



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

Performance measurement with RIPE Atlas and RIS data An investigative Approach

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Research and Development
RIPE NCC

4 March 2020 | Géant Performance Workshop



RIPE Atlas

overview

Hardware Probes



V1



V2



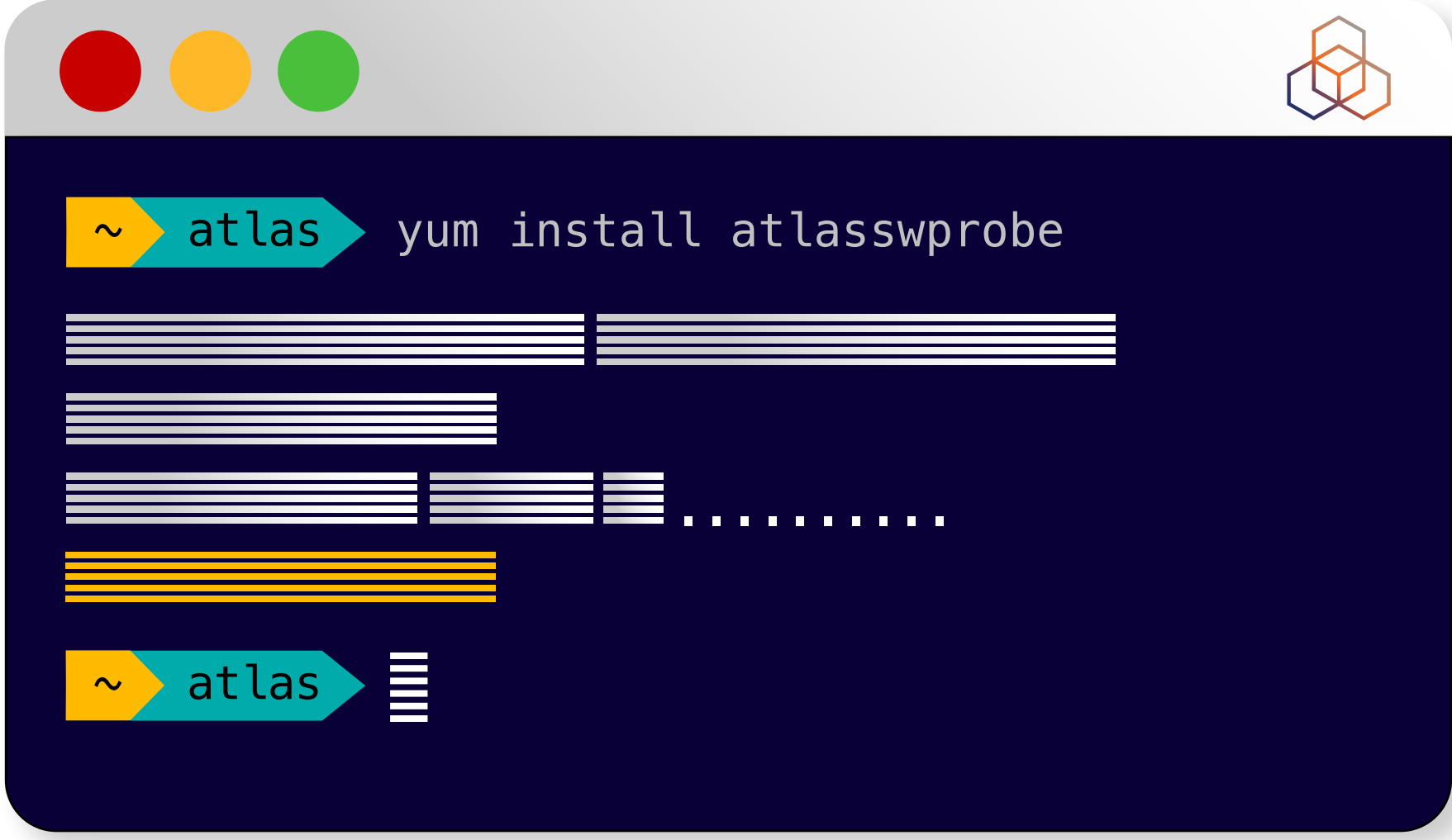
V3



V4

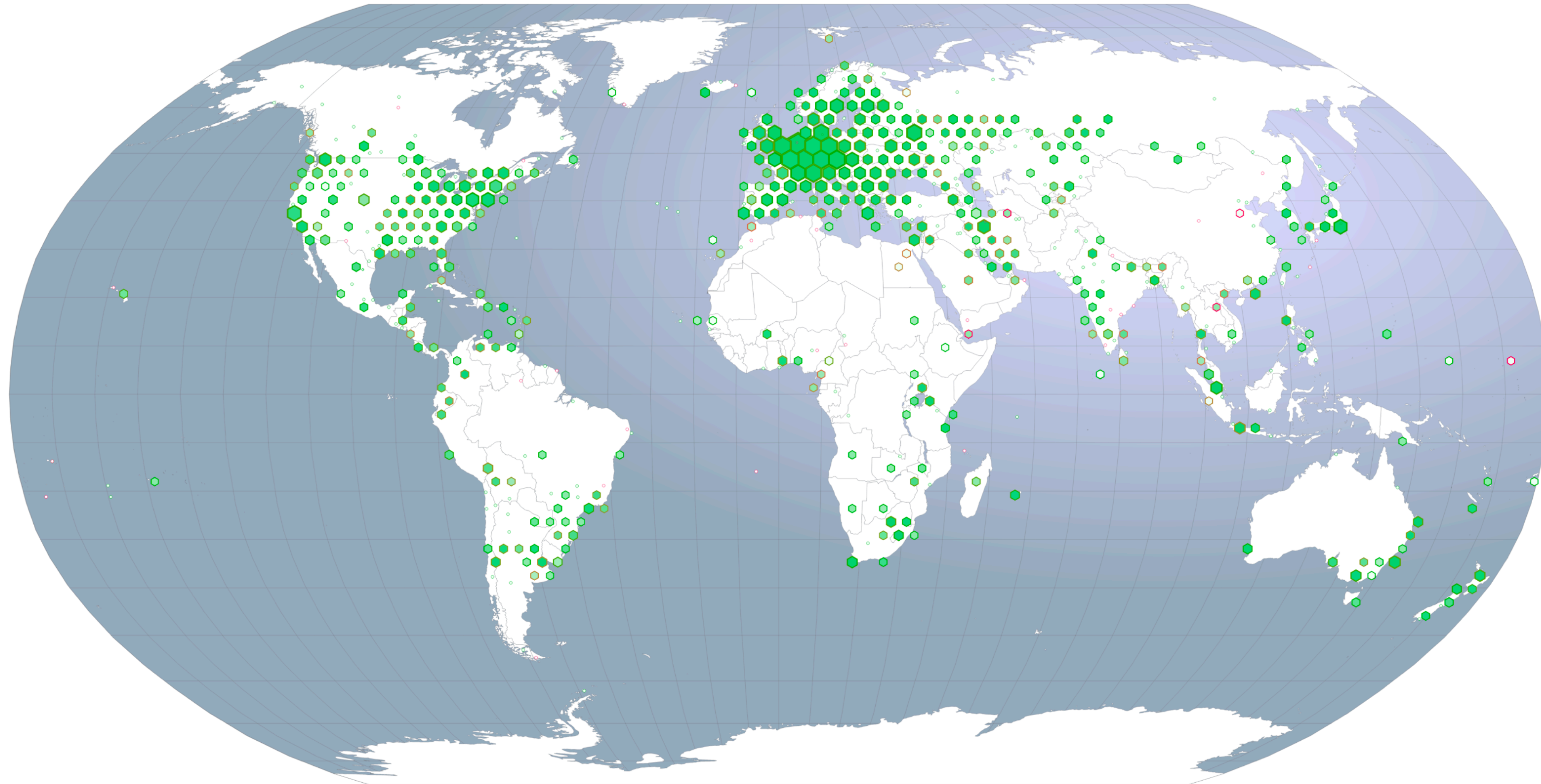


Software Probes & Virtual Anchors

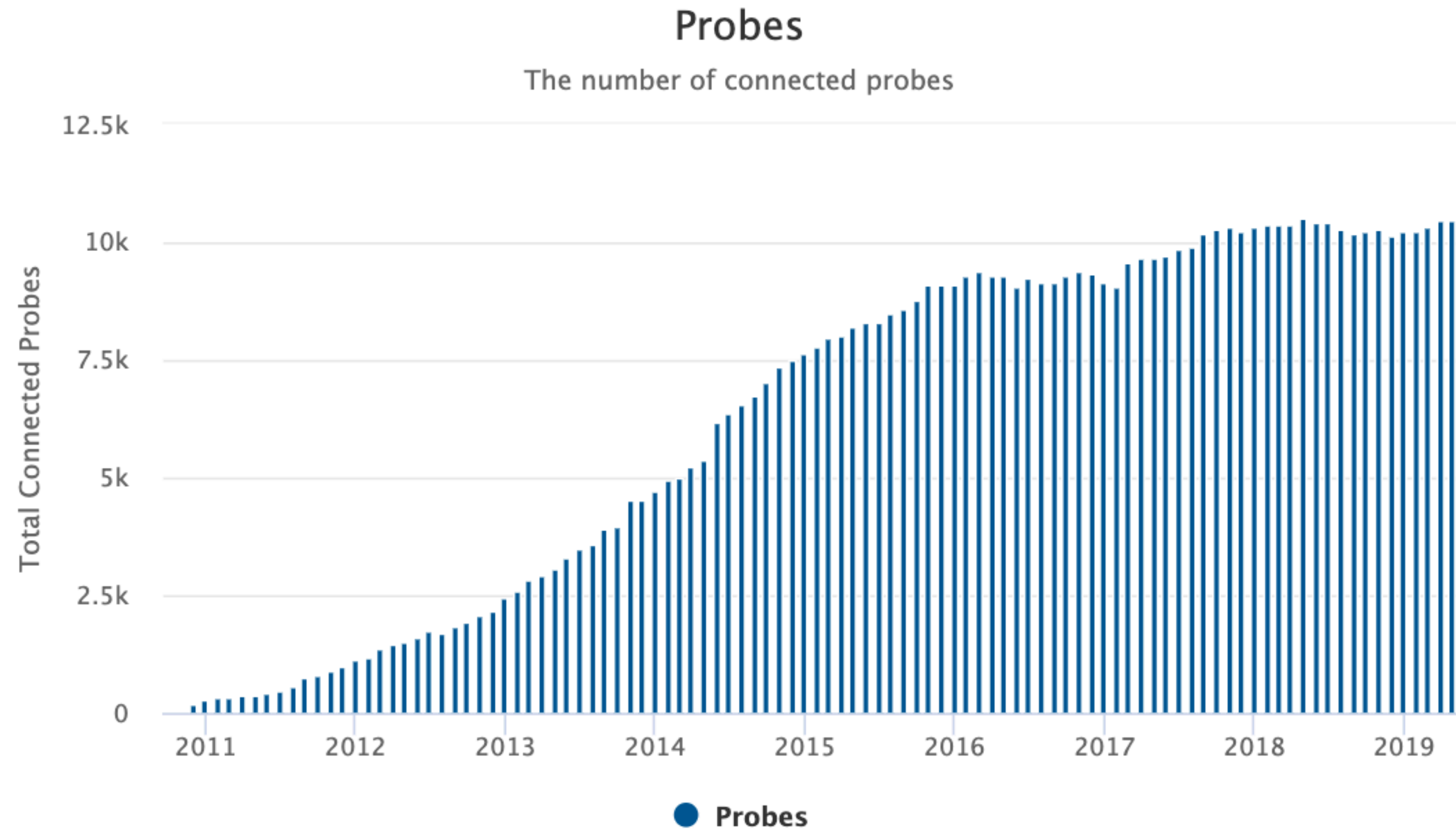


```
~ atlas yum install atlasswprobe  
.....  
~ atlas
```

Probes Distribution



Probes Distribution



currently 10,000+ connected probes at any given time

RIPE Atlas Interfaces



web

The screenshot shows the 'Measurements' page on the RIPE Atlas website. The page header includes the RIPE NCC logo and navigation links. The main content area features a search bar and a table of measurements. The table has columns for ID, Type, Target, Description, Probes, Interval, Time (UTC), and Status. The table lists several measurements, including Traceroute, DNS, and Ping tests.

ID	Type	Target	Description	Probes	Interval	Time (UTC)	Status
22024235	Traceroute	silو.plainspace.com (AS60781)	Traceroute measurement to silو.plainspace.com	8	one-off	2019-06-17 12:19 2019-06-17 12:25	🟢
22024168	DNS	9.9.9.9 (AS19281)	DNS measurement to 9.9.9.9	110	one-off	2019-06-17 11:58 2019-06-17 12:05	🟢
22024103	Traceroute	1.1.1.1 (AS13335)	Traceroute quad1 test from drc+ug	6	one-off	2019-06-17 11:34 2019-06-17 11:40	🟢
22023396	Ping	93.175.147.1 (AS12654)	ROA invalid	5	one-off	2019-06-17 08:24 2019-06-17 08:30	🟢
22023393	Ping	93.175.146.1 (AS12654)	ROA valid	5	one-off	2019-06-17 08:23 2019-06-17 08:30	🟢
22019050	DNS	1.1.1.1 (AS13335)	DNS measurement to 1.1.1.1 recur african probes	254	600 s Never	2019-06-16 07:14	🟡
22002347	Ping	silو.plainspace.com (AS60781)	Ping measurement to silو.plainspace.com	1	one-off	2019-06-13 14:49 2019-06-13 14:55	🟢
21929001	Traceroute	as112.hivane.net (AS34019)	Traceroute measurement to	9	one-off	2019-06-08 09:10	🟢

The screenshot shows the 'Jasper Home' page on the RIPE Atlas website. The page header includes the RIPE NCC logo and navigation links. The main content area features a profile card for 'Jasper Home' with various tabs and a map. The profile card includes general information, connection and traffic data, and a map of the location.

Jasper Home

General Information

- Id: 27460
- MAC Address: C4:6E:1F:5B:E4:7E
- Architecture: tl-mr3020
- Host: jasper den Hertog
- Sponsor: RIPE Atlas
- Firmware Version: 4940 (1100)
- Router Type: None
- Bandwidth Limit: Not set
- DNS Entry: Off
- Shared Publicly: Yes

Connection & Traffic

Connected Time: 5 months, 4 weeks

System Tags: V3, IPv4 Capable, IPv6 Capable, IPv4 REC1918

RIPE Atlas Interfaces



command line interface

```
$ ripe-atlas measure ping --target example.com
$ ripe-atlas measure ping --packets 7 --size 42 --target example.com
$ ripe-atlas measure traceroute --target example.com
$ ripe-atlas measure traceroute --packets 2 --target example.com
$ ripe-atlas measure dns --query-argument example.com
$ ripe-atlas measure dns --use-probe-resolver --query-type AAAA --query-argument example.com
```


RIPE Atlas Interfaces



API (restful + streaming)

```
Terminal
jdenhertog ~ $ curl "https://atlas.ripe.net/api/v2/measurements/12016253/results?probe_ids=50426&start=2019-06-14T00:00" | jq .
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total     Spent    Left     Speed
100  500    0  500    0    0    330    0  --:--:--  0:00:01  --:--:--  330
[
  {
    "af": 4,
    "dst_addr": "1.1.1.1",
    "dst_port": "53",
    "from": "141.8.2.122",
    "fw": 4970,
    "group_id": 12016253,
    "lts": 65,
    "msm_id": 12016253,
    "msm_name": "Tdig",
    "prb_id": 50426,
    "proto": "UDP",
    "result": {
      "ANCOUNT": 1,
      "ARCOUNT": 1,
      "ID": 51022,
      "NSCOUNT": 0,
      "QDCOUNT": 1,
      "abuf": "x06AgAABAAEAAAABAmIkBnNlcnZlcgAAEAADwAwAEAADAAAAAAAAEA01YUAAAKQWsAAAAAAAA",
      "answers": [
        {
          "NAME": "id.server",
          "RDATA": [
            "MXP"
          ],
          "TYPE": "TXT"
        }
      ]
    },
    "rt": 34.02,
    "size": 54
  },
  "src_addr": "192.168.2.117",
  "stored_timestamp": 1560599501,
```

RIPE Atlas Measurements



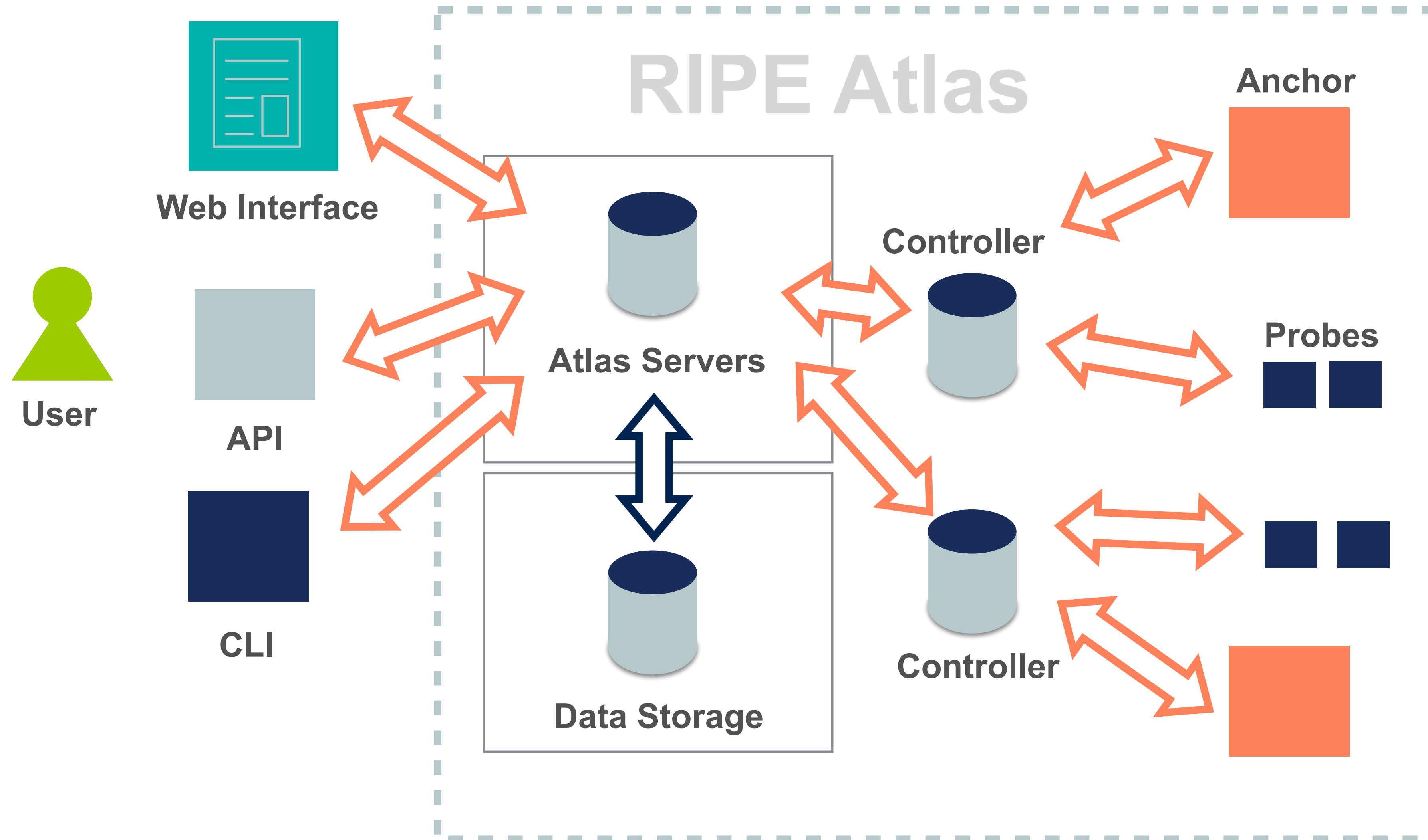
Measurements currently running

	Built-in	User-defined			
		Total UDM	Anchoring	DNSMON	Other
Ping	41	6953	1924	0	5029
Traceroute	45	6721	1926	875	3920
DNS	158	6033	1	3500	2532
SSL/TLS Certificate	4	374	0	0	374
NTP	0	140	0	0	140
HTTP	4	1982	1925	0	57
WiFi	0	14	0	0	14

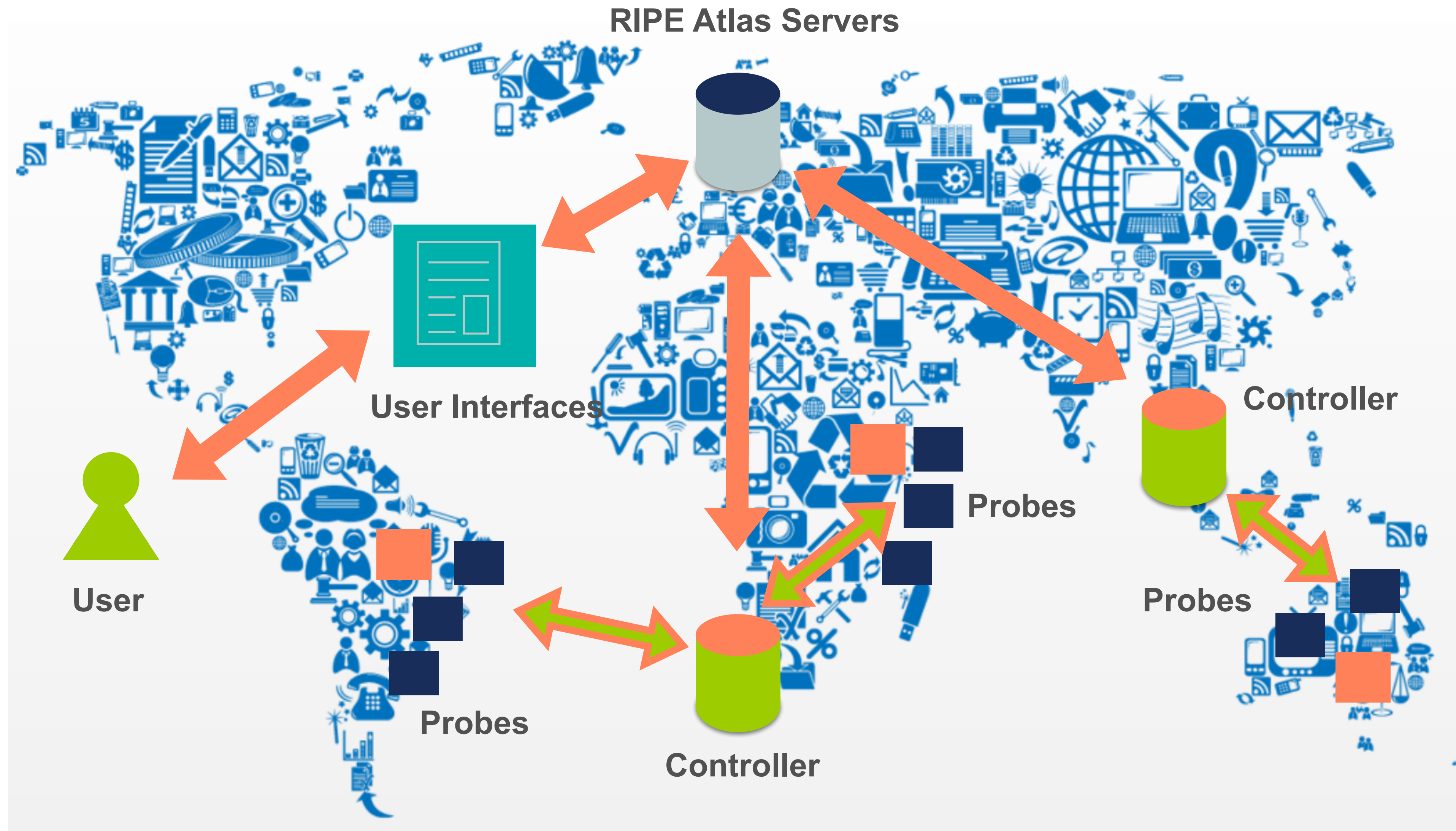


Infra Structure

RIPE Atlas Overview



RIPE Atlas Use Case





What kind of performance can Atlas
measure?



Latency

Ping Latency



Measurement #22019050 - RIP X

https://atlas.ripe.net/measu

Jasper den Hertog

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE Database (Whois) Website

Search IP Address or ASN

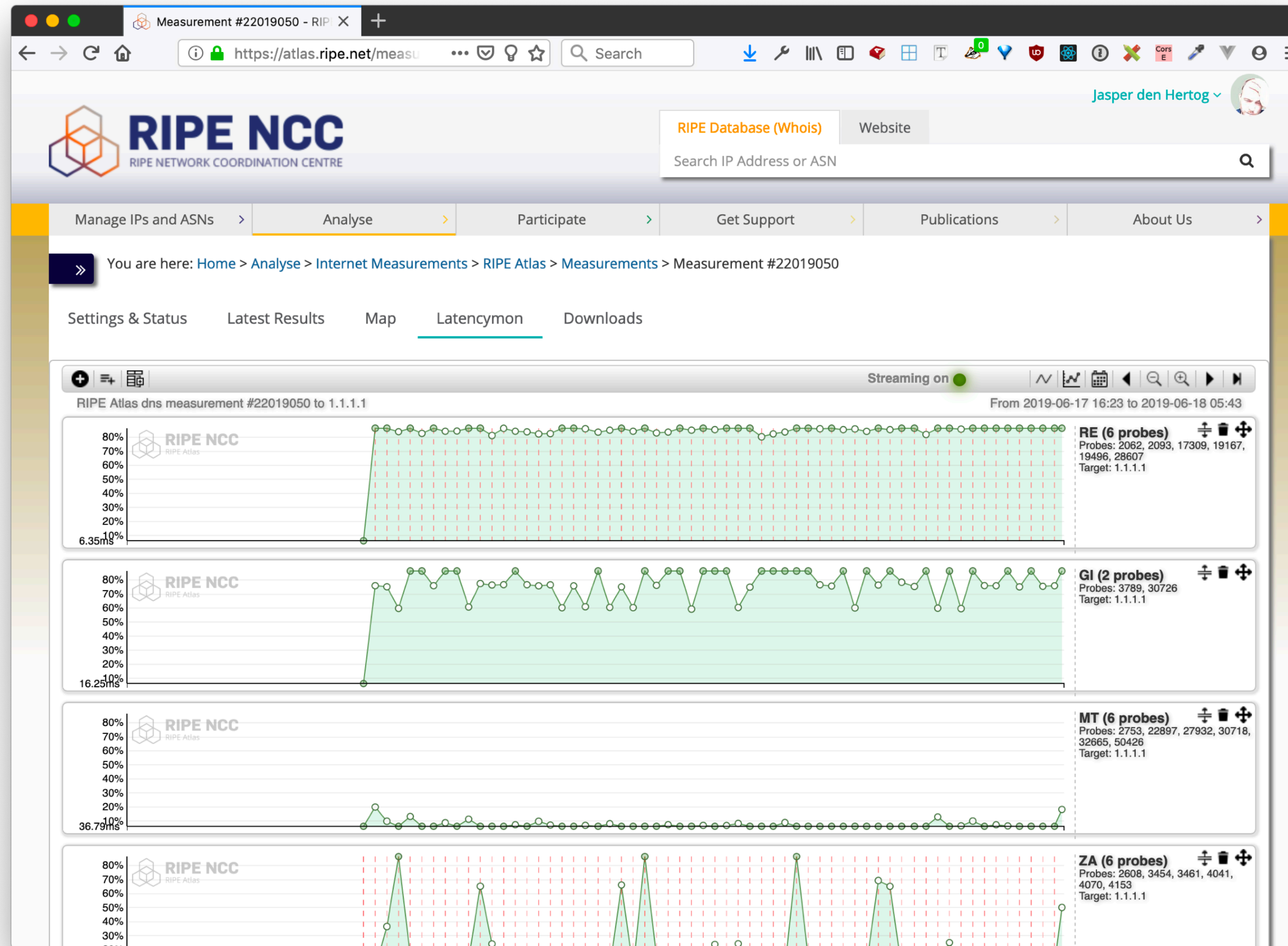
Manage IPs and ASNs > Analyse > Participate > Get Support > Publications > About Us >

You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements > Measurement #22019050

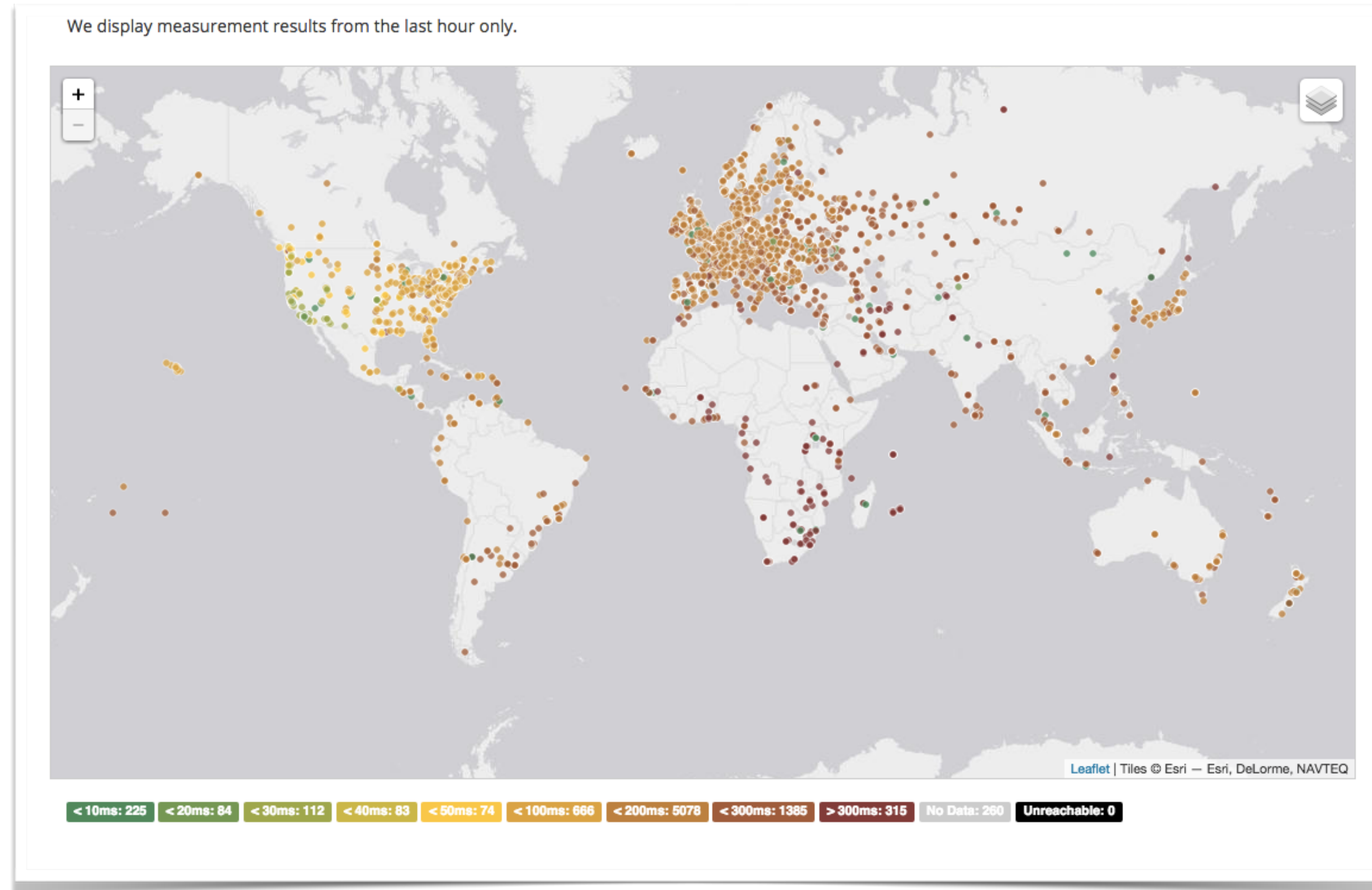
Settings & Status Latest Results Map Latencymon Downloads Time Travel

Probe	ASN (IPv4)	ASN (IPv6)		Time (UTC)	Answer	Response Time
35067	36903		🇺🇸 🌐	2019-06-18 03:30	SERVFAIL	1937.569
34131	64294		🇩🇪 🌐	2019-06-18 03:30	SERVFAIL	650.472
30133	1273		🇬🇧 🌐	2019-06-17 05:49	SERVFAIL	593.573
6380	30997		🇮🇳 🌐	2019-06-18 03:31	SERVFAIL	264.727
19984	37054		🇮🇳 🌐	2019-06-18 03:32	SERVFAIL	209.476
19521	37054		🇮🇳 🌐	2019-06-18 03:33	SERVFAIL	205.599
15313	21042		🇮🇳 🌐	2019-06-18 03:38	NOERROR	188.451
14945	3491		🇮🇳 🌐	2019-06-18 03:30	SERVFAIL	181.967
14960	36996		🇮🇳 🌐	2019-06-18 03:37	SERVFAIL	173.37
51664	37204		🇮🇳 🌐	2019-06-18 03:37	SERVFAIL	172.047
22431	41095		🇮🇳 🌐	2019-06-18 03:30	SERVFAIL	162.878
22588	327809		🇮🇳 🌐	2019-06-18 03:32	SERVFAIL	159.43
21634	37090	6939	🇮🇳 🌐	2019-06-17 23:32	SERVFAIL	157.09
19574	31960		🇮🇳 🌐	2019-06-18 03:40	SERVFAIL	151.095
14958	36902		🇮🇳 🌐	2019-06-18 03:33	SERVFAIL	150.444
14943	37406		🇮🇳 🌐	2019-06-18 03:32	SERVFAIL	143.843
13114	36914		🇮🇳 🌐	2019-06-18 03:38	SERVFAIL	142.636

LatencyMON



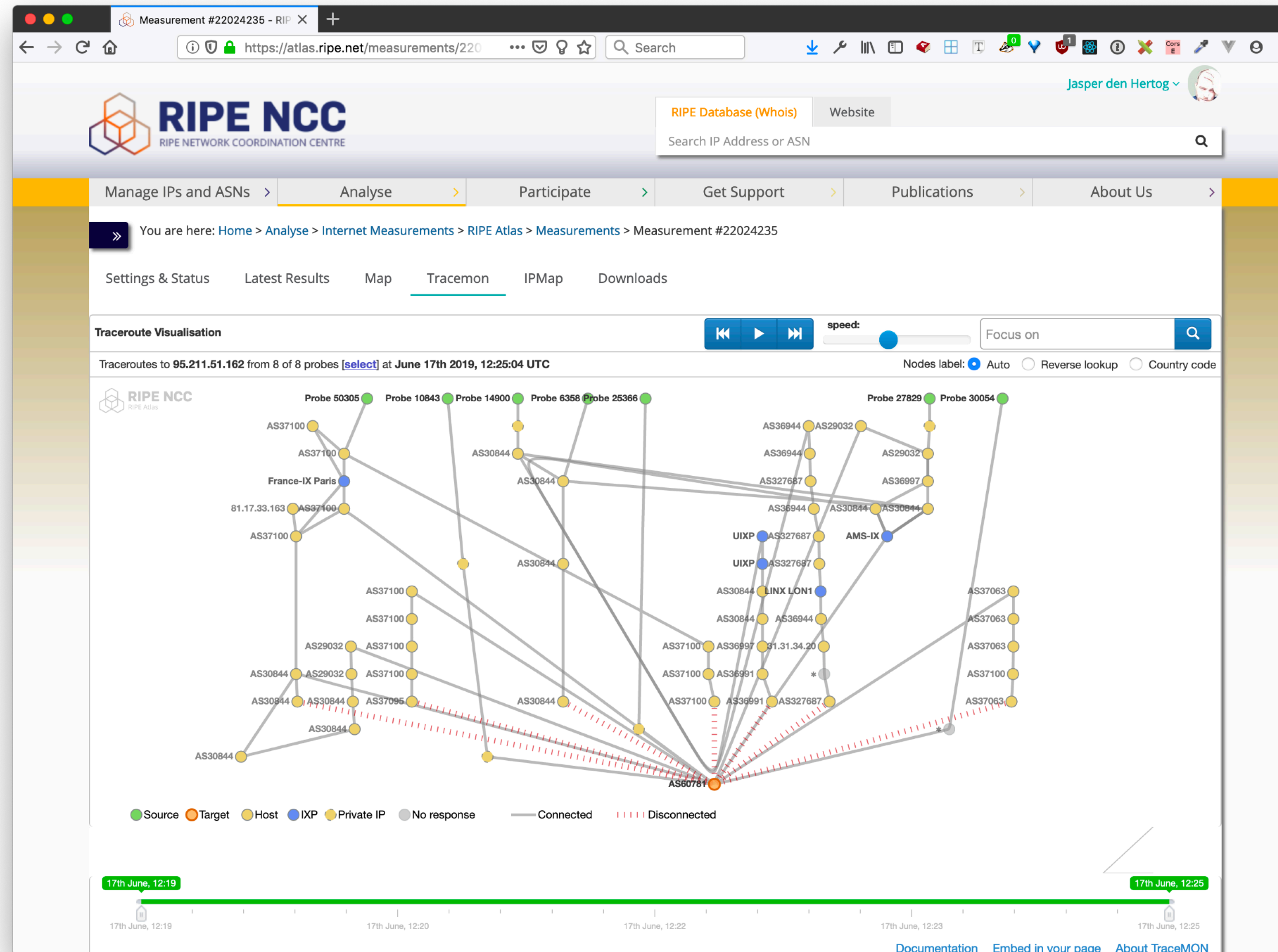
Where is B-root?





Path Efficiency

TraceMON





openipmap frnog30 example - x

Secure | <https://atlas.ripe.net/measurements/11680405/#openipmap>

Apps pb kb4 Kibana OneTab pulpo Bitbucket Marvin Rnd Issues debugaccess tosvg hb SVG Crowbar

General Information Probes Map LatencyMON TraceMON **Openipmap (beta)** Results

TRACEROUTES MEASUREMENT 11680405

ATLAS RESULT 2001:41d0:fe3f:7300:eade:27ff:fec9:71f8 → AS16276 A...

SUMMARY

AS16276	24057 (2001:41d0:fe3f:7300:eade:27ff:fec9:71f8)	Lammersart, FR-32
	1ms (2001:41d0:fe3f:7300:3291:8fff::1)	ADD A LOCATION
	34ms (2001:41d0::1040)	ADD A LOCATION
	33ms (2001:41d0:0:5:3::8)	ADD A LOCATION
AS16276	34ms (2001:41d0::41a)	ADD A LOCATION
	34ms (2001:41d0::1a2)	ADD A LOCATION
	35ms (2001:41d0::144)	ADD A LOCATION
AS16276	37ms as8218.fr.eu	Saint-Denis, FR-11
	43ms (2001:1b48:2:3::b2)	Lyon, FR-84
	48ms (2001:1b48:2:3::b6)	Marseille, FR-93
AS8218	50ms (2001:1b48:2:3::42:1)	Marseille, FR-93
	50ms (2001:1b48:2:3::2:2)	Marseille, FR-93
AS unknown	74ms (2001:1b48:2:3::17:2)	Toulouse, FR-76
	(2001:1b48:2:3::17:2)	Toulouse, FR-76

REMOVE FROM MAP

ATLAS RESULT 2a01:e35:8ba5:9600:220:4aff:fee0:20ea → AS12322 A...

ATLAS RESULT 2a01:66c0::fa1a:67ff:fe4d:753a → AS58308 AS82...

ATLAS RESULT 2a01:cb04:712:e000:6666:b3ff:fed1:2e50 → AS3215 AS5511...

ATLAS RESULT 2001:470:b49e:12:6666:b3ff:fed1:3150 → AS6939 AS...

Available visualisations: DNS



- Map, colour-coded response time or



- List of probes, sortable by response time

DNS measurement to ns1.opteamax.de						
General Information	Probes	Map	Download Results	Modification Log		
Probe	ASN (v4)	ASN (v6)		Time	Name	Response Time
17840	6327		🇨🇦	2015-05-19 09:38	null	362.009
18035	43030		🇮🇳	2015-05-19 09:50	null	347.39
18129	327805		🇮🇳	2015-05-19 09:49	null	207.743
15844	32098		🇮🇳	2015-05-19 09:48	null	184.237
17857	852		🇨🇦	2015-05-19 09:37	null	177.694
19894	6327		🇨🇦	2015-05-19 09:36	null	168.689
19204	21513		🇨🇦	2015-05-19 09:50	null	141.199
15922	30036		🇺🇸	2015-05-19 09:47	null	133.309



Combine with other Tools



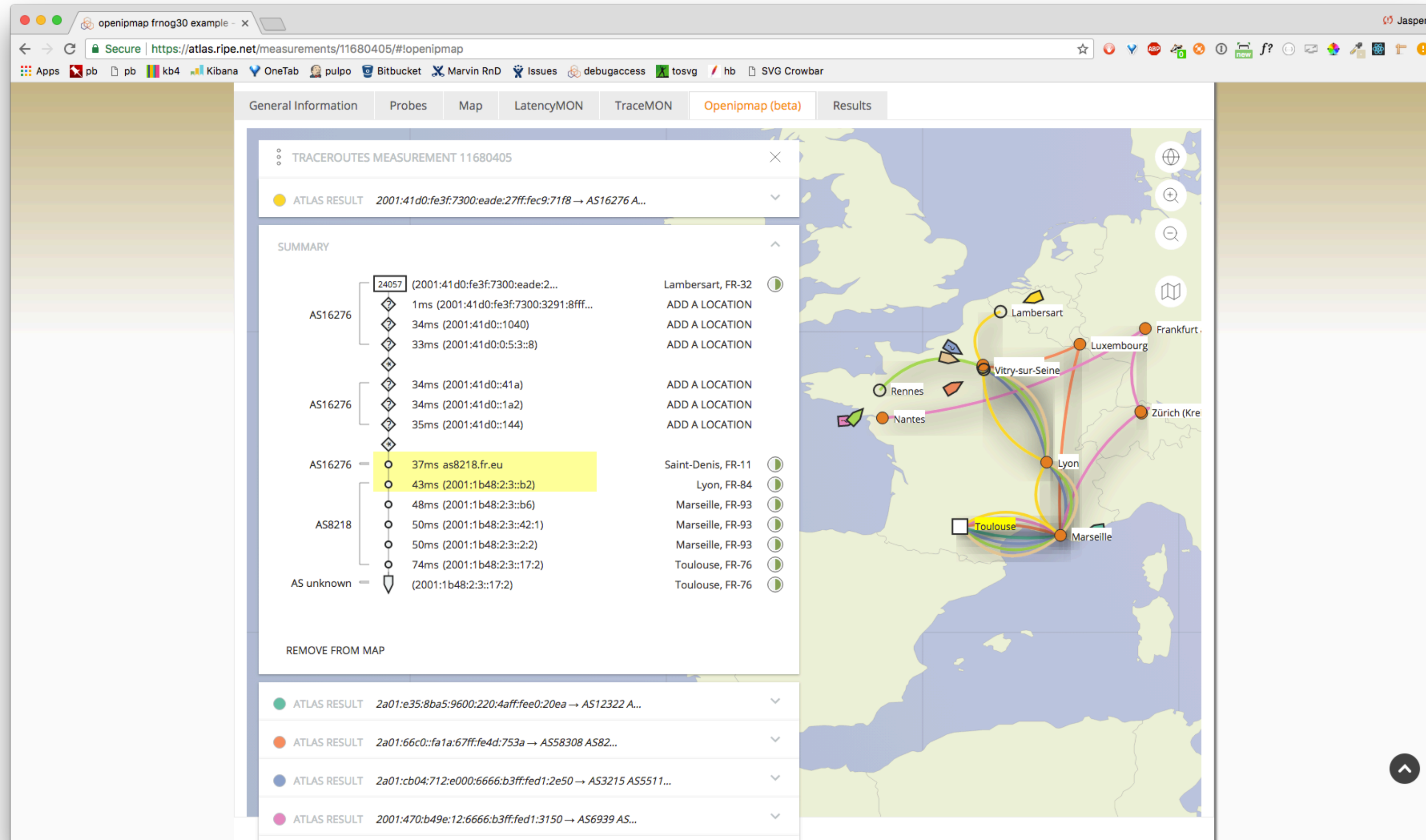
RIPE IPmap

Geo-location internet core
infra-structure

RIPE IPmap



<https://atlas.ripe.net/measurements/11680405/#!openipmap>





RIS

Routing Information Service

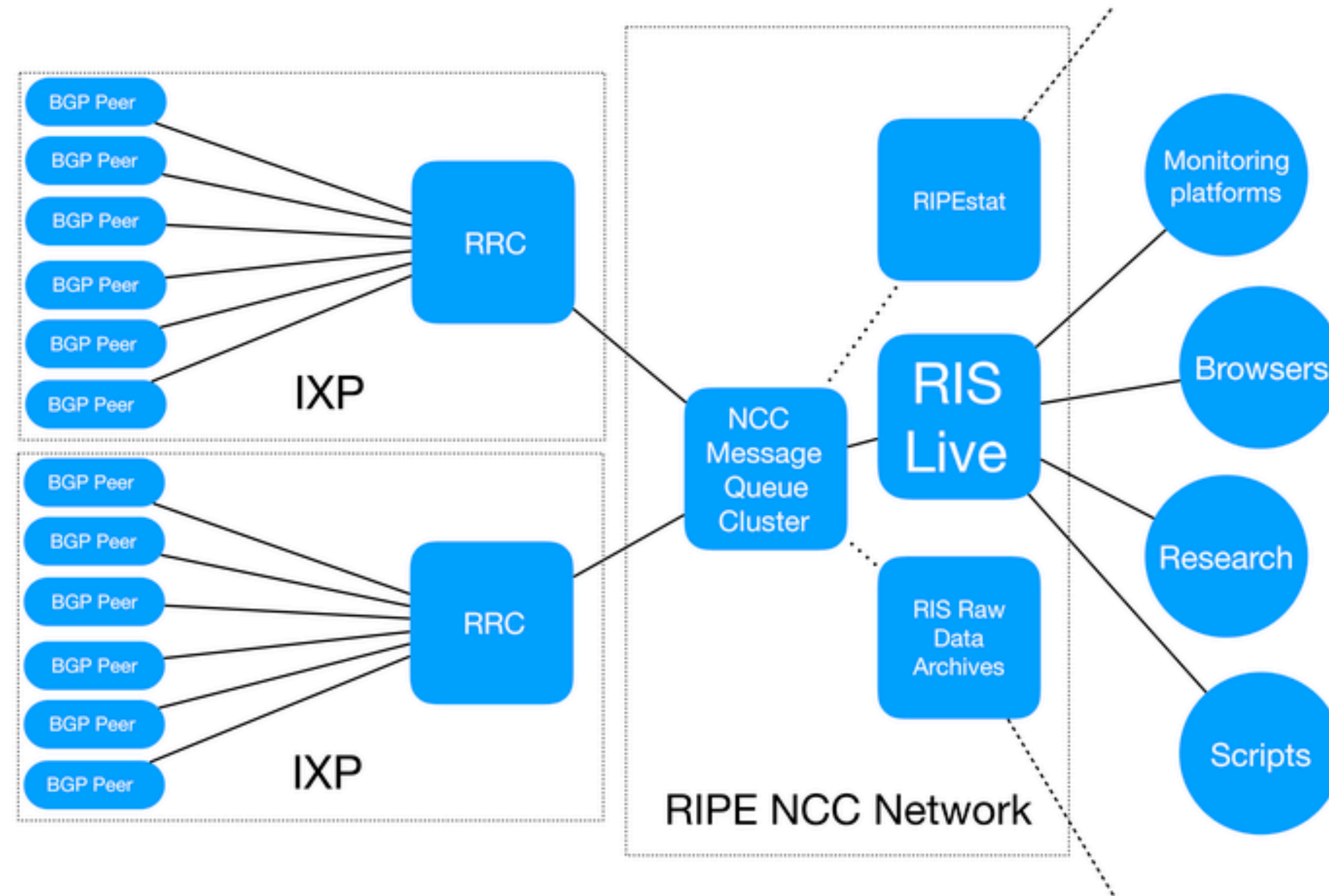
Routing Information Service (RIS)



- AS12654
- 24 RRCs in various IXPs
- ~230 full table peers
- Open to peering, especially full table peers!
- Bucharest & Montevideo



RIS Live BGP Stream



RIS Live <https://ris-live.ripe.net>



- You can play with the demo below to get an idea of the data and filters that are provided.
- You can then look at the code examples and [the manual](#) to learn how to integrate RIS Live in your own tools.
- [Fill in the survey!](#)

Demo

Subscriptions to the stream are sent as a JSON object containing various filter parameters. You can adjust the parameters below and see the messages that are streamed on the right.

```
{
  "prefix": null,
  "path": 3356,
  "type": null,
  "require": null,
  "moreSpecific": true,
  "lessSpecific": false,
  "host": null (all),
  "peer": null,
  "socketOptions": {
    "includeRaw": false
  }
}
```

Code examples

Below are simple examples of using the RIS Live WebSocket interface. For a full guide, see the [RIS Live manual](#).

Live RIS BGP messages



Connected

2585 matching messages ~371 kbit/s ⓘ

```
// Received at 10:25:00 (1.18 second delay)
{
  "timestamp": 1558607099.5,
  "peer": "217.29.66.88",
  "peer_asn": "20811",
  "id": "217.29.66.88-1558607099.5-125125839",
  "host": "rrc10",
  "type": "UPDATE",
  "path": [20811, 3356, 3257, 9498, 132772, 137654],
  "origin": "igp",
  "announcements": [
    {
      "next_hop": "217.29.66.88",
      "prefixes": [
        "103.121.157.0/24"
      ]
    }
  ]
}
```

```
// Received at 10:25:00 (1.18 second delay)
{
  "timestamp": 1558607099.5
```

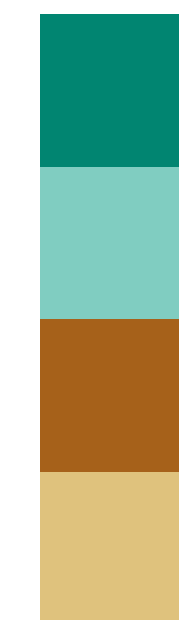
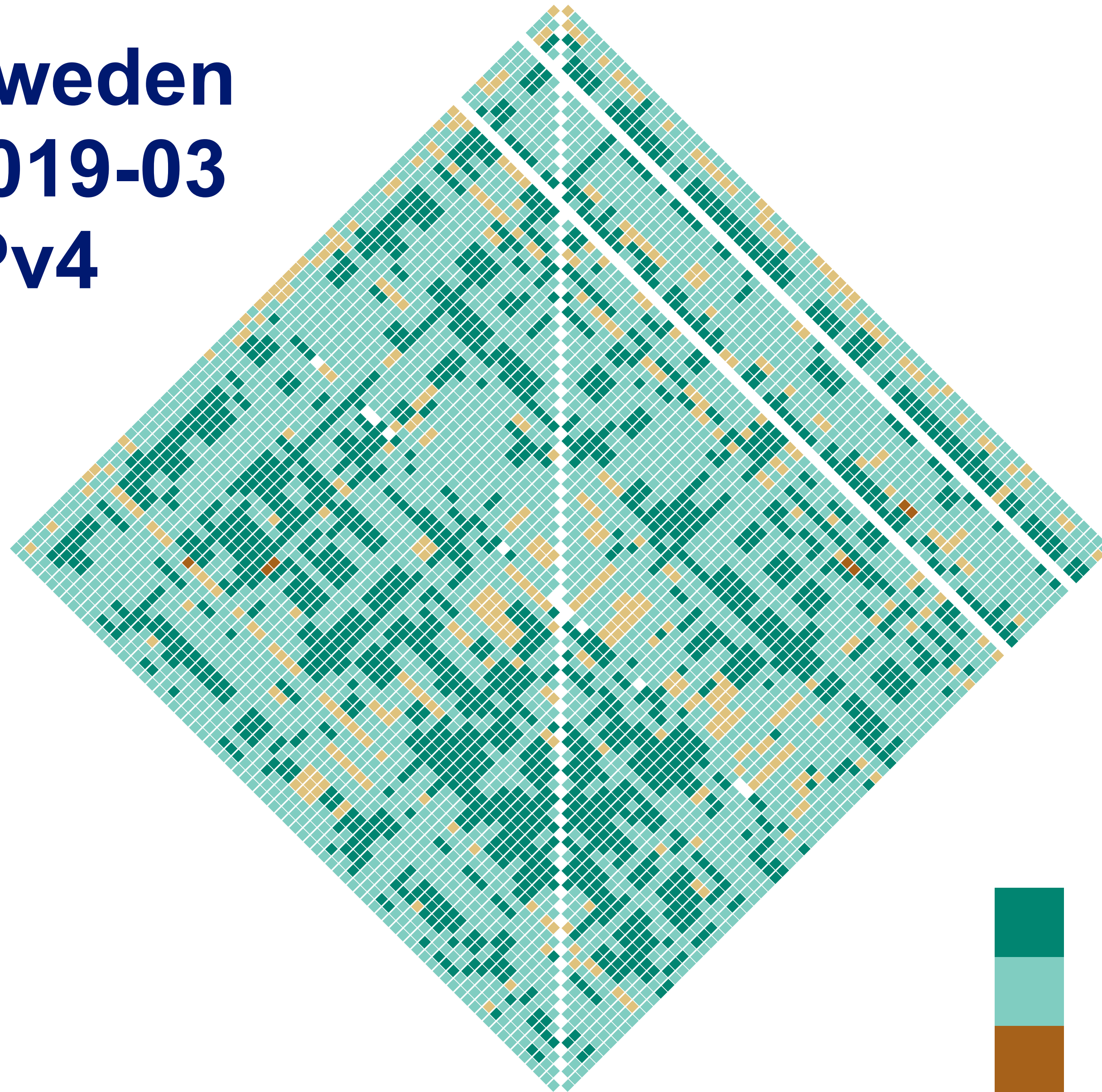


Some work that we do



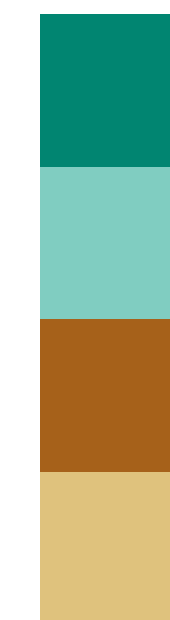
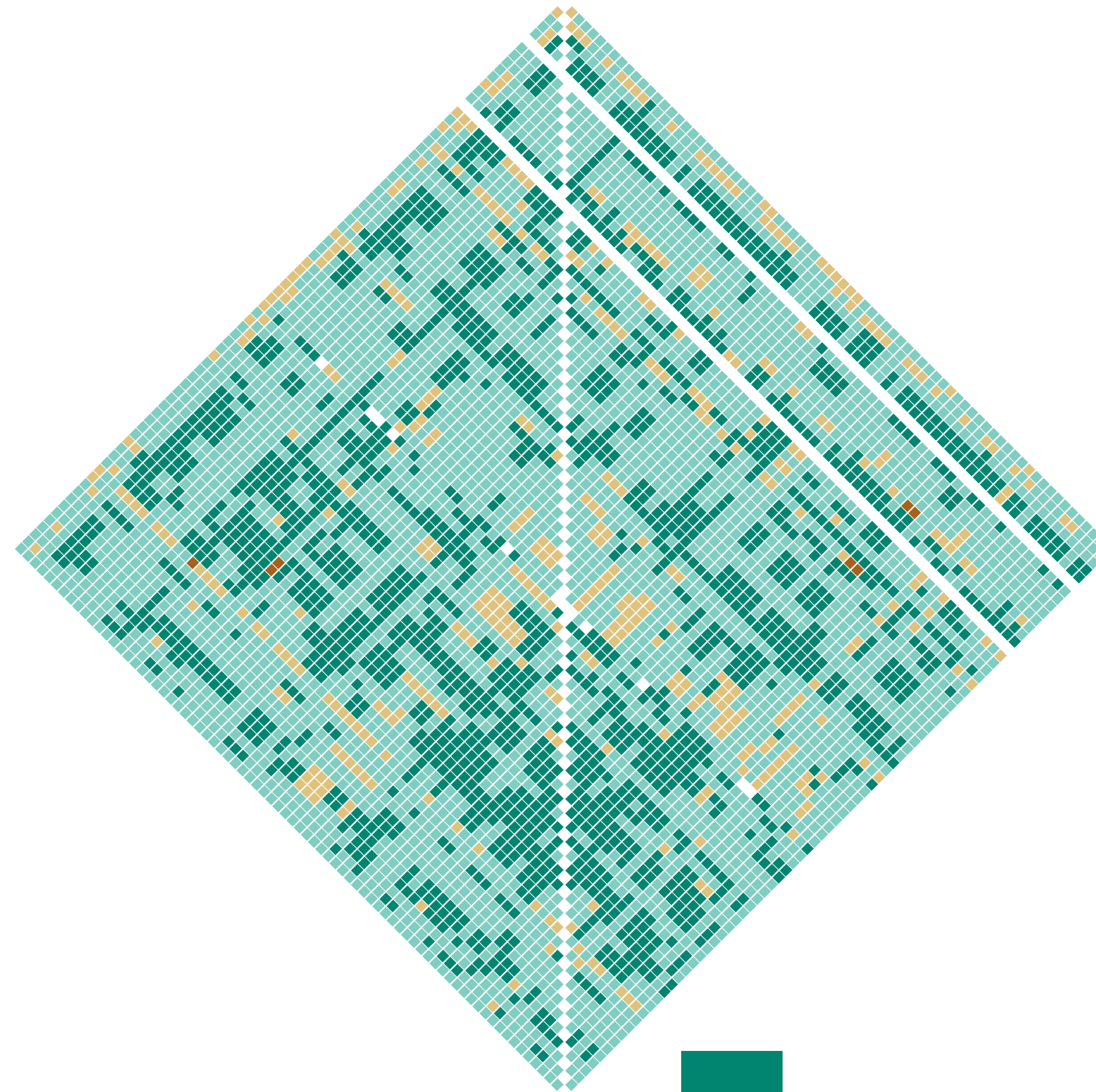
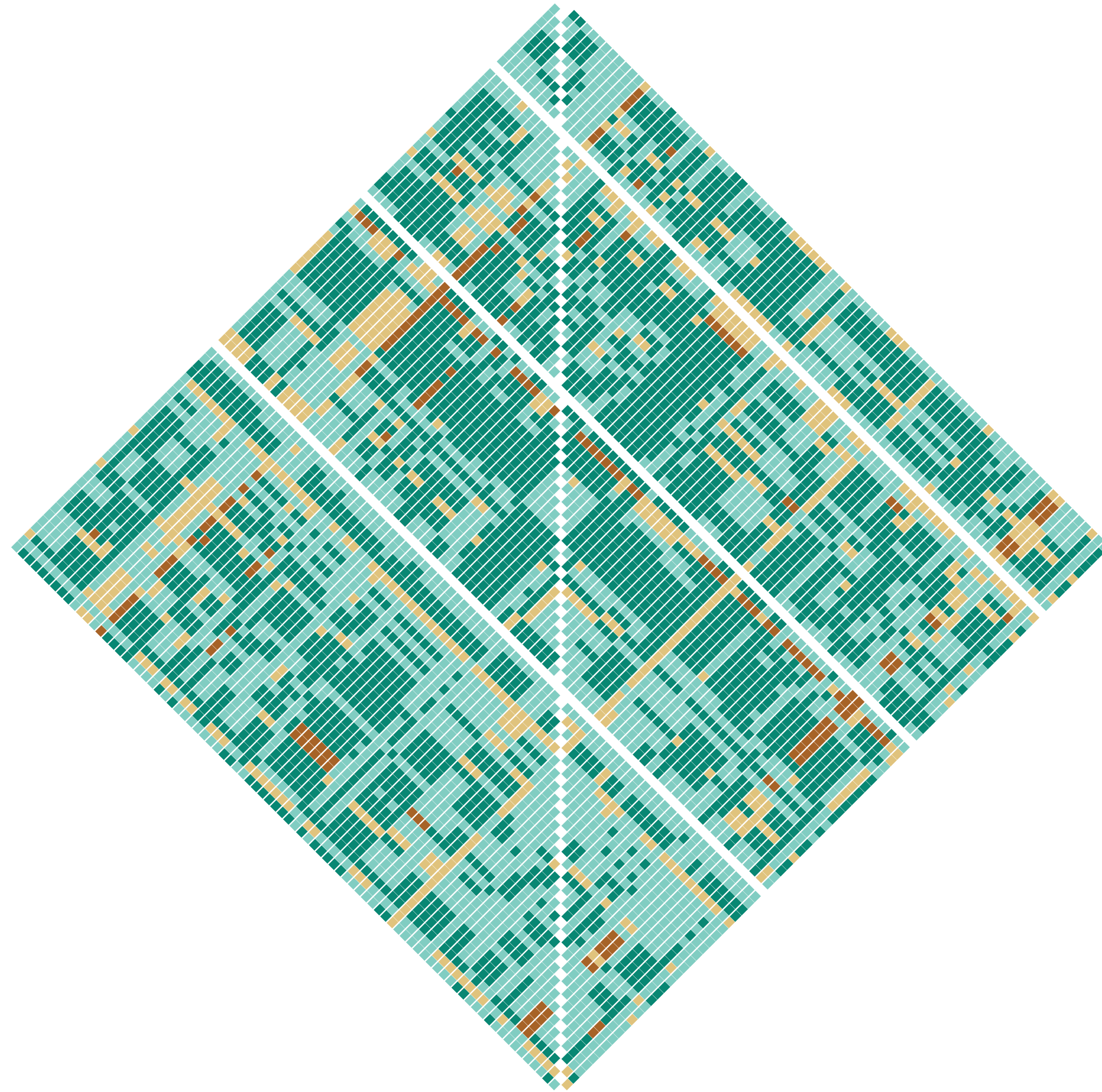
IXP-Country-Jedi

Sweden 2019-03 IPv4



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

Sweden ipv4 ipv6 comparison



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

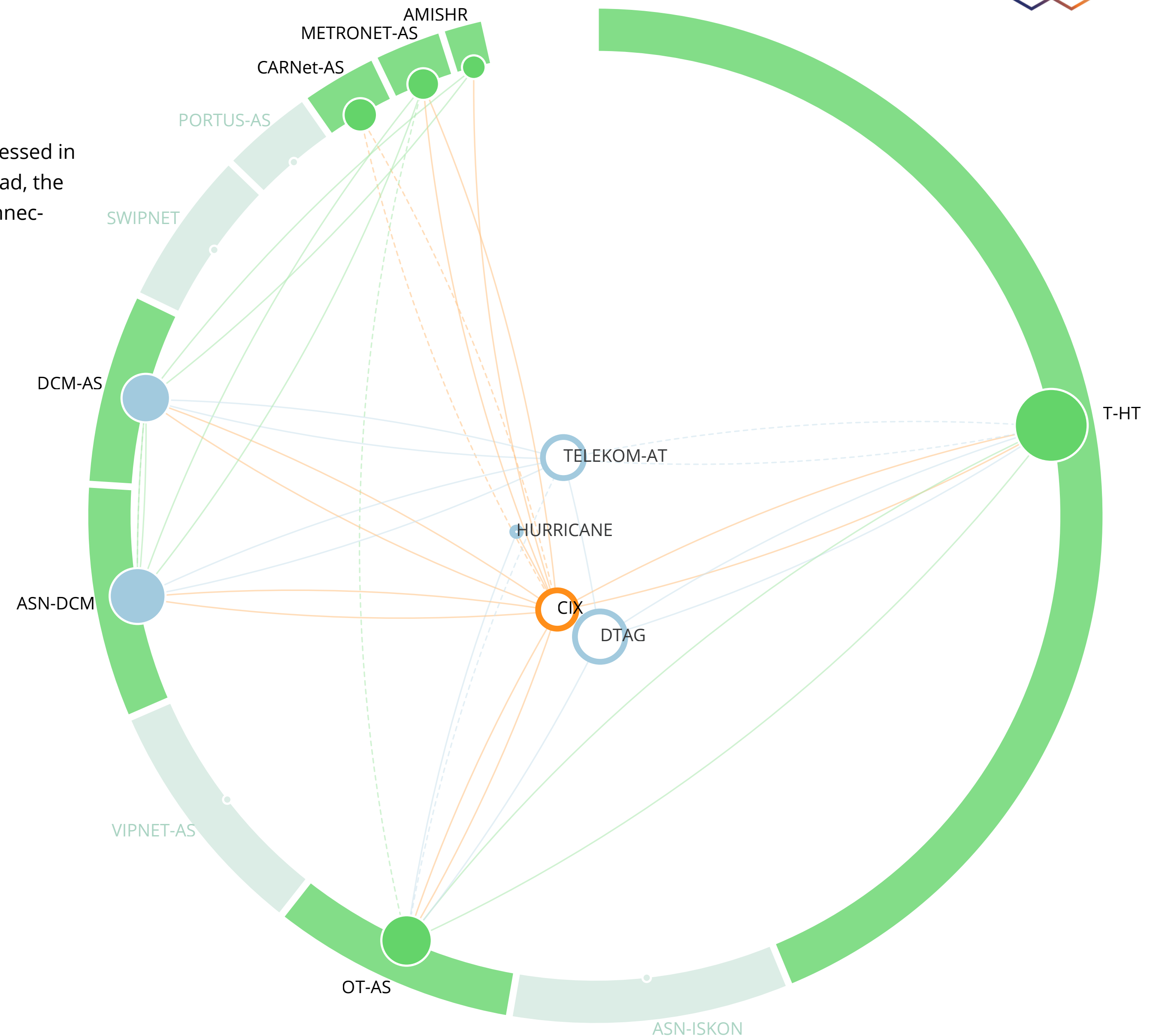
Sketches of the Peer-to-Peer Fabric of a Country



The quality of end-user connections are often expressed in download speeds towards content providers. Instead, the sketches presented here focus on peer-to-peer connections in a country.

The sketches explore the different ways in which end-users are interconnected within the same country: the peer-to-peer fabric. Each sketch represents a snapshot of this fabric at a single given point in time. They try to put a number on the amount of different ways the networks interconnect their users.

These sketches are created with active measurements from the RIPE Atlas measurement platform, datasets from RIPEstat, AS-to-ORG datasets from CAIDA and a dataset from APNIC that estimates the percentage of end-users in each network.



Peer-to-Peer Fabric



country

USA

snapshot date

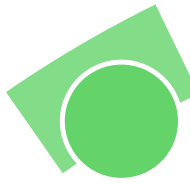
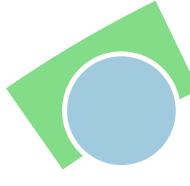

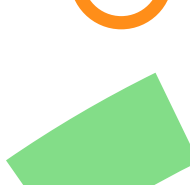


1 March 2018

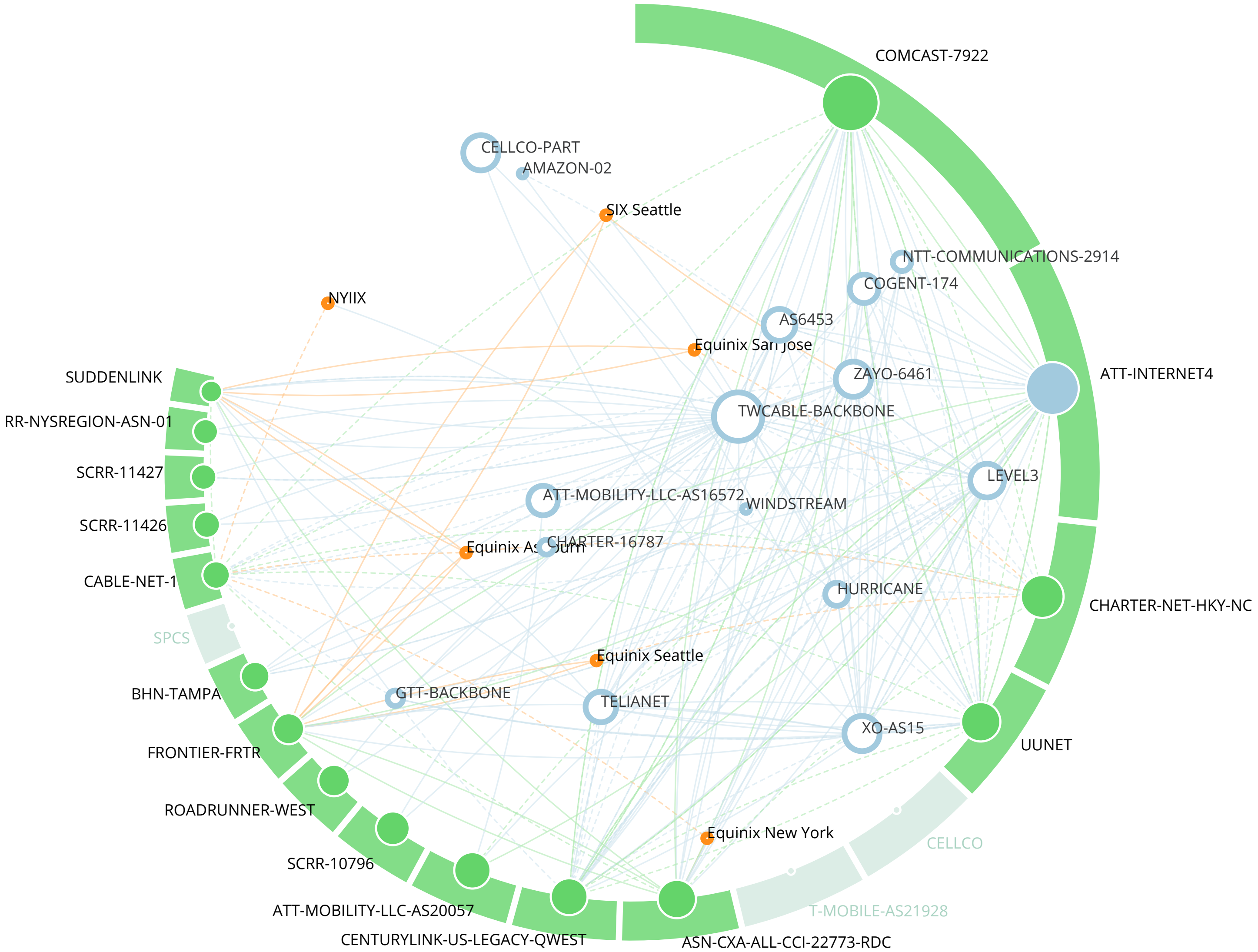
github

<https://github.com/emileaben/ixp-country-jedi/>

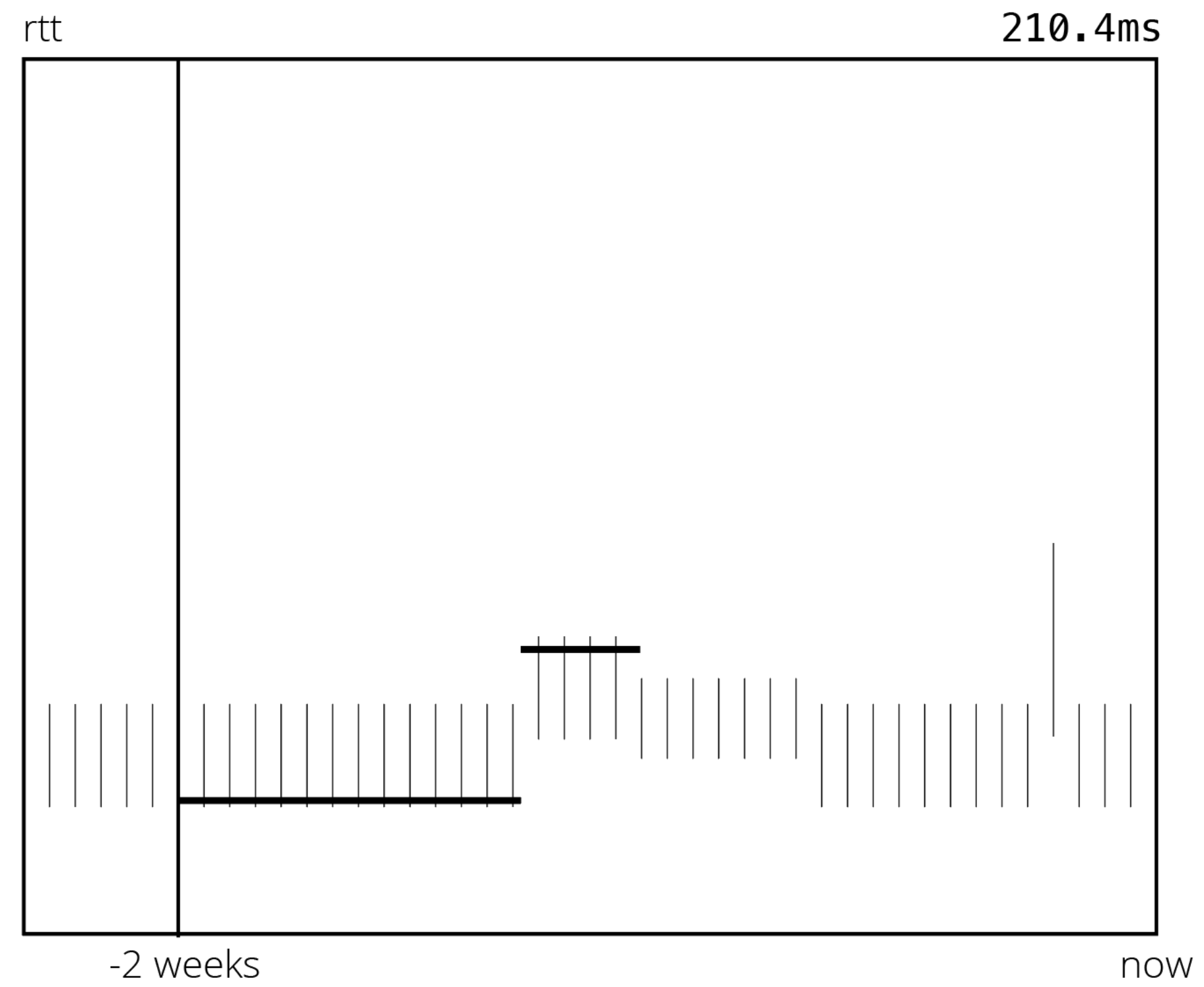
url

<http://sg-pub.ripe.net/ixp-country-jedi/dk/2018/03/01>

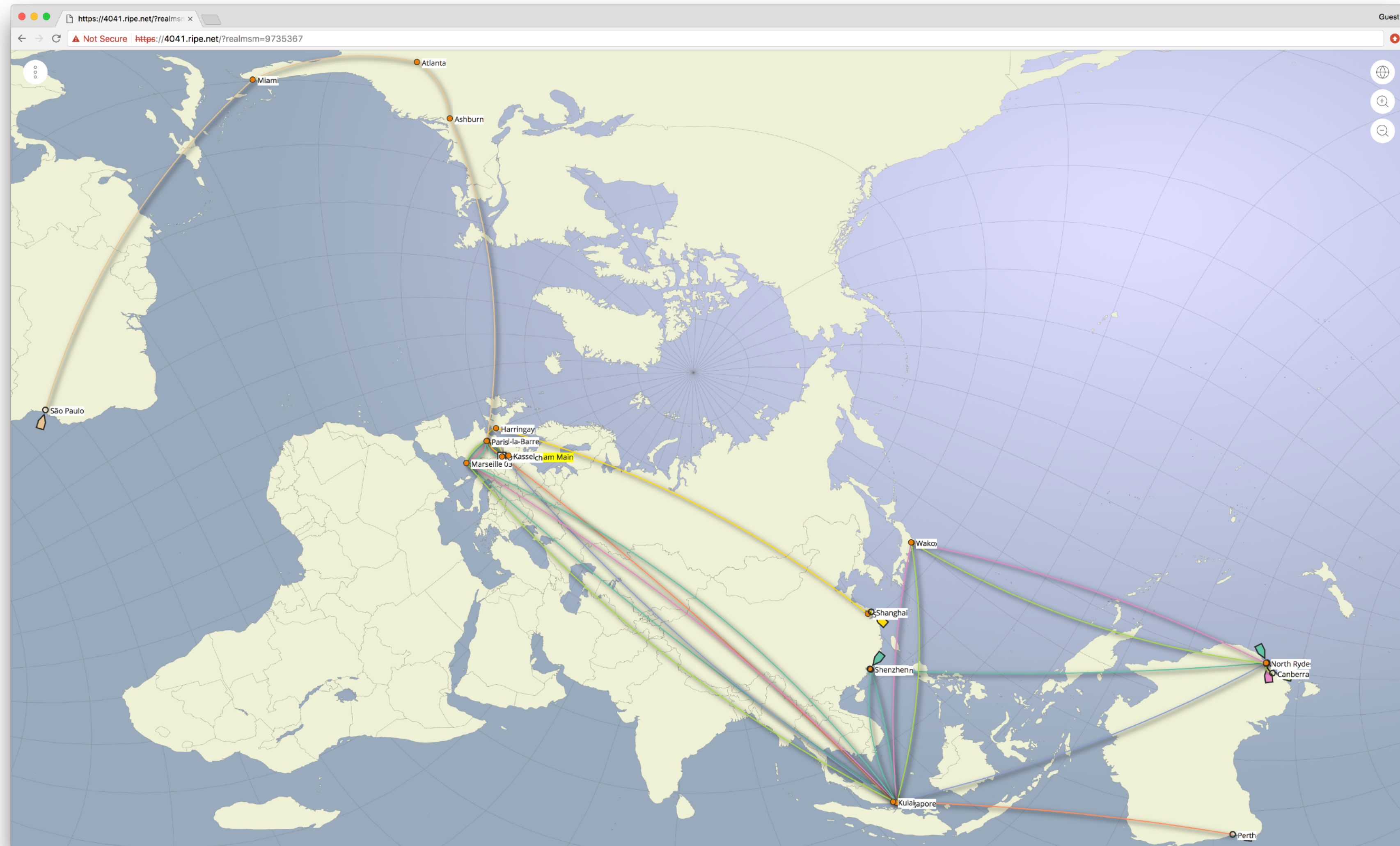
-  A network that serves end-users
-  A network that serves end-users and provides transit to other end-user networks within the country
-  A transit network or an IXP external to this country
-  An IXP that is identified with this country
-  A sizable end-user network for which we have data
-  A sizable end-user network for which we have no data



Atlas Trends



<https://ipmap.ripe.net>





jdenhertog@ripe.net
[@density215](#)