



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Countries, IXPs and RIPE Atlas

...and a little bit of Yoda

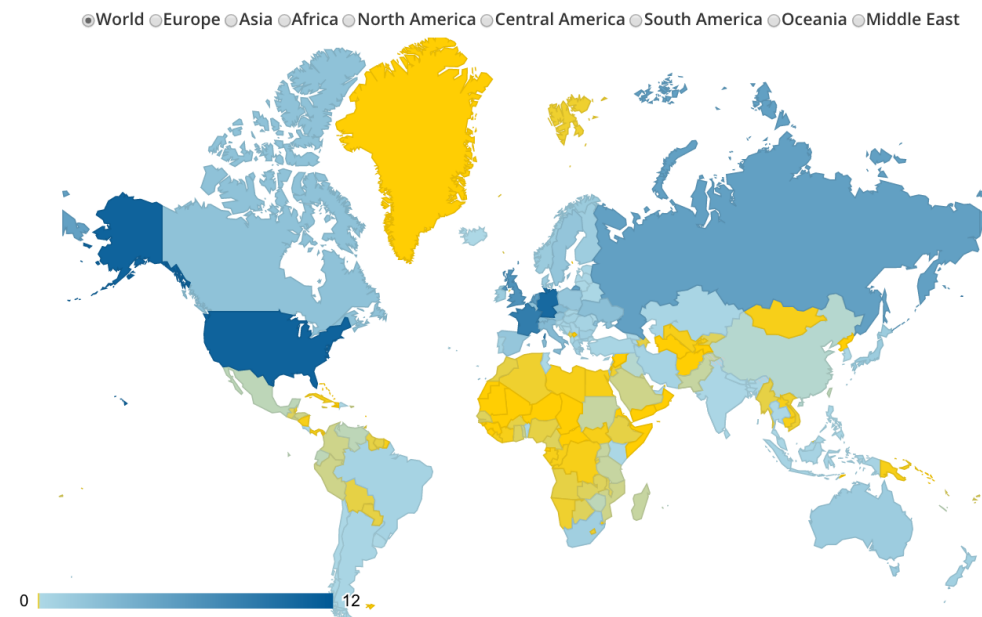
RIPE Atlas



Coverage for Countries



- Some countries well covered, others not so much



- Can we create country-specific Internet measurements from RIPE Atlas?
 - Can this help make things better?

Country	Probes
United States of America	1005
Germany	927
France	774
United Kingdom	578
Netherlands	531
Russia	463
Czech Republic	259
Italy	245
Switzerland	235
Ukraine	223

“Keeping Local Traffic Local”

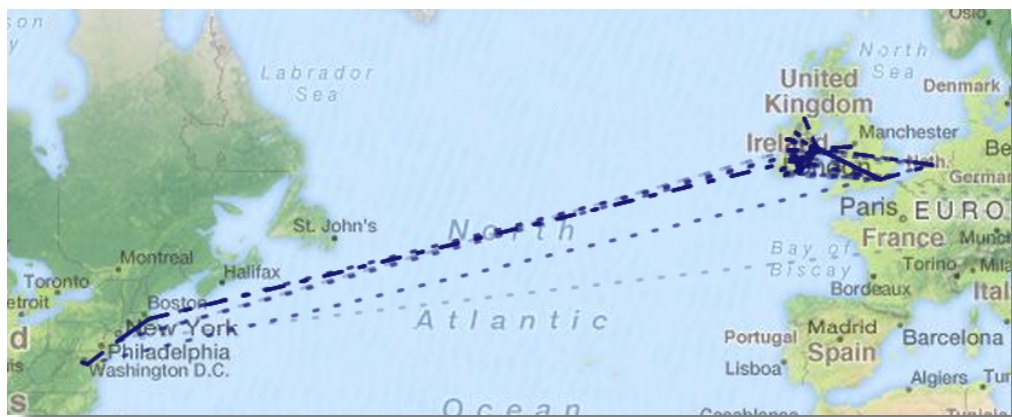


- Is Internet traffic kept local?
- Arbitrary definition: local = within country
 - (Studies can be repeated with other arbitrary boundaries)
- RIPE Atlas can measure paths (traceroute) between probes in a given country
 - Do we see IXPs in these paths?
 - Do we see out-of-country paths?
 - Do they need to be fixed?

Methodology



- Mesh of traceroutes between “public” probes
 - Max. 2 probes per ASN. Example:
 - Full mesh France: $755 \times 754 = 569,270$ traceroutes
 - 1-2 probes/ASN France: $155 \times 154 = 23,870$ traceroutes (manageable)
- Geolocate IP hops: OpenIPMap



<https://marmot.ripe.net/openipmap/>

- Locate IXPs: Configurable

Limitations



- RIPE Atlas measures traffic paths, not traffic volume
 - Expectation: A lot of what we measure are paths that are not optimised
- RIPE Atlas vantage points are a biased sample of connectivity in a country
 - Expectation: Biased towards “clue core”
- Traceroute-limitations: ICMP rate-limiting, ICMP-blocking, doesn't see layer 2, etc.

Case Study: Sweden



- Paths with out-of-country IP addresses:
 - IPv4: 12%
 - IPv6: 21%

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

Case Study: Sweden



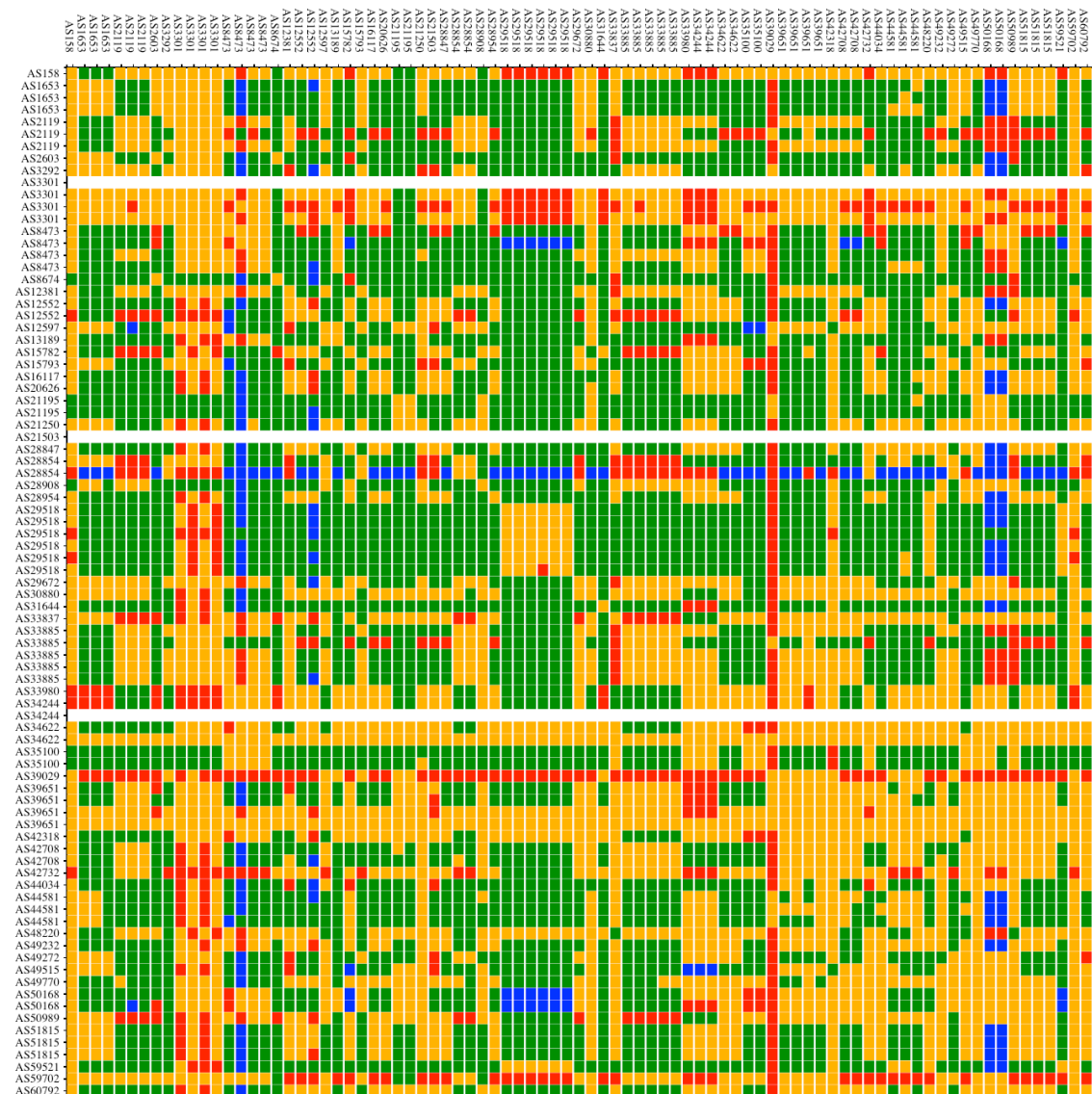
- Paths with out-of-country IP addresses:

- IPv4: 12%
- IPv6: 21%

Legend:
Green: IXP IPs: YES, out-of-country IPs: NO
Yellow: IXP IPs: NO, out-of-country IPs: NO
Blue: IXP IPs: YES, out-of-country IPs: YES
Red: IXP IPs: NO, out-of-country IPs: YES

Destination (by ASN)

Source (by ASN)



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

Case Study: Sweden



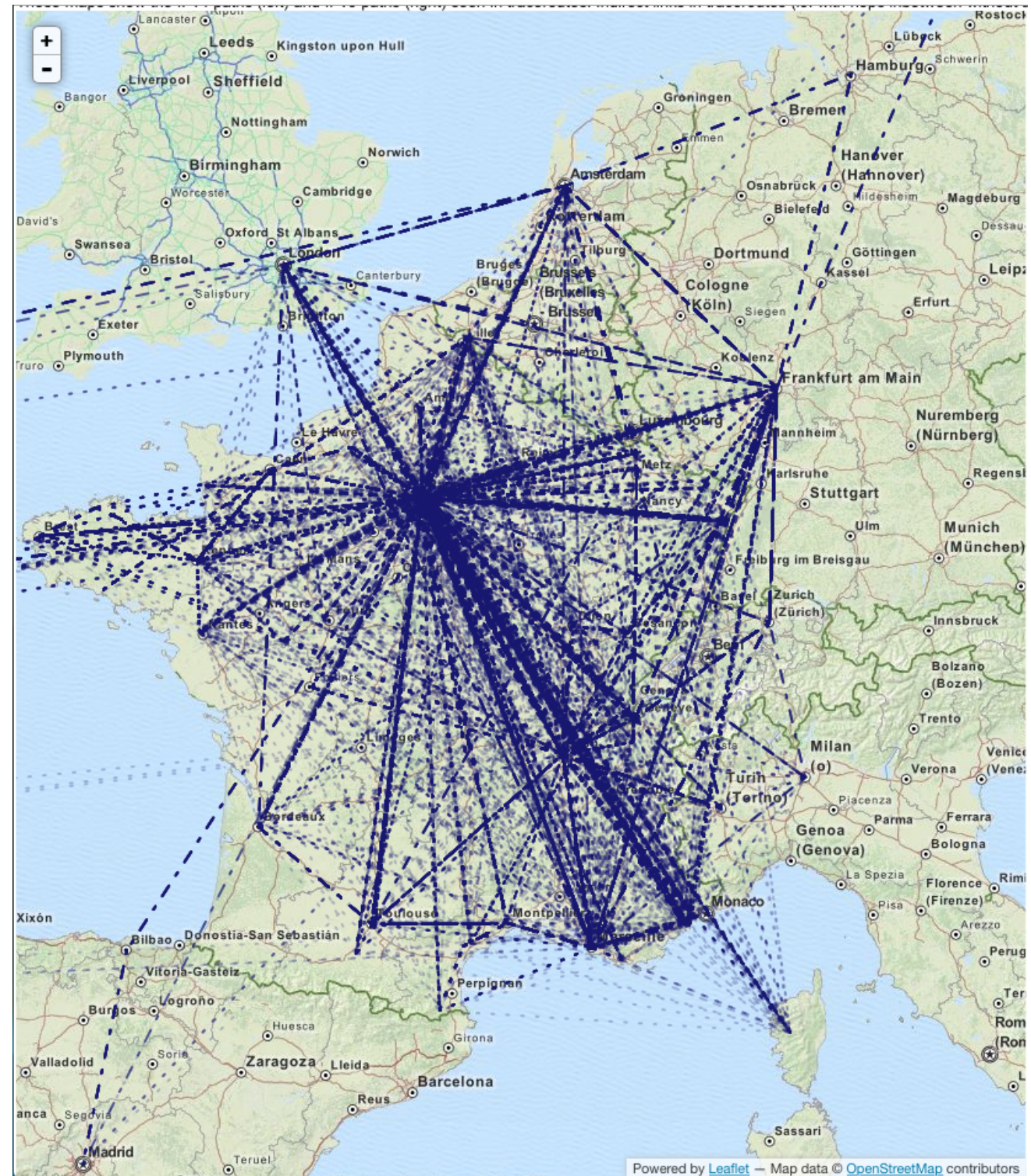
- What if “local” included Oslo and Copenhagen?
- “Keeping local traffic local” is not “keep all traffic within a country”



Case Study: France

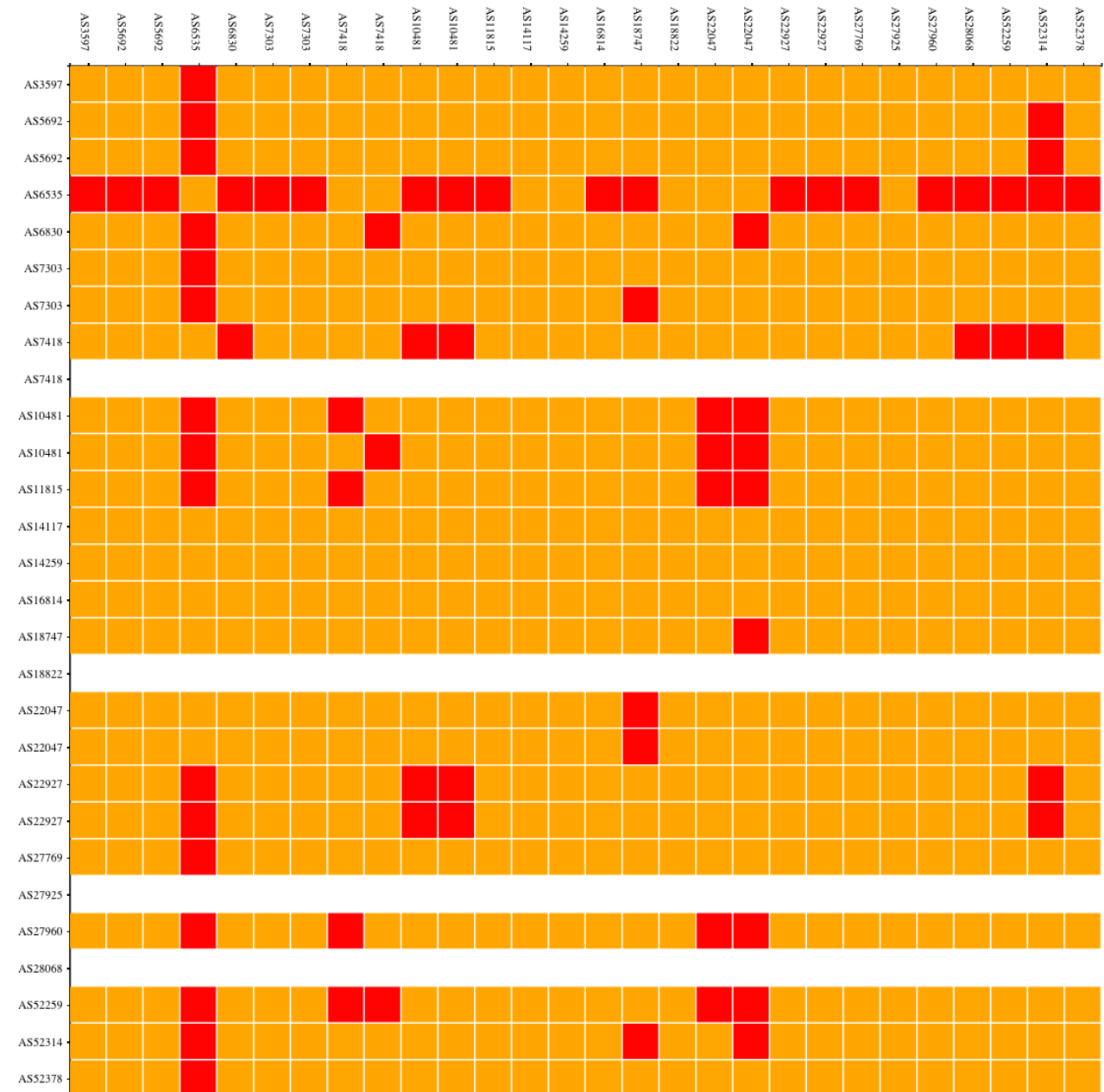
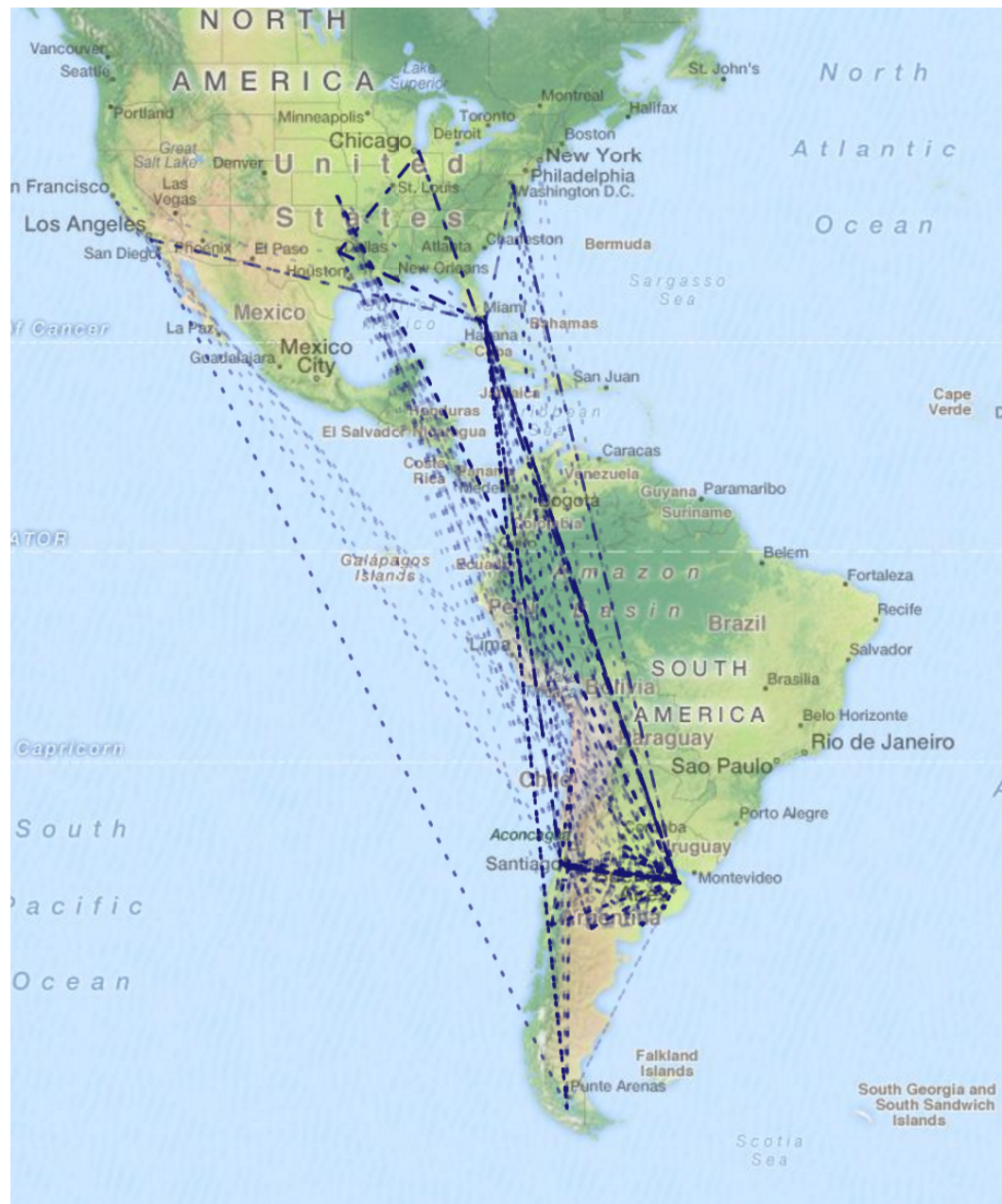


- “Spiderweb”
 - Due to probe selection
- Some nearby cities were FR-FR paths go:
 - London
 - Amsterdam
 - Frankfurt



<https://labs.ripe.net/Members/emileaben/looking-at-france-ix-with-ripe-atlas-and-ris>

Case Study: Argentina + Chile

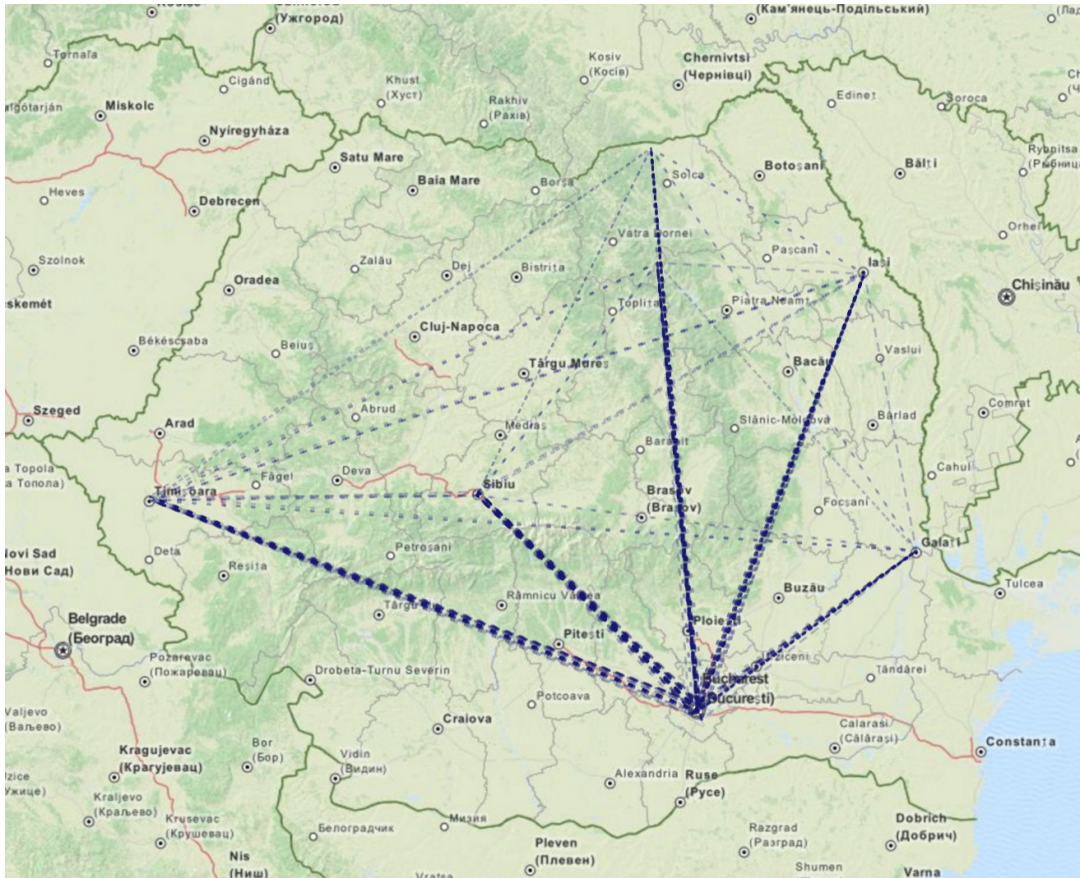


no out-of (CL, AR) IPs in path
 path contains out-of (CL, AR) IPs

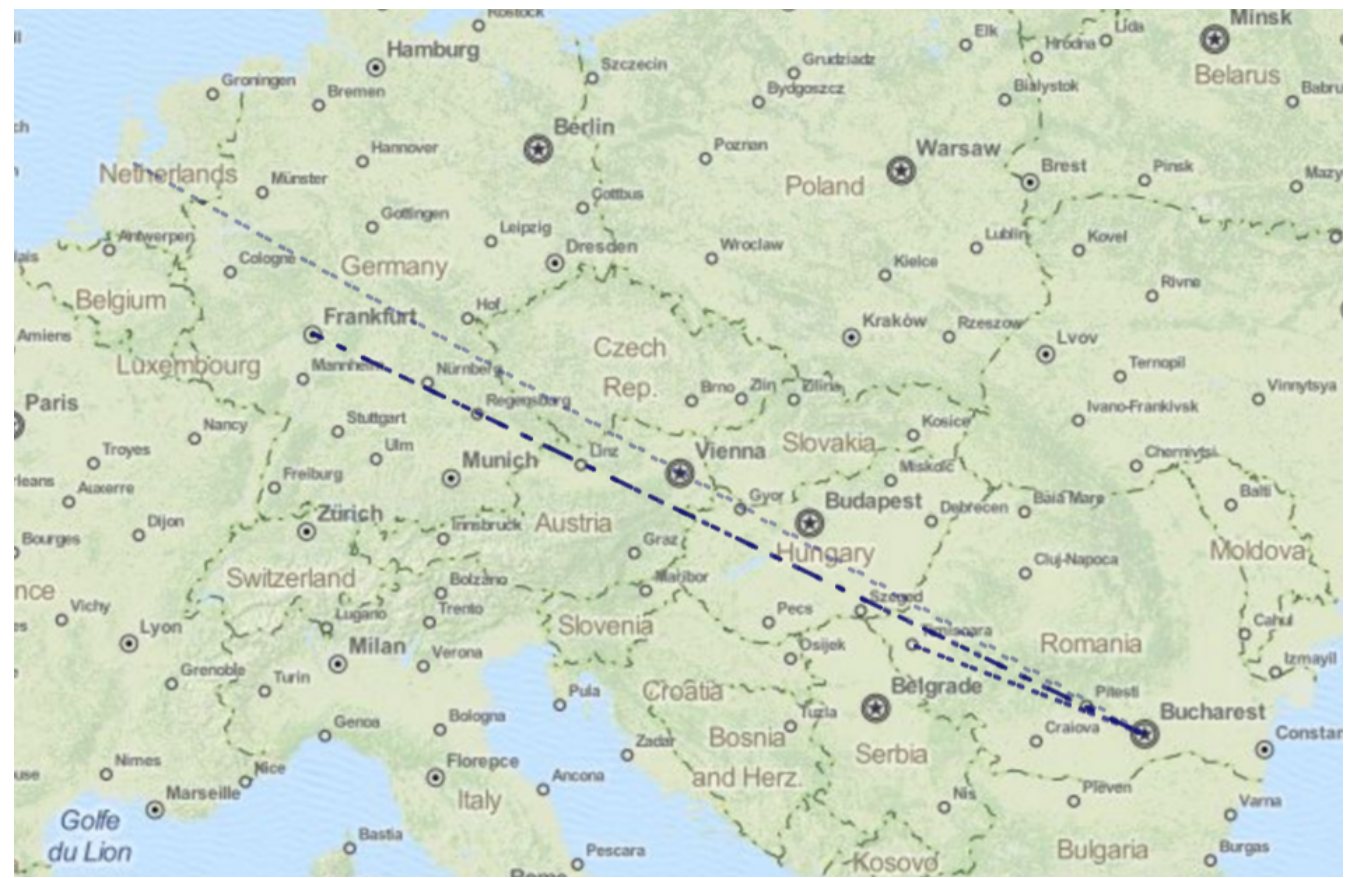
Case Study: Romania



<http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2015-11-01/RO/geopath/>



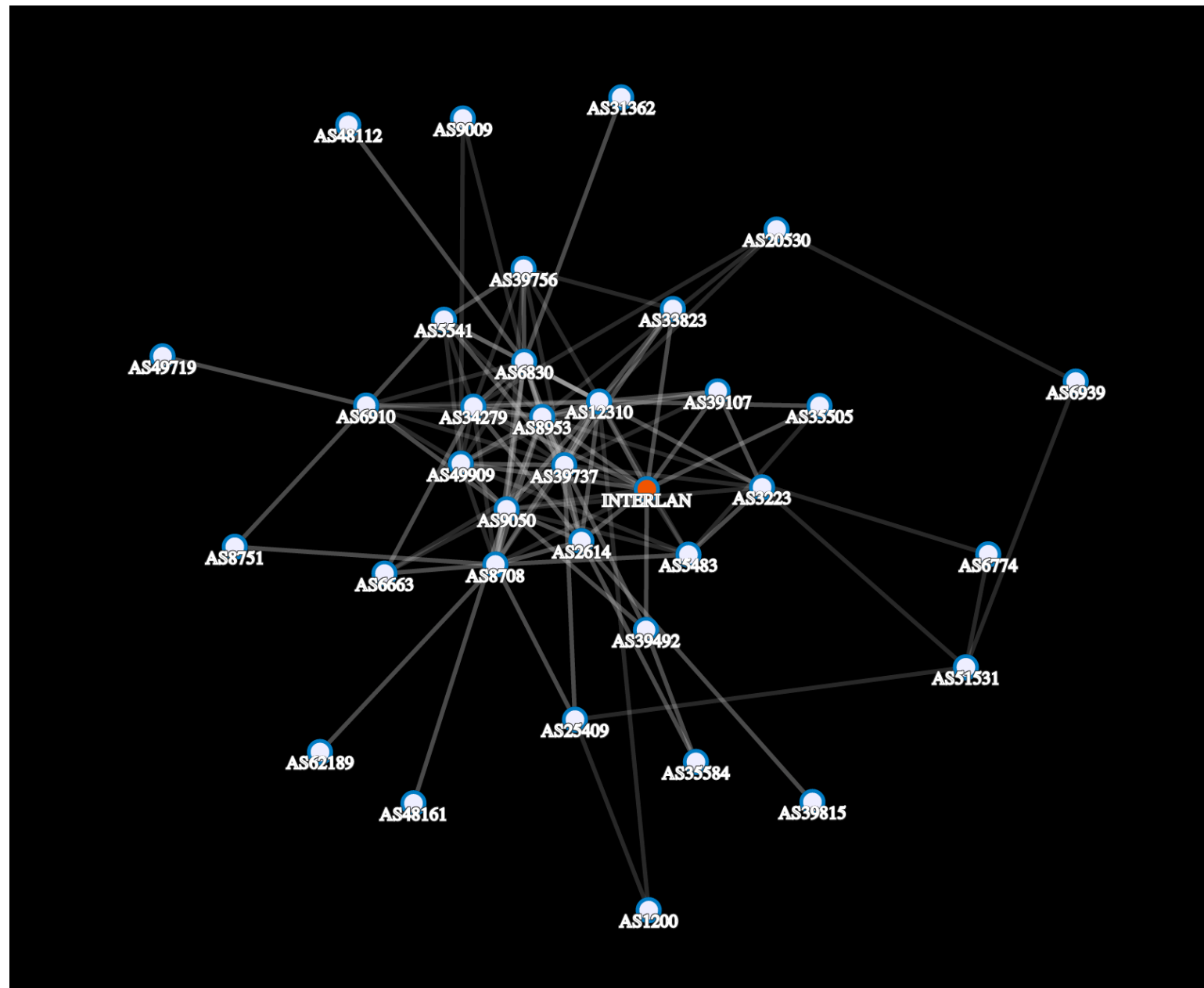
IPv4



IPv6

- IPv4 and IPv6 not congruent
 - What if a popular app/site is suddenly IPv6 enabled?

Case Study: Romania



<http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2015-11-01/RO/asgraph/>

How: IXP-Country-Jedi



- Collection of scripts that prepare, measure and analyse RIPE Atlas mesh-traceroutes
- Simplest config.json:

```
{ "country": "RO" }
```
- <https://github.com/emileaben/ixp-country-jedi/>



Monthly IXP-Country-Jedi Runs



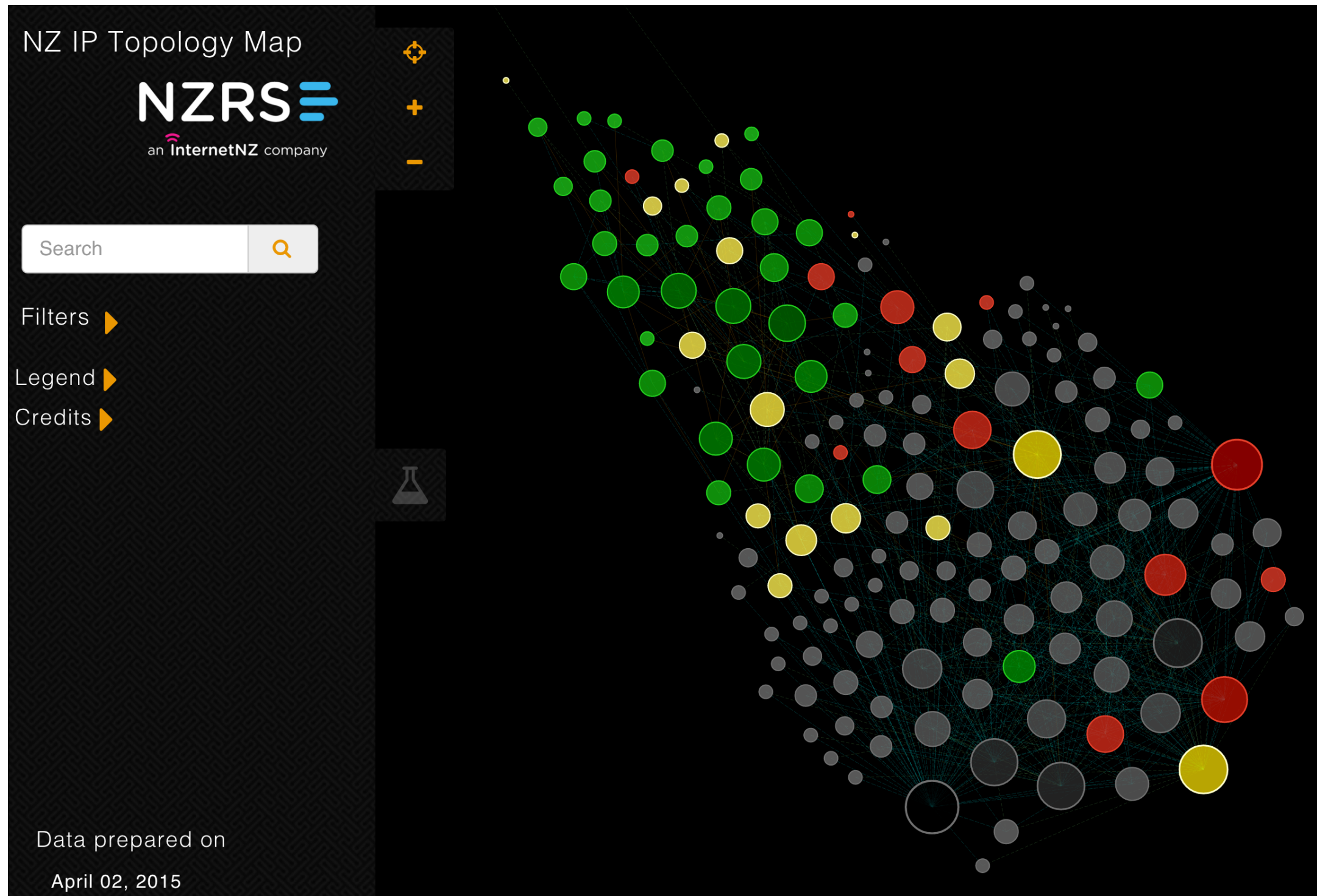
- Taking a monthly run for all countries with >3 ASNs covered

- Latest run: 105 countries

<http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2015-11-01/>

- IXPs automatically filled in from PeeringDB
 - Put your IXP in PeeringDB, and list your peering LANs

Related Work



<http://ip.topology.net.nz/>

Action Points



- Your network of interest not covered?
 - Apply for a probe:
 - <https://atlas.ripe.net/get-involved/become-a-host/>
 - Become a RIPE Atlas Ambassador:
 - <https://atlas.ripe.net/get-involved/become-a-ripe-atlas-ambassador/>



Action Points



- Network Operators
 - Explore, see if you can identify where you can improve
- IXP
 - Find network ops that you can bring together and peer locally
- Programmer
 - Check out the code that does all this, and improve it
 - <https://github.com/emileaben/ixp-country-jedi/>

Feature requests welcome



Questions



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Forcing Localisation?



Rafael Prince

@rafaelprince

+ Follow

.@vgcerf When you force localisation, you remove a great deal of resilience from the system: that's an engineer's point of view.
#IGF2015

RETWEETS

4

LIKES

5

the
information
society.org



6:45 AM - 13 Nov 2015

