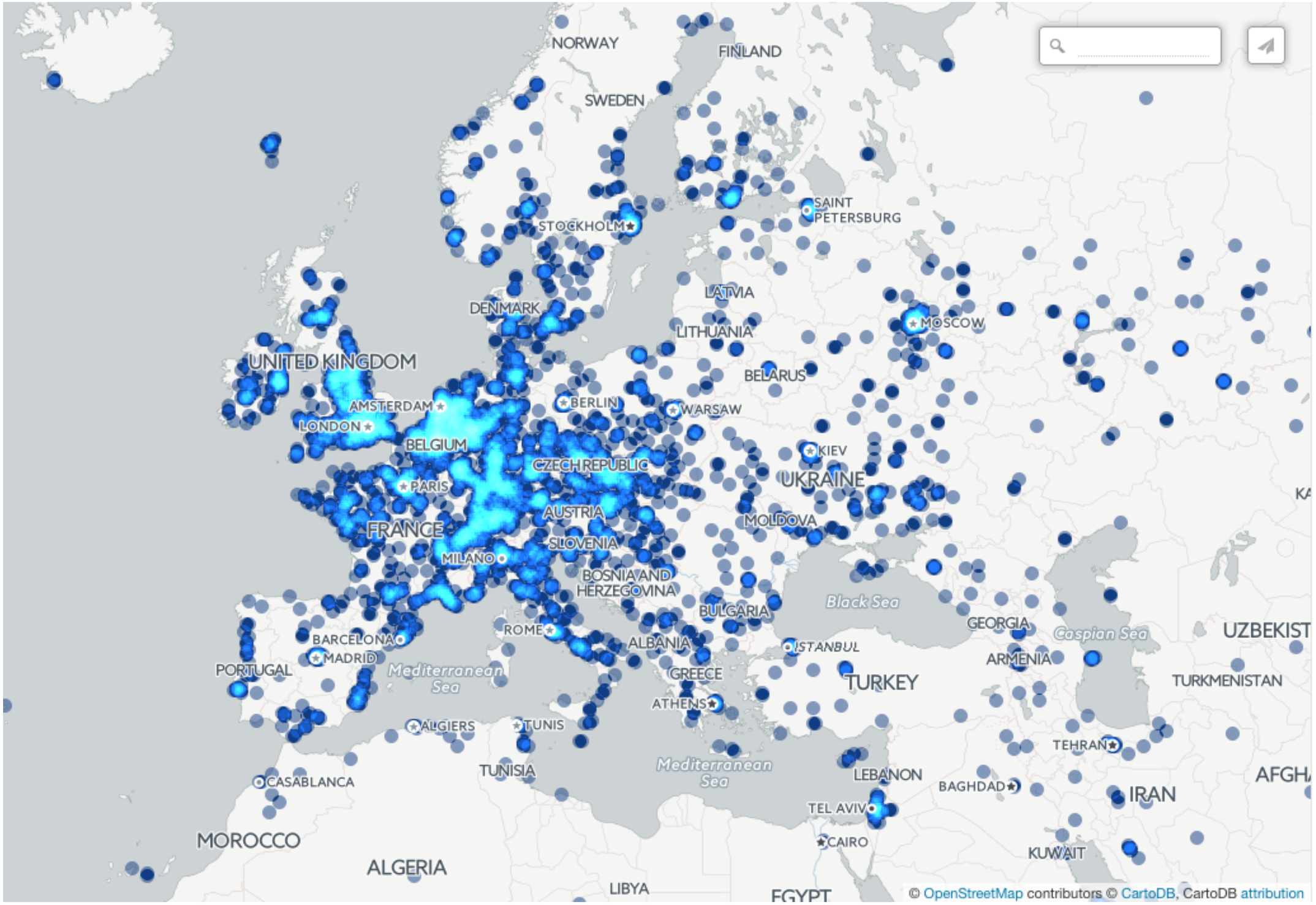
https://atlas.ripe.net/results/maps/network-coverage/

RIPE Atlas Network Extent



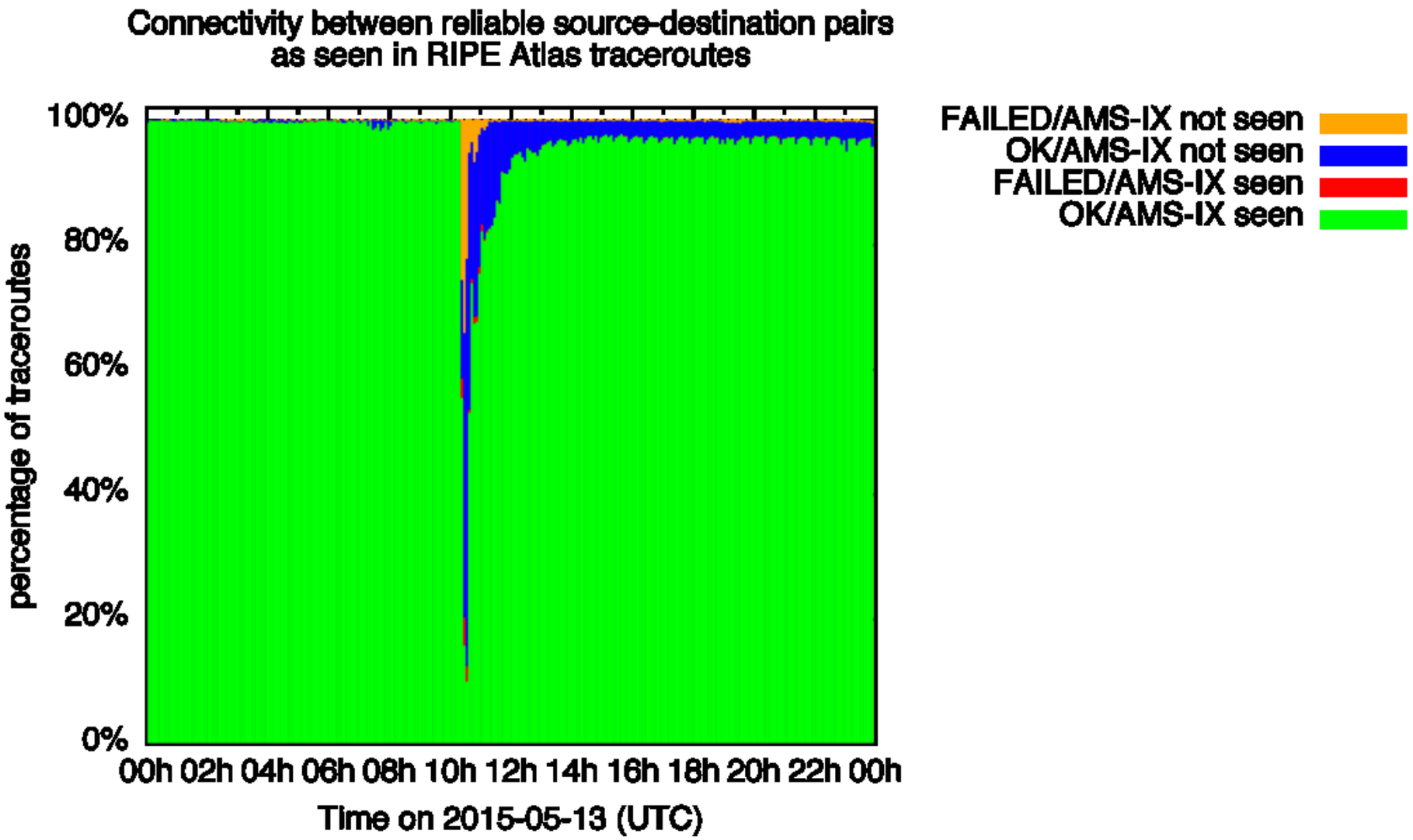
https://ripe.cartodb.com/u/andreasstrikos/viz/f03c2d52-e450-11e5-9a18-0e8c56e2ffdb

RIPE Atlas Extent (Zoom)



Case Study

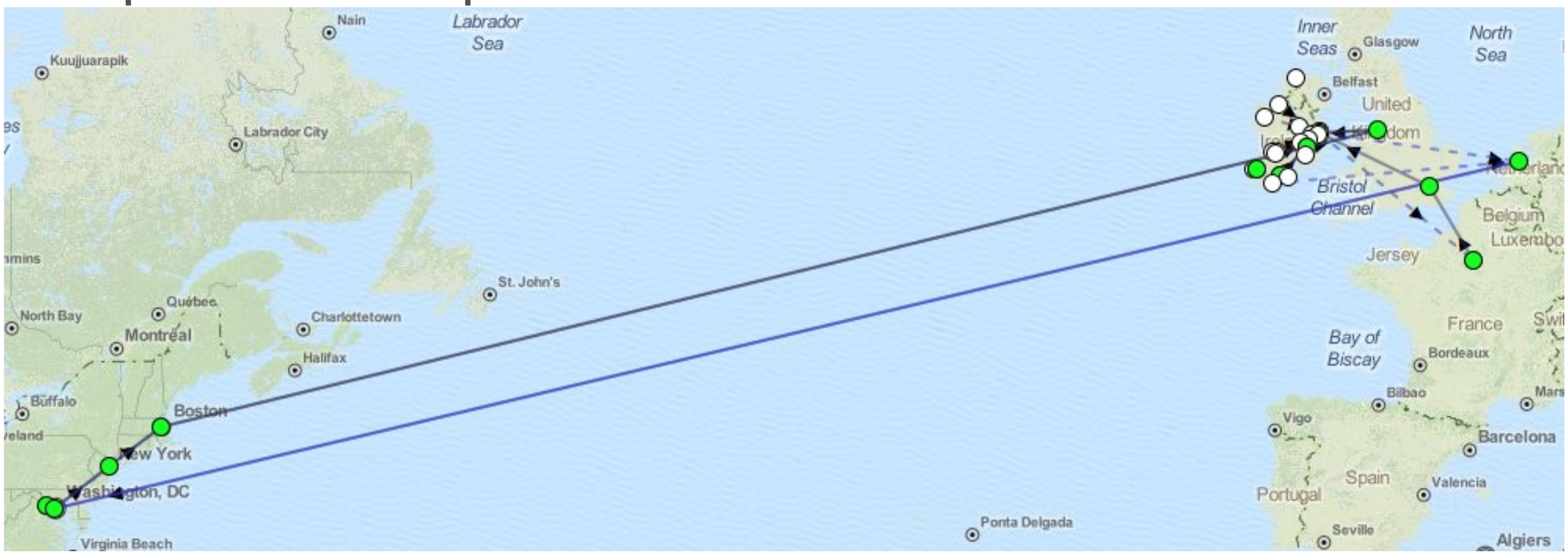
- Internet outages



https://labs.ripe.net/Members/emileaben/does-the-internet-route-around-damage

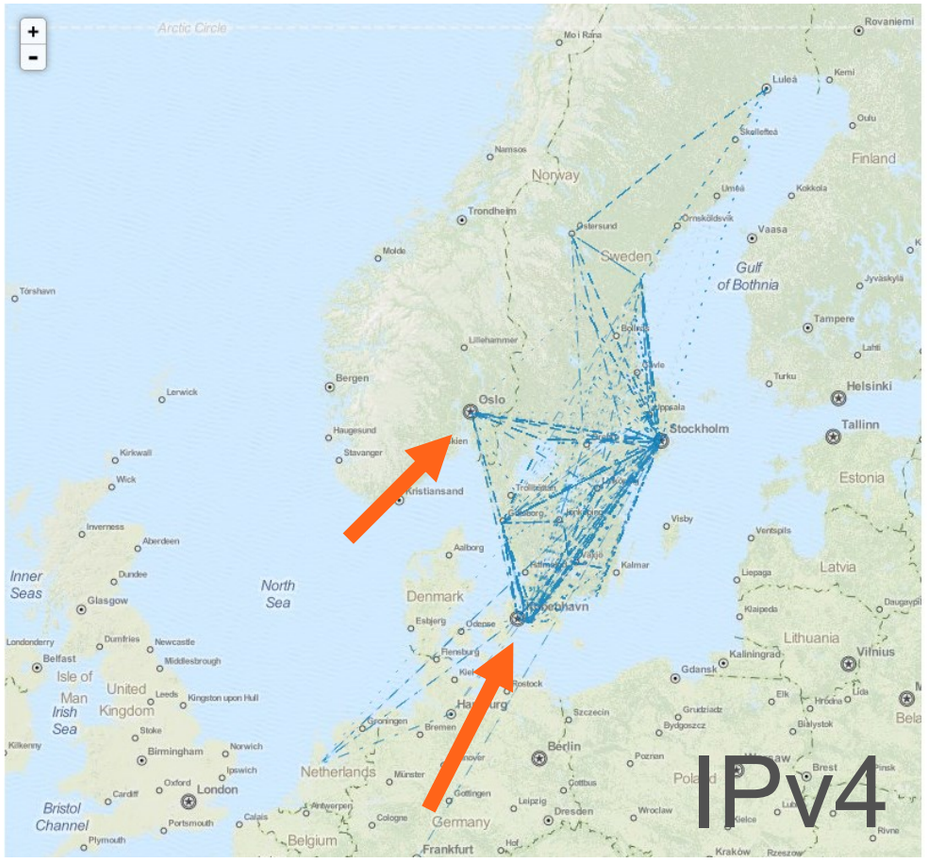
Case Study

- OpenIPMap (Prototype)
  - A crowd-sourced database with location information for infrastructure IP addresses
  - Other available information has data quality issues
  - “OpenStreetMap for infrastructure IP addresses”



Case Study

- Are local paths local? Example: Connectivity between RIPE Atlas probes in Sweden
- Many SE paths via NO and DK



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

Additional Reading

- Community:
  - https://atlas.ripe.net/atlas/community (users, sponsors …)
  - Twitter: #RIPEAtlas & @RIPE_Atlas
  - Active users mailing list: ripe-atlas@ripe.net
  - Helpdesk / questions: atlas@ripe.net
- https://labs.ripe.net/atlas/user-experiences
- https://atlas.ripe.net/resources/training-and-materials/

Potential Action Items

- What kind of cooperation can you envision with RIPE Atlas?
- Compare where measurement infrastructure is co-deployed?
- Follow-up: meetings, workshops, mailing list discussions
- Constraints:
  - RIPE Atlas doesn’t do bandwidth measurements
  - RIPE NCC prioritises benefits to its members/community

Questions

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