RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE Atlas & RIPE NCC Internet Measurement Tools

For the Good of the Internet

Vesna Manojlović | LUNOG7 | November 2024

RIPE NCC Strategy 2021–2026

- “Be a **centre of excellence for data, measurements and tools** that provide insight on the Internet and its operations”
- RIPE NCC Internet measurement tools and services:
  - RIPE Atlas
  - RIPE Routing Information Service (RIPE RIS)
  - RIPEstat

RIPE Atlas

RIPE Atlas

- RIPE Atlas is the RIPE NCC's **Internet measurement platform**
- It is a global network of devices that actively measure Internet connectivity, reachability and performance
- Anyone can access this data
  - via Internet traffic maps, streaming data visualisations, and an API
- RIPE Atlas users can also perform **customised measurements** to gain information about their own networks

How we Collect Data?

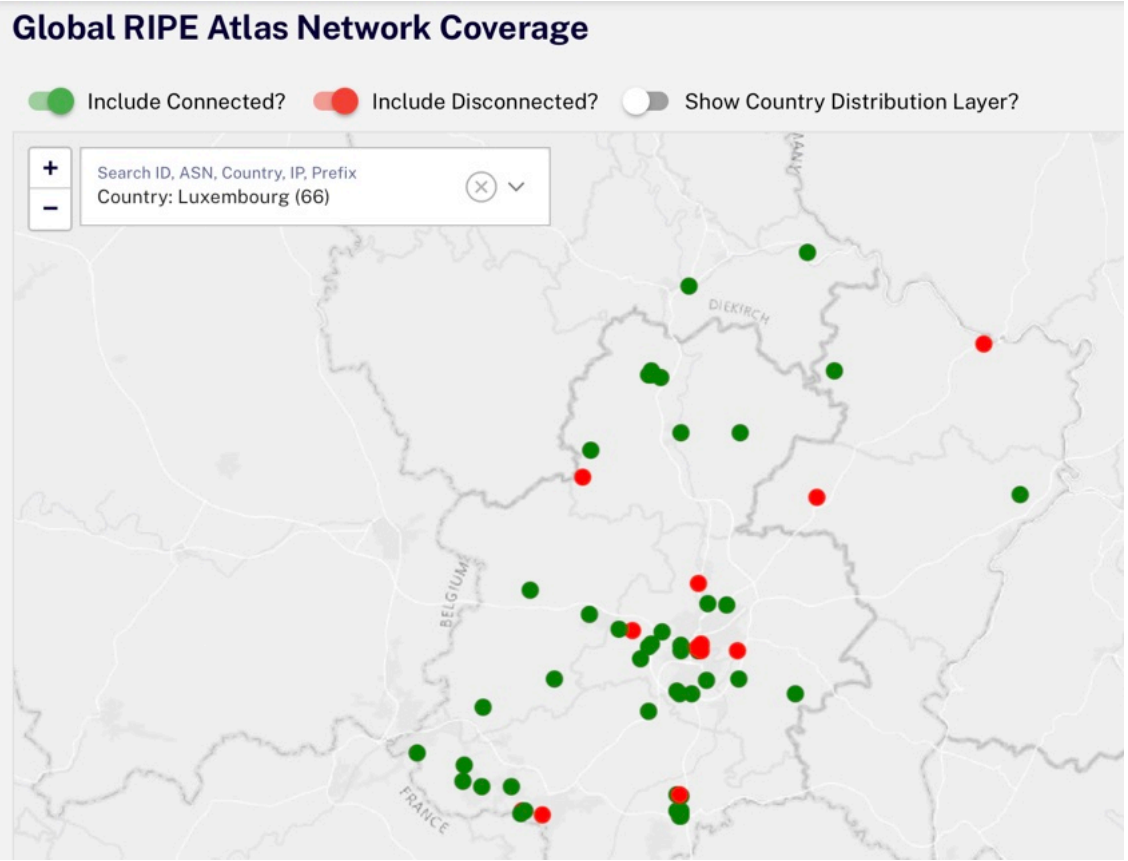
- 12,000+ RIPE Atlas probes connected in 169 countries
- 785 RIPE Atlas Anchors
- 15,000+ results collected per second
- 32,000+ measurements currently running

- More information at: atlas.ripe.net

RIPE Atlas Anchors

- More robust probes mostly for data centres
- Either physical hardware or a virtual machine
- Generally more reliable and better connected than probes
- Have all features of probes plus extra server features
  - DNS server
  - HTTP(S) server
- Full mesh of ping and traceroute measurements is scheduled between all anchors

RIPE Atlas in Luxembourg



- https://atlas.ripe.net/coverage/?filter=LU

Networks Coverage in Luxembourg

Network (ASN)	Network Name	Estimated User Population %	IPv4 Public Probes	IPv4 Private Probes	IPv4 Total Probes	IPv6 Public Probes	IPv6 Private Probes	IPv6 Total Probes	More
6661	EPT-LU	48.46	7	0	7	2	0	2	View
56665	TANGO-TELINDUS	18.77	3	0	3	0	0	0	View
53667	PONYNET	8.91	5	0	5	2	0	2	View
204279	ELTRONA	4.76	1	0	1	1	0	1	View
199524	GCORE	4.53	1	0	1	1	0	1	View
47377	Orange_Belgium_SA	4.35	1	0	1	0	0	0	View
8632	LOL-AS	2.49	4	1	5	1	0	1	View
9008	ASN-VO	1.39	3	0	3	2	0	2	View
56369	OrangeBE	1.28	0	0	0	0	0	0	Apply for a probe
2602	RESTENA	0.78	3	1	4	3	1	4	View

- https://sg-pub.ripe.net/petros/population_coverage/country.html?name=LU

RIPE Atlas Measurements

- **Built-in global** measurements towards root nameservers
  - Visualised as Internet traffic maps
- **Built-in regional** measurements towards “anchors”
- **Customised** measurements run by users

Want to Learn More?

- Check our webinars:
  - Using RIPE Atlas
  - RIPEstat
- RIPE Atlas use cases
- Our quarterly plans for our services/tools

RIPE Atlas Use Cases

A distributed view of the Internet
https://labs.ripe.net/author/alun_davies/ripe-atlas-a-distributed-view-of-the-internet/

The Kazakhstan outage as seen from RIPE Atlas
https://labs.ripe.net/author/emileaben/the-kazakhstan-outage-as-seen-from-ripe-atlas/

Detecting DNS root manipulation
https://labs.ripe.net/author/qasim-lone/detecting-dns-root-manipulation/

DNS vulnerability, configuration errors that can cause DDoS
https://labs.ripe.net/author/giovane_moura/dns-vulnerability-configuration-errors-that-can-cause-ddos/

RIPE Atlas Community

- RIPE Atlas Ambassadors & Sponsors
  - https://www.ripe.net/analyse/internet-measurements/ripe-atlas/ripe-atlas-community/
- FLOSS Community & RIPE Atlas
  - https://github.com/RIPE-Atlas-Community
- Hackerspaces & RIPE Atlas
  - https://wiki.hackerspaces.org/RIPE_Atlas
  - https://labs.ripe.net/author/becha/the-next-42-ripe-atlas-probes-at-hackerspaces/
- Hackathons
  - December 2024 https://labs.ripe.net/author/becha/announcing-the-green-tech-hackathon/
  - March 2025 https://labs.ripe.net/author/becha/join-the-dns-hackathon-2025/

RIPE RIS

RIPE Routing Information Service (RIPE RIS)

- RIPE RIS is a routing data collection platform
  - It collects raw BGP data from peers
  - and stores BGP messages and routing table dumps
- Historical and live data
  - Historical data since 1999
  - All (historical) data is publicly available

Remote Route Collectors (RRCs)

- 23 Route collectors deployed at IXPs
  - 1500+ peering sessions
  - 600+ peer ASes
- They collect raw BGP data from peers

Actual Routing Data

- RIS shows you what is really happening on the Internet
  - which AS is announcing which address block
  - and where it is visible
  - right now or in the past

- As opposed to information in the RIPE Database and other Routing registries:
  - Route object in the RIPE Database may be out of date
  - RIS includes real routing information
  - “Routing consistency check” tool can help with this

Why Collect BGP Data?

- BGP doesn’t have in-built security mechanisms and routing incidents are common
- Troubleshooting is difficult
  - Routing problems and Looking glasses are temporary
- BGP history is recorded to track what has happened
  - It allows operators to identify and address security risks
  - Better visibility → Greater security → Lower risk of a BGP attacks

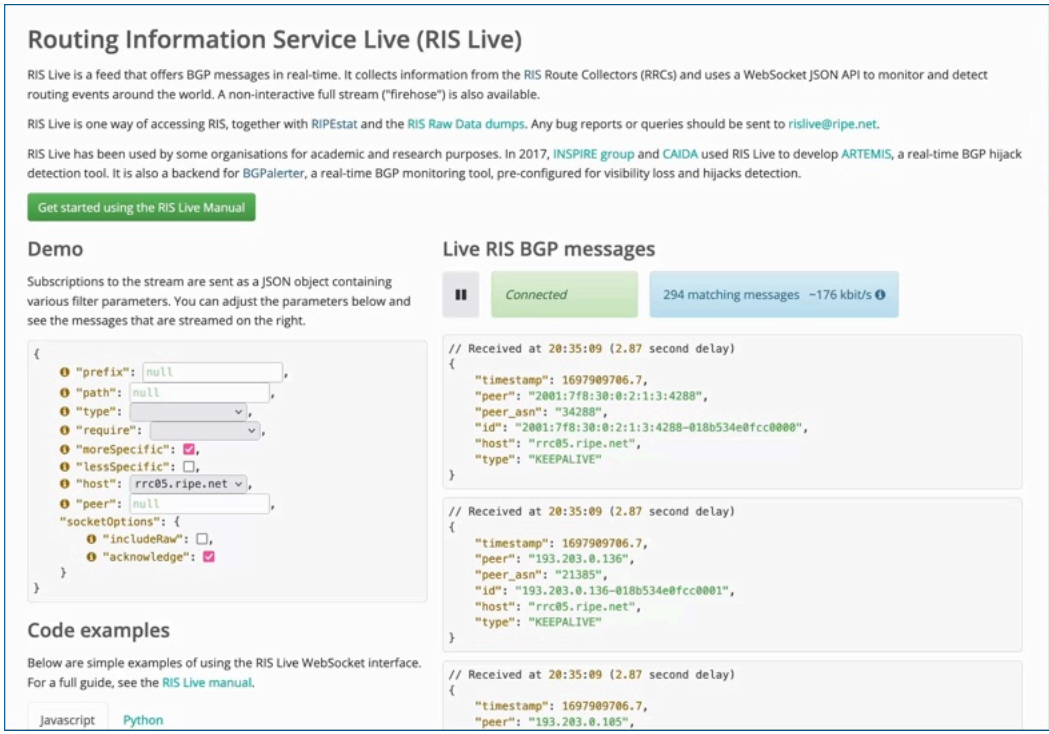
Who is RIS for?

- Network operators
  - To monitor Internet routing and to troubleshot accidents
  - Build open source tools based on RIS Data
- Researchers
  - To investigate notable routing incidents (i.e. network disruptions in specific countries, service outages, etc.)
- Policy makers
  - To develop future plans based on routing trends

How Can You Use RIS?

- Raw data - archived MRT files
- RIS Live - Live stream
- RISwhois - Whois query interface
- RIPEstat - Routing check, BGPlay visualisations

- Find more at ris.ripe.net



Other Tools That Use RIS

- Hurricane Electric BGP Toolkit
  - Provides a **dashboard** to locate Internet number resources and access network data
- BGPalerter
  - This software **monitors** RIS data in near real-time to detect route hijacks and other incidents
- Internet Health Report, Georgia Tech/IODA
  - These research projects use RIS data to build experimental views using Internet routing data

RIS Future Plans

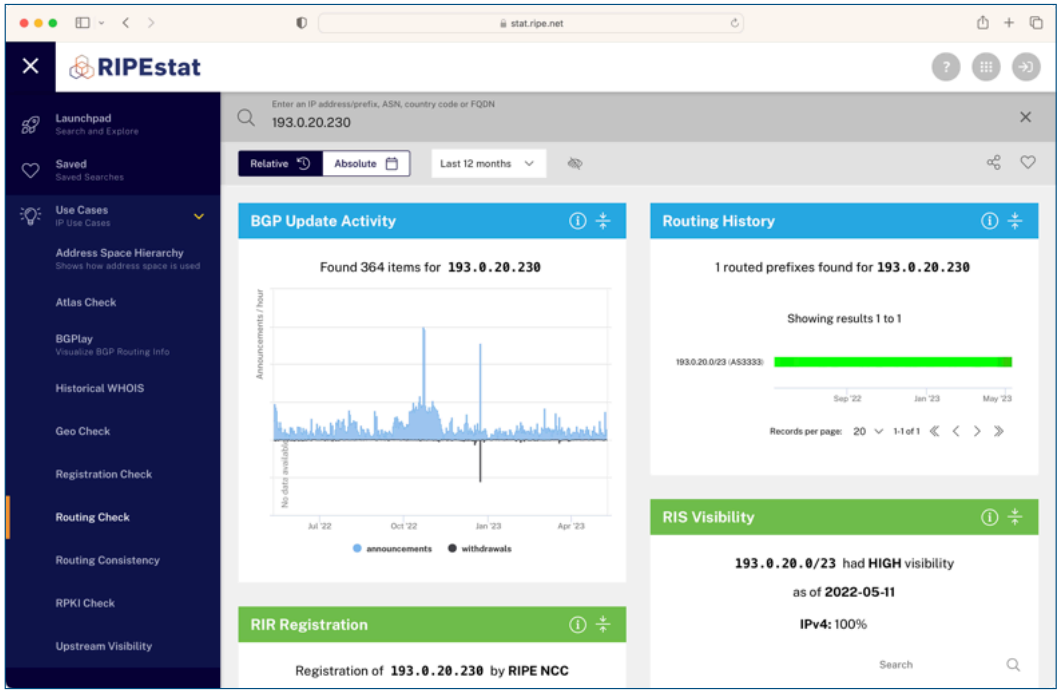
- Improvements to RIS data through peering coordination
  - We aim to add at least one peer per country in our service region that is not yet covered in RIS
  - Working on our new peering strategy
- Define a process to get access to kafka directly
- Open-source RIS Live

- View our quarterly planning for RIPE RIS

RIPEstat

What is RIPEstat?

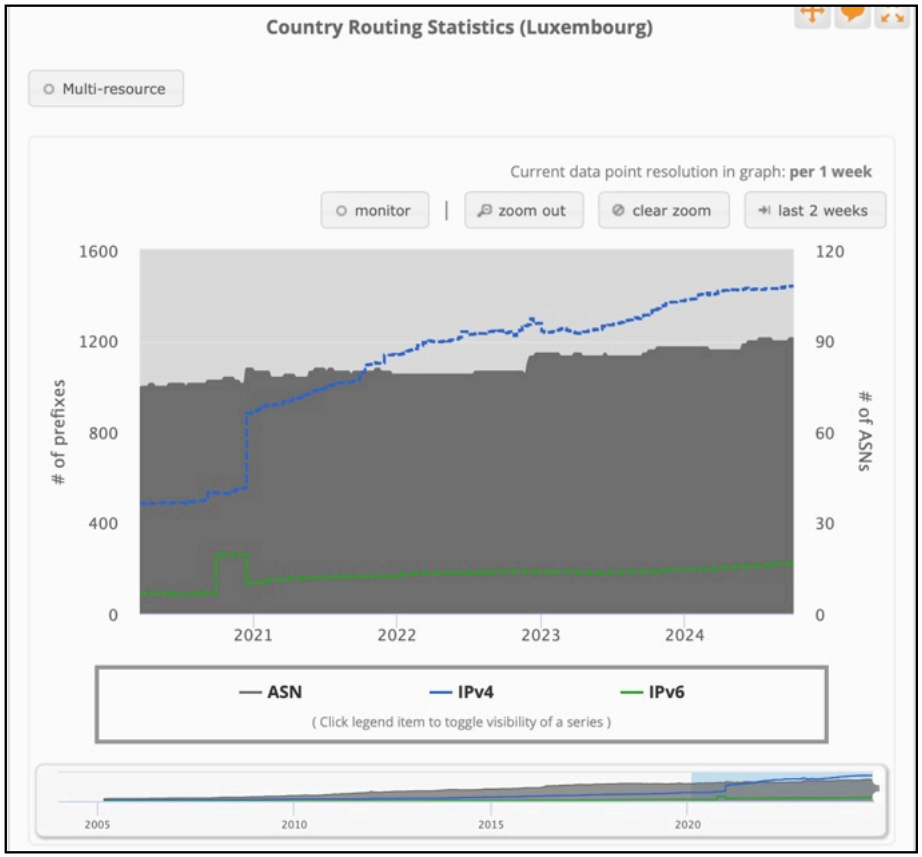
- Information service for Internet-related data
- RIPEstat provides:
  - information on IP address space and Autonomous System Numbers (ASNs)
  - statistics on specific hostnames and countries
  - visualisations of Internet routing

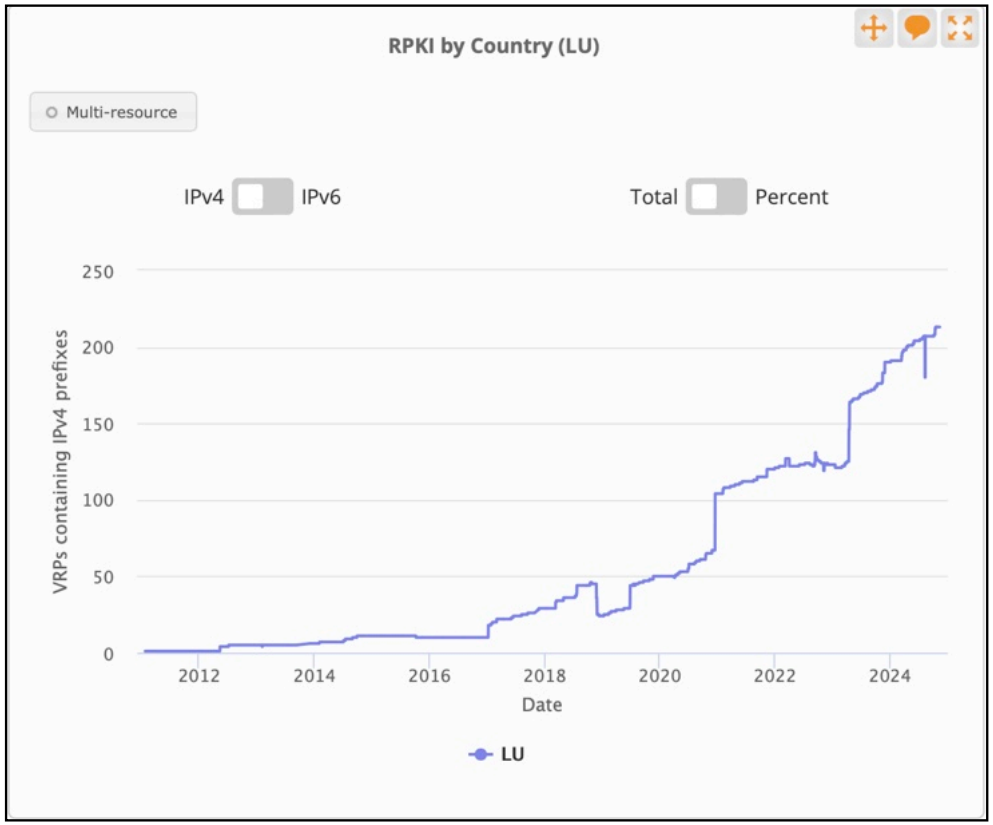


RIPEstat Data Sources

- More than 35 different datasets
  - RIPE Database and the registry data from other RIRs
  - BGP routing data (RIS)
  - RIPE Atlas
  - Geolocation
  - RPKI
  - M-Lab, Speedchecker, etc.
  - More details at https://stat.ripe.net/data-sources
- New datasets are constantly added!
  - E.g. new feature to check multiple DNS-based blocklists in real-time

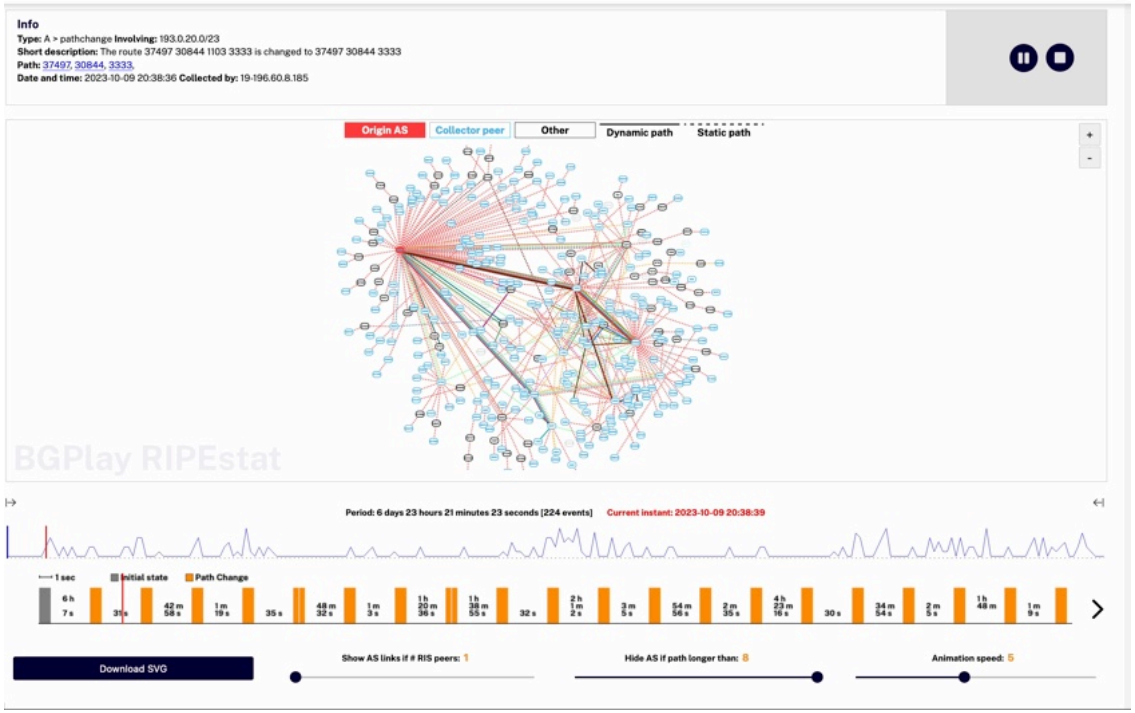
Use Cases: Country Stats – LU





Use Cases: BGPlay

- BGPlay shows the routing history related to a specific set of resources (prefixes, Autonomous Systems, IPs)
- BGPlay visualises changes in BGP announcements for a specific destination over time
- As seen by RIS



Questions

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