RIPE NCC
RIPE NETWORK COORDINATION CENTRE

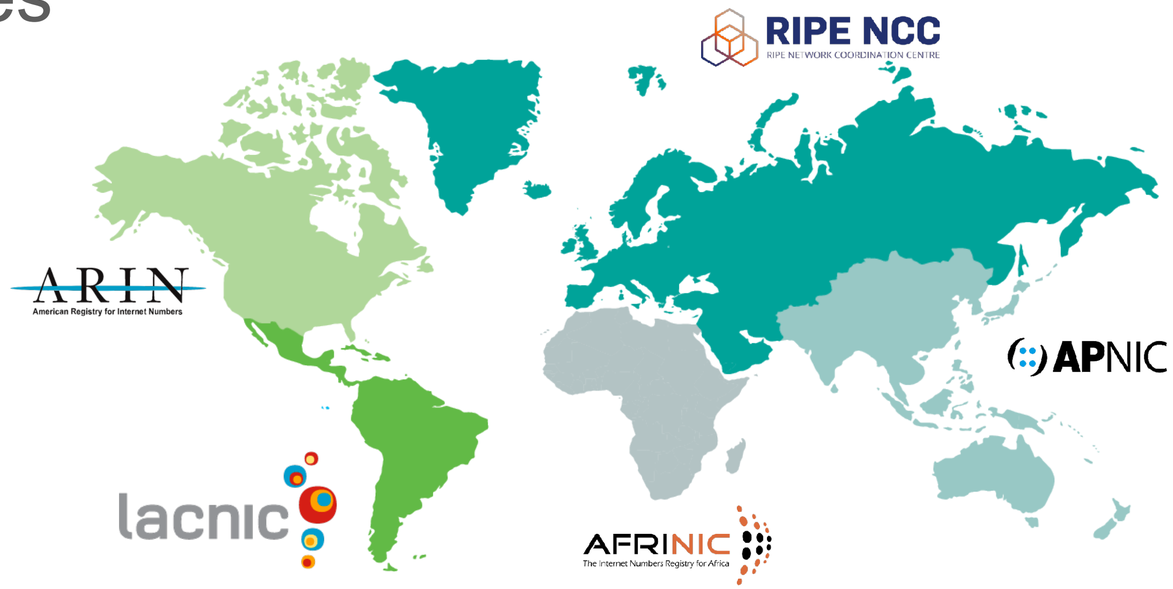
RIPEstat, RIPE Atlas and RIS

RIPE NCC Tools

Christian Teuschel | 15 June 2022 | M3AAWG 55th GM

RIPE NCC

- Regional Internet Registry (RIR)
- Not-for-profit, membership-based (association)
- Funded by membership fees
- Based in Amsterdam
- Established in 1992
- ~180 employees
- https://www.ripe.net



What does the RIPE NCC do?

- Distributes IPv6, IPv4 and AS Numbers to 24,000 members in 76 countries
- Operates the RIPE Database
- Provides many tools and services for members and the wider Internet community
  - RPKI
  - K-root
  - Etc.
- This presentation focuses on three tools

RIPE NCC Tools

- Routing Information Service (RIS)
  - https://ris.ripe.net
- RIPE Atlas
  - https://atlas.ripe.net
- RIPEstat
  - https://stat.ripe.net

Routing Information Service (RIS)

https://ris.ripe.net

What is RIS?

- RIS is a routing data collection platform
- Collecting BGP data since 1999
- Up-to-date routing information, as opposed to information in databases and routing registries, such as:
  - What is being announced
  - Which prefixes are seen and where
  - Which ones are not seen

THANK YOU TO OUR COMMUNITY

22 collectors

1,377 global peers

Why collect BGP data?

- The Internet routing system doesn’t have built-in security mechanisms
- Better visibility = greater security = lower risk of a BGP hijack

Who is RIS for?

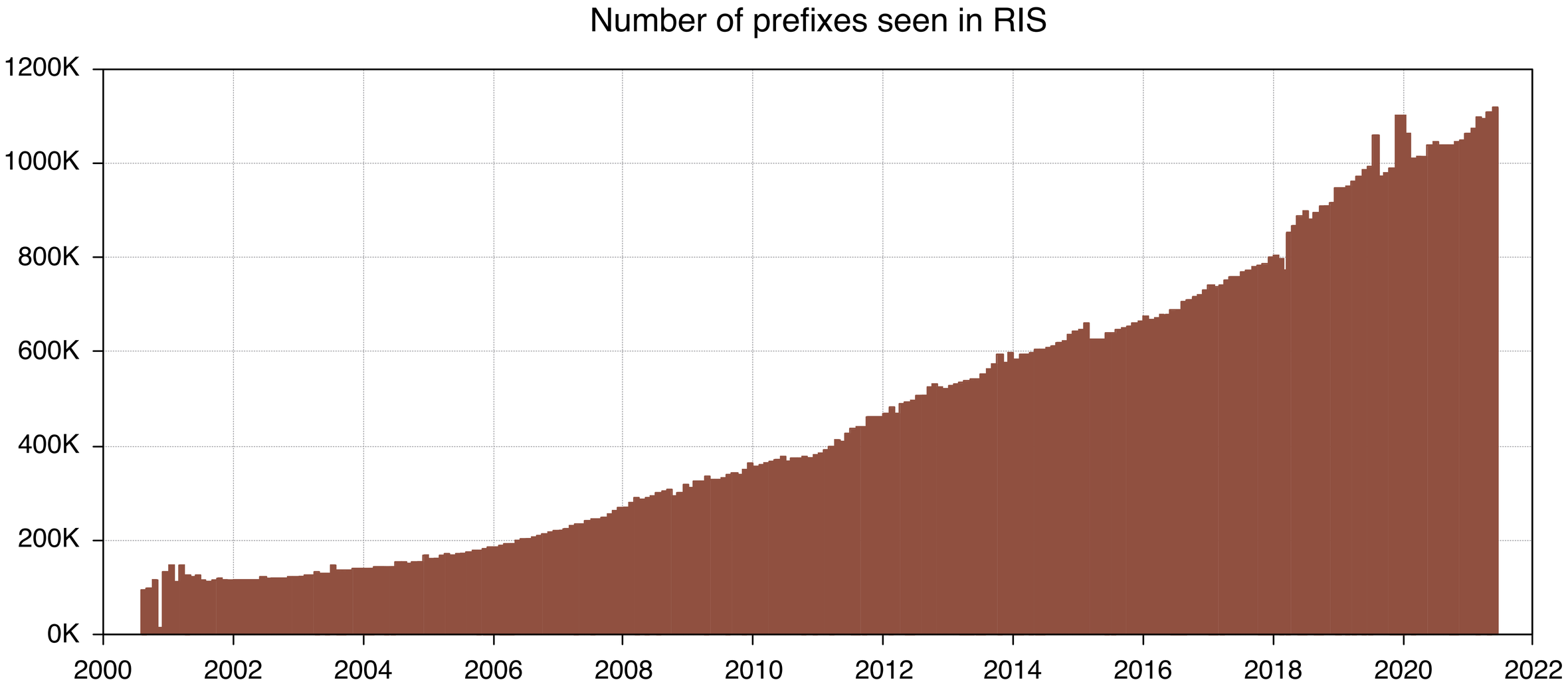
- Network operators, policy makers
  - To check specific routing incidents
  - To troubleshoot Internet routing
  - To develop future plans based on routing trends

- Researchers
  - To investigate notable events occurring on the Internet (i.e. network disruptions in specific countries, Facebook outages, etc.)

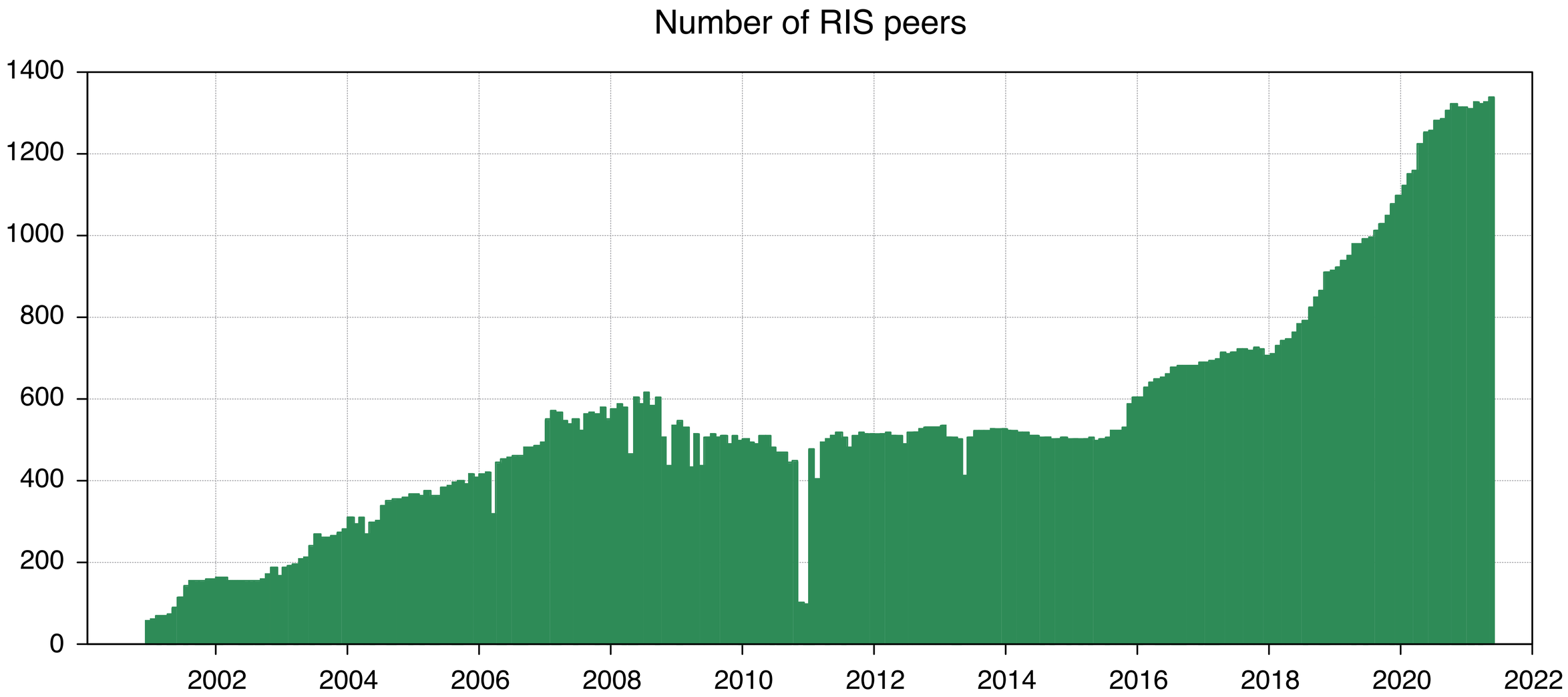
How can you use RIS?

- Available as:
  - Raw data (https://www.ripe.net/analyse/internet-measurements/routing-information-service-ris/ris-raw-data)
  - Live stream (RIS Live, https://ris-live.ripe.net/)
  - Whois query interface (RISwhois, https://www.ripe.net/analyse/archived-projects/ris-tools-web-interfaces/riswhois)
- Data and visualisations available in RIPEstat
  - https://stat.ripe.net

BGP Growth – Number of Prefixes



RIS Growth – Number of Peers



Negative Effects of Growth

- More data does not bring more diversity in routes
- More peers bring more noise into the data
- More input data causes bigger delays for output data

Planned Improvements

- Pipeline improvements (shorter delays for output)
- Peering coordination:
  - Diversity encouraged
  - Increasing coverage in the RIPE NCC region
- Higher multi-hop capacity
- Metadata for our multi-hop collectors

Come peer with us!

- We are inviting **representative networks** in Croatia, Czech Republic, Greece, Hungary and Slovakia to peer with RIS!
  - Send us an email: ris-peering@ripe.net
  - Send us a peering request: https://www.ris.ripe.net/cgi-bin/peerreg.cgi
  - Provide a full feed when possible
- Goals
  - Better routing visibility and more security for:
    - Your network
    - Your country
    - The Internet

RIS Collectors

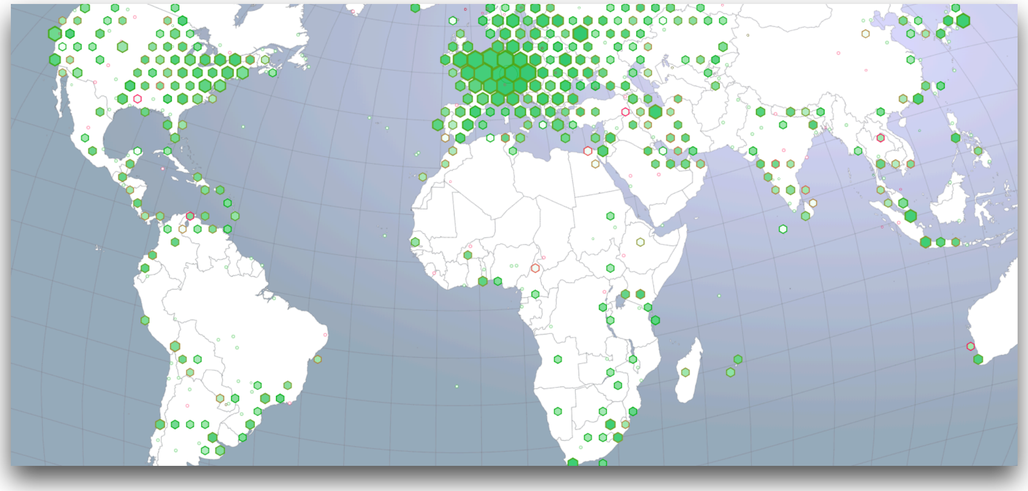
Collector	Location	IXP	Deployed	Removed	Collector	Location	IXP	Deployed	
RRC00	Amsterdam	Multi-hop	1999		RRC13	Moscow	MSK-IX	2005	
RRC01	London	LINX	2000		RRC14	Palo Alto	PAIX	2005	
RRC02	Paris	SFINX	2001	2008	RRC15	Sao Paulo	PTT-Metro SP	2006	
RRC03	Amsterdam	AMS-IX	2001		RRC16	Miami	NOTA	2008	
RRC04	Geneva	CIXP	2001		RRC18	Barcelona	CATNIX	2015	
RRC05	Vienna	VIX	2001		RRC17				
RRC06	Tokyo	DIX-IE	2001		RRC19	Johannesburg	NAPAfrica JB	2016	
RRC07	Stockholm	Netnod	2002		RRC20	Zurich	SwissIX	2015	
RRC08	San Jose	MAE-West	2002	2004	RRC21	Paris	FranceIX	2015	
RRC09	Zurich	TIX	2003	2004	RRC22	Bucharest	InterLAN	2017	
RRC10	Milan	MIX	2003		RRC23	Singapore	Equinix SG	2017	
RRC11	New York	NYIIX	2004		RRC24	Montevideo	LACNIC multi-hop	2019	
RRC12	Frankfurt	DE-CIX	2004		RRC25	Amsterdam	RIPE multi-hop	2021	

RIPE Atlas

https://atlas.ripe.net

What is RIPE Atlas?

- A global platform for active Internet measurements
- Operated by the RIPE NCC with the support and involvement of the Internet community
- Focused on “network-level” connectivity and reachability
- Since 2010: the long term and sustainability in mind
- 11k+ measurement devices
- Hosted by volunteers



RIPE Atlas Measurement Devices

- Hardware-based probes
  - Versions 1 & 2: Lantronix XPort Pro
  - Version 3: TP-Link TL-MR3020
  - Version 4: NanoPi NEO Plus2
  - Version 5: Turris MOX (by CZ.nic)

- Software-based probes
  - Functionally similar to hardware-based probes
  - Allow for easier deployment and distribution, but dependent on host resources
  - Supported hosts: CentOS7/8, Debian (9 and 10), Docker, Rasbian and Turris Routers
  - https://atlas.ripe.net/docs/software-probe/

RIPE Atlas Measurement Devices

- RIPE Atlas Anchors
  - Probes with enhanced measurement capacity set up at special locations
  - Act as highly reliable measurement targets

Measurements in RIPE Atlas

- Types of measurements
  - Ping, Traceroute, DNS, SSL, NTP
  - HTTP (with limitations)
- Built-in measurements
  - Created by the system
- Custom measurements
  - Created by users
  - Require RIPE Atlas credits
- Credit system to guarantee fairness and prevent abuse
  - Earned by hosting probes, spent by creating measurements

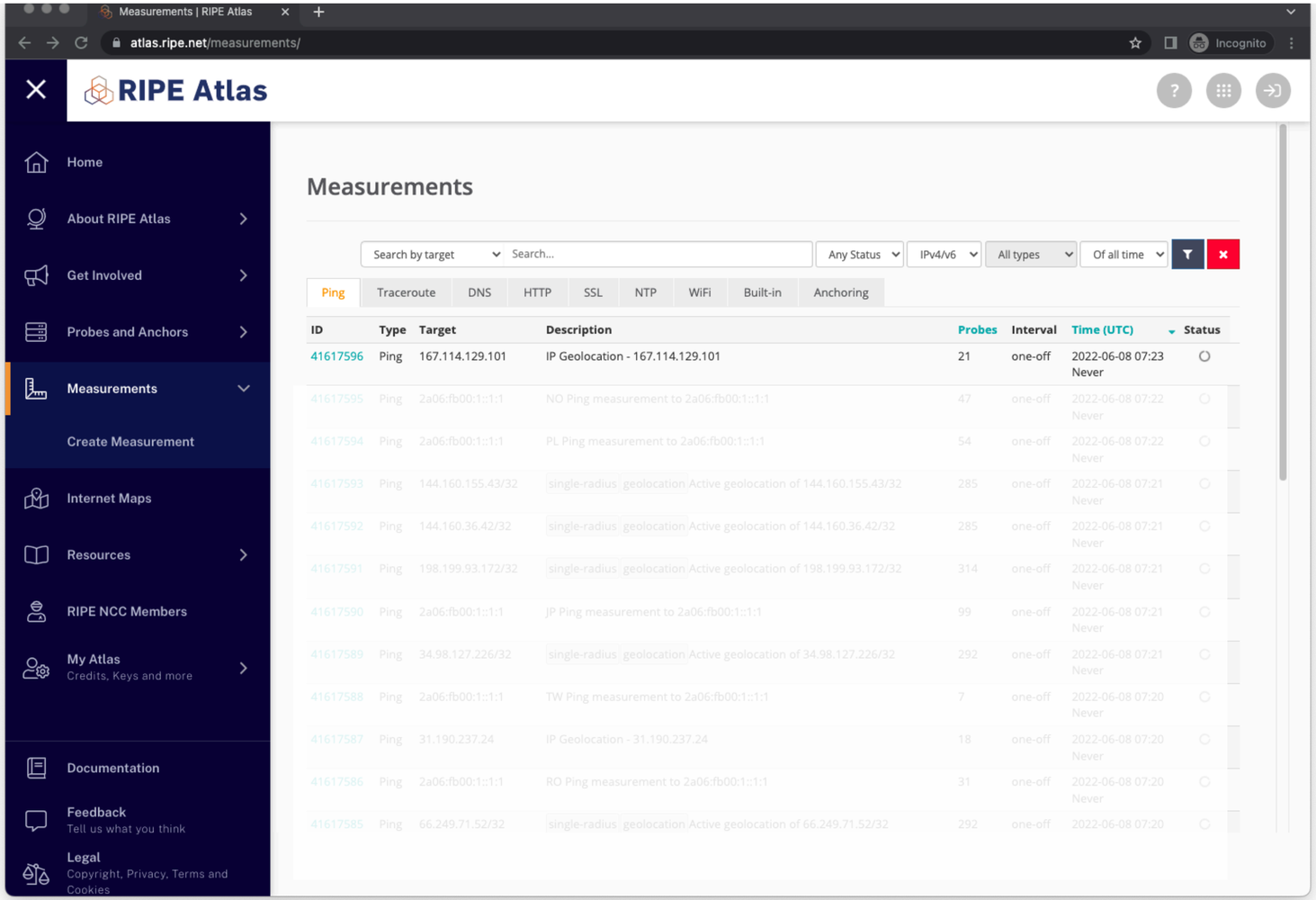
Stakeholder Benefits of RIPE Atlas

- For probe hosts
  - Baseline results; collect credits; provide a vantage point for others; feel good
- For anchor hosts
  - All of the probe host benefits; be automatically measured
- For network operators/RIPE NCC members
  - Use external vantage points; share results and tools; get alerts*
- For researchers
  - Access to large volumes of collected data; extract new insights

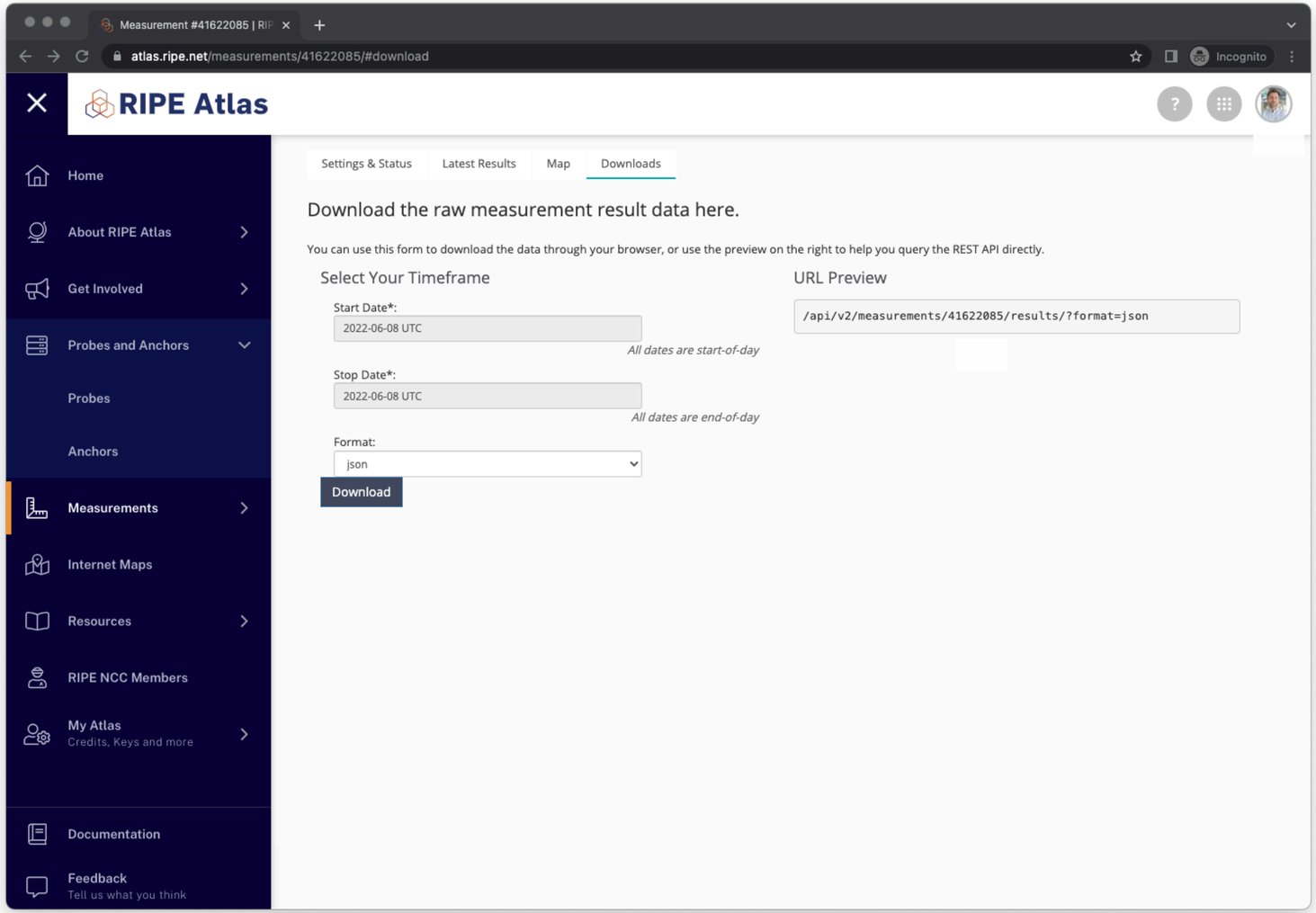
Accessing Measurement Data

- Existing measurement data can be accessed without login or credits
- Via the user interface
  - https://atlas.ripe.net/measurements/
  - Various filter mechanisms
  - Select a measurement for details and download data (JSON)
- Or via REST-API
  - https://beta-docs.atlas.ripe.net/apis/

Accessing Measurement Data



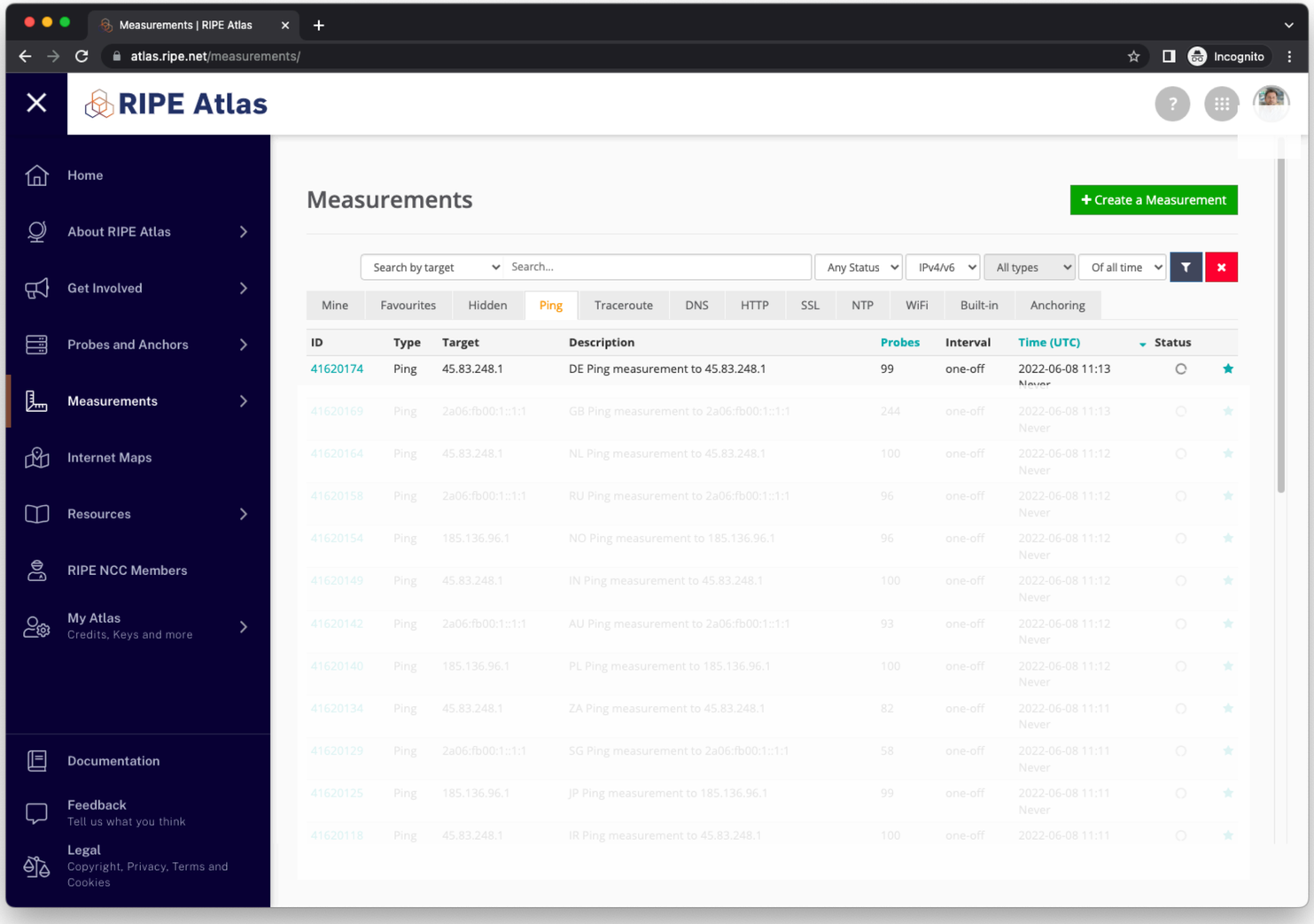
Accessing Measurement Data



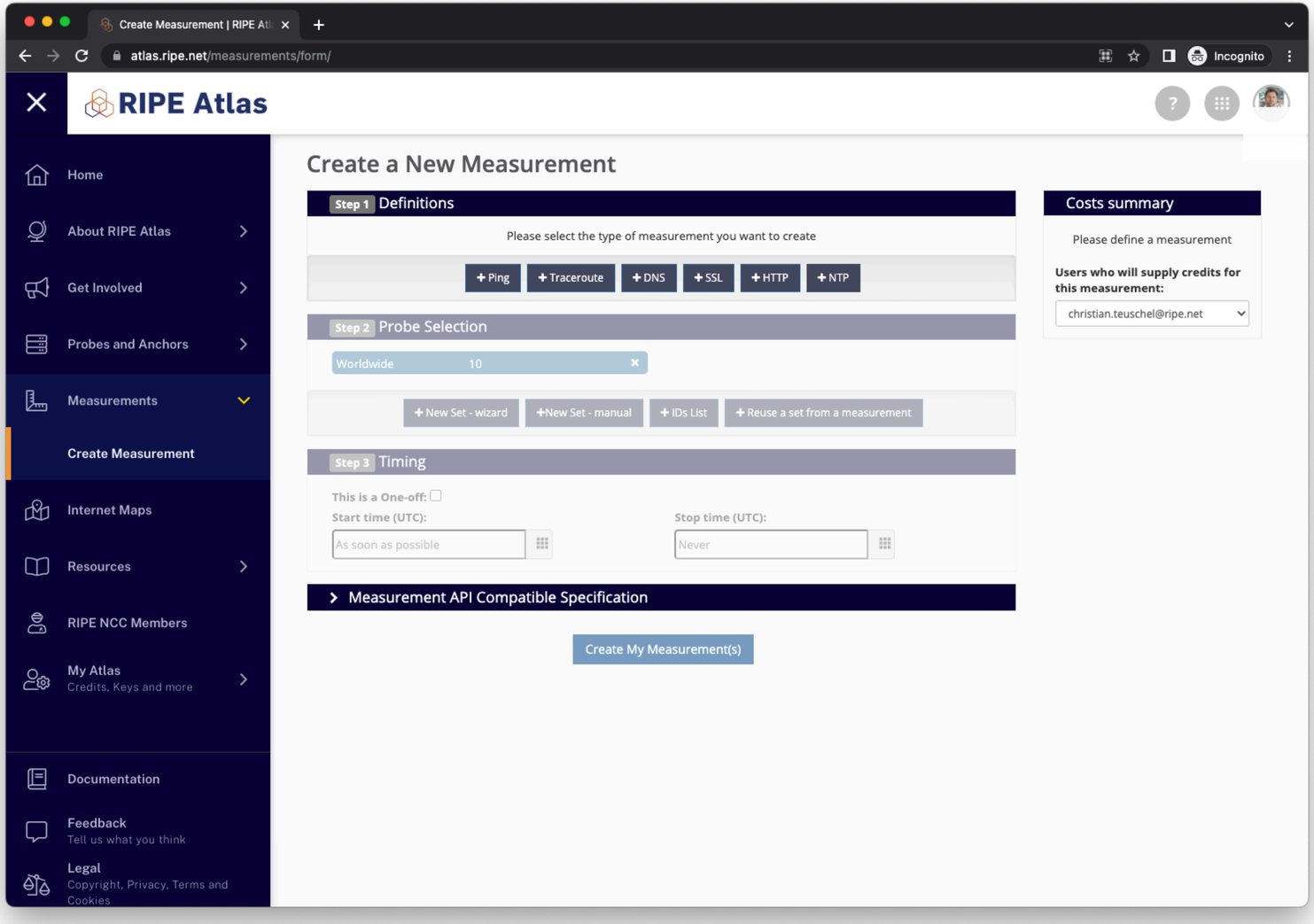
Creating Measurements

- Creating a measurement requires:
  - A RIPE NCC Access account
  - RIPE Atlas credits
- Via the user interface:
  - https://atlas.ripe.net/measurements/form/
- Or via REST-API:
  - https://beta-docs.atlas.ripe.net/apis/

Creating Measurements

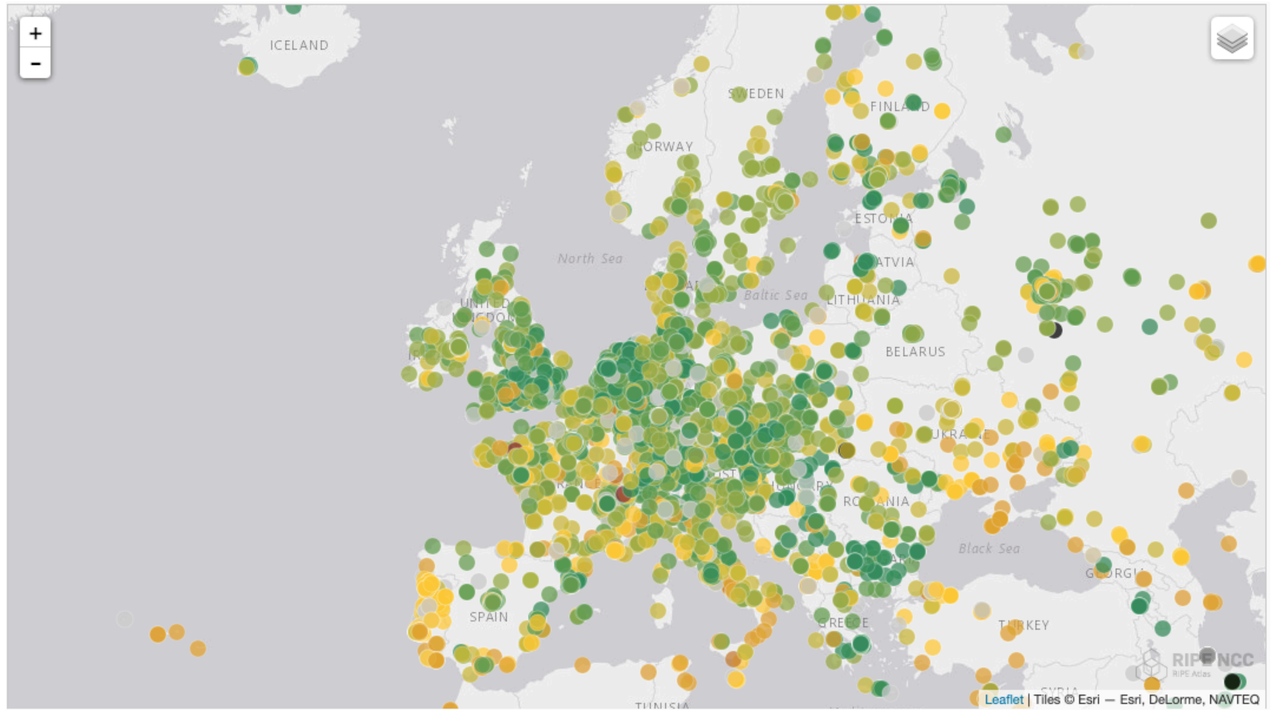


Creating Measurements



Internet Maps

- Measurement data provides insights on a global level
- https://atlas.ripe.net/results/maps/
  - E.g. RTT to K-root



Security Aspect

- Probes connect to the infrastructure using SSH
- The very reason to run a probe is to measure, so outgoing ping, traceroute, DNS, TLS, etc. to all over is the expected behaviour!
- The probes don’t have any publicly open ports
  - They only initiate connections
  - This works fine with NATs too
- Probes don’t listen to local traffic; no passive measurements are running
  - There’s no snooping around

Apply for a RIPE Atlas Probe

- Hardware probe
  - Standard probe: https://atlas.ripe.net/get-involved/become-a-host/
  - Anchor: https://atlas.ripe.net/anchors/apply/
- Software probe
  - Build a software probe from source: https://github.com/RIPE-NCC/ripe-atlas-software-probe
  - Register your probe: https://atlas.ripe.net/apply/swprobe/

RIPEstat

https://stat.ripe.net

What is RIPEstat?

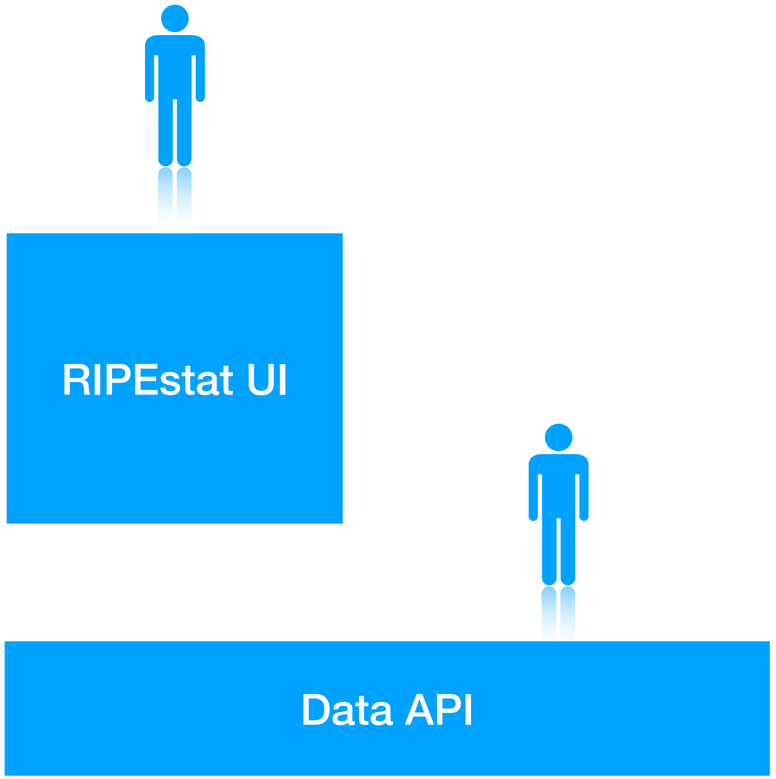
- Open data platform for RIPE NCC data
  - RIPE Database, RIS and RIPE Atlas
- Large-scale information service for Internet-related data
- Data insights for Internet number resources, hostnames (FQDN) and countries

Data Sets on RIPEstat

- More than 35 different data sets
  - RIPE Database (INR, IRR) and other RIRs’
  - BGP routing data (RIS)
  - RIPE Atlas, M-Lab, Speedchecker, Meter.net, etc.
  - Geolocation
  - Blocklists
  - More details at https://stat.ripe.net/data-sources
- New data sets are constantly added!
  - E.g. new feature for RDNSBL

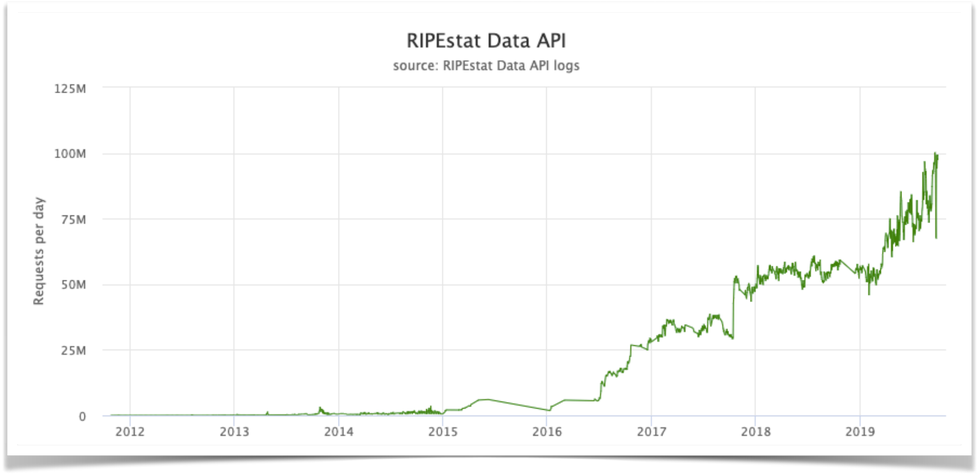
RIPEstat Interfaces

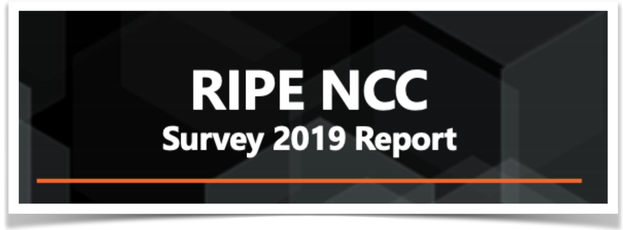
- RIPEstat UI
  - UI2020 (latest user interface)
    - https://stat.ripe.net/app/launchpad
  - UI2013 (previous user interface)
    - https://stat.ripe.net/ui2013/
- RIPEstat Data API
  - Raw, uninterpreted data



RIPEstat Data API

- Core of RIPEstat
- Powering RIPEstat UIs and many other use cases

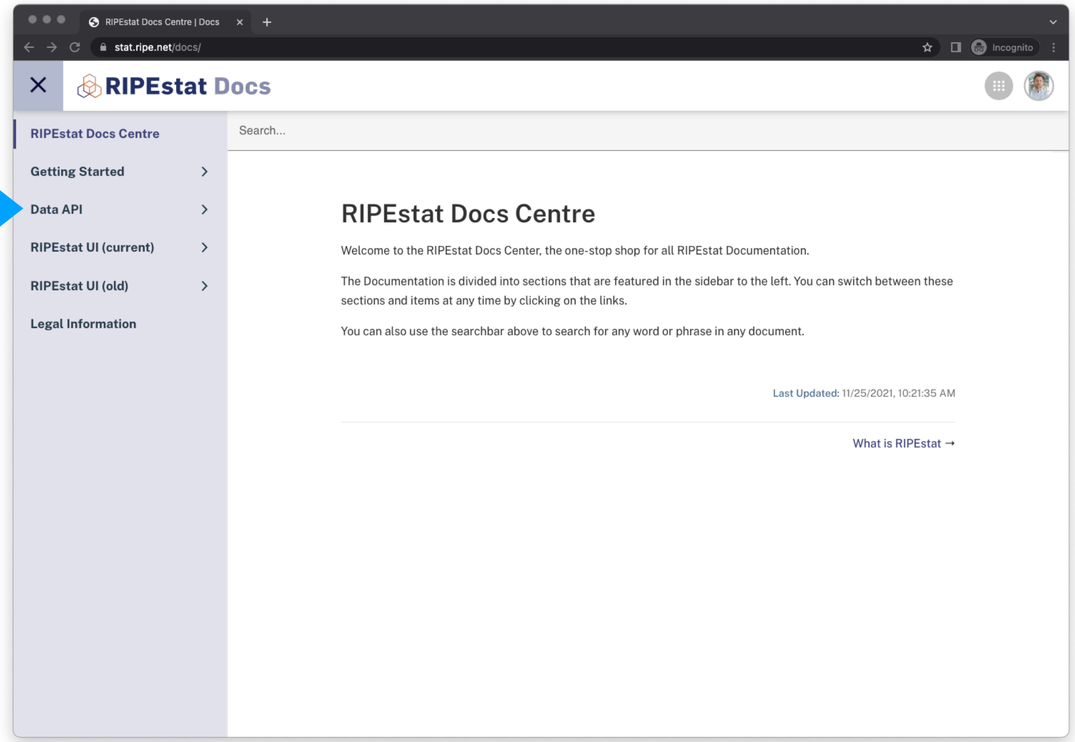




"RIPEstat is the most-used tool of RIPE NCC tools and services…"

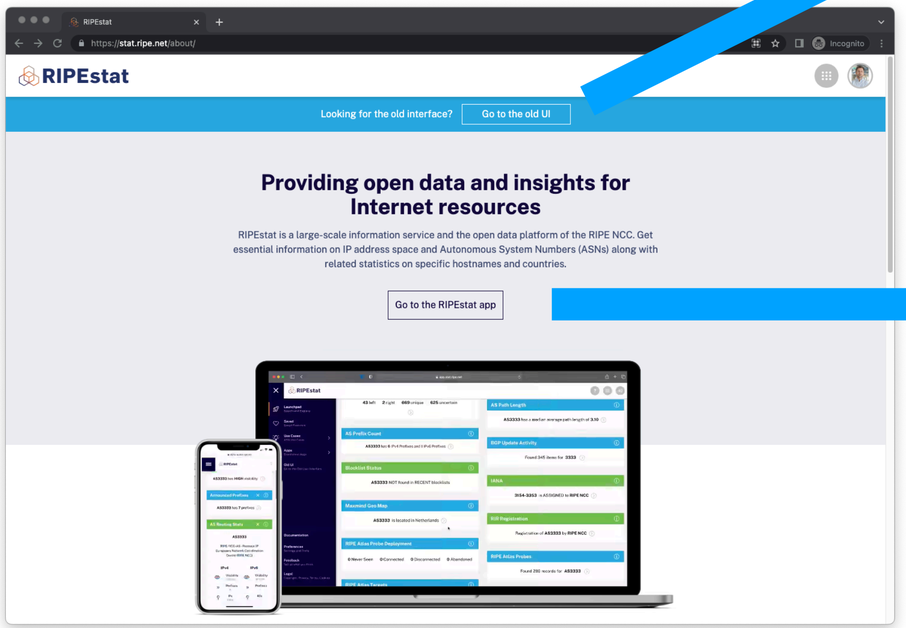
RIPEstat Data API

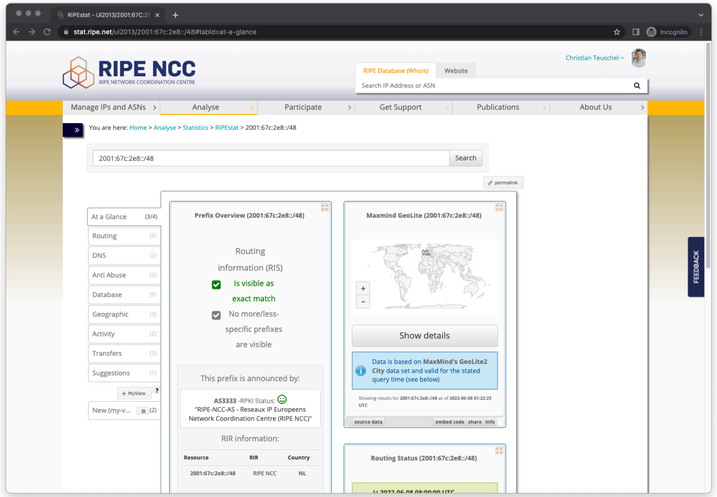
- JSON-RPC API
  - E.g. https://stat.ripe.net/data/prefix-overview/data.json?max_related=50&resource=193.0.20.0%2F23
- More than 50 data calls
- Documentation
  - https://stat.ripe.net/docs/

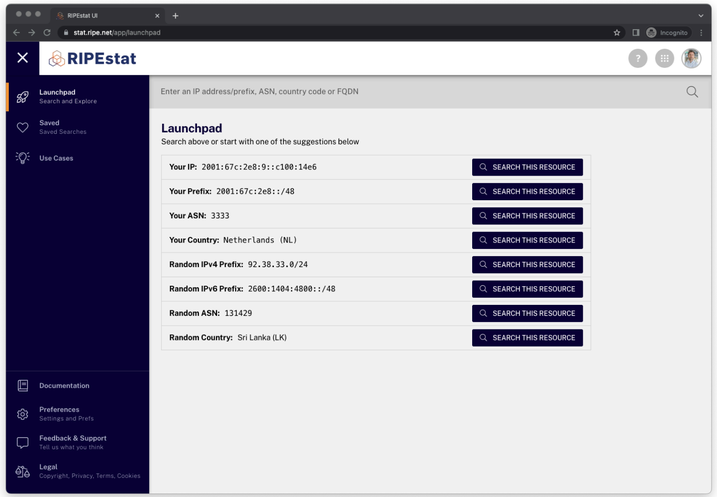


RIPEstat UIs

- UI2020 / UI2013
  - UI2013 will be open-sourced and discontinued by the RIPE NCC
  - https://stat.ripe.net







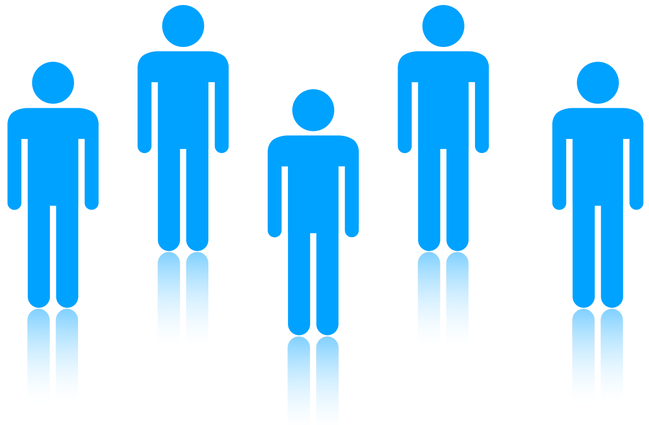
UI Example: BGPlay

- Tool to visualise/animate the state of BGP routing (“control plane”)
- Use cases:
  - Visibility analysis (IPv4/IPv6), route flapping
  - Multi-homed prefixes, prefix hijacks, etc.

Use Case Example: Anti-Abuse

- Provide an abuse contact for Internet resources
  - Full coverage for the RIPE NCC region
  - Best effort for other RIRs
- Blocklist feature
  - New interface for RDNSBL: https://stat.ripe.net/widget/dns-blocklists
- Are there other interesting data sets/features?
  - Must be linked to Internet number resources

RIPEstat Feedback



RIPE NCC RIPEstat Feature Tracker

https://ripestat.featureupvote.com/

usersnap

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Questions

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