



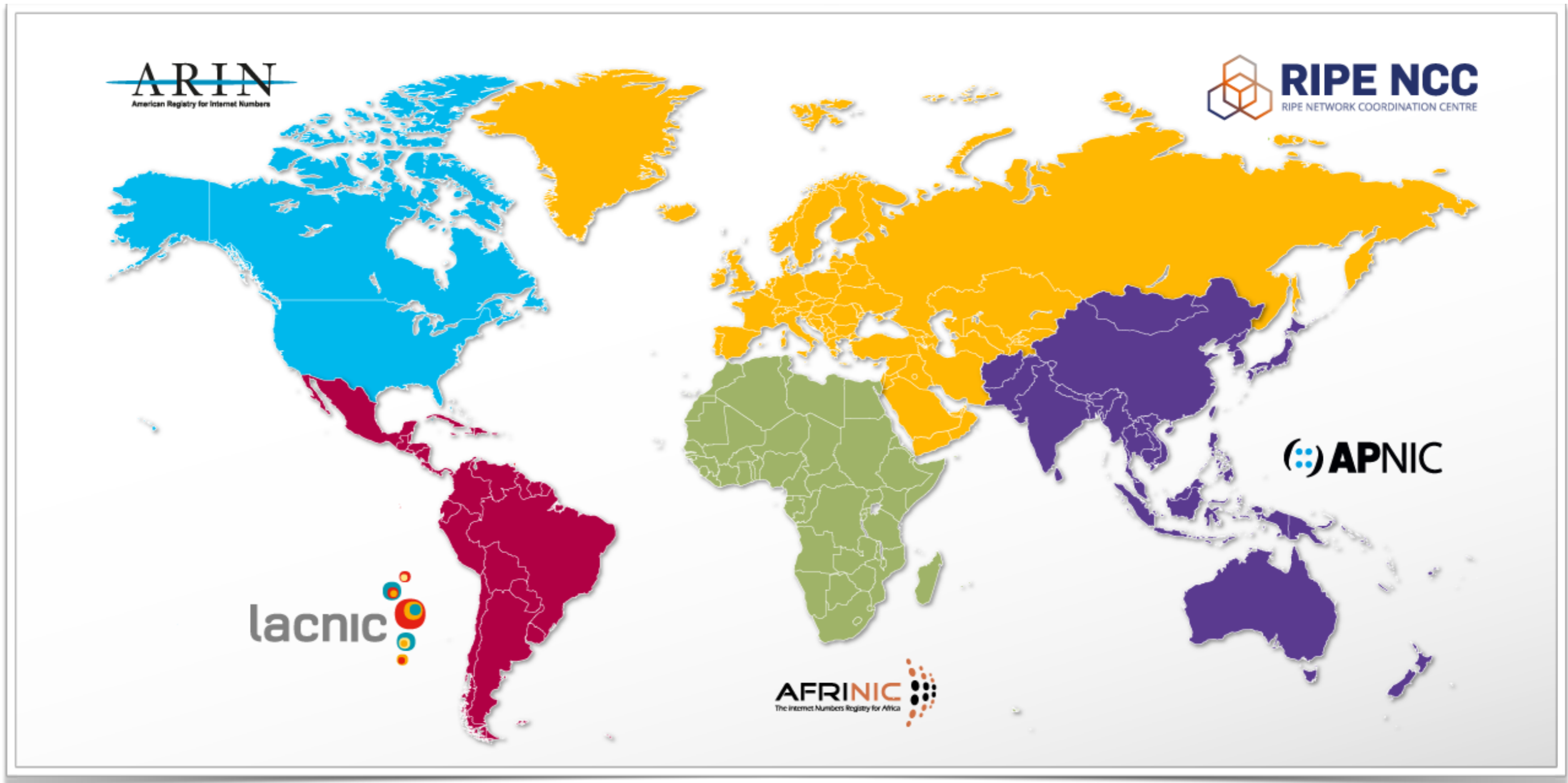
RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Data & Tools

Mirjam Kühne

Mirjam Kühne | IETF 104 GAIA RG | March 2019

Regional Internet Registries



RIPE NCC Activities



- Secretariat for RIPE community
- RIPE Database (RIPE Registry)
 - IP addresses, contact info, routing details, etc.
- Data sets and tools
 - publicly available
 - for researchers and operators
- Community building



RIPE Atlas

Active Measurements Network

RIPE Atlas Definition



RIPE Atlas is a **global, open, distributed** Internet measurement platform, consisting of thousands of measurement devices that measure **Internet connectivity** in real time. (wikipedia)



Active Measurements Network



- Probe distribution
 - 10,300 active RIPE Atlas probes
 - 442 active RIPE Atlas anchors
- Coverage
 - 183 countries covered
 - 3,600 IPv4 ASes (6%)
 - 1,450 IPv6 ASes (9%)
- All data are open and publicly available



Most Popular Features



- Six types of measurements
 - ping, traceroute, DNS, SSL/TLS, NTP, HTTP (to anchors)
- APIs that interact with the system
- Informative visualisations
- CLI tools (RIPE Atlas Magellan)
- Streaming of real-time data

<https://atlas.ripe.net/>



User-to-user

RIPE Atlas measurements

Motivation



- Usually client-to-server gets measured
 - for traffic and cost optimisation
- What about de-centralised, peer-to-peer, server-less connections?
 - let's go back to end-to-end (i.e. user-to-user)
- Sketches Internet eco system of a country

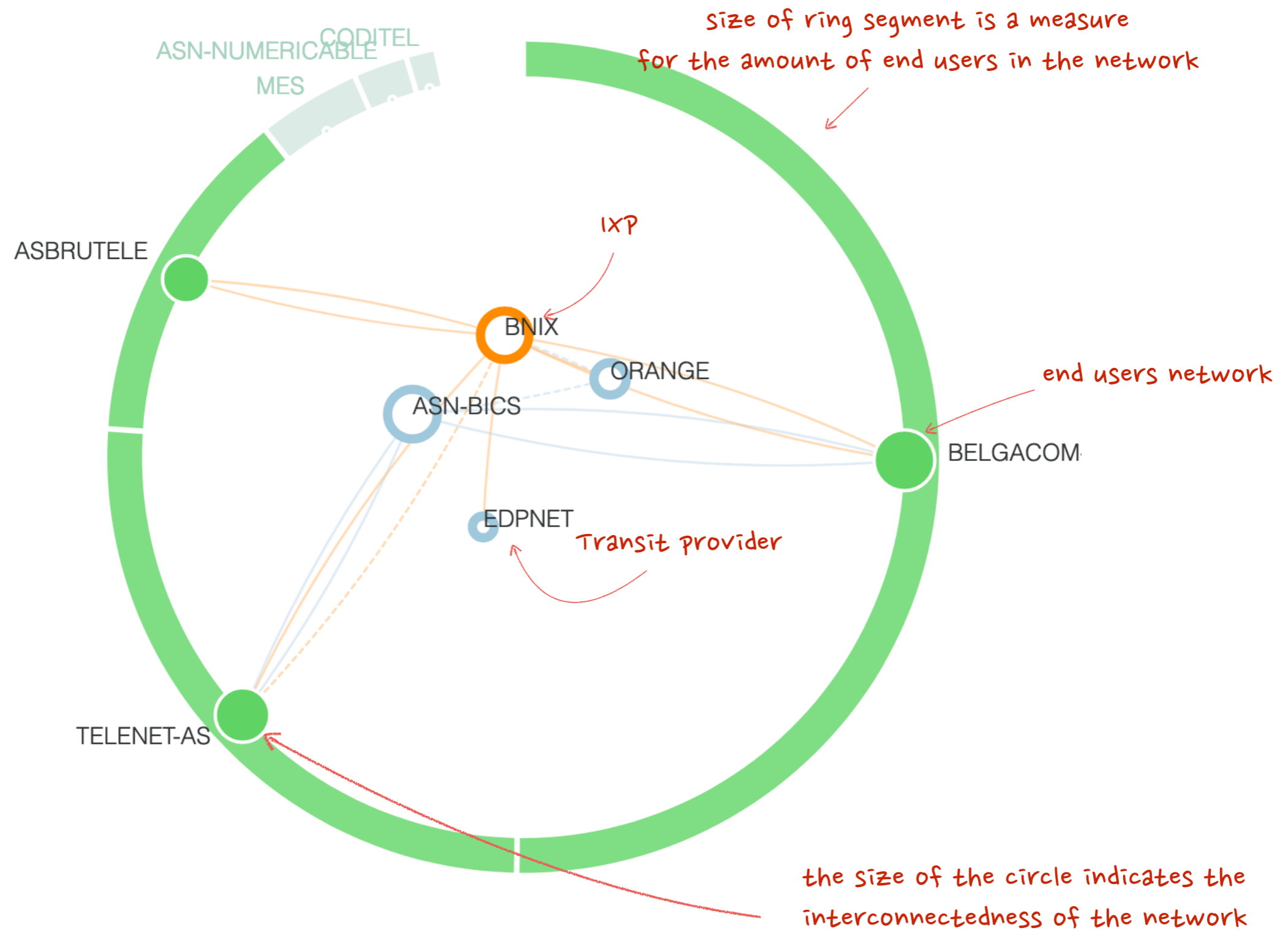
<https://sg-pub.ripe.net/ixp-country-jedi/de/2019/03/01>

Ingredients

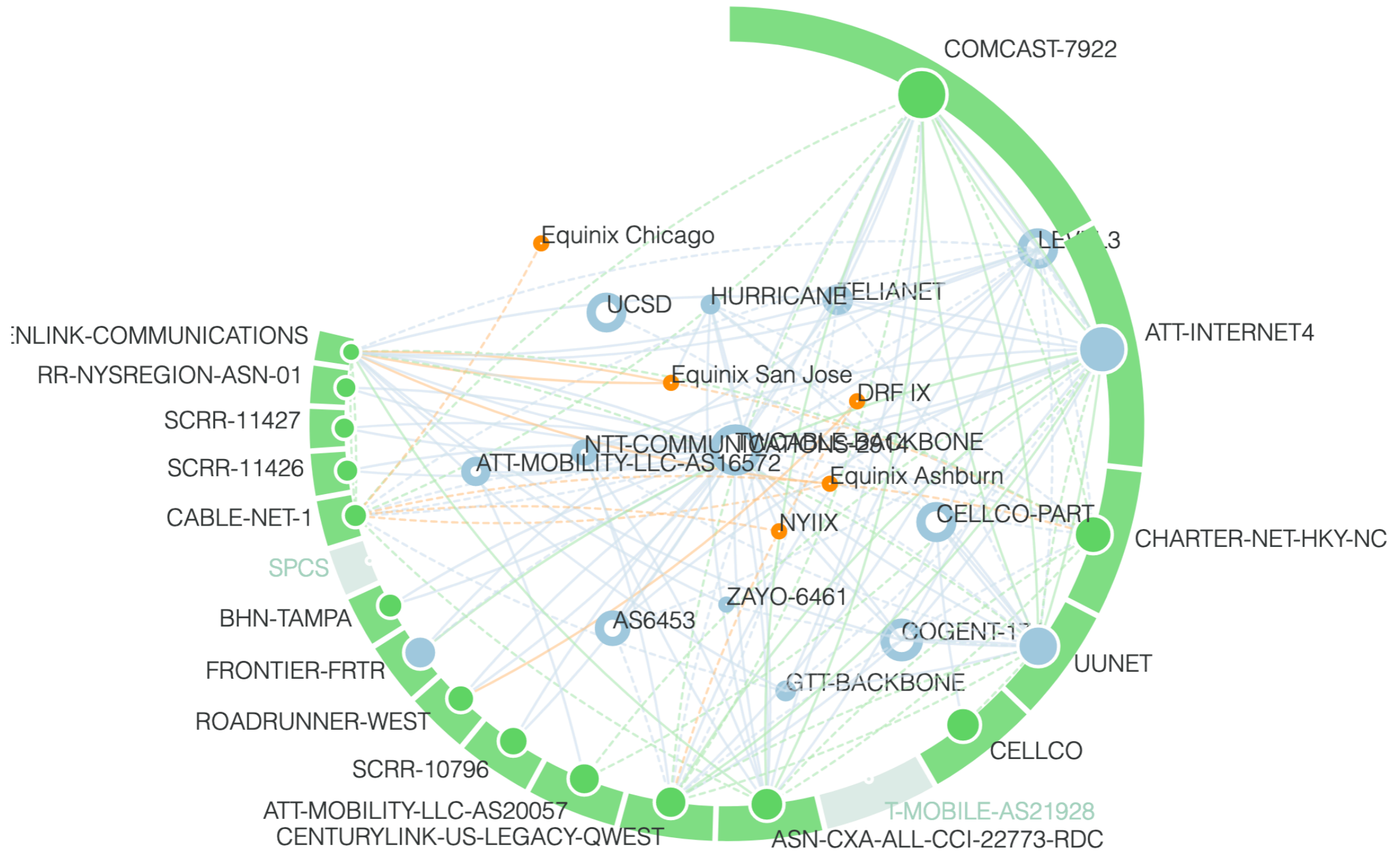


- RIPE Atlas
- User population estimates (APNIC data)
 - measurement-based rough estimate
 - <https://stats.labs.apnic.net/aspop/>
- IXP Country Jedi
 - mesh traceroutes between RIPE Atlas probes in a country
 - <https://www.ripe.net/ixp-country-jedi/>
- Many caveats: Results are ‘sketches’

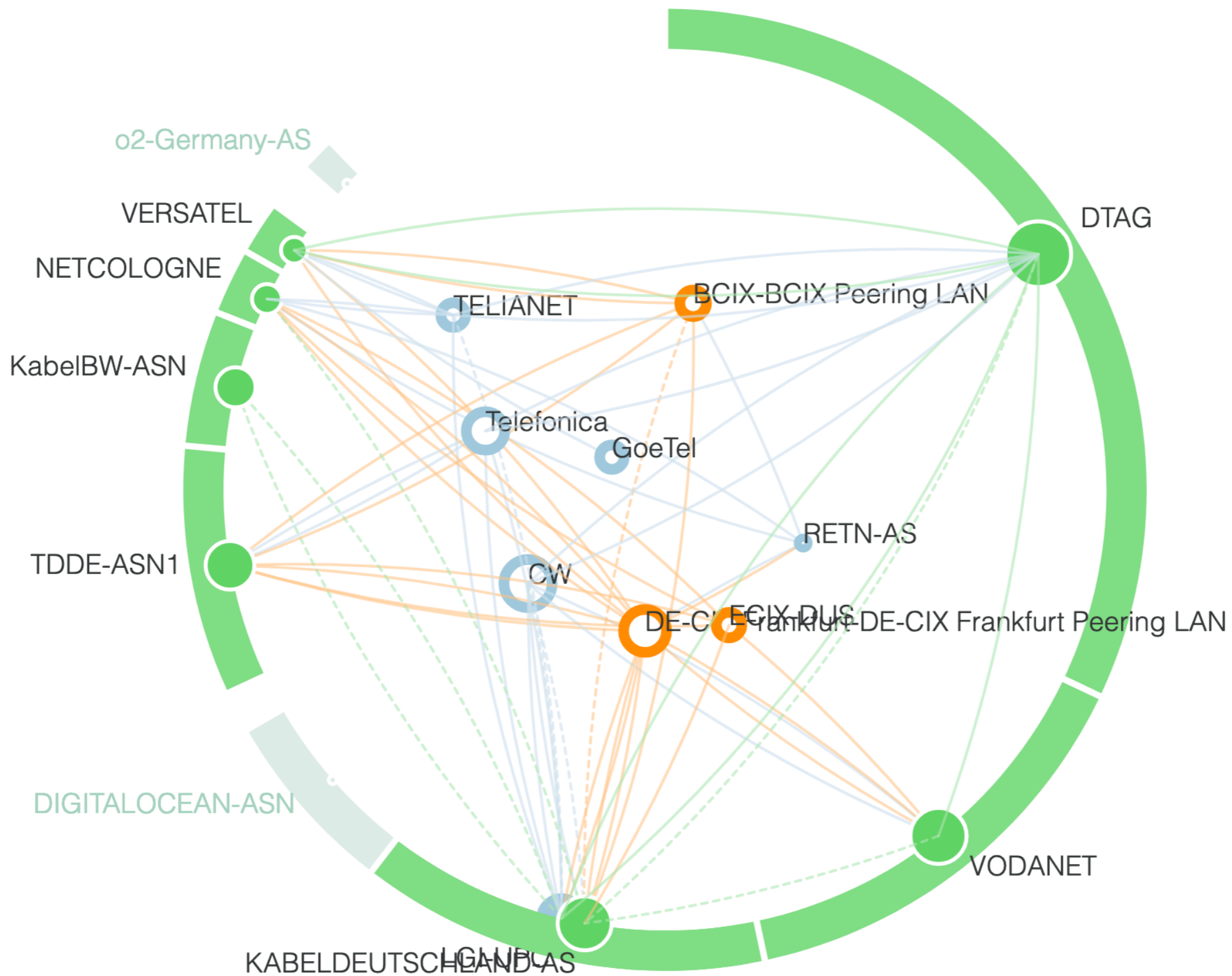
Belgium



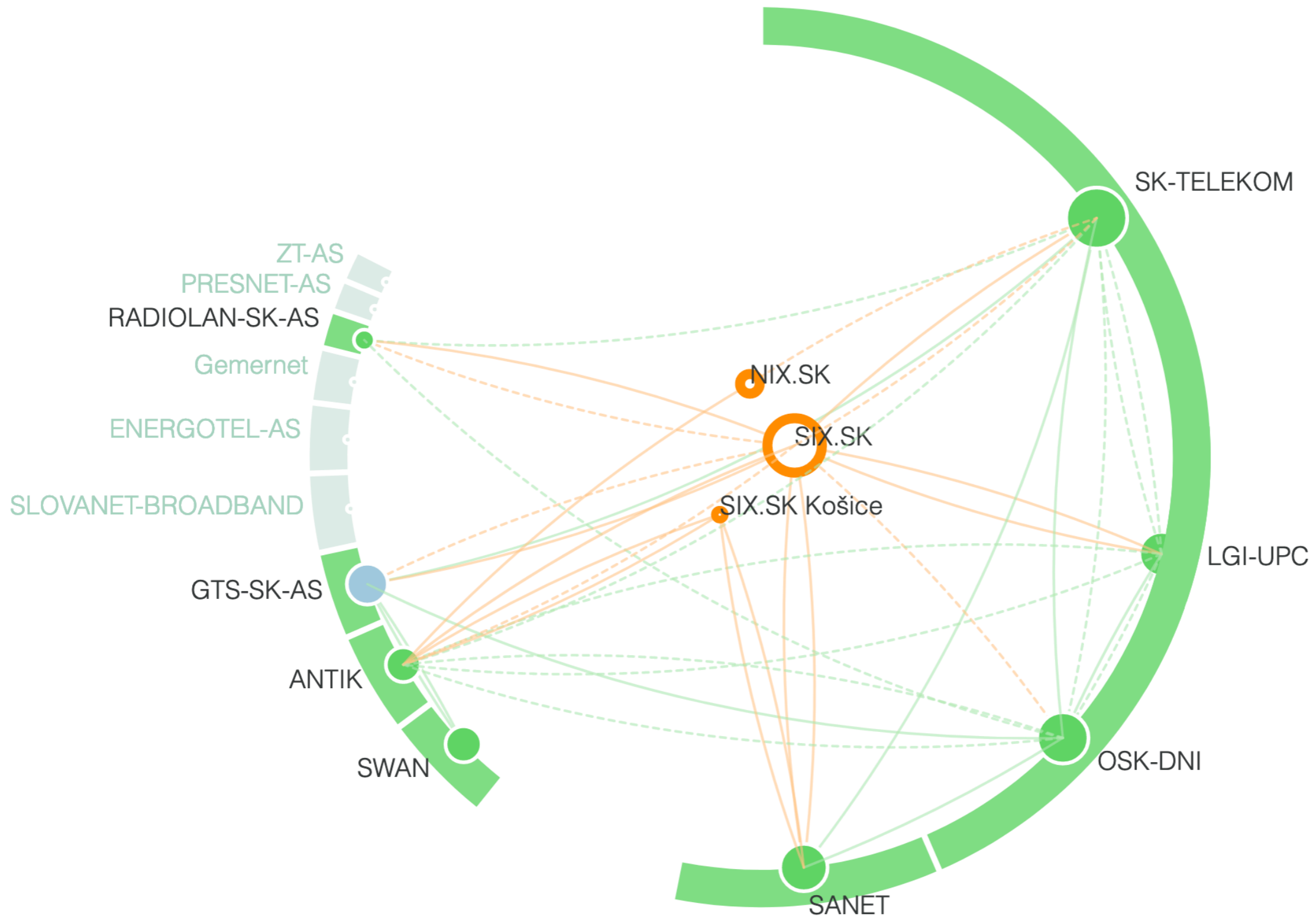
United States



Germany



Slovakia





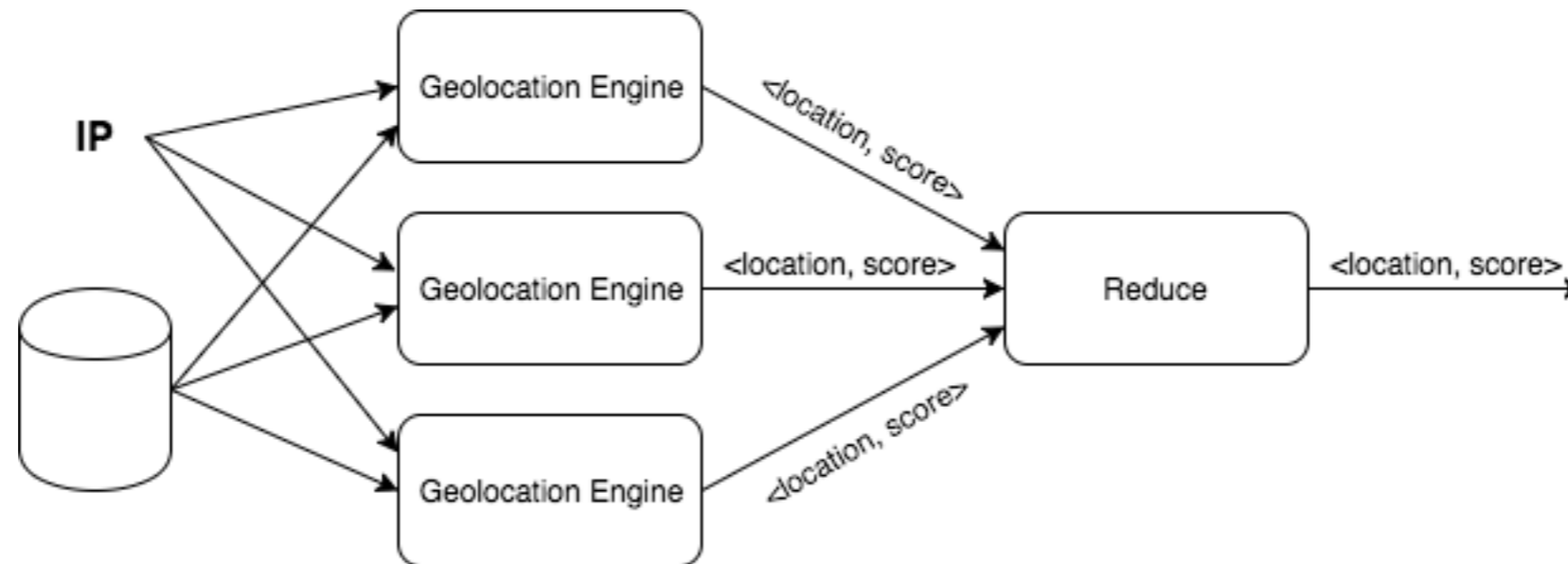
RIPE IPmap

Geolocation for Infrastructure

Geolocation for Infrastructure



- Collaborative model (multi-approach)
 - e.g. crowdsourced, triangulation (RIPE Atlas)



- https://labs.ripe.net/Members/massimo_candela/ripe-ipmap-whats-under-the-hood

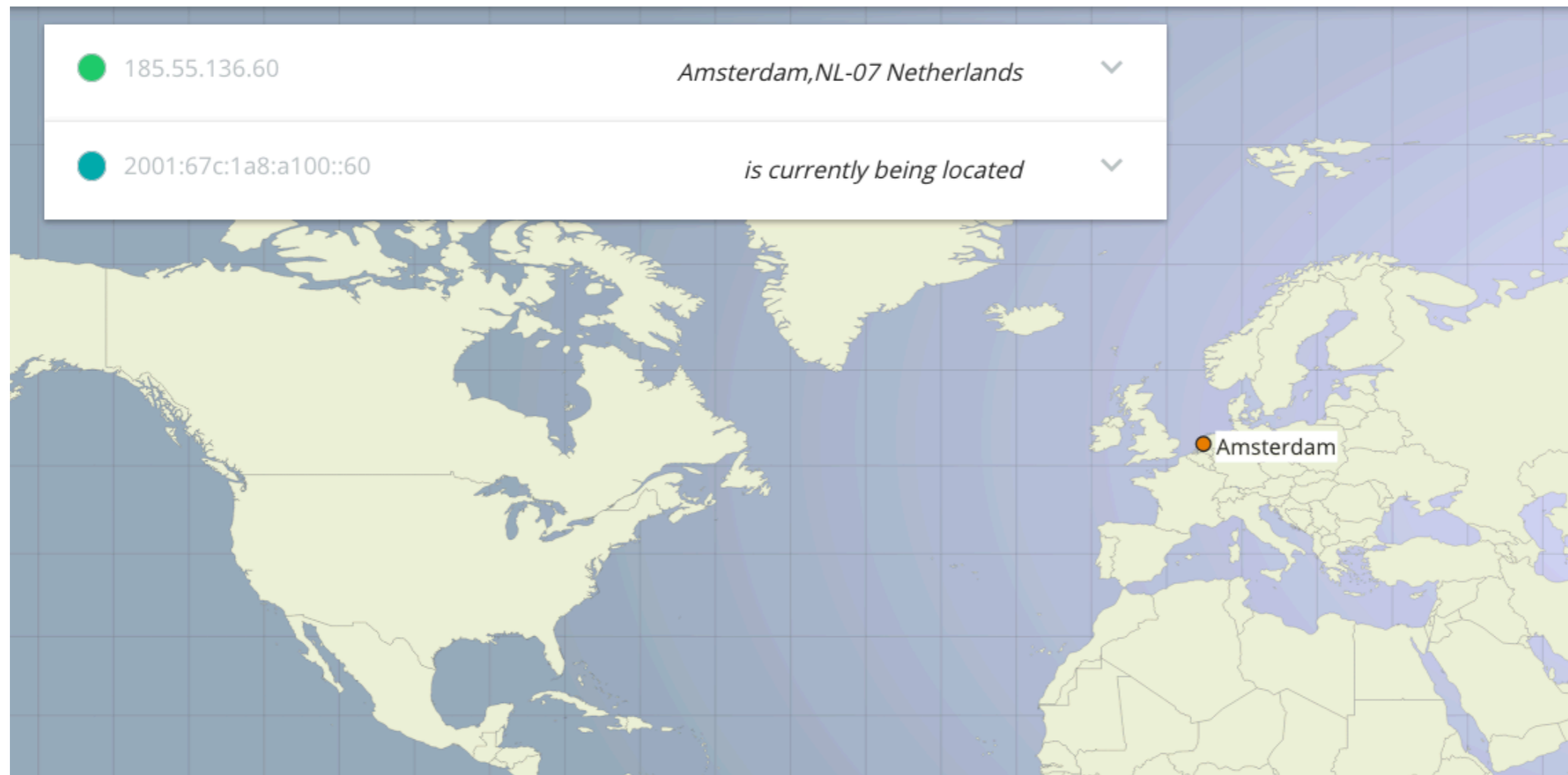
RIPE IPmap Output



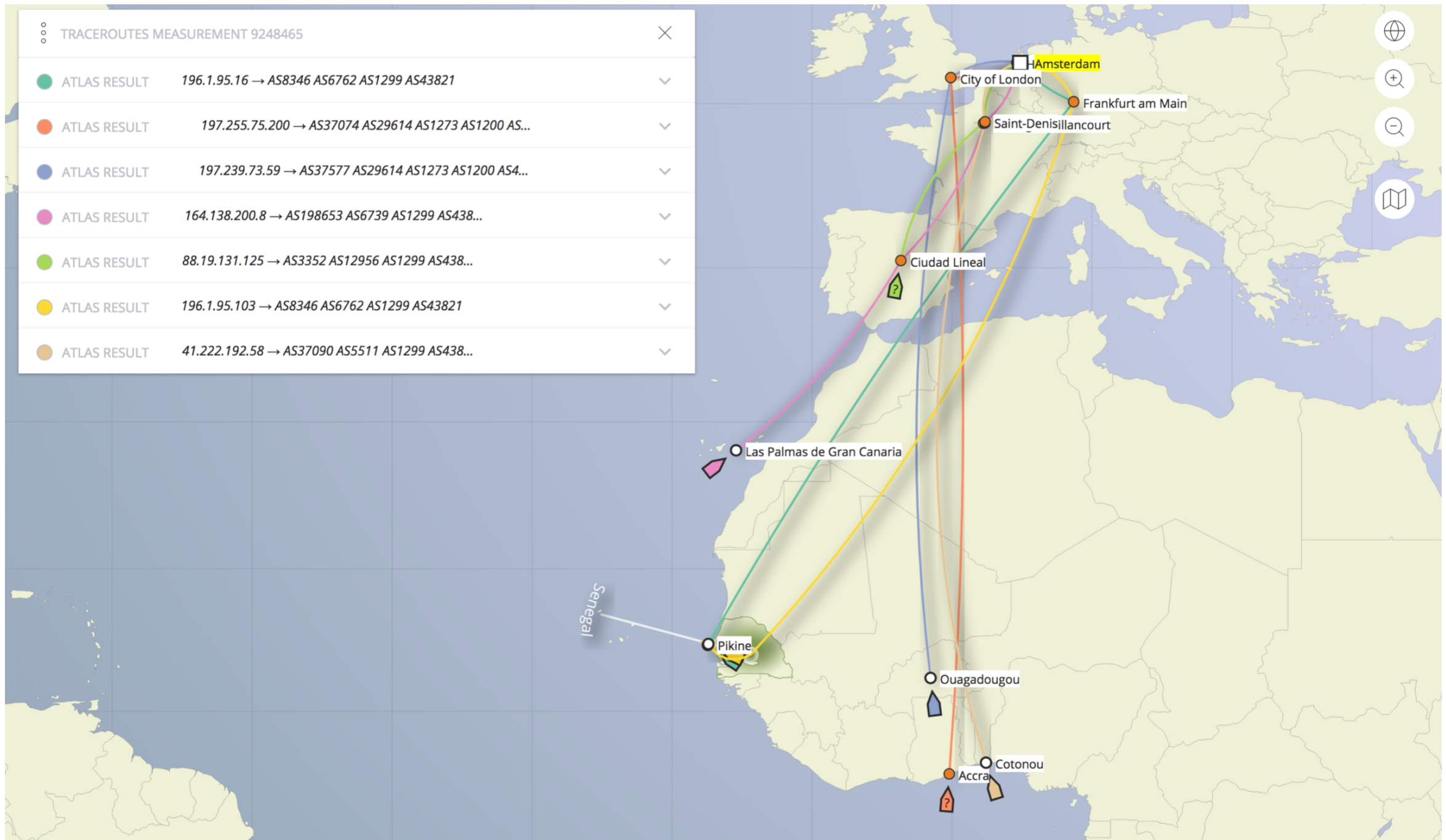
RIPE IPmap A Collaborative Approach to Mapping Internet Infrastructure

ams-ix.net

[About](#) | [API reference](#) | [Manual](#)



Traceroute Visualisation





Routing Information Service (RIS)

What is RIS?



- Worldwide network of BGP collectors
- Deployed at Internet Exchange Points
- Collects raw BGP data from peers
- Stores BGP routing table dumps
- 18+ years of routing history!
- Used by network operators and researchers

RIS Route Collector Locations



RIS Data Access



- Raw data:
 - <https://www.ripe.net/analyse/internet-measurements/routing-information-service-ris/ris-raw-data>
- Data stored in MRT format (RFC 6396)
- Readable using BGPdump utility
 - Open source, available on GitHub:
<https://bitbucket.org/ripenc/bgpdump/wiki/Home>
- RIPEstat

RIS Live BGP Message Stream



- Monitoring and detecting routing events
- Based on RIS route collector data
- WebSocket JSON API

https://labs.ripe.net/Members/chris_amin/ris-live-bgp-message-stream

Live RIS BGP messages

▶ Connected 6165 matching messages ⓘ

```
// Received at 14:05:05 (0.25 second delay)
{
  "timestamp": 1550235905.09,
  "peer": "91.206.52.130",
  "peer_asn": "58299",
  "id": "91.206.52.130-1550235905.09-3854212",
  "host": "rrc20",
  "type": "UPDATE",
  "path": [58299, 6939, 2914, 12859, 12654],
  "community": [[58299, 1100]],
  "origin": "igp",
  "announcements": [
    {
      "next_hop": "2001:7f8:24::82",
      "prefixes": [
        "2001:7fb:ff02::/48"
      ]
    },
    {
      "next_hop": "fe80::4e5e:cff:fe25:40c4",
      "prefixes": [
        "2001:7fb:ff02::/48"
      ]
    }
  ]
}
```



RIPEstat

One stop shop for data

RIPEstat - stat.ripe.net



RIPEstat

Enter an IP address/prefix, ASN, country code or hostname

Go

Your network: AS3333, 2001:67c:2e8::/48

Try one of these: [IPv4 prefix](#), [IPv4 range](#), [IPv6](#), [ASN](#)

The screenshot shows the RIPEstat interface. At the top, there's a search bar with the text "Enter an IP address/prefix, ASN, country code or hostname" and a "Go" button. Below the search bar, it says "Your network: AS3333, 2001:67c:2e8::/48" and "Try one of these: IPv4 prefix, IPv4 range, IPv6, ASN". The main content area shows the RIPE NCC logo and navigation tabs: "Manage IPs and ASNs", "Analyse" (selected), "Participate", "Get Support", "Publications", and "About Us". A breadcrumb trail reads "You are here: Home > Analyse > Statistics > RIPEstat > 193.0.20.0/23". A search input field contains "193.0.20.0/23" and a "Search" button. Below the search, there's a "permalink" button. The main results area is divided into two columns. The left column, titled "At a Glance (4)", lists various categories: Routing (9), DNS (2), Anti Abuse (2), Database (9), Geographic (2), Activity (4), and Suggestions (1). The right column, titled "Prefix Overview (193.0.20.0/23)", shows a green "Announced" status and states "This prefix is announced by AS3333 'RIPE-NCC-AS, NL'". Below this is a table with columns "RIR", "Status", "Registration", and "Country". The table contains one row: "RIPE NCC", "ALLOCATED", "1993-09-01", "NL". A "Show IANA Registry Information" button is located below the table. To the right of the "Prefix Overview" is a "Geoloc (193.0.20.0/23)" section featuring a map of Europe with a red dot indicating the location of the prefix. The map shows a 100.00% match for "lands" in Germany. Below the map is a "Geoloc details" section with a blue box stating "Data is based on MaxMind's GeoLite City data set and valid for the stated query time (see below)". At the bottom of the page, it says "Showing results for 193.0.20.0/23 as of 2016-11-06 16:00:00 UTC" and "Showing results for 193.0.20.0/23 as of 2016-11-01 00:00:00 UTC".



Data Sets

- IP Registry data from all RIRs
- Routing data (RIPE RIS)
- RIPE Atlas data
- External datasets
 - Geolocation, blacklists, bandwidth measurements (MLab, Speedchecker) and more

Widget API & Data API

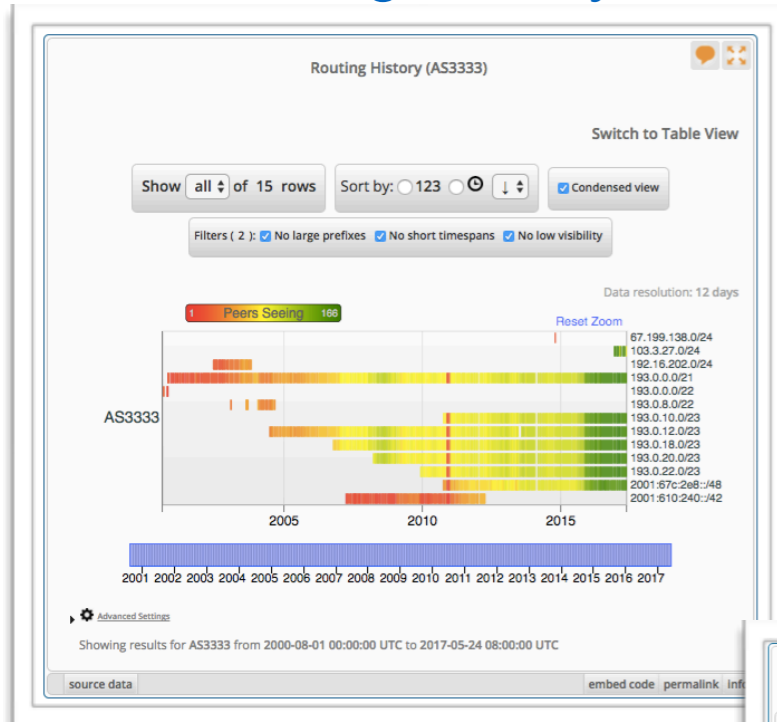


- More than 50 widgets
- RIPEstat widgets are embeddable
 - e.g. web pages or NOC interfaces
- Documentation: https://stat.ripe.net/docs/widget_api
- Access to underlying data via data API
- Documentation: https://stat.ripe.net/docs/data_api

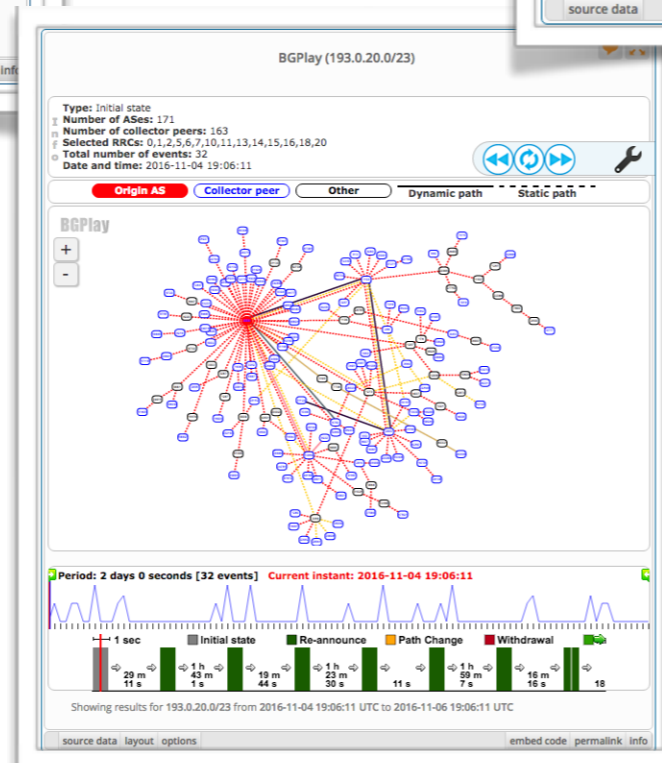
Use Cases



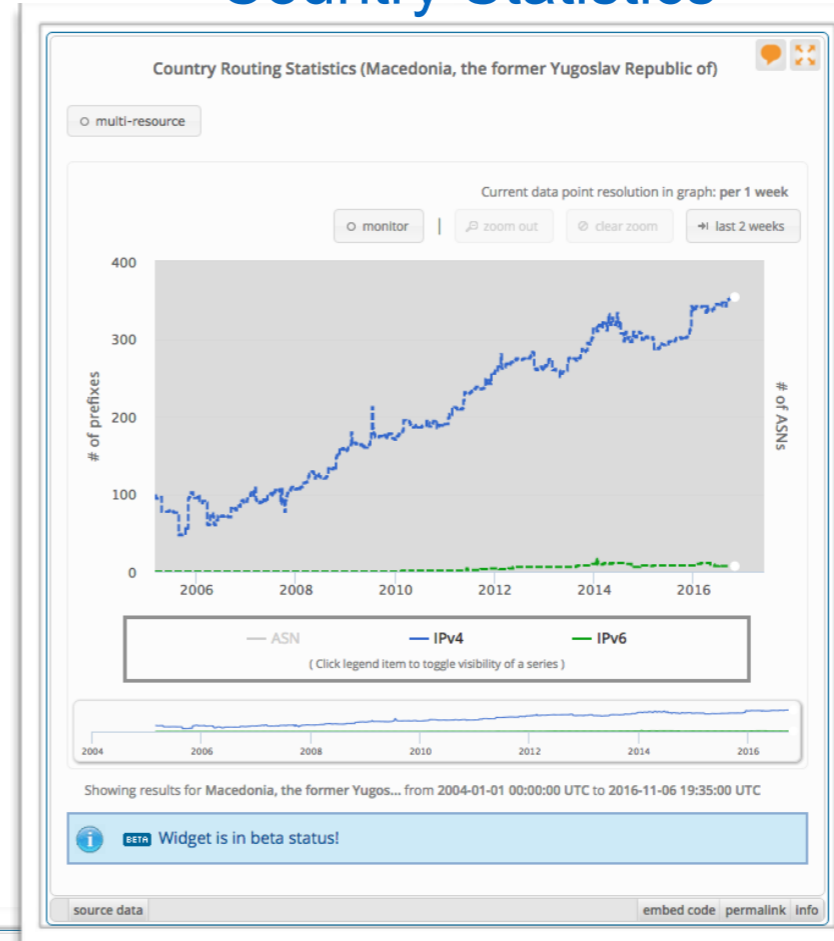
Routing History



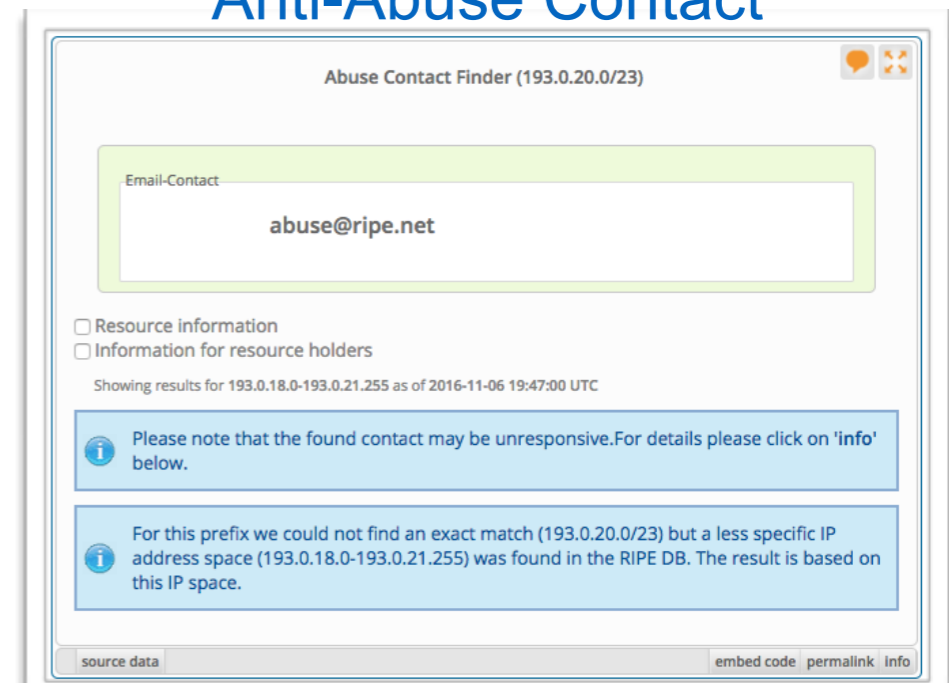
BGPlay



Country Statistics



Anti-Abuse Contact





References

References



- RIPE Atlas: atlas.ripe.net
- IXP country Jedi: www.ripe.net/ixp-country-jedi
- RIPEstat: stat.ripe.net
- IPv6 RIPEness: ipv6ripeness.ripe.net
- IPv6 ASNs: v6asns.ripe.net
- RIPE DB bulk: <https://ftp.ripe.net/ripe/dbase/>
 - <https://ftp.ripe.net/ripe/dbase/split>
- RIPE Labs: labs.ripe.net



Questions



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