RIPE & RIPE NCC

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Booking.com IT Day,
June 2014, Amsterdam

RIPE and RIPE NCC

RIPE

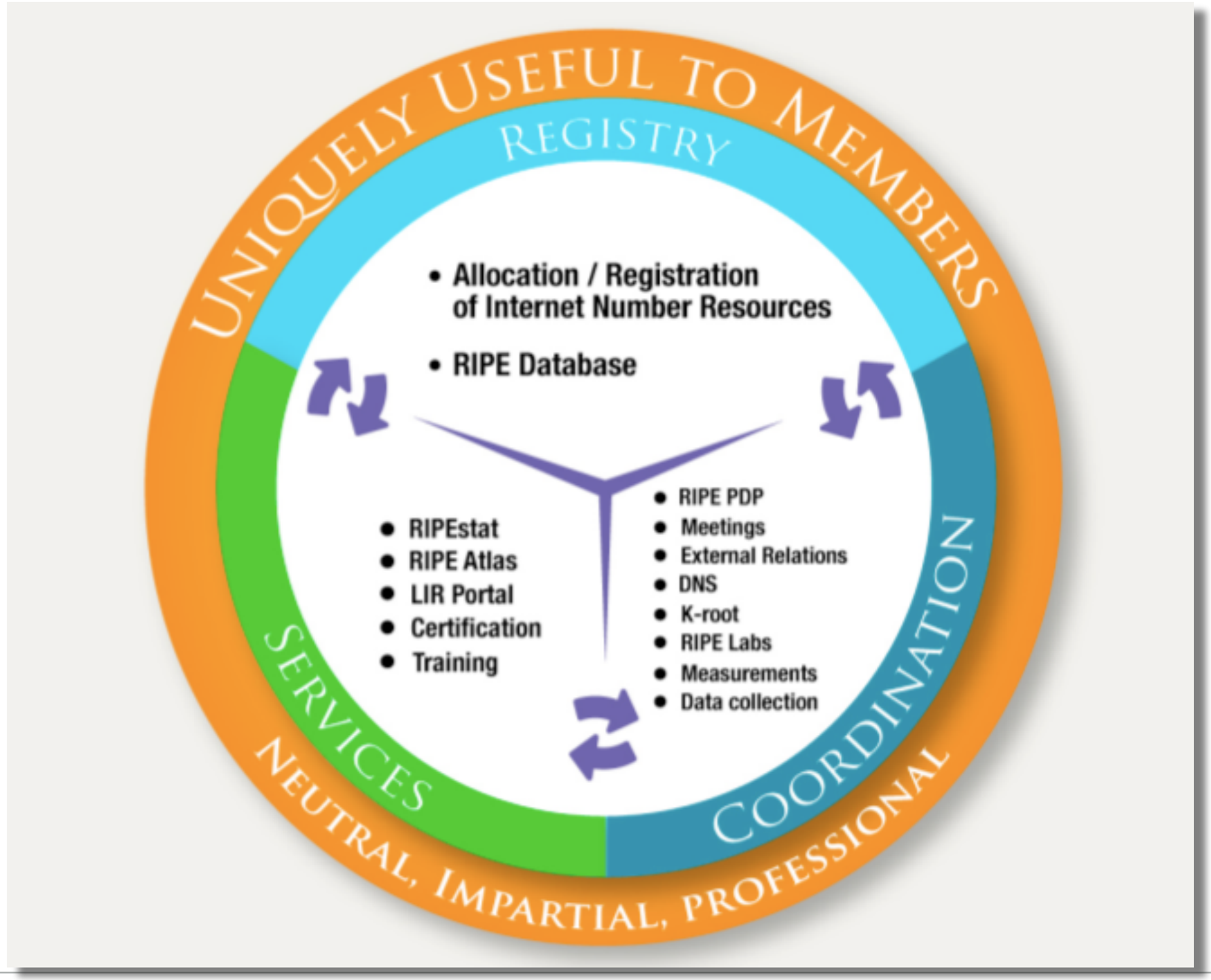
- Réseaux IP Européens
- Started in 1989
- Not a legal entity
- An open community
- No official membership
- Makes polices
- Meets twice a year
- Work is done in Working Groups on mailing lists

RIPE NCC

- RIPE Network Coordination Centre
- Started in 1992
- Not-for-profit organisation
- Located in Amsterdam
- Has members called Local Internet Registries (LIRs)
- Implements policies
- Facilitates two RIPE Meetings each year
- Provides services to both members and non-members
- Governed by an Executive Board elected by membership
- Neutral, Impartial, Open, Transparent

Five RIRs Worldwide

Not Only an Regional Internet Registry



RIPE NCC

Using RIPE Atlas and RIPEstat for Network Analysis

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Science Division
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Booking.com IT Day,
June 2014, Amsterdam

RIPEstat

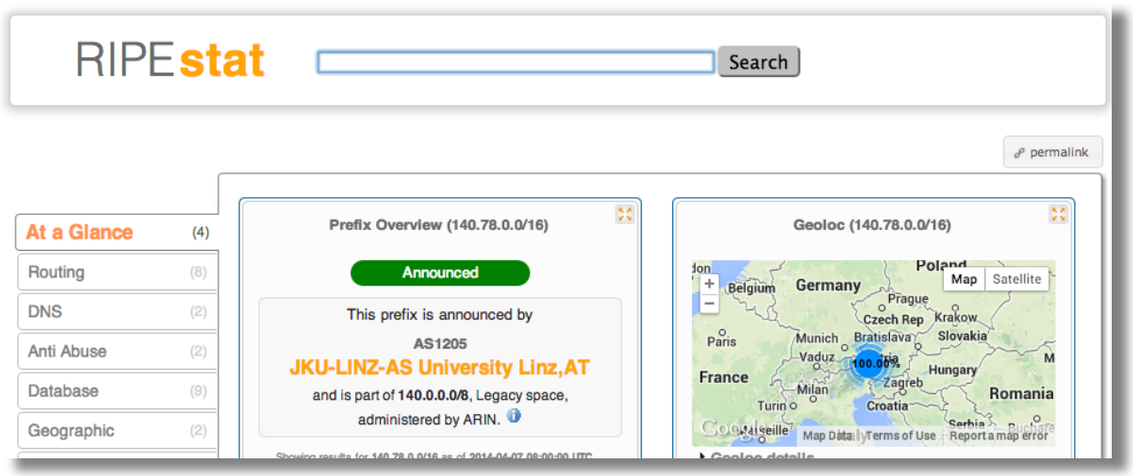
RIPE NCC

What is RIPEstat

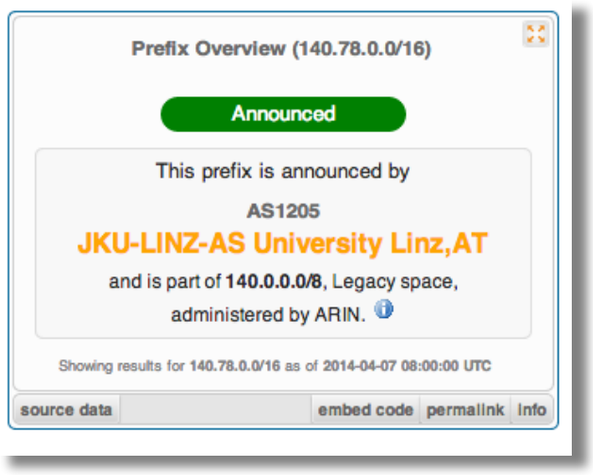
- Information system for Internet number resources
- Data
  - Routing data
    - Collected by RIS: http://ris.ripe.net
  - Registration data (whois)
    - RIPE Database & other RIR databases
  - MaxMind's geolocation data
  - Blacklist data
  - And many more: https://stat.ripe.net/data-sources

Interfaces Provided On RIPEstat

- RIPEstat Web



- RIPEstat Widget API



- RIPEstat Data API / RIPEstat Text API
  - https://stat.ripe.net/data/routing-status/data.json?resource=…

Lookup A Resource

- The result page

Use Case: Network Announced?

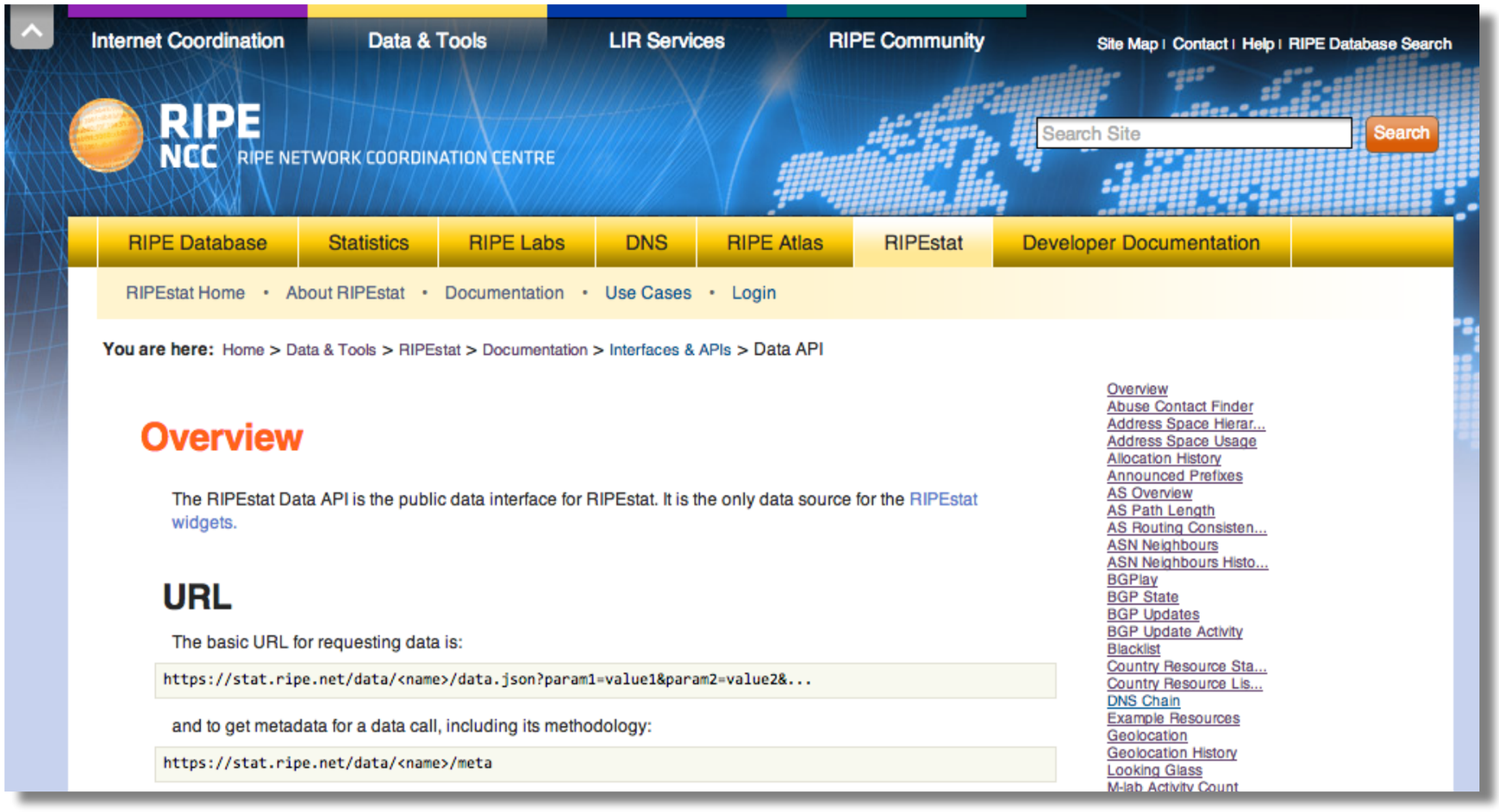
- Is my network announced?
  - https://stat.ripe.net/data/prefix-overview/data.json?resource=193/23


```
"cached": true,
"data": {
    "actual_num_related": 0,
    "announced": true,
    "asns": [
        {
            "asn": 3333,
            "holder": "RIPE-NCC-AS Reseaux IP Europeens Network Coordination Centre (RIPE NCC),NL"
        }
    ],
```


  - Feed it to your monitoring system (e.g. Icinga, Nagios…)
  - Build a custom application

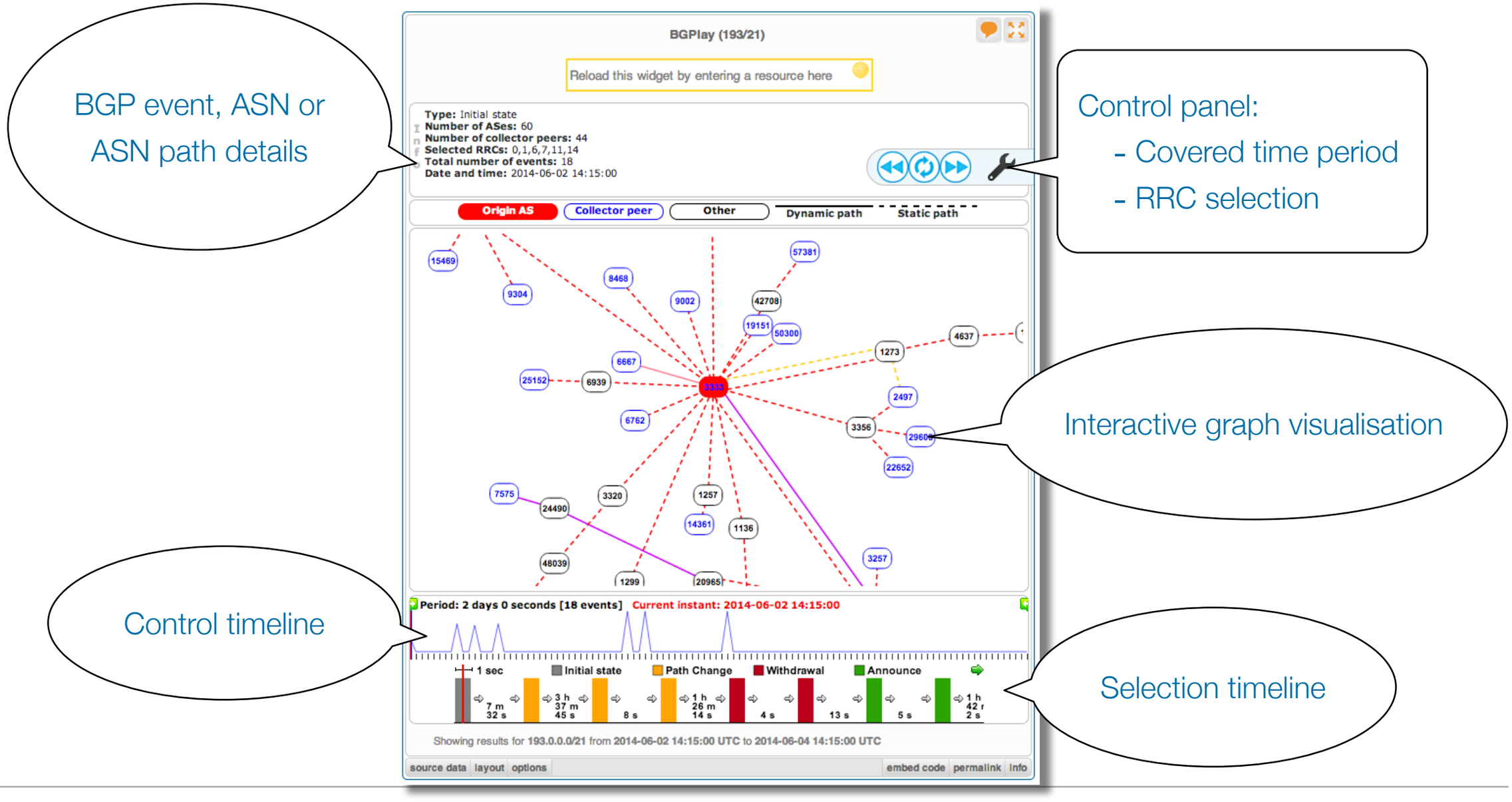
Use Case: Prefix Announced?

- Explore the RIPEstat Data API
  - With 40+ data calls
  - https://stat.ripe.net/docs/data_api



Use Case: BGPlay

- Analyse the routing status for your network!
  - https://stat.ripe.net/bgplay



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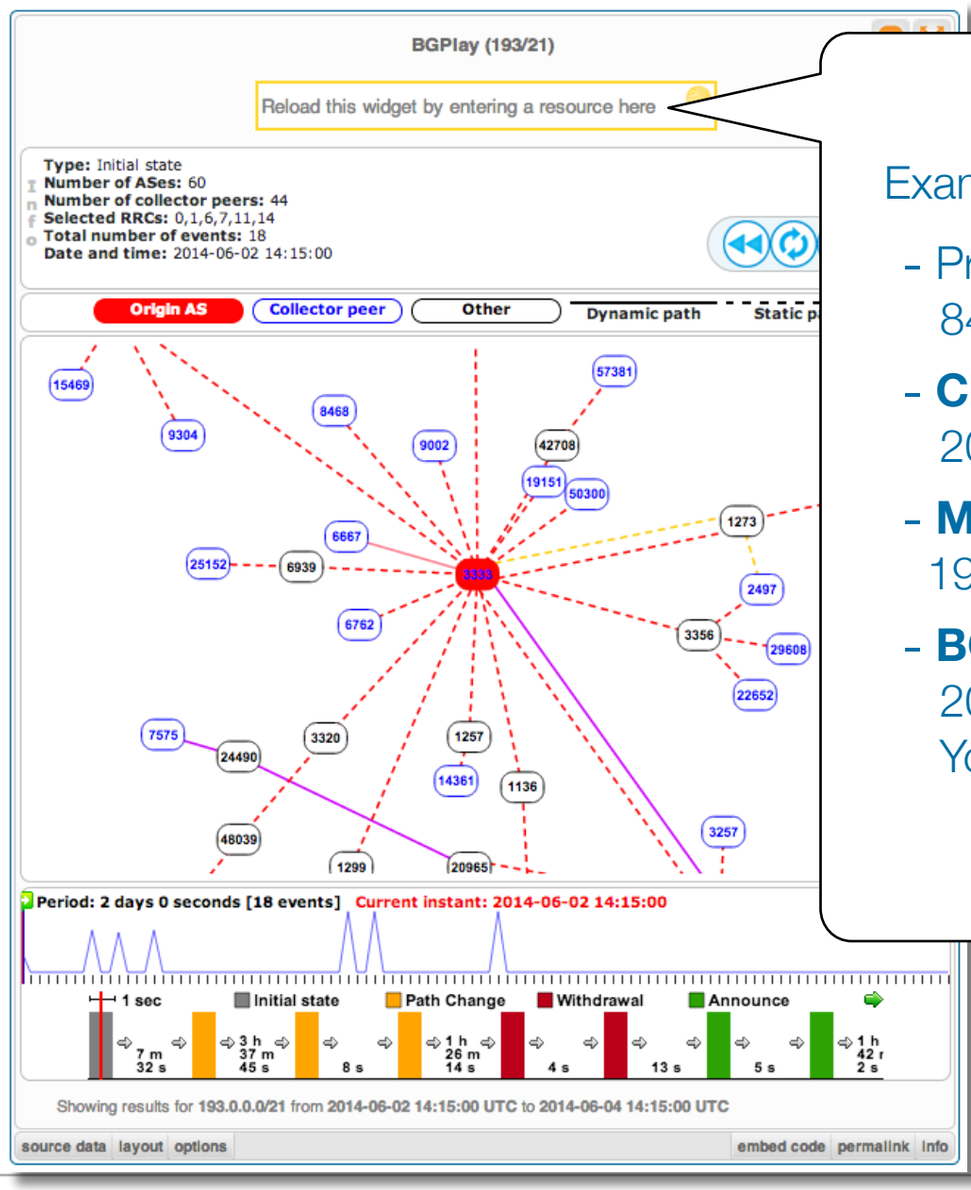
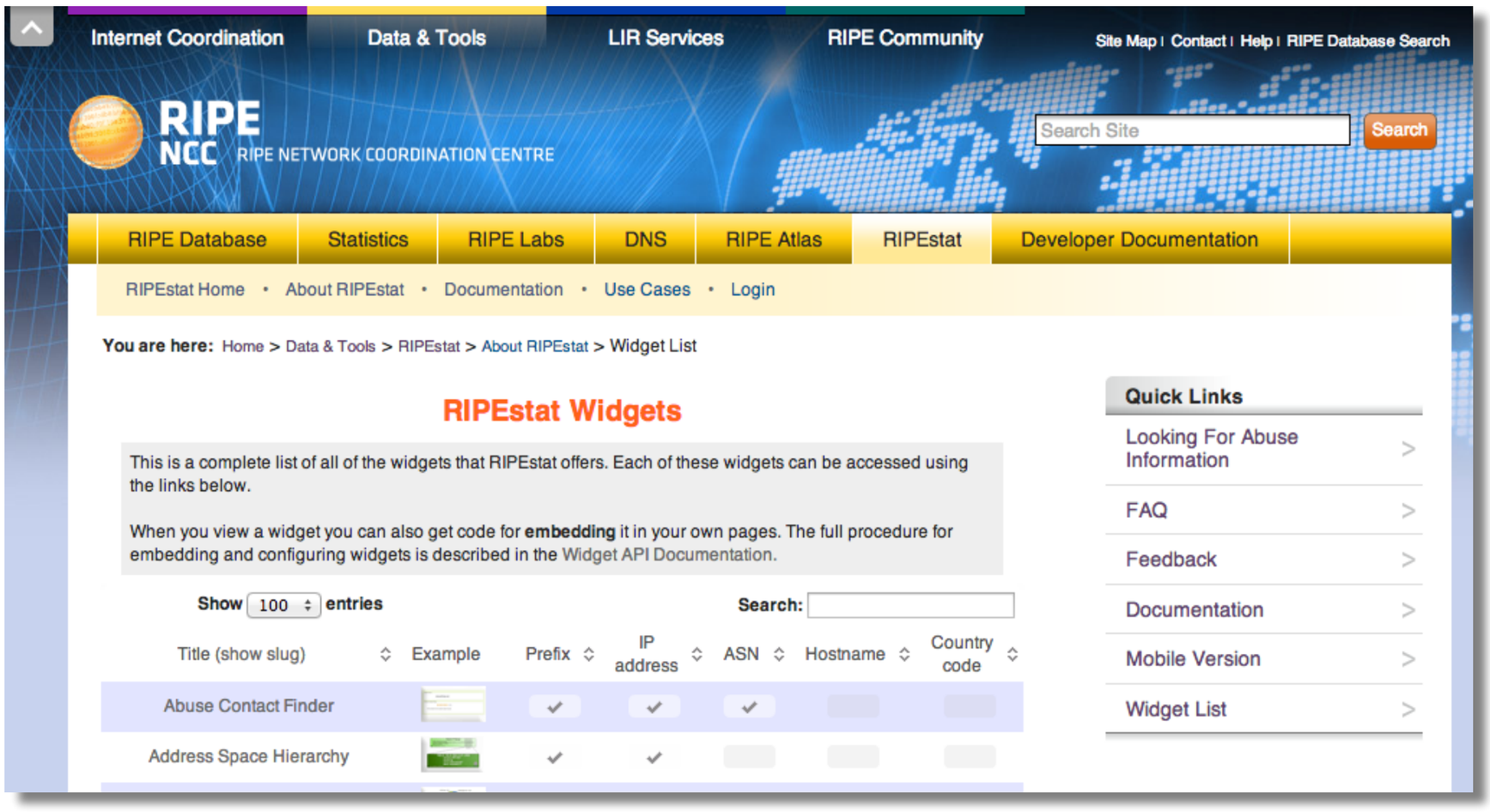


Examples:

- Prefix with **announcements** & **withdrawals**: 84.205.64.0/24
- **Check IPv6 connectivity**: 2001:67c:2e8::/48
- **Multi-homed** prefix: 199.7.80.0/24
- **BGP-Hijacking**
  2008-02-28: 208.65.153.0/24
  Youtube traffic by Pakistan Telecom AS17557

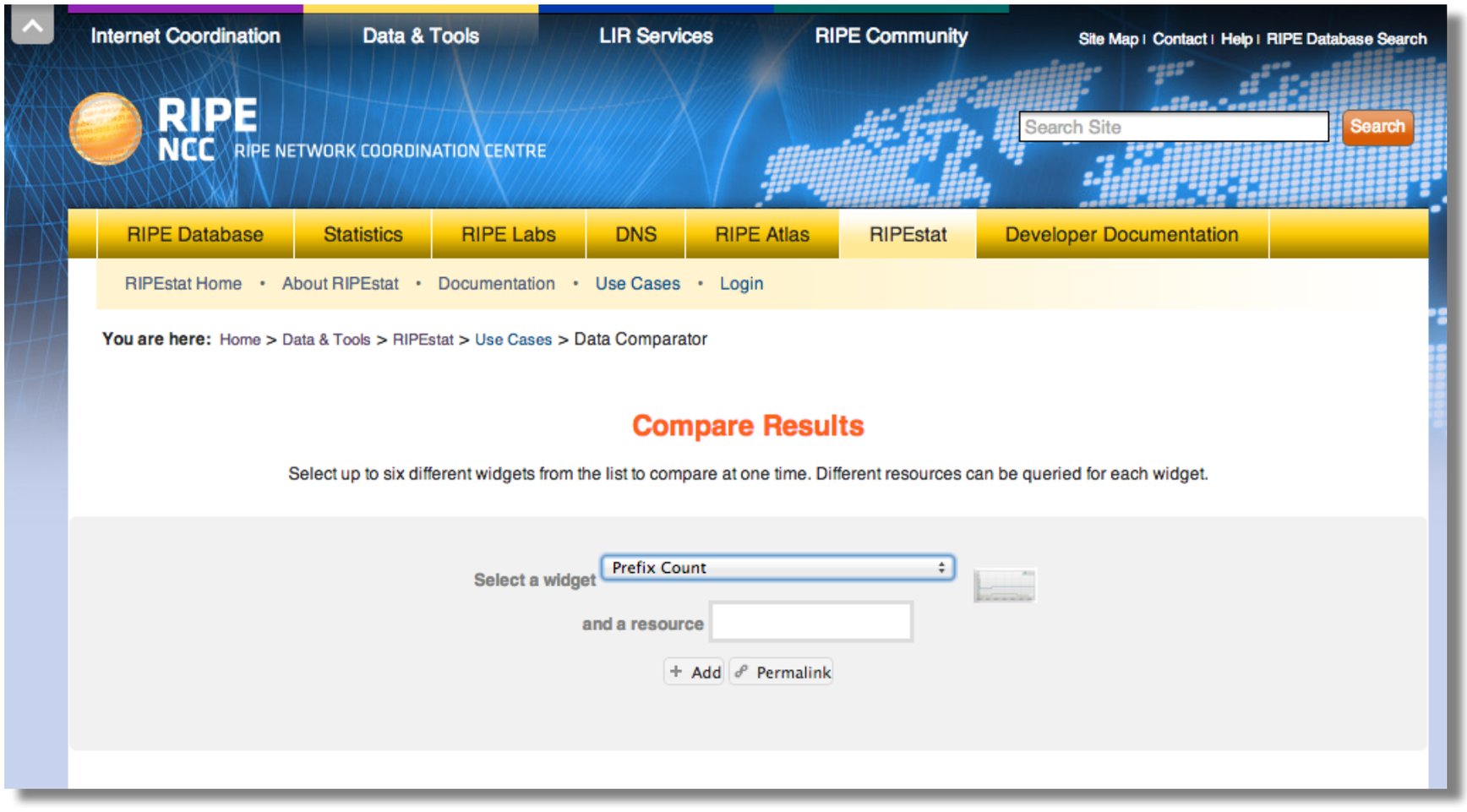
Use Case: Prefix Announced?

- Explore the RIPEstat Widget API
  - With 46 widgets
  - https://stat.ripe.net/widget/list



Use Case: Compare Results

- Compare the number of routed prefixes of two ASNs?
  - https://stat.ripe.net/special/compare-results



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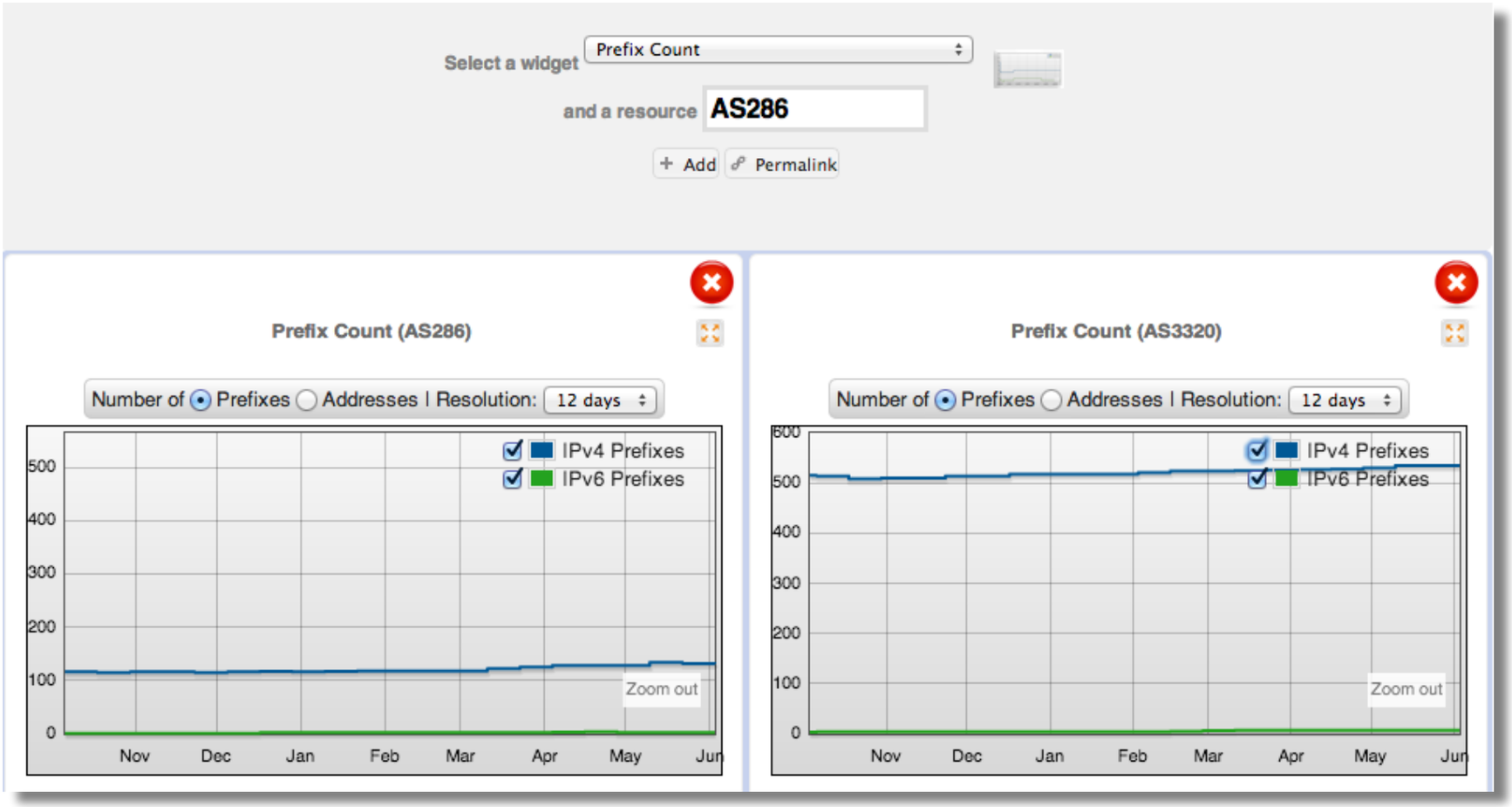
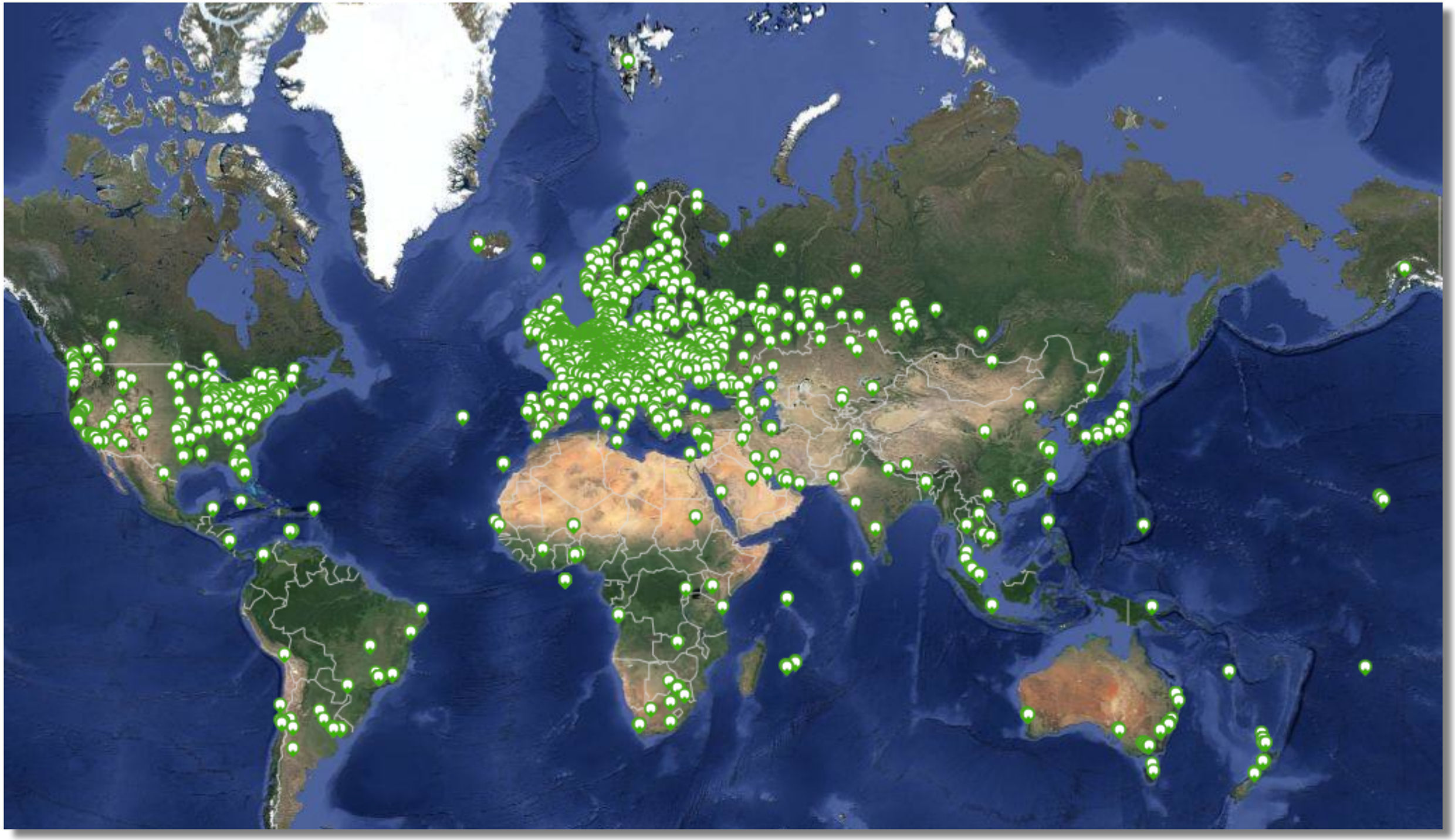


RIPE Atlas

https://atlas.ripe.net



RIPE NCC

RIPE Atlas in Numbers: June 2014

- 6,200+ probes connected
- 8,000+ active users this year
- Doing:
  - Built-in measurements
  - User-defined measurements
  - Four types of user-defined measurements available to probe hosts and RIPE NCC members: ping, traceroute, DNS, SSL

Country	Probes
United States	948
Germany	908
Russian Federation	773
France	721
United Kingdom	705
Netherlands	518
Ukraine	376
Belgium	214
Czech Republic	193
Italy	191

- Goal by end of 2014:
  - 10,000 connected probes

Credit System

- By hosting a probe, you earn credits
- To perform measurements, you spend credits
  - pings costs 10 credits, traceroutes costs 20, etc.
- Credit system introduced to ensure **fairness** and **protect system from overload**
- Extra credits can be earned by:
  - Being a RIPE NCC member
  - Hosting a RIPE Atlas anchor
  - Sponsoring multiple probes
- More details: https://atlas.ripe.net/doc/credits

Measurement Devices

- v1 & v2: Lantronix XPort Pro

- v3: TP-Link TL-MR3020 powered from USB port
  - Does not work as a wireless router
  - Same functionality as the old probe

- RIPE Atlas anchor: Soekris net6501-70

RIPE Atlas Anchors

- Anchors: well-known targets and powerful probes
- Anchoring measurements
  - Measurements between anchors
  - 200 probes targeting each anchor with measurements
  - Each probe measures 4-5 anchors
- Vantage points for new DNSMON service
- 60 RIPE Atlas anchors
  - Goal for end of 2014: 100 anchors worldwide

RIPE Atlas Anchors

- Become a Anchor host
  - https://atlas.ripe.net/get-involved/become-an-anchor-host/

RIPE Atlas Anchor Hosts (part 1)

spectruminternet

GÉANT

grnet

SpaceNet
Internet Business Produkte

MEANIE

HIBERNIA NETWORKS

SysEleven
Hosting. Skaliert.

RESTENA

SWITCH

iPH

ITGATE
The best way to carry IP

AS34288
CONNECTING EDUCATION TO THE WORLD

cz.nic

Raytheon
BBN Technologies

sanet.
Slovenská akademická sieť

Redpill Linpro

TREX
REGIONAL EXCHANGES

universität wien

RIPE Atlas Anchor Hosts (part 2)

lacnic

ENNIT

ati

HEAnet
Ireland's National Education & Research Network

netnod

CSUC
Consorci de Serveis Universitaris de Catalunya

BLACKNIGHT SOLUTIONS

ausregistry

CERN

VIX
Vienna Internet eXchange

SIDN

ISZT
Council of Hungarian Internet Providers

rezopole

aiv!vid
Information and Communications Technologies

FICIX

BelWü

PSNC

ISNIC

SURF NET

SOX
Serbian Open eXchange

RIPE NCC

Measurement Devices

- Distribution model changed for ordinary probes!
  - https://labs.ripe.net/Members/fatemah_mafi/changes-to-the-distribution-model-for-ripe-atlas-probes
  - Consider sponsoring probes https://atlas.ripe.net/get-involved/become-a-sponsor/

Security Aspects

- Probes have hardwired trust material (registration server addresses / keys)
- The probes don’t have any open ports; they only initiate connections - this works fine with NATs, too
- Measurements are scheduled by centralised “command servers” via reverse ssh tunnels
- **Probes don’t listen to local traffic**
- Measurement source code published
- Reported vulnerabilities: https://atlas.ripe.net/docs/security/

RIPE Atlas

Network Monitoring

RIPE NCC

Network Monitoring

- Network operators use tools for monitoring health of networks
  - Nagios, Icinga etc.
- Tools can receive input from RIPE Atlas, via API
- Benefits:
  - Doing pings from 1,000 out of 6,000+ probes around the world
  - Looking at your network from the outside
  - Plug into your existing practices

Integration with Monitoring Systems

- Three easy steps:

1. Create a RIPE Atlas ping measurement
2. Go to “Status Checks” URL
3. Make alerts available to Icinga, Nagios etc.

- https://labs.ripe.net/Members/suzanne_taylor_muzzin/introducing-ripe-atlas-status-checks

Use Case: Reachability Check

- Quick-Look Feature

- For RIPE NCC members only
- No credits required

Success Stories

- Investigating problems of slow servers:
  - http://engineering.freeagent.com/2014/01/24/atlas-probes/
- Selective blackholing (examples based on RIPE Atlas)
  - https://ripe68.ripe.net/presentations/176-RIPE68_JSnijders_DDoS_Damage_Control.pdf
- Anycast analysis:
  - https://labs.ripe.net/Members/stephane_bortzmeyer/the-many-instances-of-the-l-root-name-server
- Evaluation of new IXP peering partners:
  - https://labs.ripe.net/Members/daniel_gomez/basic-evaluation-of-new-ixp-peering-partners-with-ripe-atlas-and-zabbix

Success Stories

- “Why we wanted an Atlas anchor”
  - https://labs.ripe.net/Members/tim_kleefass/how-fast-the-ripe-atlas-anchor-has-paid-off

IPv6 Troubleshooting

- “It is quite common in the IPv6 world to have devices that believe they are connected to the IPv6 Internet while they are not”
  - “When you use RIPE Atlas to measure the connectivity of an IPv6 device, 90% success is the maximal reachability you'll get.”
  - https://labs.ripe.net/Members/stephane_bortzmeyer/how-many-atlas-probes-believe-they-have-ipv6-but-are-wrong

RIPE Atlas Code Sharing

- Probe code & data analysis:
  - https://github.com/RIPE-Atlas-Community/

- Code to make your analysing life easier:
  - Parser for measurement data
  - https://github.com/RIPE-NCC

Probes Photos

Feedback

- RIPEstat
  - stat@ripe.net
  - https://stat.ripe.net
- RIPE Atlas
  - atlas@ripe.net
  - https://atlas.ripe.net
- On Twitter
  - @RIPE_Atlas, #RIPEAtlas & #RIPEstat
- On RIPE Labs (https://labs.ripe.net)
- http://roadmap.ripe.net

Questions?

Monitoring for DNS TLD operators

DNSMON beta

DNS responses for pl. Go

Protocol: UDP Servers: IPv4 and IPv6

Show RIPE Atlas measurements

Unanswered queries ≤ 4% > 22% Data resolution: 1 day

zone: pl.

From: 2014-04-02 00:00 To: 2014-05-08 00:00 UTC

a-dns.pl. IPv4
a-dns.pl. IPv4(2)
c-dns.pl. IPv4
d-dns.pl. IPv4
e-dns.pl. IPv4
f-dns.pl. IPv4
f-dns.pl. IPv6
g-dns.pl. IPv4
g-dns.pl. IPv6
h-dns.pl. IPv4
h-dns.pl. IPv6
i-dns.pl. IPv4

2014-04-03 2014-04-05 2014-04-07 2014-04-09 2014-04-11 2014-04-13 2014-04-15 2014-04-17 2014-04-19 2014-04-21 2014-04-23 2014-04-25 2014-04-27 2014-04-29 2014-05-01 2014-05-03 2014-05-05 2014-05-07

2014-02-16 2014-02-23 2014-03-02 2014-03-09 2014-03-16 2014-03-23 2014-03-30 2014-04-06 2014-04-13 2014-04-20 2014-04-27 2014-05-04

Use your mouse wheel or click and drag a selection to zoom, press the left/right arrow keys to shift the time window, press the shift key to remove rows from the displayed results

RIPE NCC

Monitoring DNS

- “Old” DNSMON service migrated to RIPE Atlas
- Using RIPE Atlas anchors as vantage points
  - instead of TTM boxes
- Currently monitoring small selection of zones
  - root-nameservers & 30 ccTLDs and few gTLDs
- New zones will be added next year
- On the roadmap: “domain checks”
- https://atlas.ripe.net/dnsmon
- https://labs.ripe.net/Members/fatemah_mafi/an-updated-dns-monitoring-service