IXP-Country-Jedi

Measuring Countries and IXPs with RIPE Atlas

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This Presentation's Goals

- Show what we can learn from RIPE Atlas around IXPs

- Raise awareness around prototype tools we're building

- Your contributions to this tooling

  - Feedback

  - Code

IXP Help Keeping Local Traffic Local

- Why?

  - Cost

  - Service quality: Happy users!

  - Security

- How?

  - Facilitate connecting locally

"Keep local traffic local"+RIPE Atlas

- Can we measure keeping local traffic local with RIPE Atlas?

  - Yes, and we are actually doing this!

  - Many challenges left that we are exploring

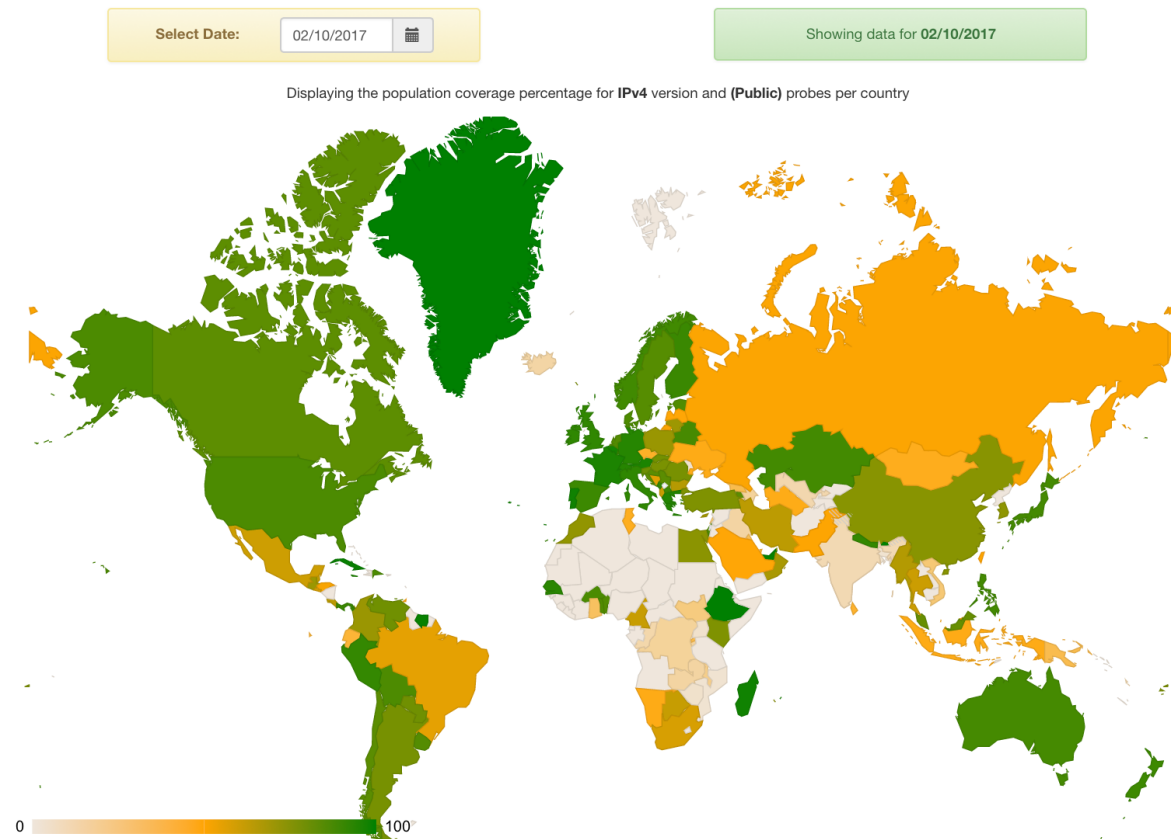### https://www.ripe.net/ixp-country-jedi

Measure a Country?

- IXP-Country-Jedi

  - Are the paths between ASes staying in the country?

  - What is the difference between IPv6 & IPv4?

  - How many paths go via a local IXP?

  - Which peer could you add to improve reachability?

- Experimental tool

  - Depends on probe distribution in a country

  - Feature requests welcome!

Probes Distribution Per Country

- Are probes in networks where the population is?

Select Date: 02/10/2017

Showing data for **02/10/2017**

Displaying the population coverage percentage for **IPv4** version and **(Public)** probes per country

0 ——————— 100

http://sg-pub.ripe.net/petros/population_coverage/

Example: India Probe Distribution

Search: [   ]

ASN	Name	Estimated Population % ▼	IPv4 Public Probes	IPv4 Private Probes	IPv4 Total Probes	IPv6 Public Probes	IPv6 Private Probes	IPv6 Total Probes	More
55836	RELIANCEJIO-IN	55.96	0	0	0	0	0	0	Apply for a probe
45609	BHARTI-MOBILITY-AS-AP	9.84	0	0	0	0	0	0	Apply for a probe
45271	ICLNET-AS-AP	6.45	0	0	0	0	0	0	Apply for a probe
38266	HUTCHVAS-AS	4.86	0	0	0	0	0	0	Apply for a probe
9829	BSNL-NIB	4.68	3	2	5	1	0	1	View
24560	AIRTELBROADBAND-AS-AP	2.26	4	2	6	0	0	0	View
18209	BEAMTELE-AS-AP	0.9	0	0	0	0	0	0	Apply for a probe
17488	HATHWAY-NET-AP	0.85	0	1	1	0	0	0	Apply for a probe
55441	TTSLMEIS-AS-AP	0.72	0	0	0	0	0	0	Apply for a probe
17803	BSES-AS-AP	0.68	0	0	0	0	0	0	Apply for a probe
55831	AIRCEL-IN	0.68	0	0	0	0	0	0	Apply for a probe
24309	CABLELITE-AS-AP	0.62	6	2	8	0	0	0	View

IXP Country Jedi

- Traceroute mesh between RIPE Atlas probes

  - Identify ASNs in the country

  - Identify IXPs & IXP LANs using <u>PeeringDB</u>

  - Mesh: from a set of probes in a country to each other

  - Max two probes per ASN

  - Only "public" probes with "good" geolocation

  - Hops geolocated using "OpenIPMap" database

- Visualised as map, matrix, graph

Benefits (1)

- Country: regulators, politicians, cyber-security

  - How many paths stay in the country? Where do they go?

- Operators

  - Routing and traffic optimisation

- IPv6 advocates
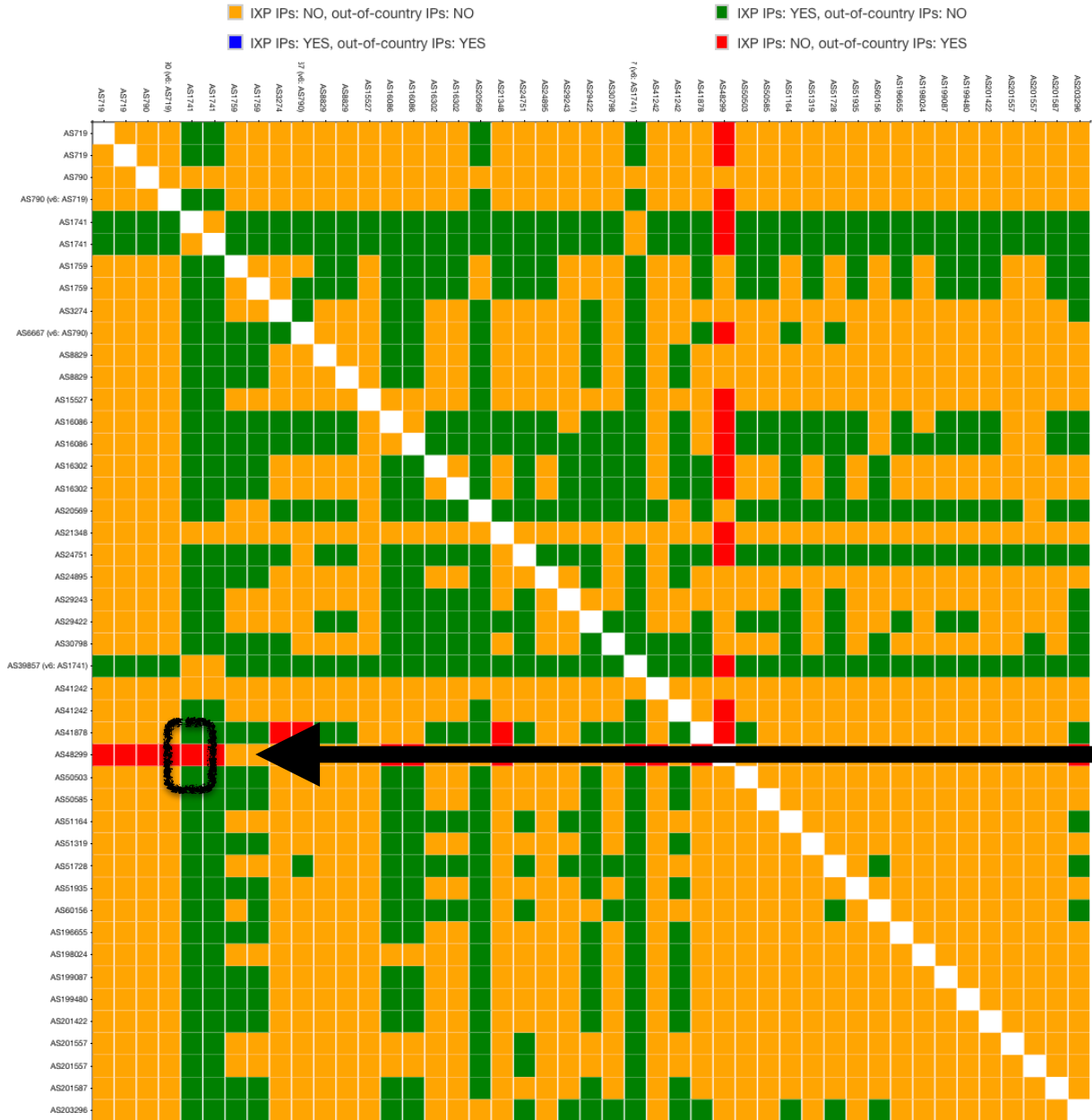
  - Comparing IPv4 and IPv6 paths

Benefits (2)

- IXP operators

  - Shows how IXPs help to keep traffic local and regional

- RIPE Atlas community

  - More probes in more networks and ASes = higher quality measurement data

- Geolocation data community

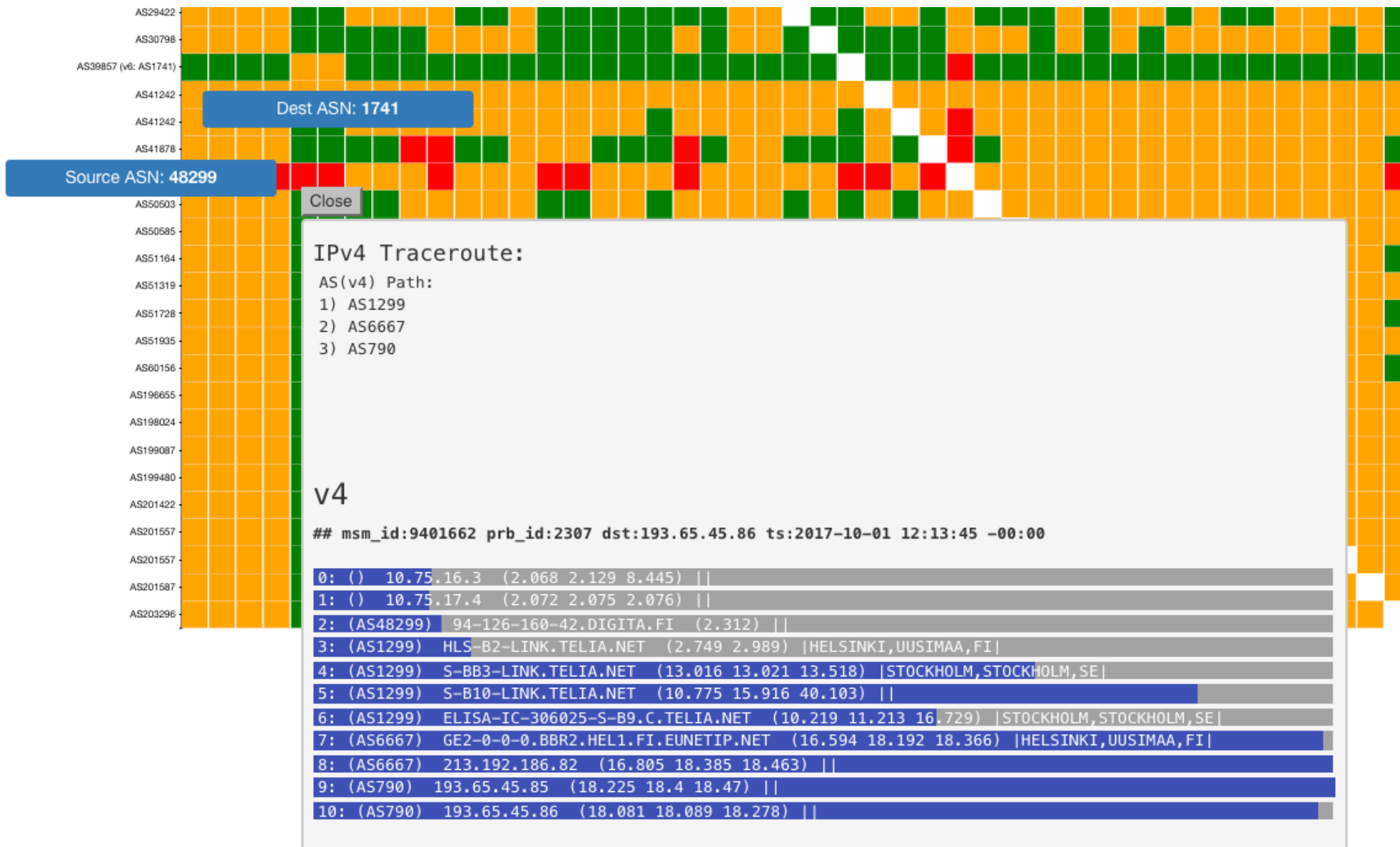 - Use case for improving the data quality

Example: Finland Matrix View

- row: source
- column: dest
- cell: path

interactive!

Example: Finland Matrix View

Example: French Geographical view

- Some FR-FR paths detour via DE,NL,CH, GB,ES,IT,BE,PT,US(!)

- Peering at a local IXP could have avoided that

Example: Brazil Graph View

Why do these paths look like that?

- Internet routing != vehicle routing

- BGP optimisation mostly based on high-cost (~high volume) traffic flows?

  - Network operators typically optimise the largest flow networks first (Google, Facebook, Amazon, Apple, Microsoft … [1])

  - Easy to forget low-volume, high-value (to users) traffic

  - Latency/locality is hardly accounted for in BGP

  - You'll have to peer with local players (at IXP and/or PNI)

[1] list from http://www.potaroo.net/ispcol/2017-03/gilding.html

Actions (1)

- Use this tool to find possible suboptimal routing

  - Find your ASN in the mesh, find the person from another ASN, have tea together :)

  - Should you start peering at a local IXP?

- To improve accuracy of this diagnostic tool

  - If your ASN is not on the graph, apply for a RIPE Atlas probe

  - If you move, remember to update your probe's geolocation

Actions (2)

- Re-use & re-write the code: it is free & open-source software

https://www.ripe.net/ixp-country-jedi

Questions

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Not a typo!

Features Not Covered

- Other geographical areas:

    - Multiple countries

    - Cities

- Groupings based on tags (hackerspaces-jedi)

Appendix 1: Challenges

- Correct probe geolocation (user provided)

- Results are per-probe, to what extend can we generalise to all of an ASes address space?

- Geolocation of IPs in traceroute path (OpenIPmap is crowd-sourced)

- IXP detection

- …