RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Measurement Data Workshop

Christian Teuschel | Lia Hestina | 19 April 2016 | SEE 5

Christian Teuschel

Lia Hestina

Schedule

09:00 - 10:30	**First session**
10:30 - 11:00	**Break**
11:00 - 12:30	**Second session**
	Lunch

Overview 1 - RIPEstat

RIPEstat

- ~~**Introduction to RIPE and the RIPE NCC**~~ - *not part of this workshop*
- **Introduction to RIPEstat**
- **More about widgets**
- ***List of widgets*** - *optional*
    - ***Exercise: Querying for a Resource***
- **Useful routing widgets**
    - ***Exercise: BGPlay***
- **Handling abuse**
    - ***Exercise: Handling Abuse***
- ***Personalising RIPEstat*** - *optional*
    - ***Exercise: MyView***
- **Comparing results**
    - ***Exercise: Comparing Results***
    - ***Exercise: RIPEstat Use Cases***

Overview 2 - RIPE Atlas

RIPE Atlas

- Introduction to RIPE Atlas
- What you can get from RIPE Atlas as a visitor
- Exploring public probes
  - *Live Demo*
- Finding public measurements
  - *Exercise F: Analyse results*
- Creating a measurement
  - *Exercise G: Create a measurement*
- Network monitoring
  - *Exercise H: Setting up 'Status Checks'*
- *More RIPE Atlas features - optional*
- How to host a probe
- ~~Advanced topics~~ - *not part of this workshop*
  - ~~Use cases and success stories~~
  - ~~RIPE Atlas anchors~~
  - ~~RIPE Atlas community~~

Introduction to RIPEstat

Section 2

What is RIPEstat?

One interface for viewing all Internet number resource data

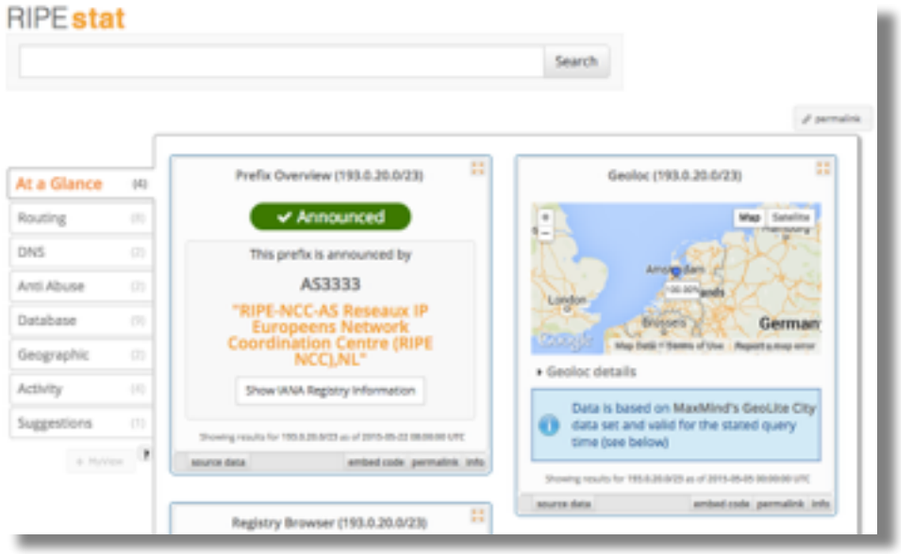
“One-stop shop”

What data? What sources?

- RIPE Database
- Other RIR data
- BGP routing data (RIS)
- Active measurements (RIPE Atlas, DNSMON)
- Geolocation (third party)
- Blacklist data (third party)
- More…

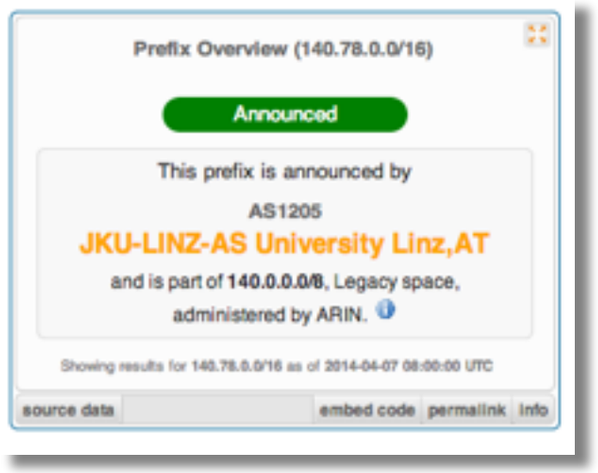
RIPEstat APIs

- https://stat.ripe.net



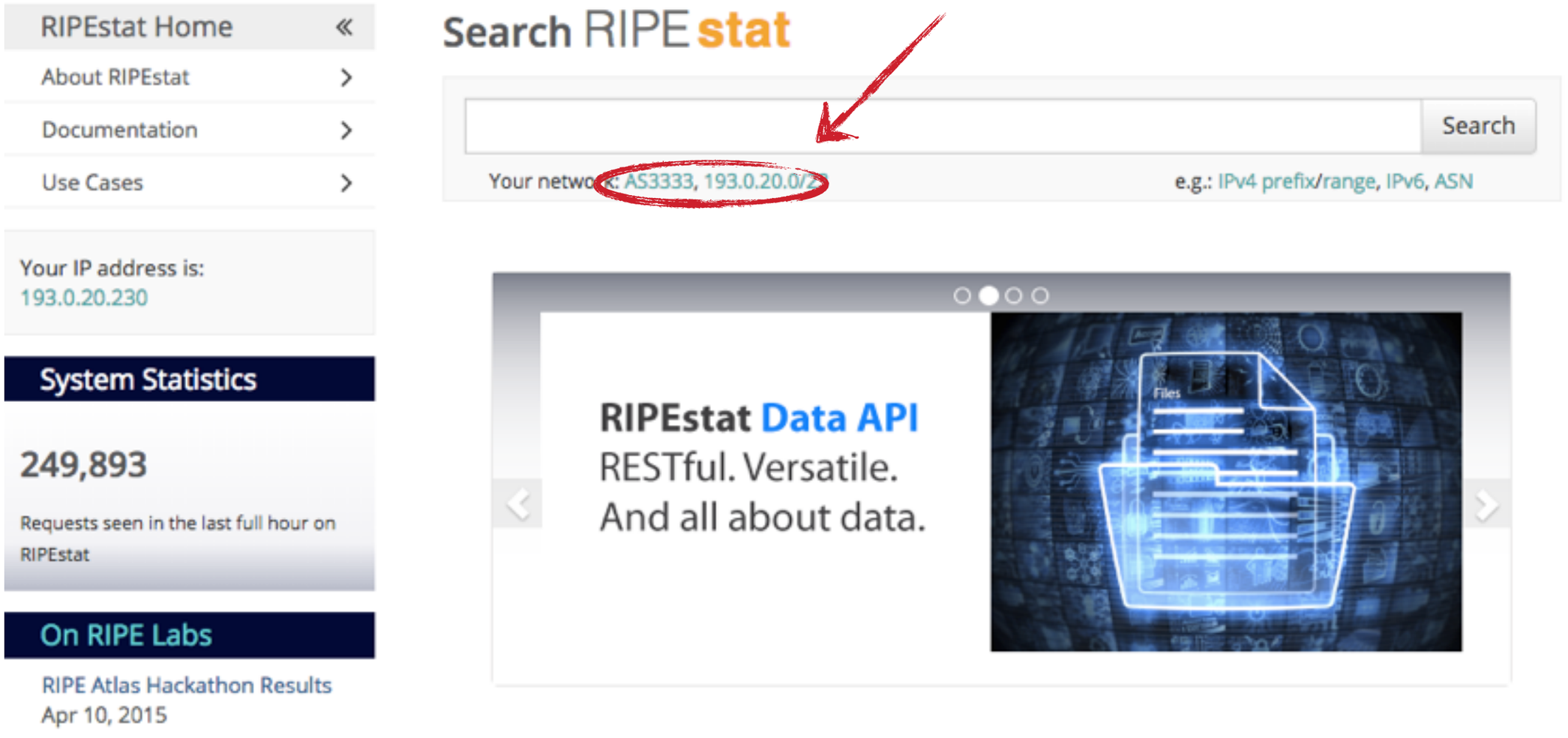
- RIPEstat widget API

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



Landing page

RIPEstat shows
your own IP/ASN



Query Types

- IPv6 address/prefix
- IPv4 address/prefix
- ASN
- Hostname
- Country code

Results page

Widgets

More tabs with results

Why use RIPEstat?

- For your own network:
  - Is someone else announcing my prefix?
  - How visible is my new IPv6 network?
  - Is my BGP routing consistent with the Routing Registry?
  - Are my DNS and reverse DNS consistent?
  - Location of my customers' prefixes
  - Was my prefix visible yesterday in Tokyo?

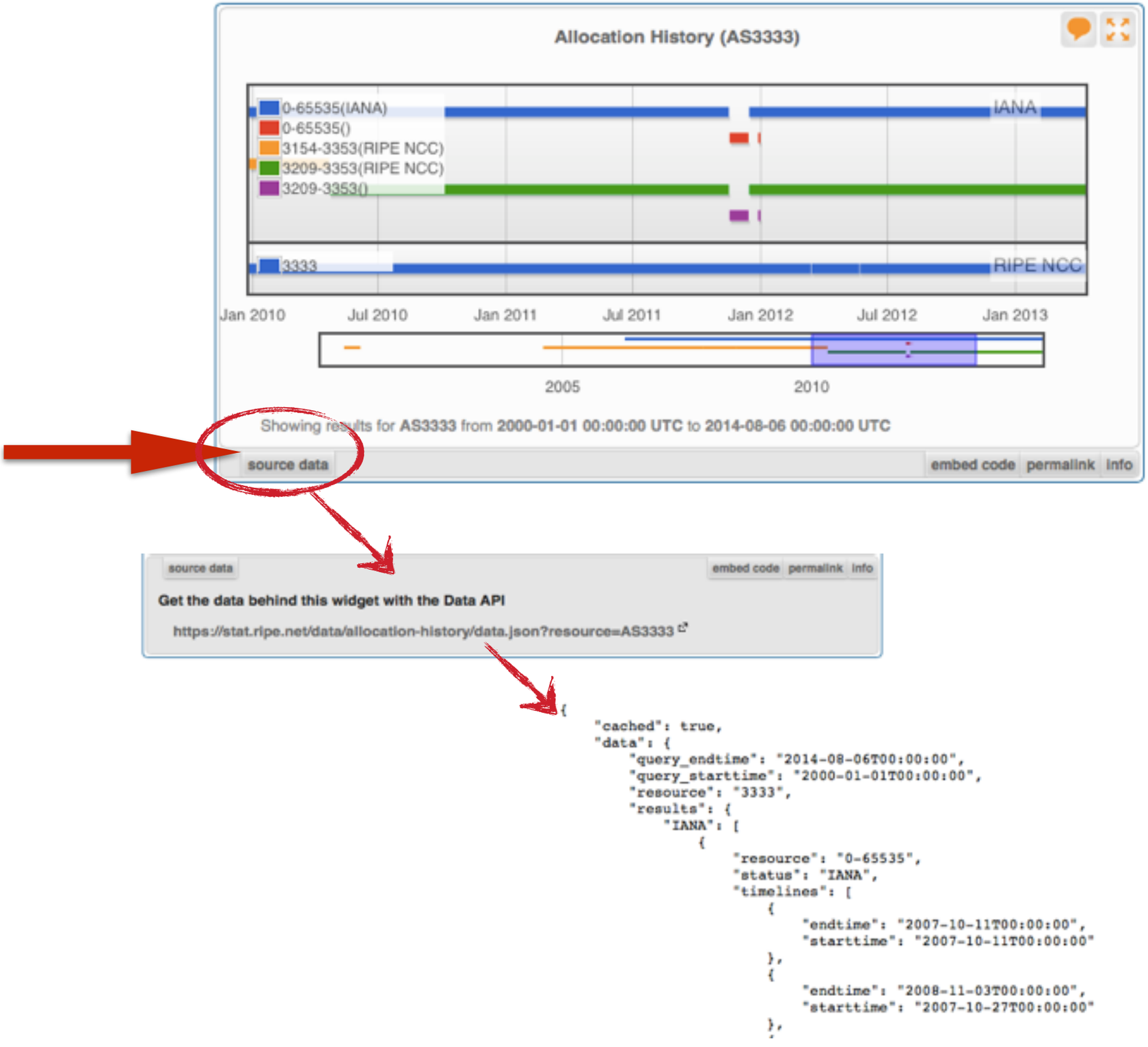
Why use RIPEstat?

- For viewing other networks:
  - How many IPv6 prefixes are announced in my country?
  - IPv6 in my country compared to neighbours
  - Who has more peers, AS1 or AS2?
  - How does the upstream outage look?
  - Is the prefix/ASN that I want already announced?
  - Which ASN announces an IP?
  - Where can I report abuse from an IP?

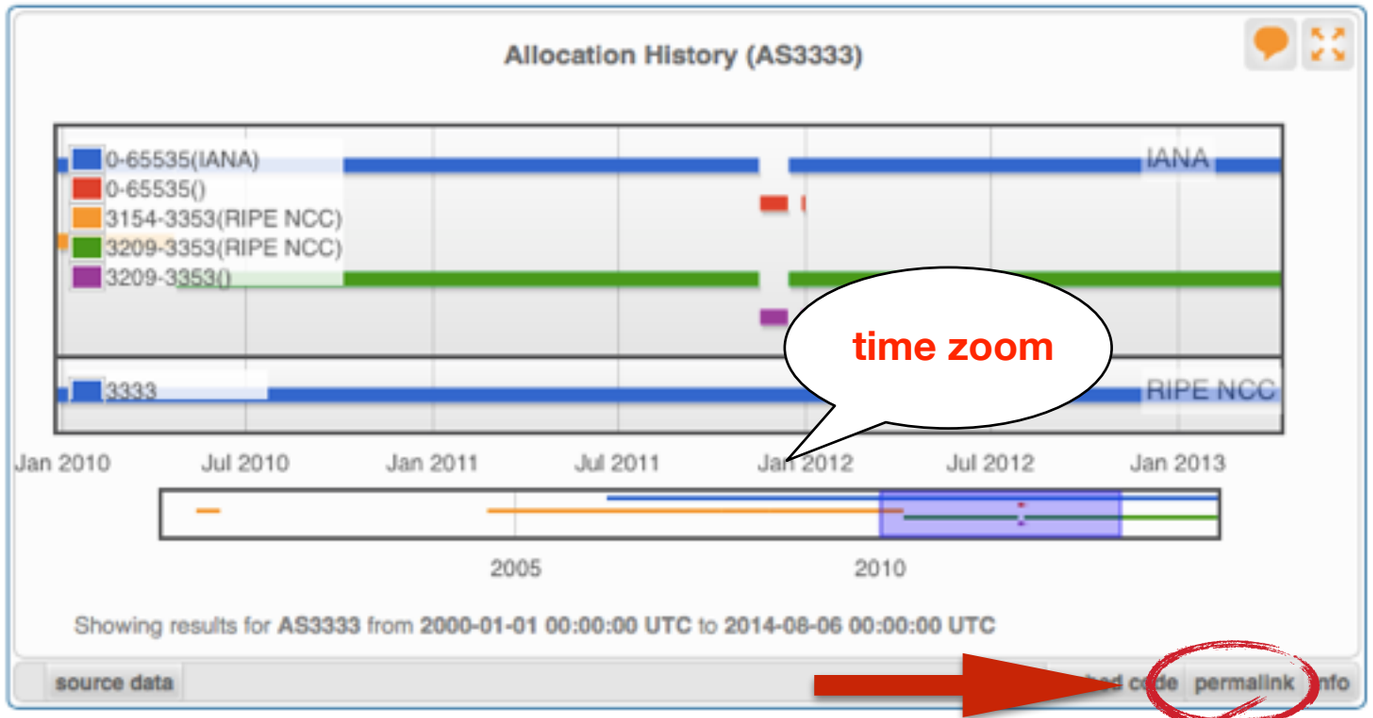
More About Widgets

Section 3

Get the data behind the widget!

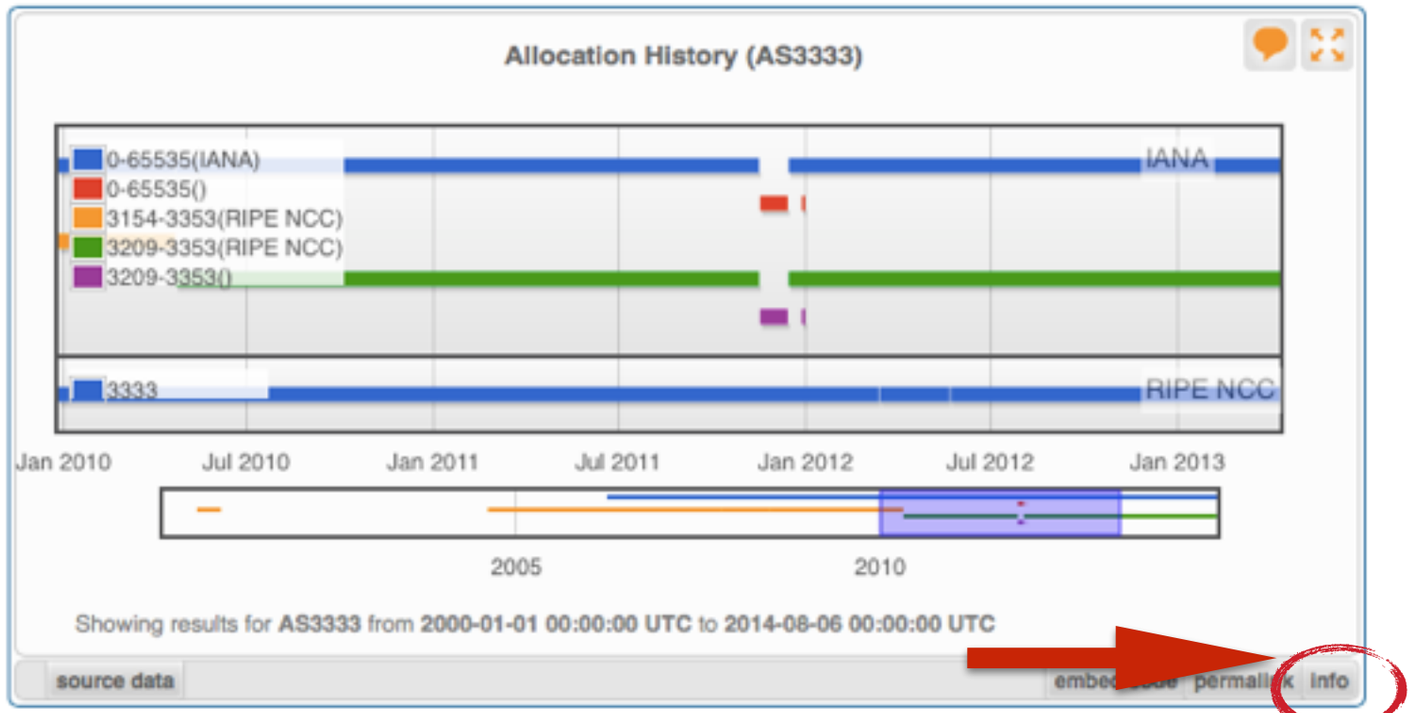


Shareable results URL

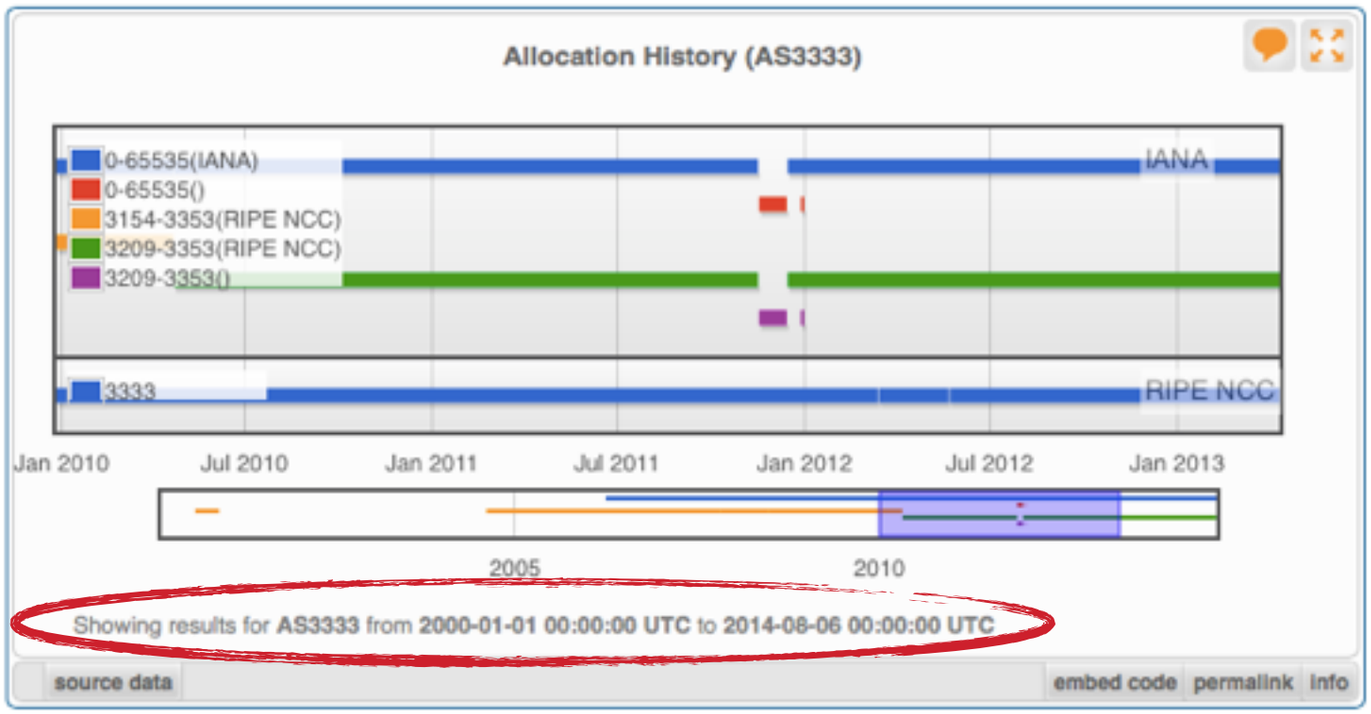


- Immutable shareable URL for each result!
- URL includes:
  - Zoom
  - History

Where’s the data from?



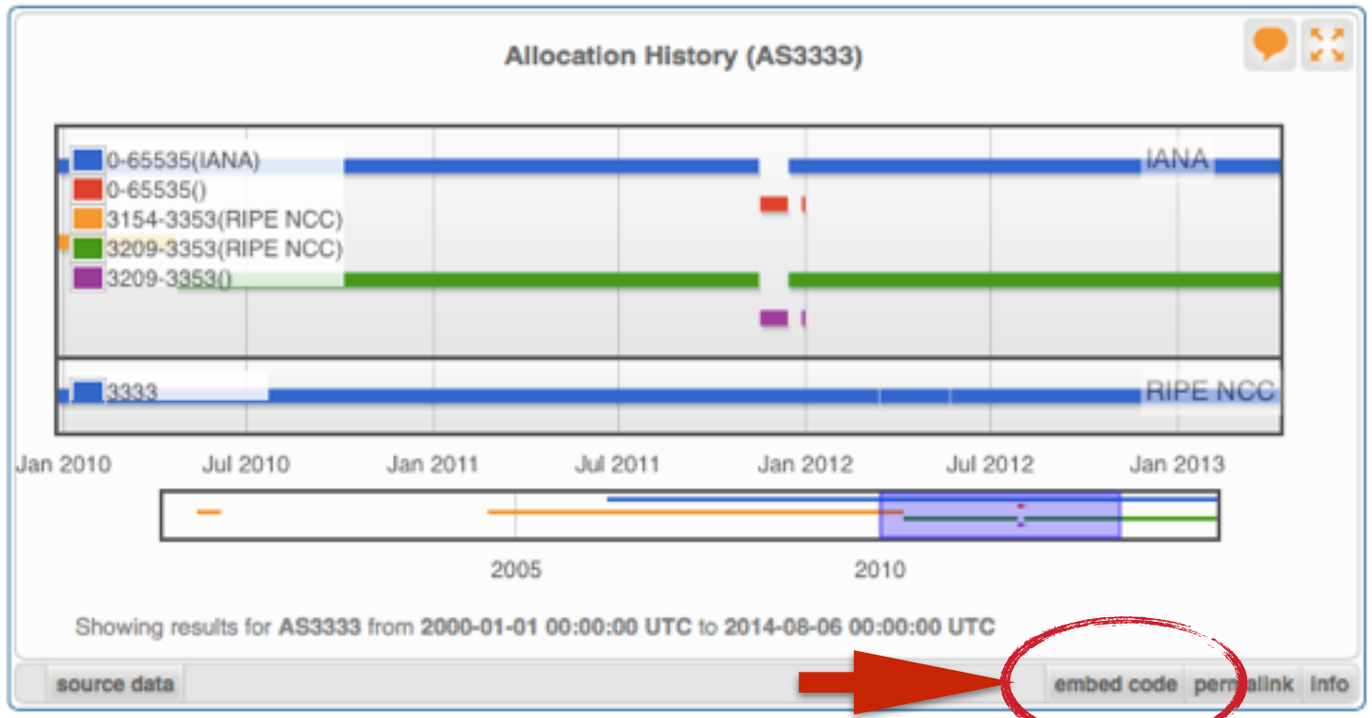
Freshness and timescale of the data



- Timestamp and time period of data
- Different widgets = different data update frequency
- Can be adjusted in most cases

  - Limits: different maximum granularities

Embed the widget!

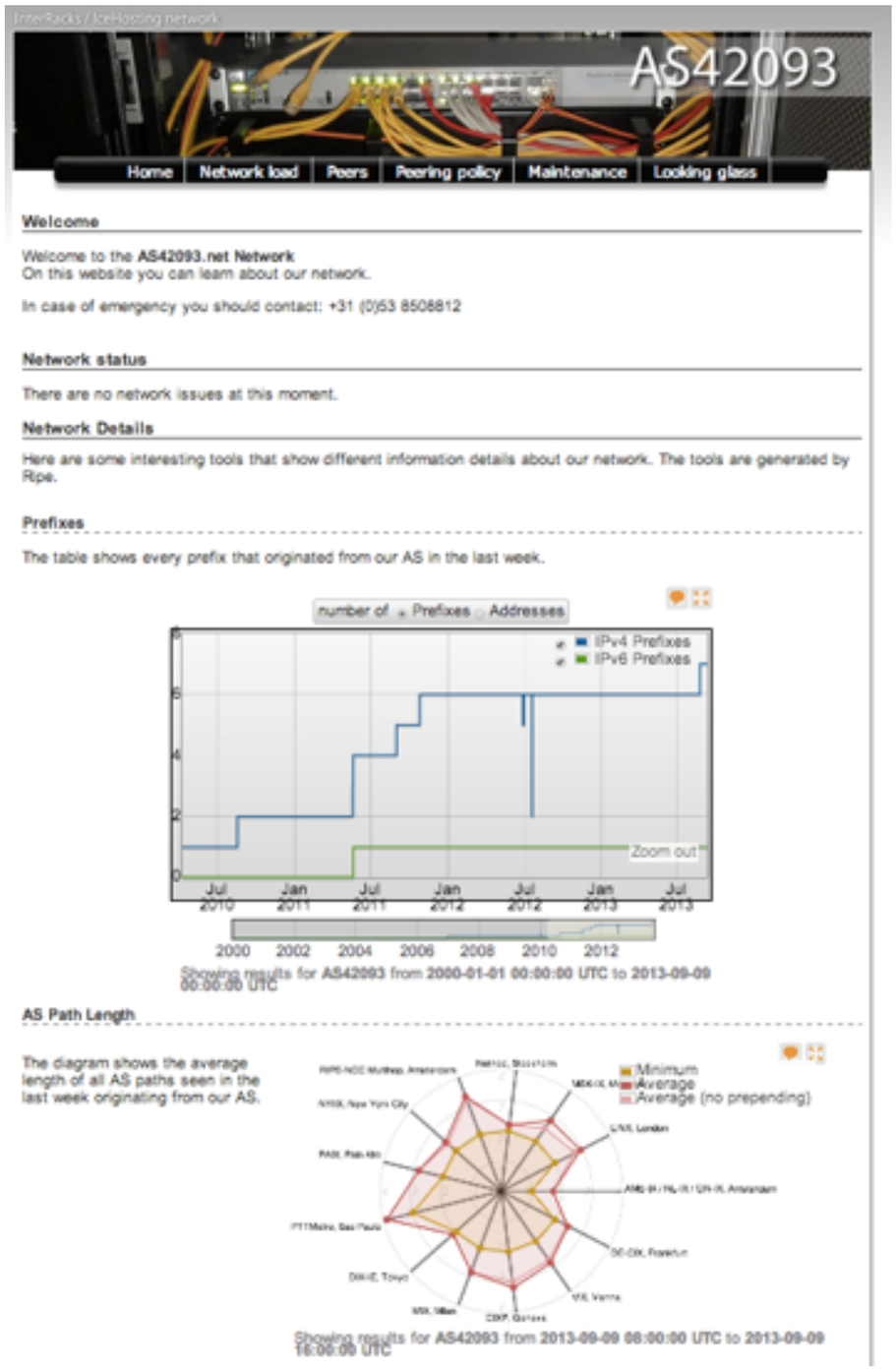


Embedding widgets on your site

- This ISP embedded widgets on its page

Prefix Count widget

AS Path Length widget



List Of Widgets

Section 4

Widgets List

https://stat.ripe.net/widget/list

RIPEstat Widgets

This is a complete list of all of the widgets that RIPEstat offers. Each of these widgets can be accessed using the links below.

When you view a widget you can also get code for **embedding** it in your own pages. The full procedure for embedding and configuring widgets is described in the Widget API Documentation.

Show 100 entries Search:

Title (show slug)	Example	Prefix	IP address	ASN	Hostname	Country code
Abuse Contact Finder		✓	✓	✓		
Address Space Hierarchy		✓	✓			
Address Space Usage		✓	✓			
Allocation History		✓	✓	✓		
Announced Prefixes				✓		
AS Overview				✓		
AS Path Length				✓		
AS Routing Consistency				✓		
ASN Neighbours				✓		
ASN Neighbours History				✓		
RIPE Atlas Probes		✓	✓	✓		✓
RIPE Atlas Measurement Targets		✓	✓	✓	✓	

Exercise A

Querying for a Resource

Refer to the exercise booklet

Visualising BGP Routing Information

Section 5

Querying

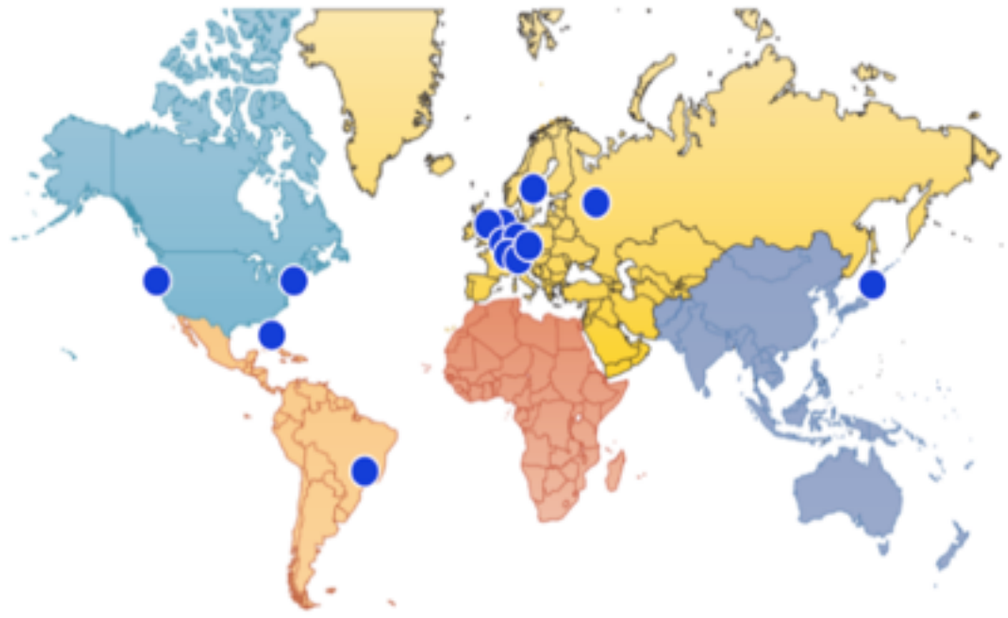
- IP or ASN queried?

  - You get different widgets!

- ASN often visualised based on the prefixes it announces

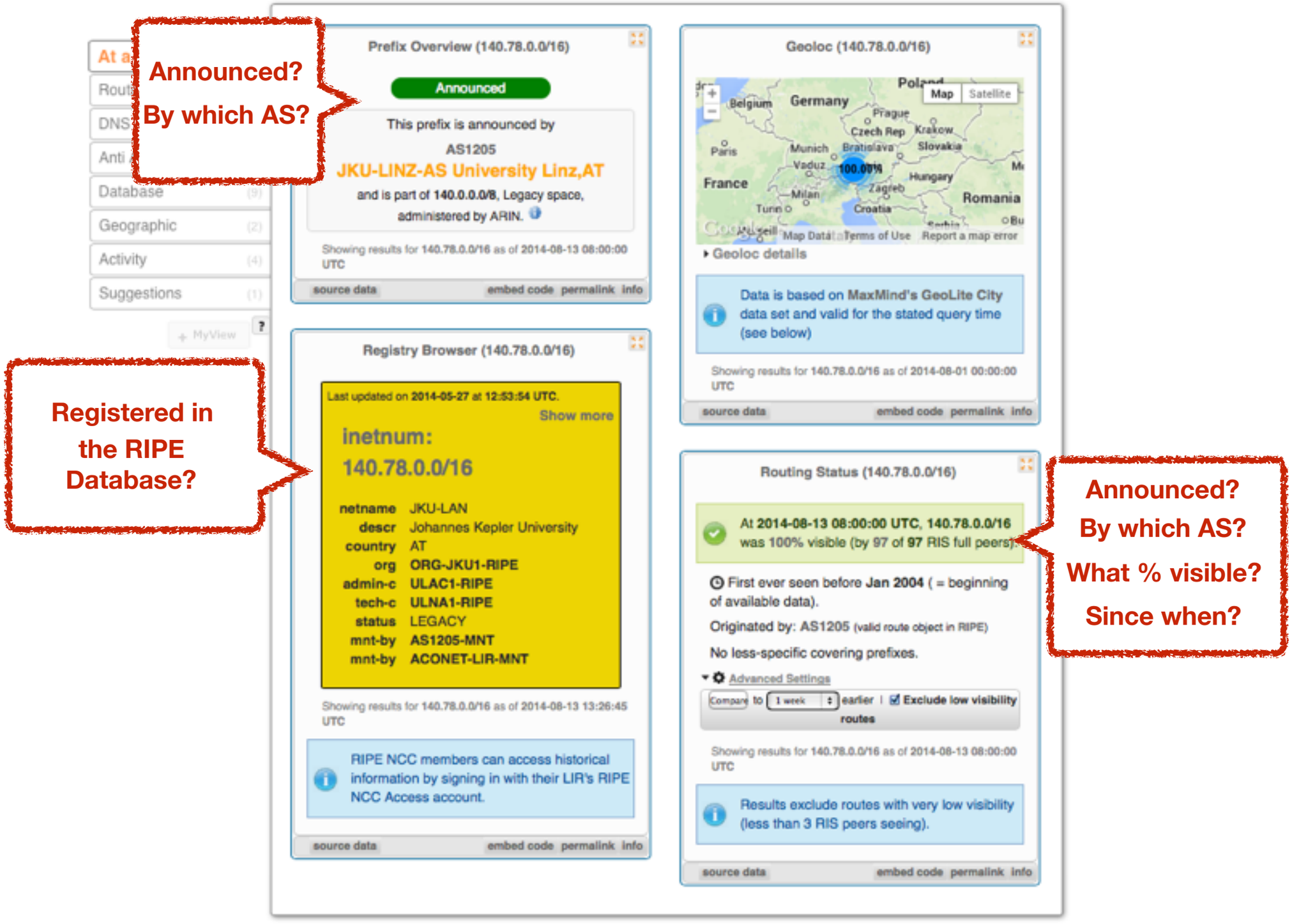
RIS - Routing Information Service

- RIPE NCC has been collecting BGP information since 1999
  - Raw data: ris.ripe.net

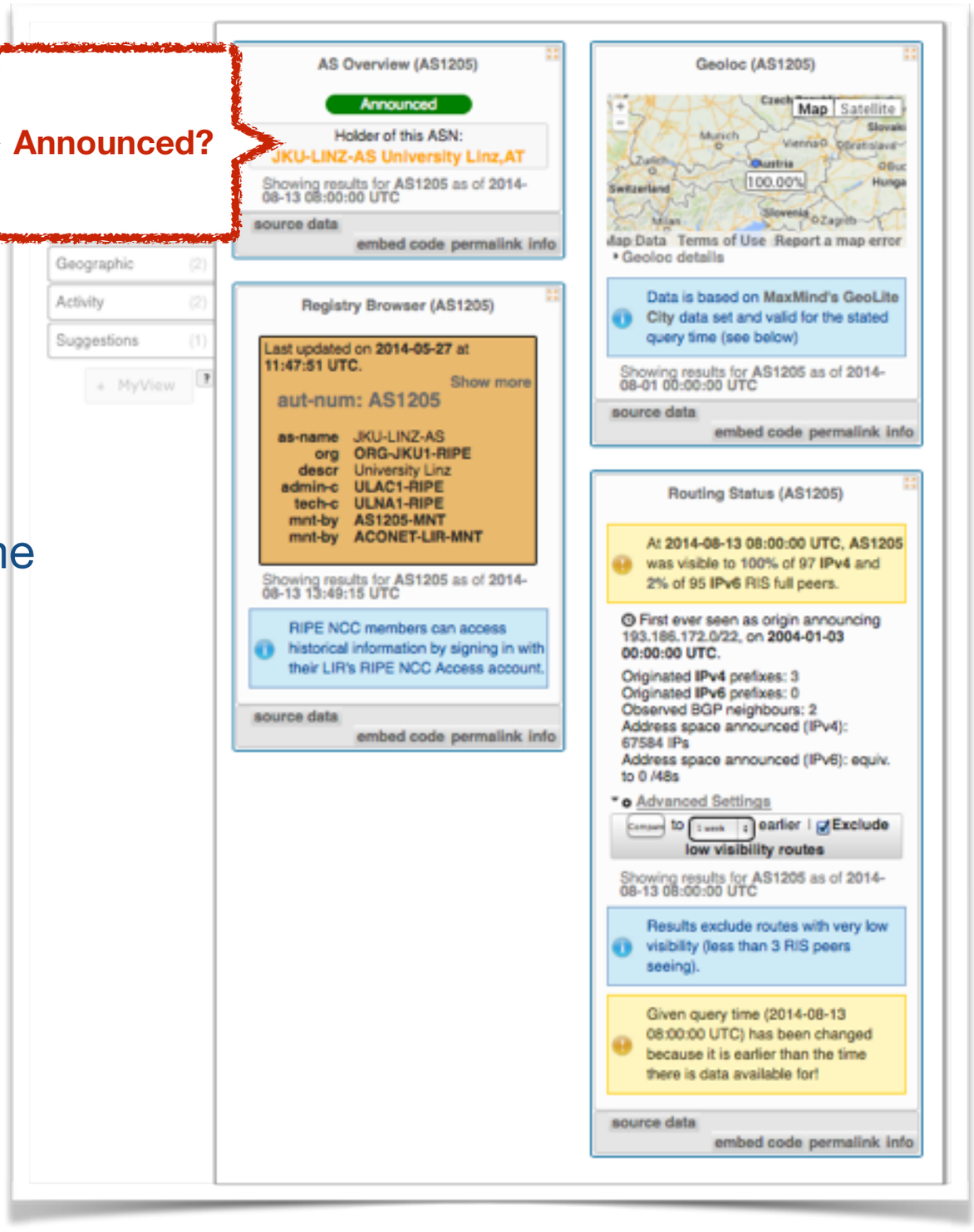


- RIS has 15 route collectors and 600+ peers
- RIPEstat visualises RIS data

At-a-glance view: Prefix queried



At-a-glance view: ASN queried



The rest is the same as for a prefix

BGPlay

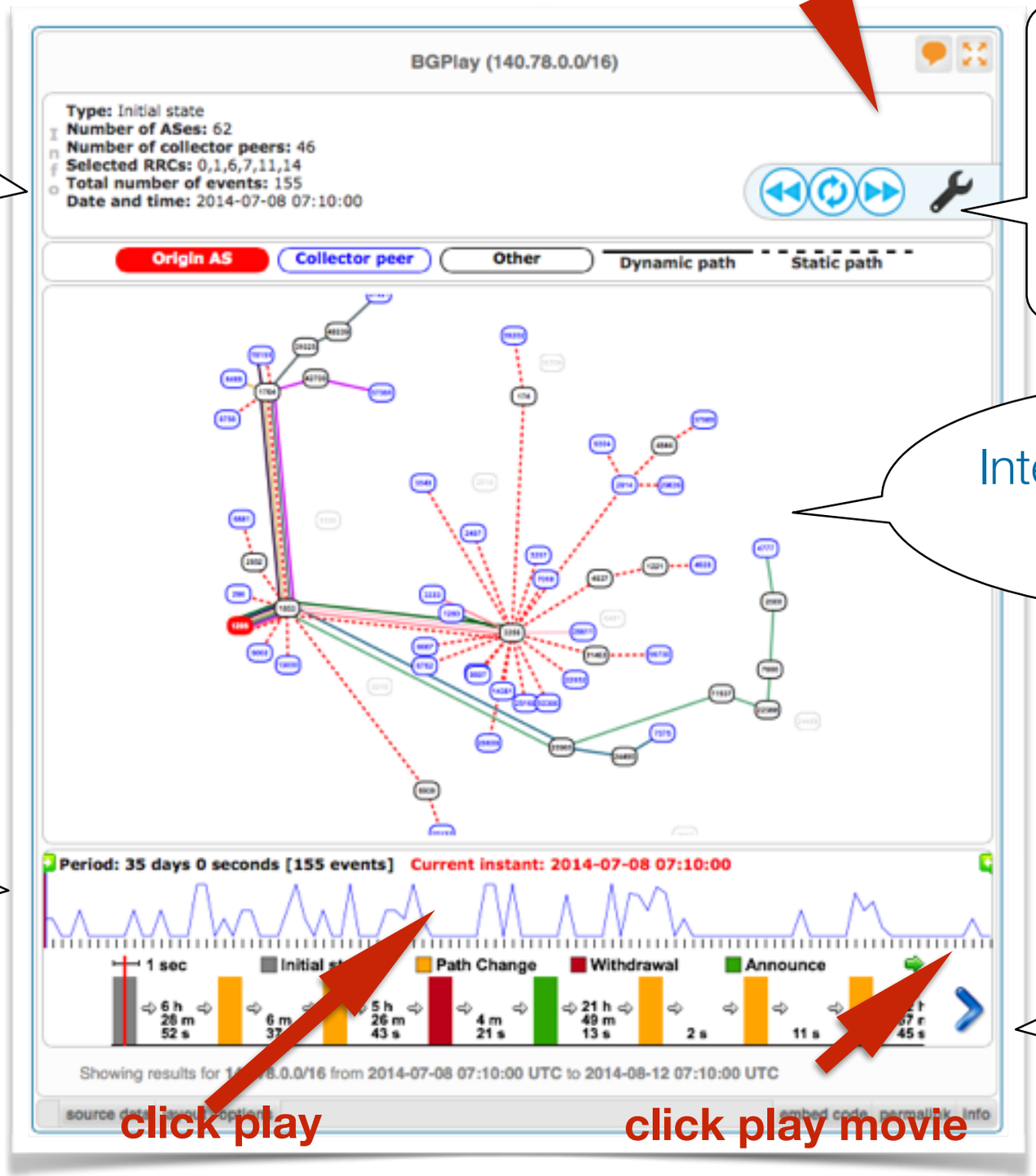
- See how your network is routed
  - Announcements
  - Withdrawals
  - Path changes
- BGPlay shows routing history
  - Animated graphic
  - Highly interactive

https://stat.ripe.net/widget/bgplay

BGPlay

BGP event, ASN or ASN path details

click play



Control panel:

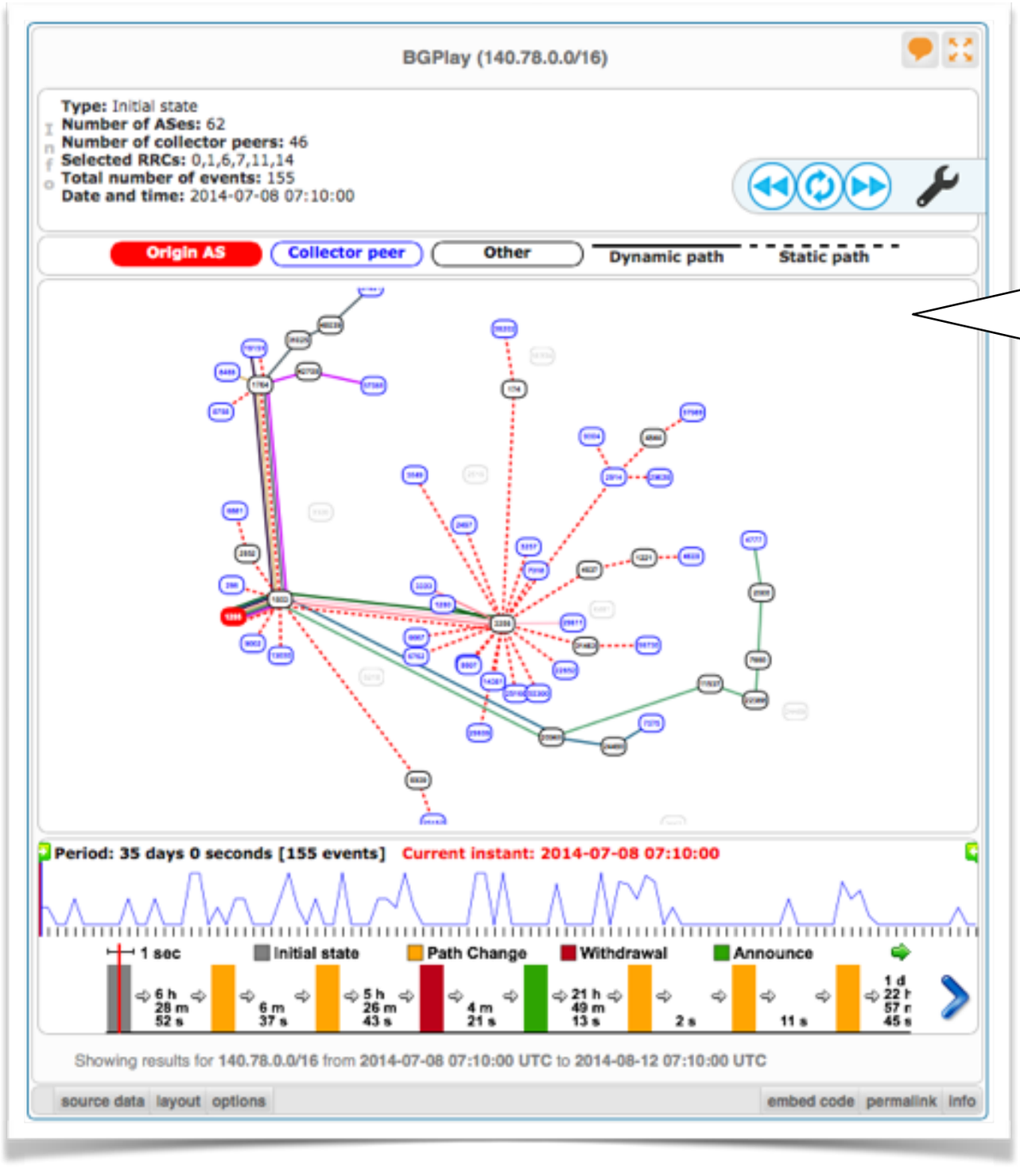
- Covered time period
- RRC selection

Interactive animated graph

Control timeline

Detailed timeline with events

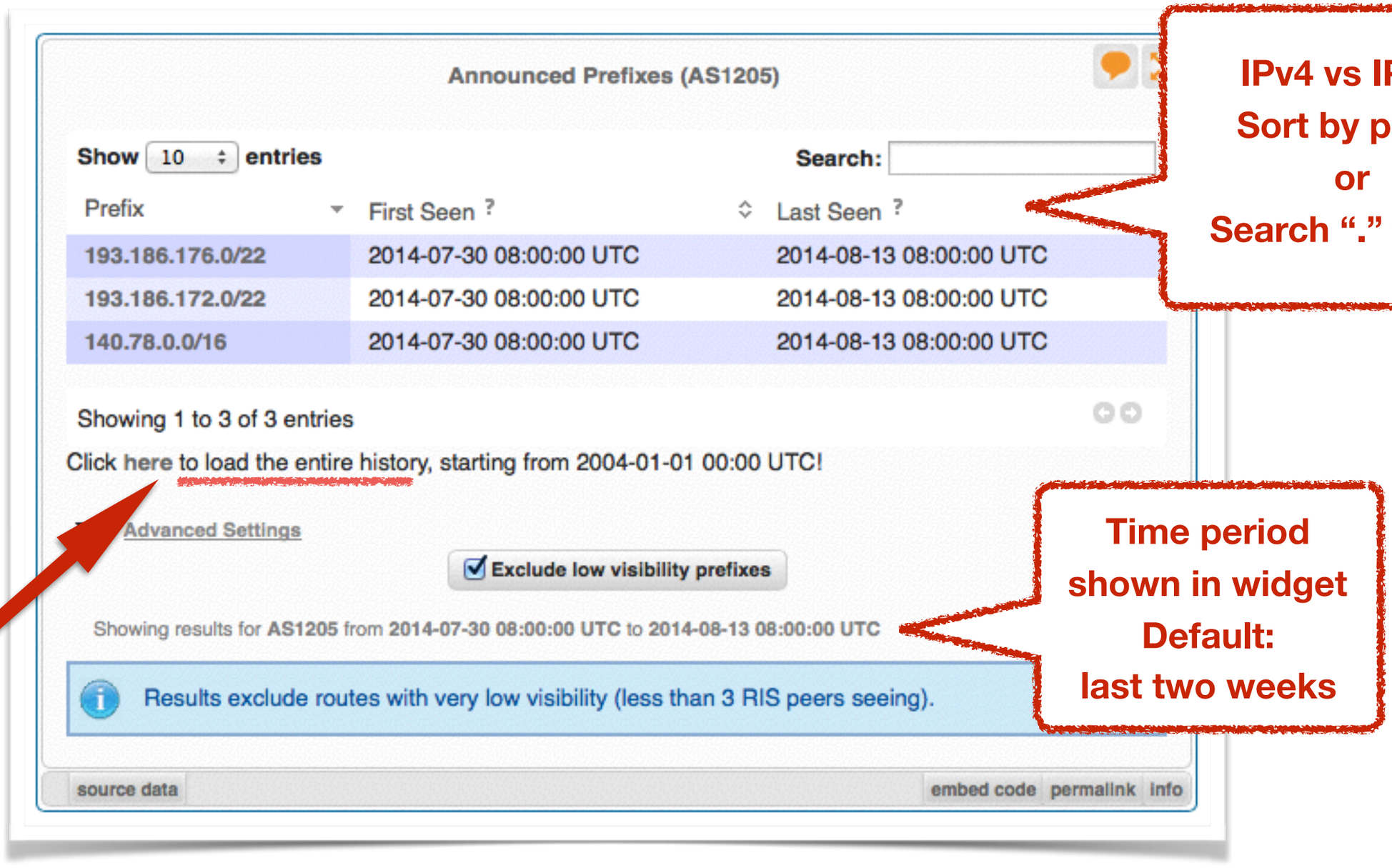
BGPlay



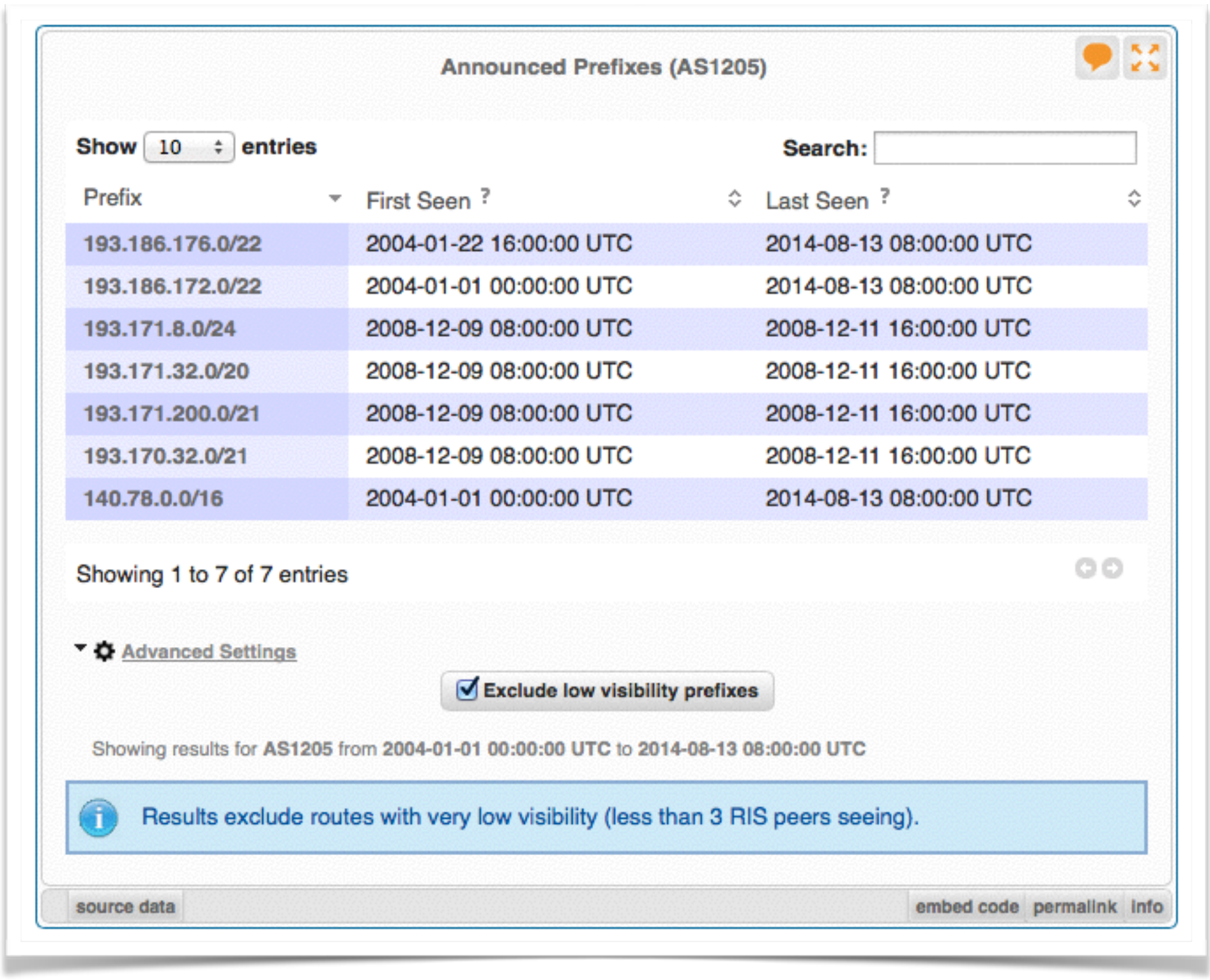
Examples: (2013/8/28-30)

- 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
- Blackholing: 193.33.96.64

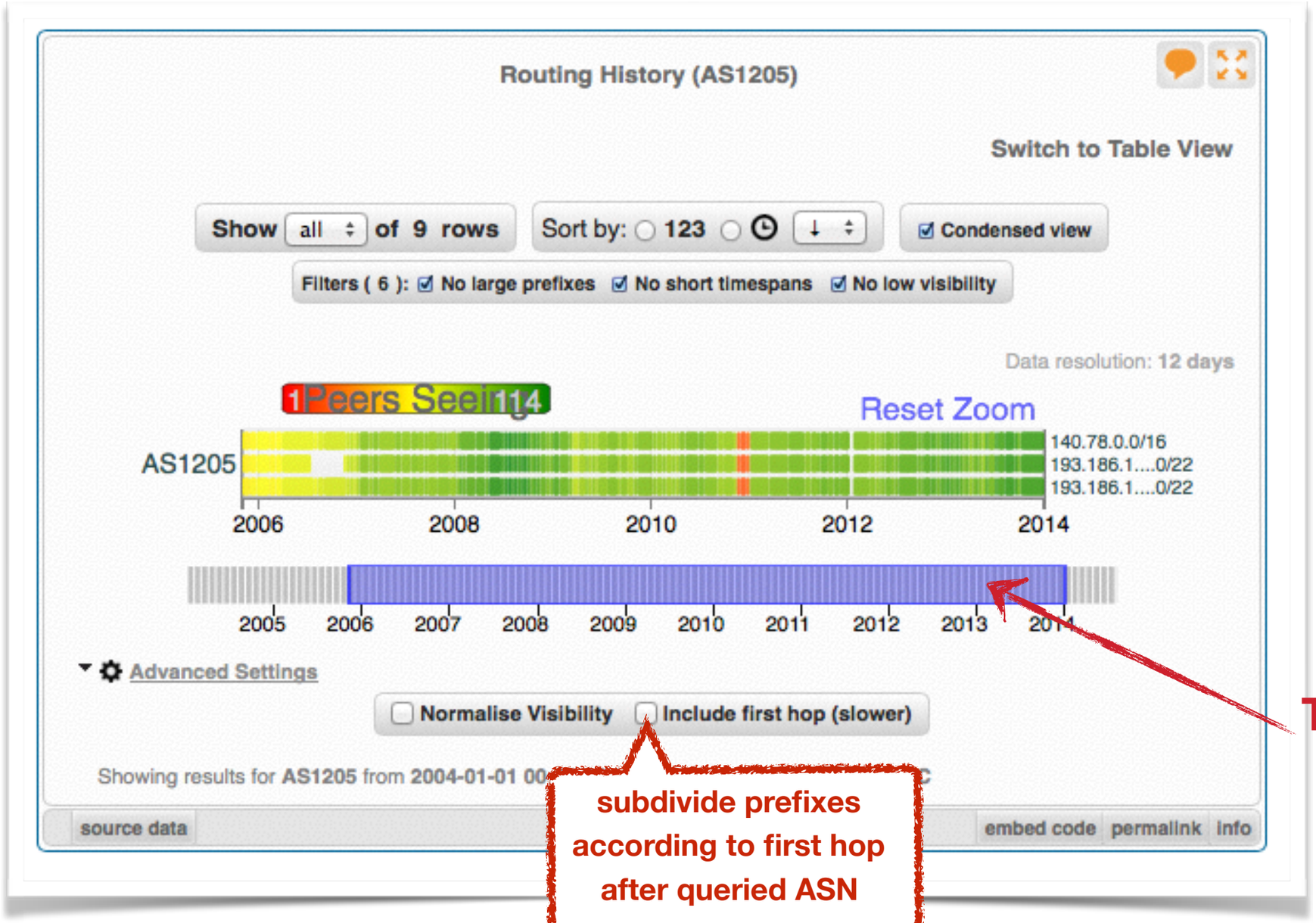
Prefixes visible for this ASN



Announced Prefixes: useful for ASN



History of prefixes announced by ASN



Exercise B

BGPlay

Refer to the exercise booklet

Reporting Abuse

Section 6

Reporting Abuse

DON’T PANIC!

What to do if your network is attacked?

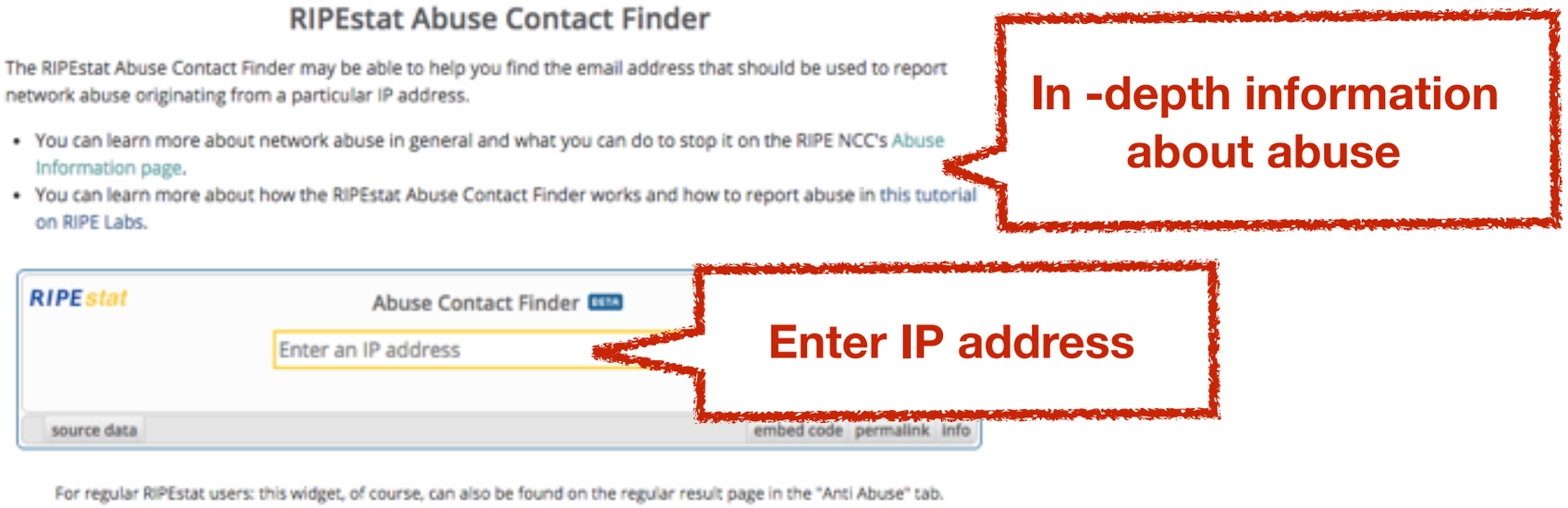
- Spam or unauthorised access?
  - Find IP in message headers or logs
- Want to contact their admin?
  - Find the correct email for reporting abuse
- RIPE Database
  - Contact details for every ASN and IP address
  - In Europe, the Middle East and parts of Central Asia

https://labs.ripe.net/Members/cteusche/finding-anti-abuse-contact-information-with-ripestat

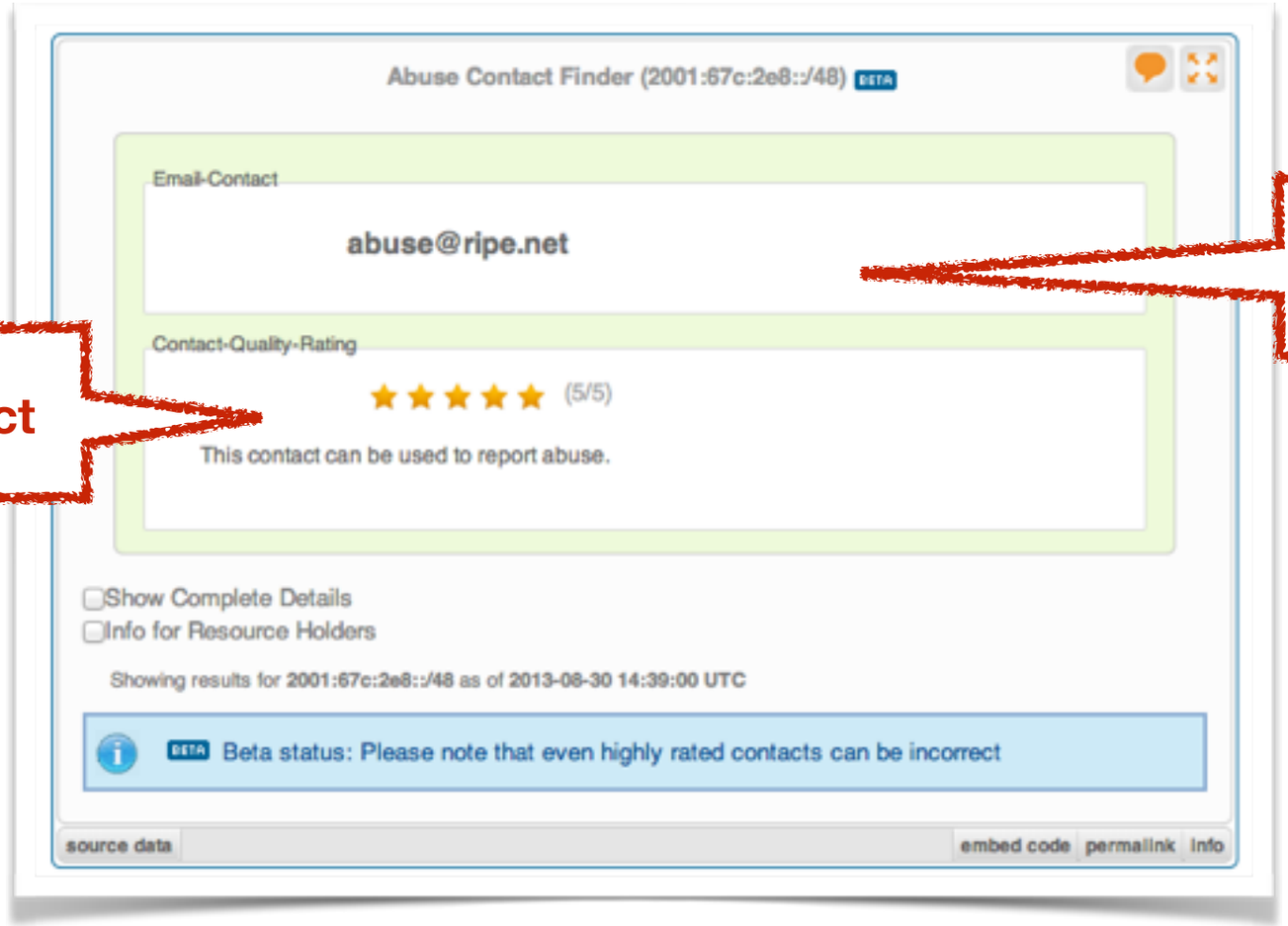
Reporting Abuse

- Take action with the Abuse Contact Finder

  https://stat.ripe.net/abuse



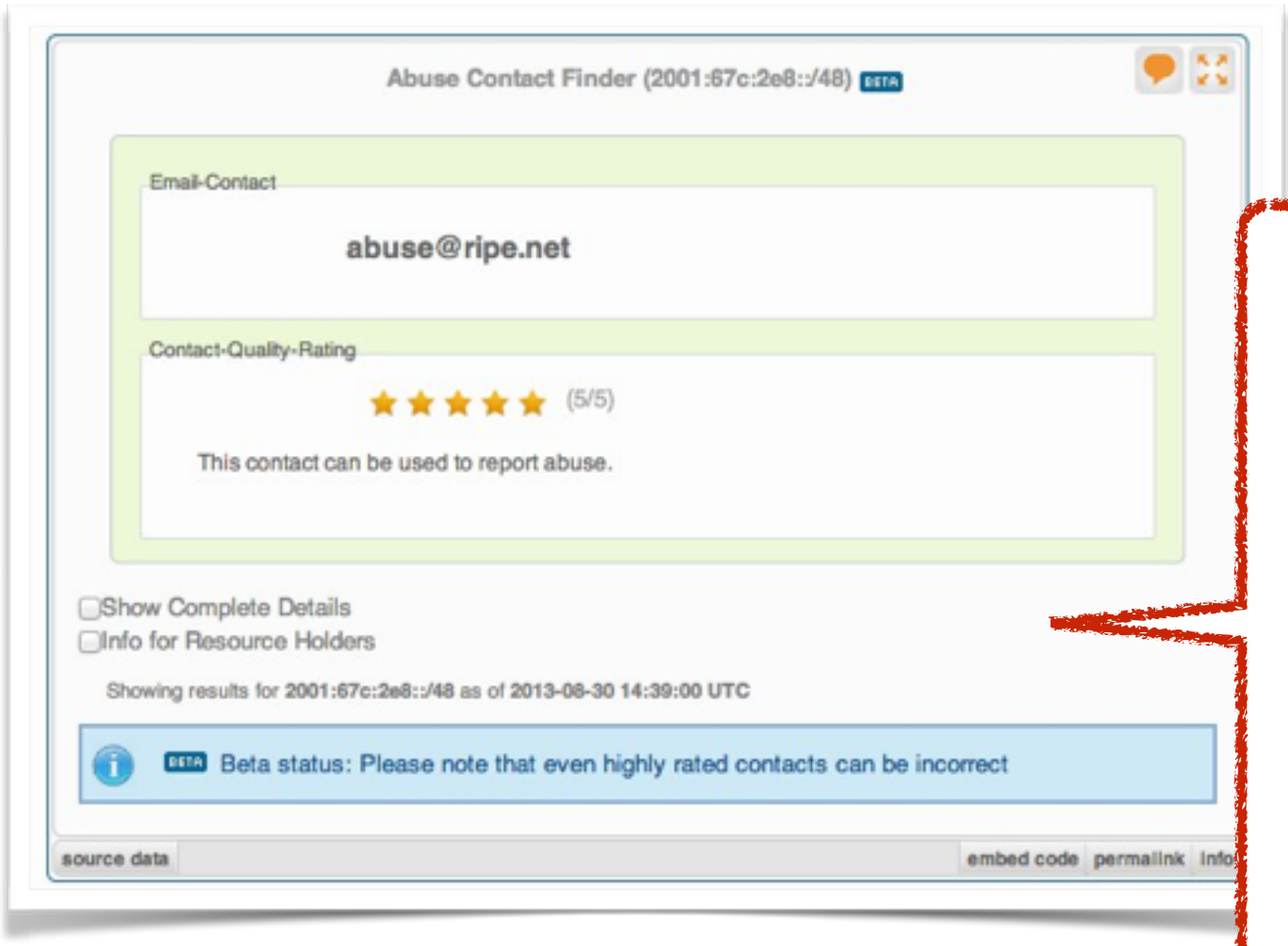
Reporting Abuse



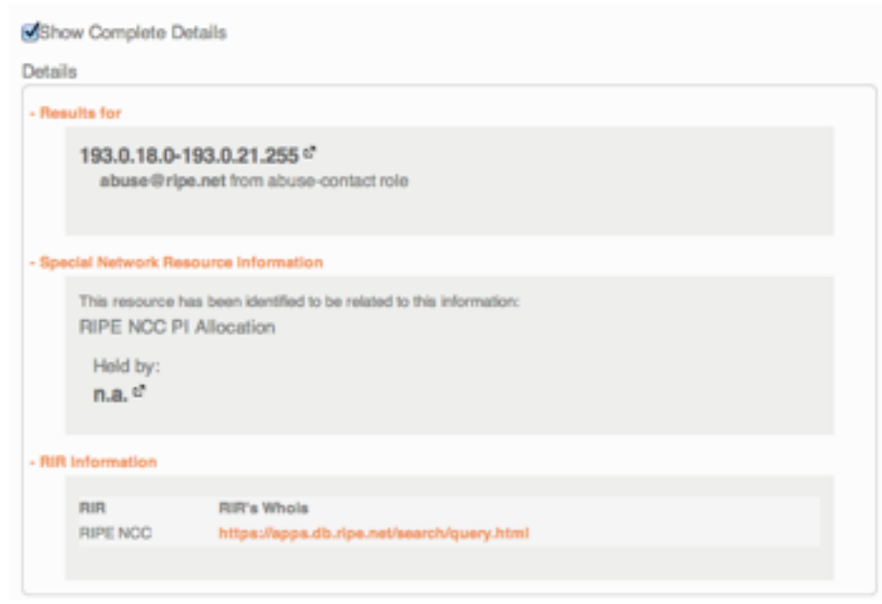
Email contact to report abuse

Rating of the contact

Reporting Abuse



Details about the resource and abuse contact:



Exercise C

Handling abuse

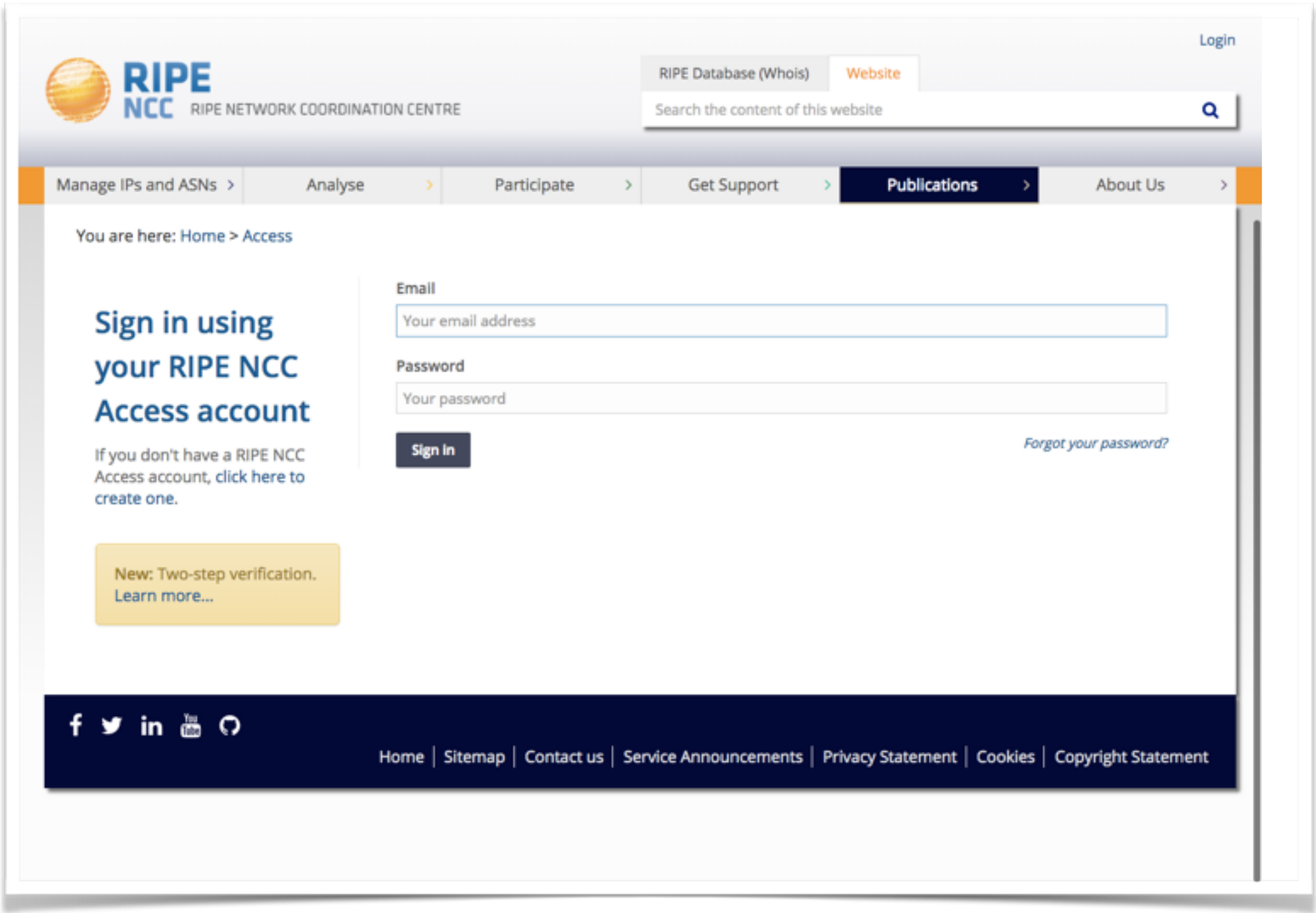
Refer to the exercise booklet

Personalising RIPEstat

Section 6

Create a RIPE NCC Access Account

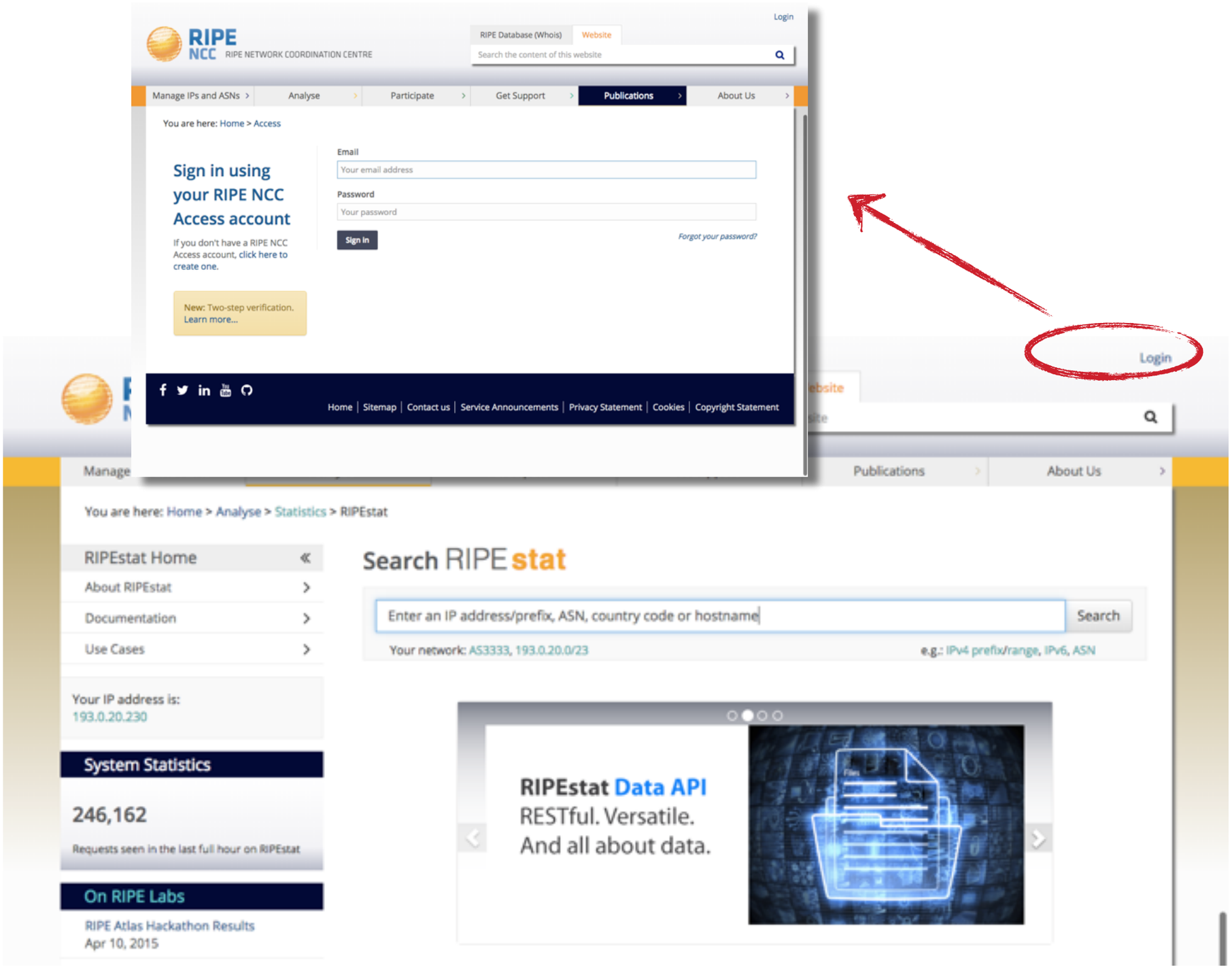
https://access.ripe.net



Why personalise RIPEstat?

- If you have recurring lookup tasks that involve different widgets spread over multiple tabs
- Building a “history” of your lookups

Log into RIPE NCC Access Account



MyView

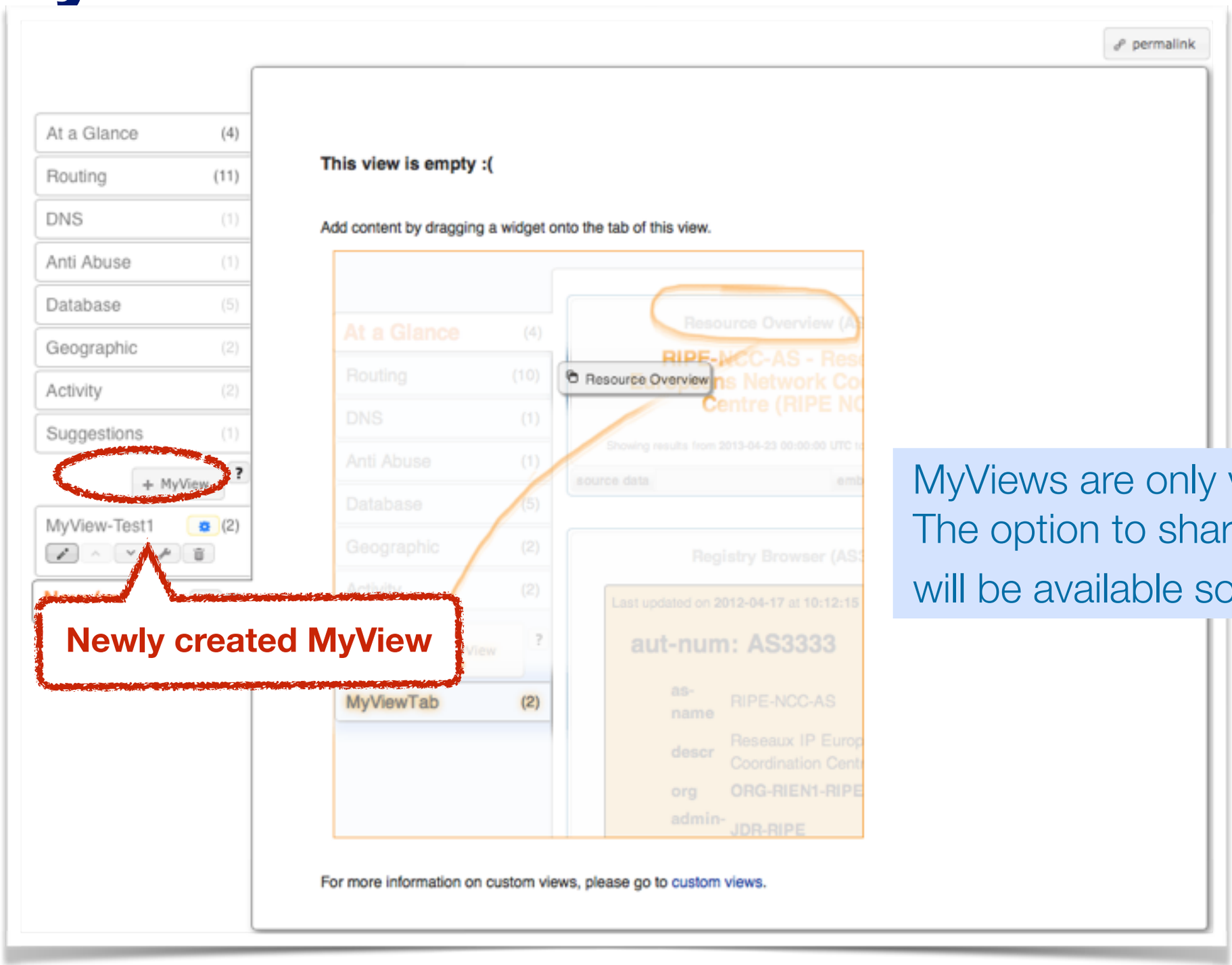
- Create custom views

  - Click the “MyView” button

  - Drag and drop the widgets you want on the MyView tab

- Created under “ASN” or “IP”

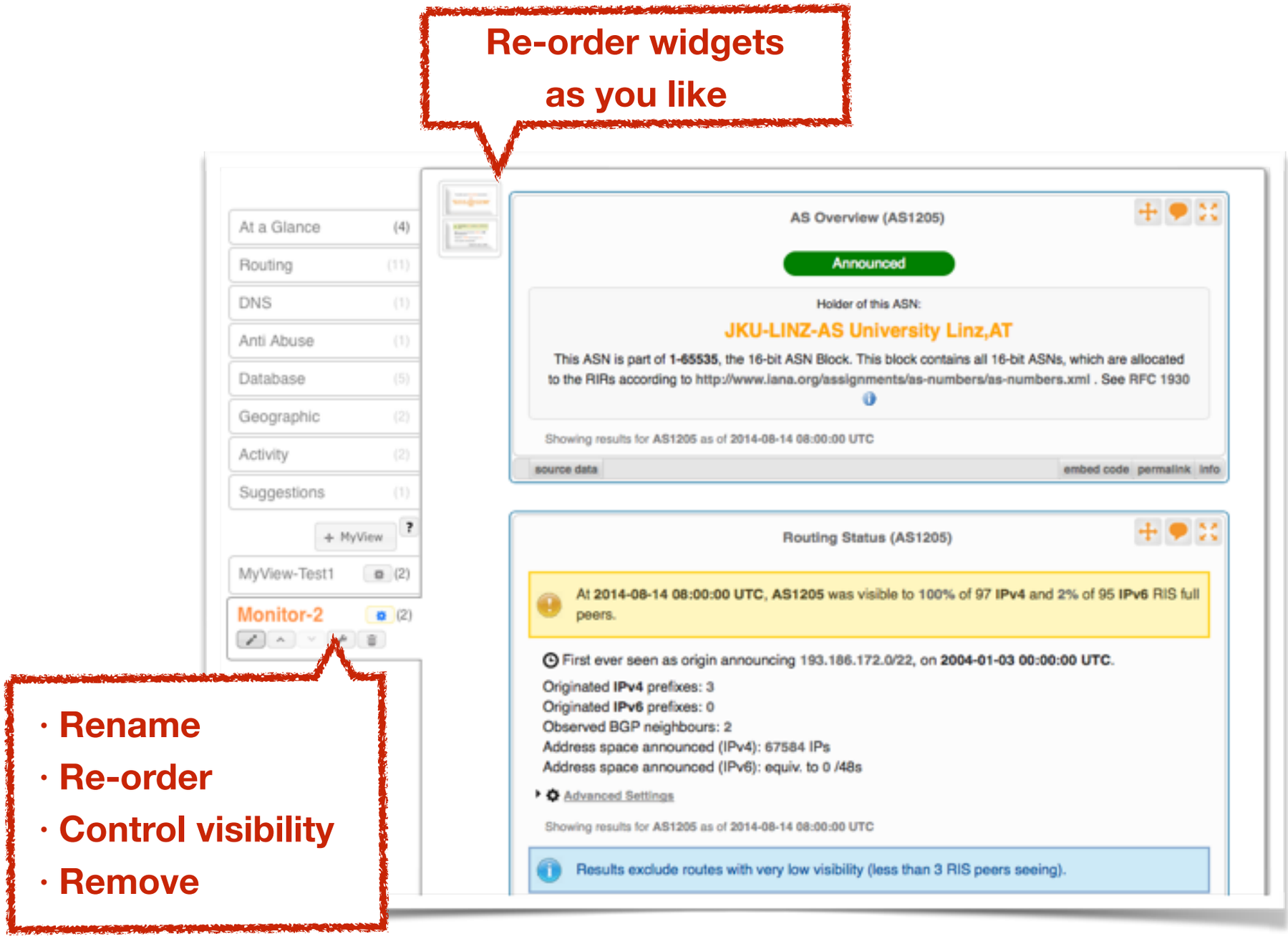
MyView



MyViews are only visible to you.

The option to share your views will be available soon!

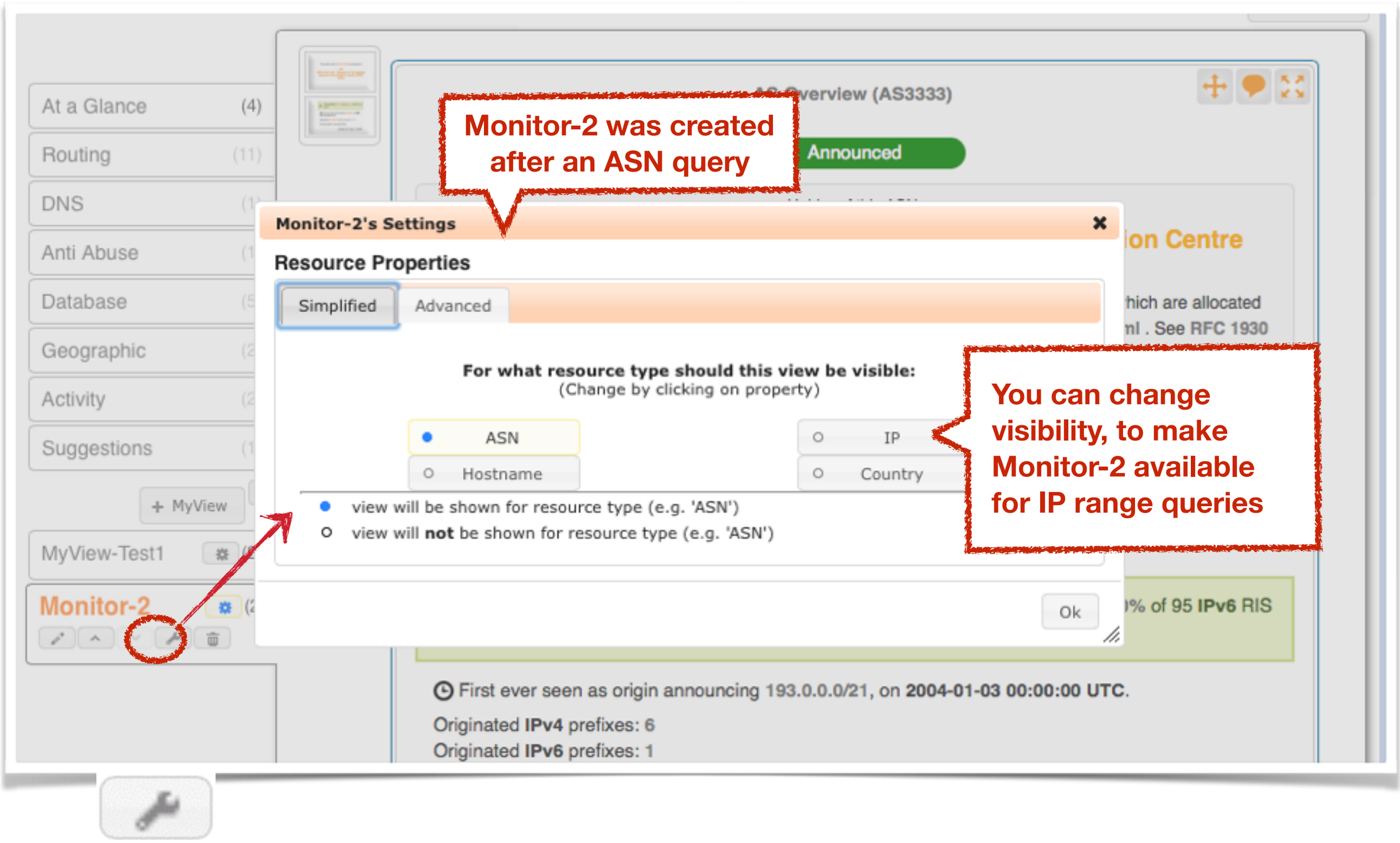
Customise MyView



Visibility of MyView

- MyView is only accessible after you have queried an ASN or IP
- A MyView created after an ASN query is only visible for other ASN queries
- A MyView created after IP query is only visible for other IP queries
- This can be changed via settings

Controlling Visibility



MyView Summary

- RIPE NCC Access login required
- Customised selection of widgets
- It’s like an extra tab, specifically for your queries
- By default, available for one type of resource (ASN or IP)
- Can’t be shared

Exercise D

MyView

Refer to the exercise booklet

Comparing Networks

Section 8

Why compare networks?

- Want to peer with AS-X?

  - Learn by opening multiple widgets about AS-X

- Choosing upstream ?

  - Compare AS-X with AS-Y by opening same widget loaded with two different ASNs

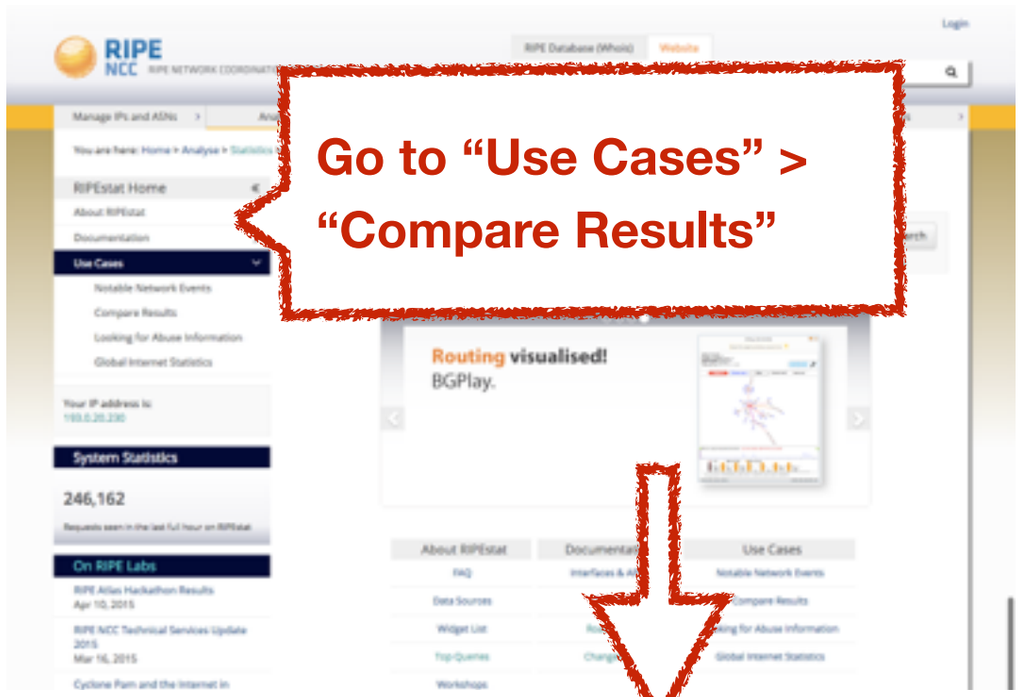
- Internet outage in a country?

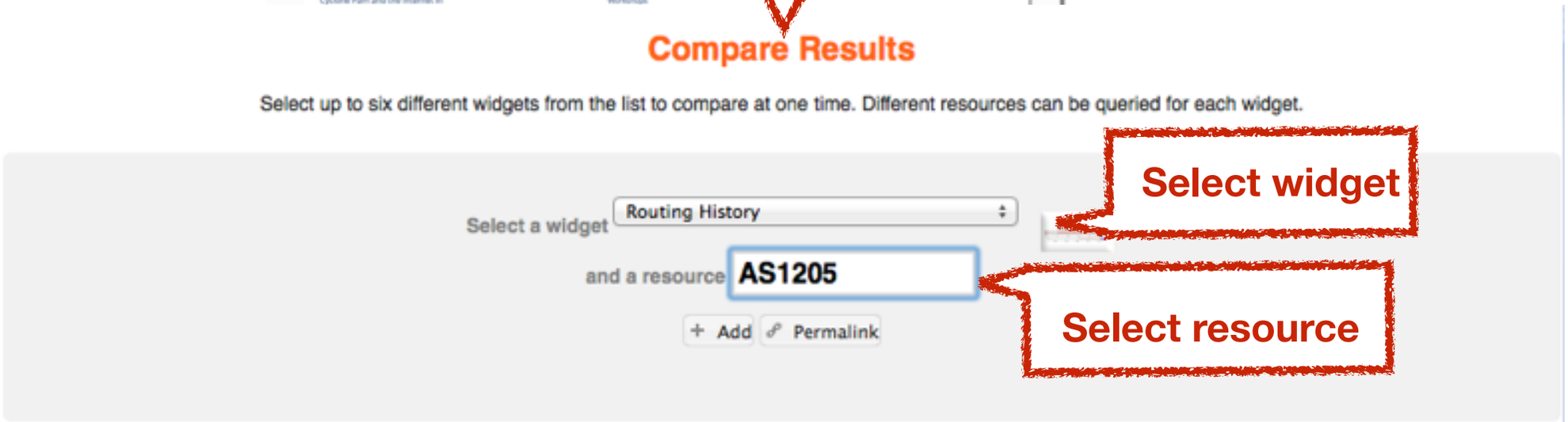
  - Open multiple country-related widgets in same view

https://labs.ripe.net/Members/suzanne_taylor_muzzin/ripestats-multiple-widget-and-resource-comparison

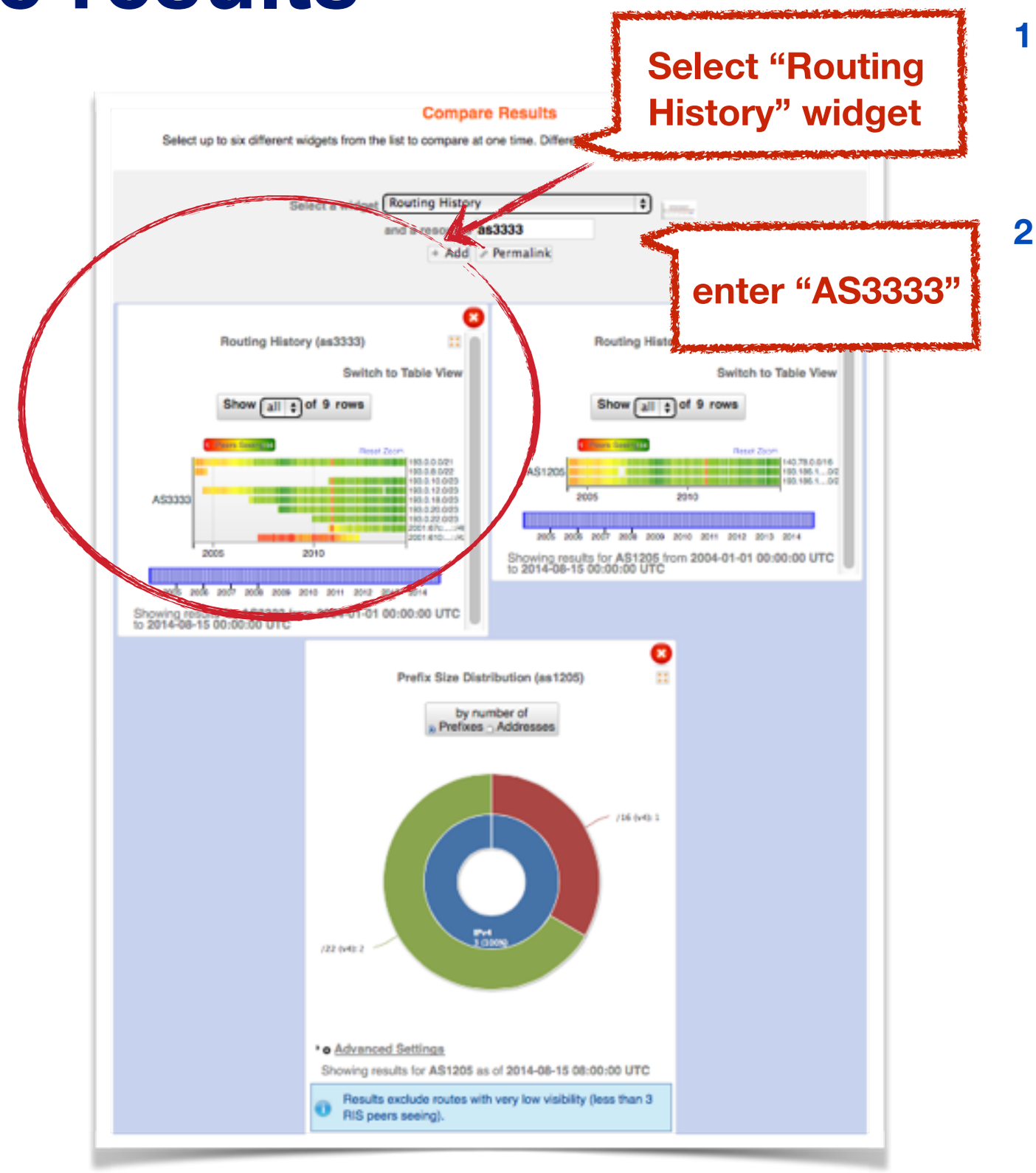
How to compare

- Compare results in different widgets





Compare results



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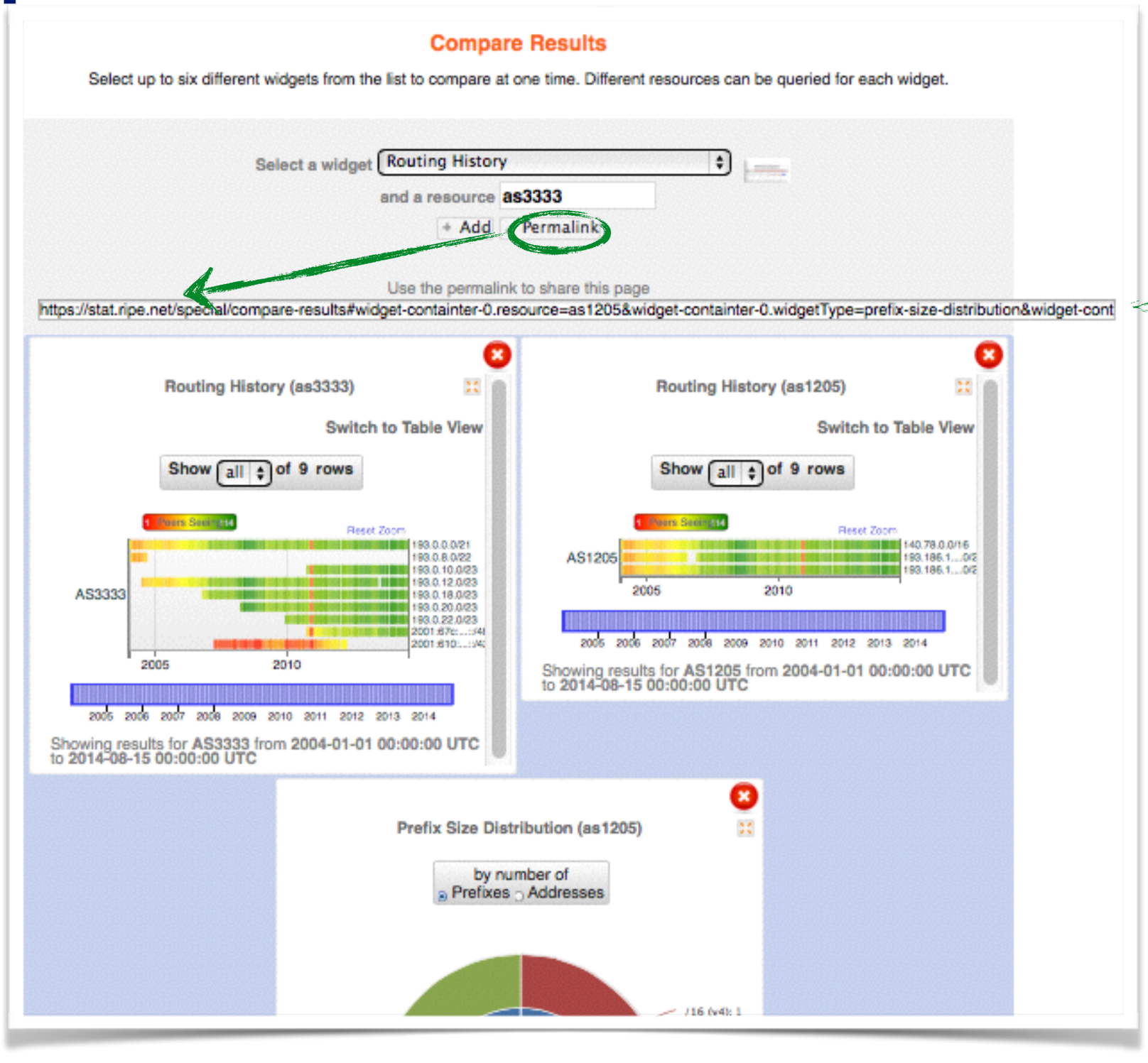

Share via "Permalink"

Compare resources summary

- No login required
- Add widgets AND input query for each widget (ASN, IP, etc.)
- It is a result page with widgets and query results
- Share it via a permalink

Comparing countries in one widget

- Compare the growth of ASNs in DE and NL
- See IPv6 adoption rate in four countries at the same time
- Analyse IP hijacking with ‘BGP Update Activity Widget’

https://labs.ripe.net/Members/wilhelm/bgp-leaks-in-indonesia)

https://labs.ripe.net/Members/suzanne_taylor_muzzin/new-in-ripestat-in-widget-comparison-and-monitoring

In-widget comparison

- Country Routing Statistics

Exercise E

Comparing Results

Refer to the exercise booklet

Exercise F

RIPEstat Use Cases

Use Cases

- How can you see whether someone has hijacked your prefixes?

- How can you see whether you had an outage?

Questions

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@cteuschel

RIPE Atlas

Overview 2 - RIPE Atlas

RIPE Atlas

- Introduction to RIPE Atlas
- What you can get from RIPE Atlas as a visitor
- Exploring public probes
  - *Live Demo*
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- ~~Advanced topics~~ - *not part of this workshop*
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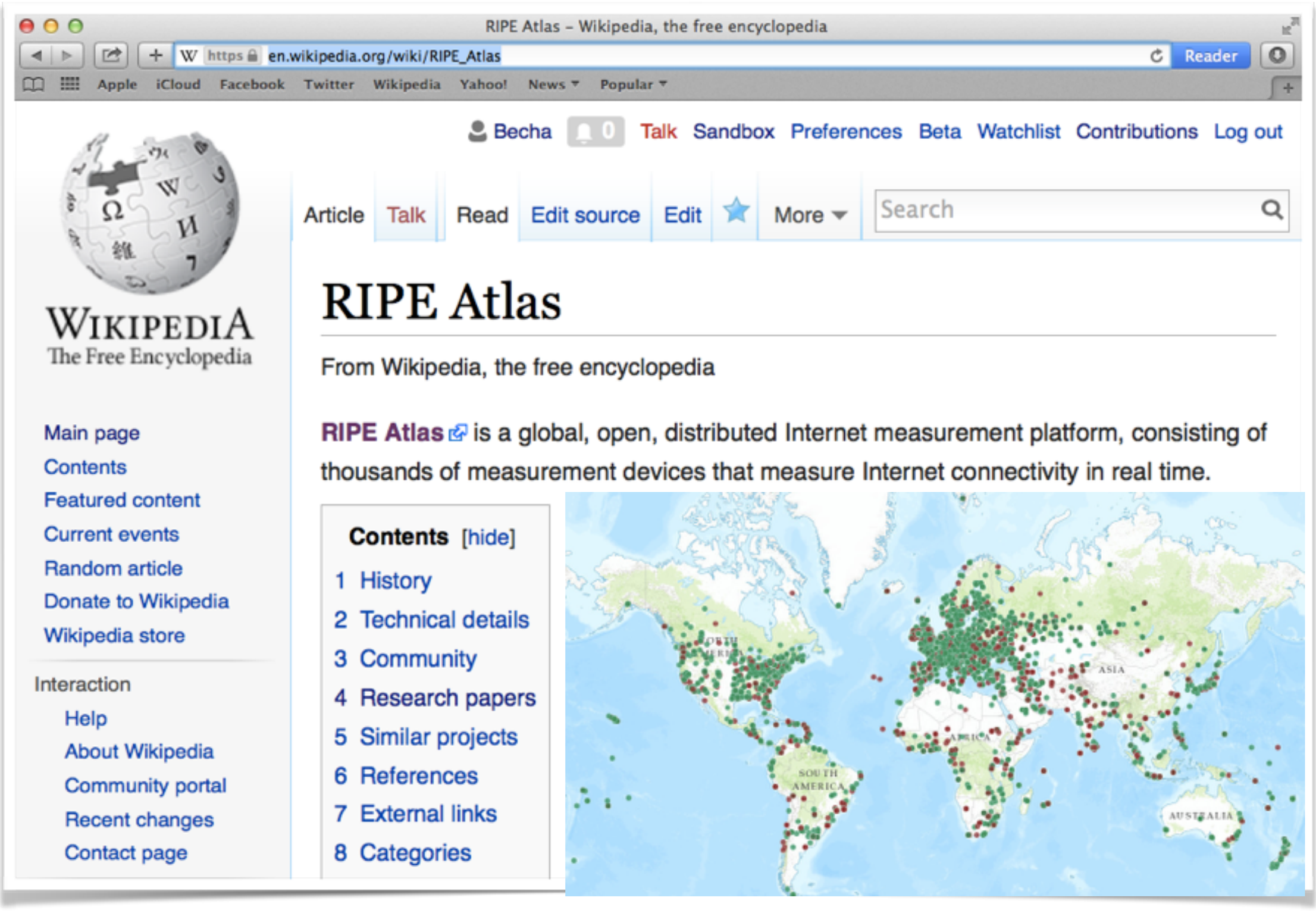
  - ~~RIPE Atlas community~~

Introduction to RIPE Atlas

Section 9

RIPE Atlas


RIPE Atlas – Wikipedia, the free encyclopedia
https
en.wikipedia.org/wiki/RIPE_Atlas
Reader
Apple
iCloud
Facebook
Twitter
Wikipedia
Yahoo!
News
Popular
Becha
0
Talk
Sandbox
Preferences
Beta
Watchlist
Contributions
Log out
Article
Talk
Read
Edit source
Edit
More
Search
WIKIPEDIA
The Free Encyclopedia
Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store
Interaction
Help
About Wikipedia
Community portal
Recent changes
Contact page
RIPE Atlas
From Wikipedia, the free encyclopedia
RIPE Atlas is a global, open, distributed Internet measurement platform, consisting of thousands of measurement devices that measure Internet connectivity in real time.
Contents [hide]
1 History
2 Technical details
3 Community
4 Research papers
5 Similar projects
6 References
7 External links
8 Categories
ASIA
SOUTH AMERICA
AUSTRALIA

Definition

- RIPE Atlas = global active measurements platform
- Goal: View Internet reachability
- Probes hosted by volunteers
- Measurements performed towards root name servers

  - Visualised as Internet traffic maps
- Users can also run customised measurements

  - ping, traceroute, DNS & SSL/TLS, NTP and HTTP*

RIPE Atlas in numbers: April 2016

- 9,300+ probes connected
- 350+ active probes in SEE countries
- Countries: 181
- Originating ASNs:

  3,398 (IPv4) = 6,4% coverage
  1,246 (IPv6) = 11,21% coverage

Overview on SEE countries

	Connected	Disconnected	Anchor
Albania (AL)	19	7	0
Slovenia (SI)	46	5	1
Serbia (RS)	42	6	2
Kosovo (XK)	0	0	0
Croatia (HR)	43	6	0
Macedonia (MK)	16	4	0
Romania (RO)	56	9	1
Bulgaria (BG)	81	18	3
Bosnia and Herzegovina	9	3	0
Montenegro (ME)	4	0	0

Measurements Devices

- v1 & v2: Lantronix XPort Pro
- v3: TP-Link TL-MR3020 powered from USB port

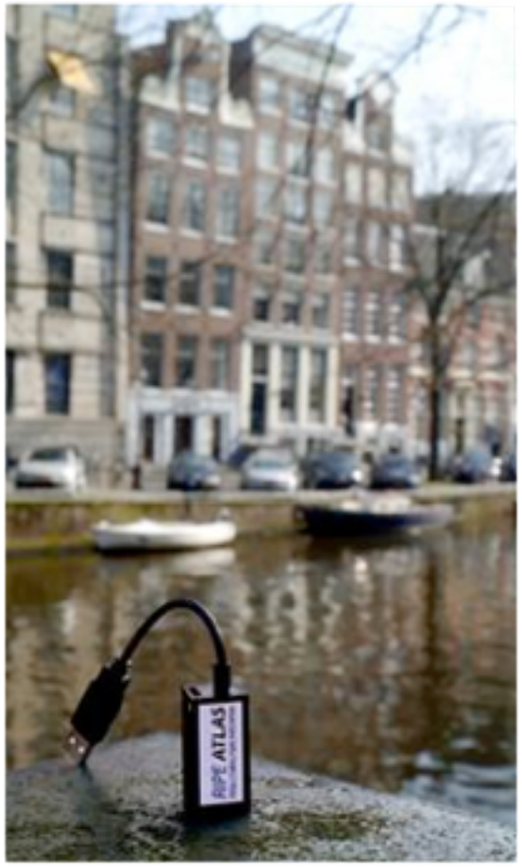
  - Does not work as a wireless router
  - Same functionality as the old probe

- RIPE Atlas anchor: Soekris net6501-70

Most Popular Features

- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- APIs and CLI tools to start measurements and get results
- Streaming data for real-time results
- New: “Time Travel”, LatencyMON, DomainMON
- Status checks (Icinga & Nagios)

Probe Photos



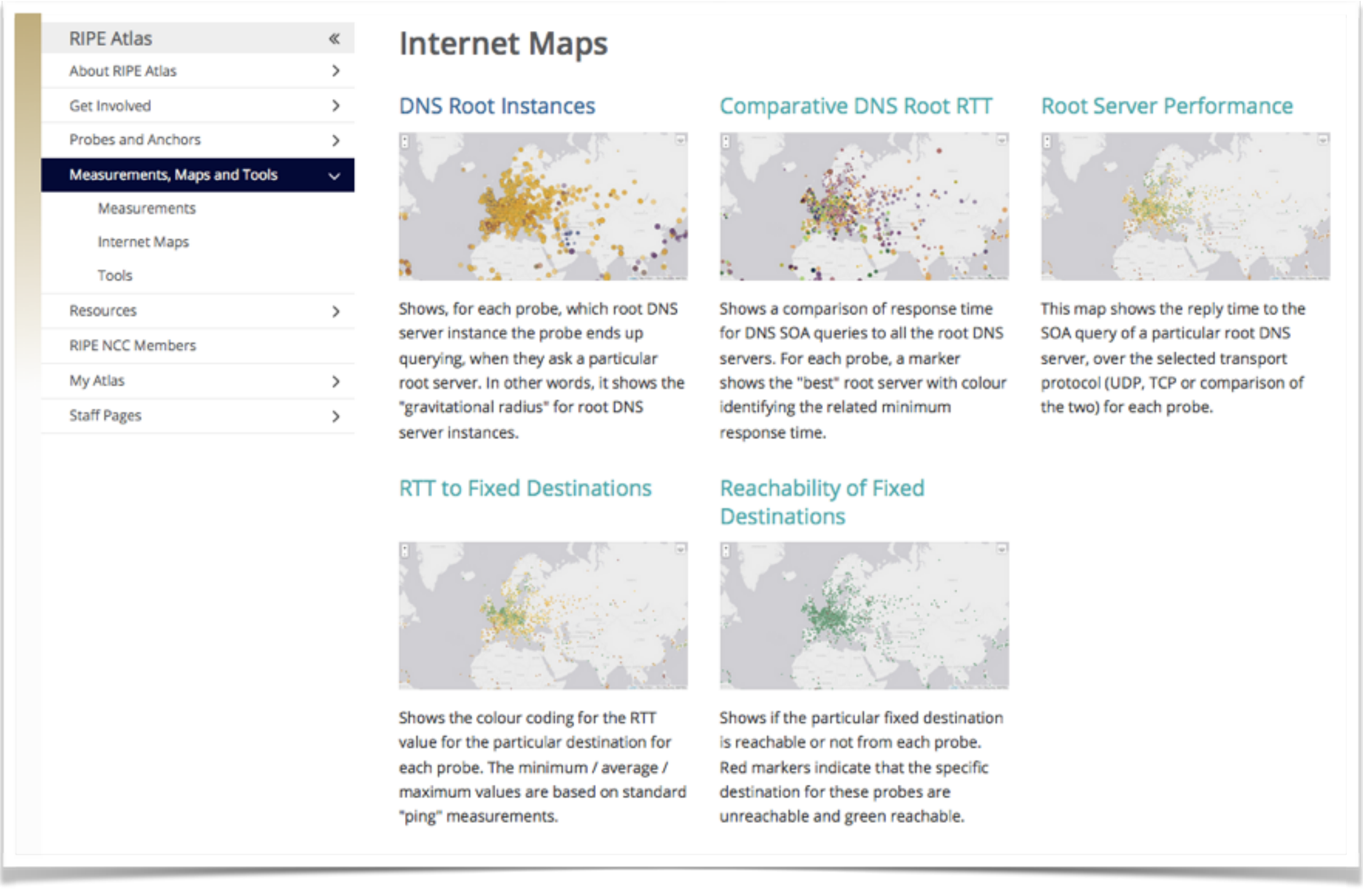
Contacting RIPE Atlas

- https://atlas.ripe.net
- Users mailing list: ripe-atlas@ripe.net
- Articles & updates on RIPE Labs: https://labs.ripe.net/atlas
- Questions and bugs: atlas@ripe.net
- Twitter: @RIPE_Atlas and #RIPEAtlas

What You Can Get From RIPE Atlas As A Visitor

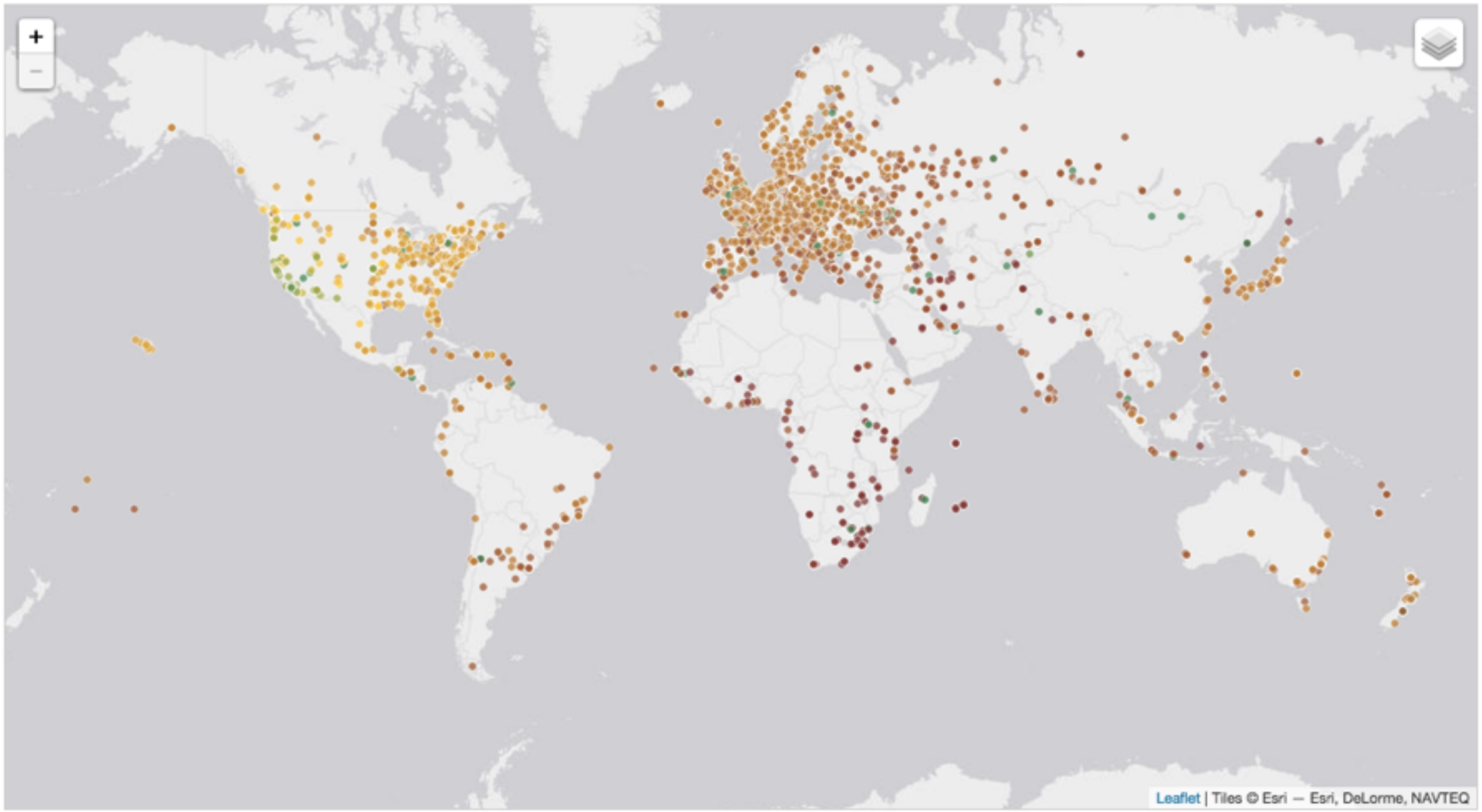
Section 10

Internet Traffic Maps



Where is B-root?

We display measurement results from the last hour only.



< 10ms: 225 | < 20ms: 84 | < 30ms: 112 | < 40ms: 83 | < 50ms: 74 | < 100ms: 666 | < 200ms: 5078 | < 300ms: 1385 | > 300ms: 315 | No Data: 260 | Unreachable: 0

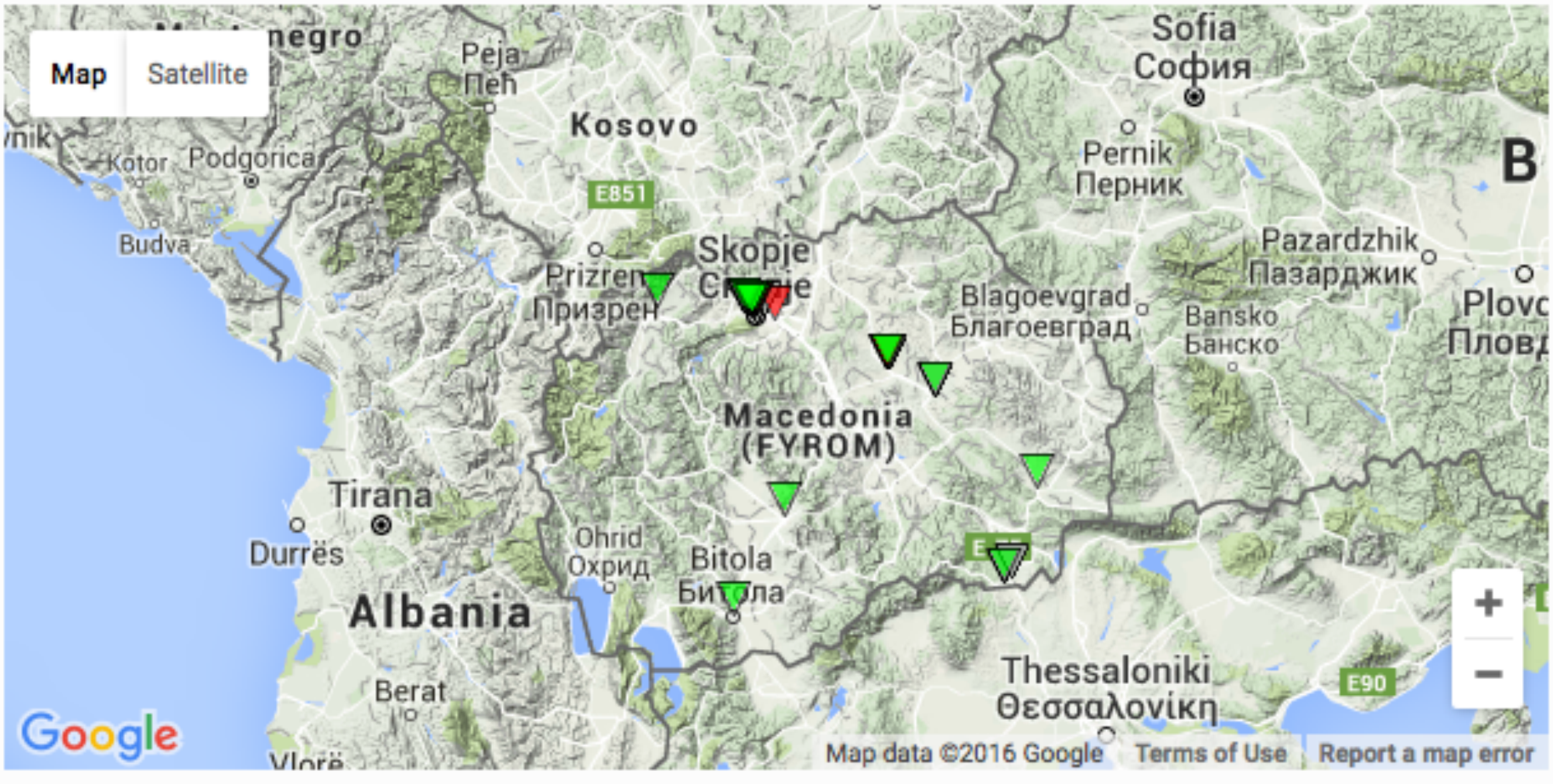
Probes per ASN (in RIPEstat)

RIPE Atlas Probes (MK)

Switch to table view

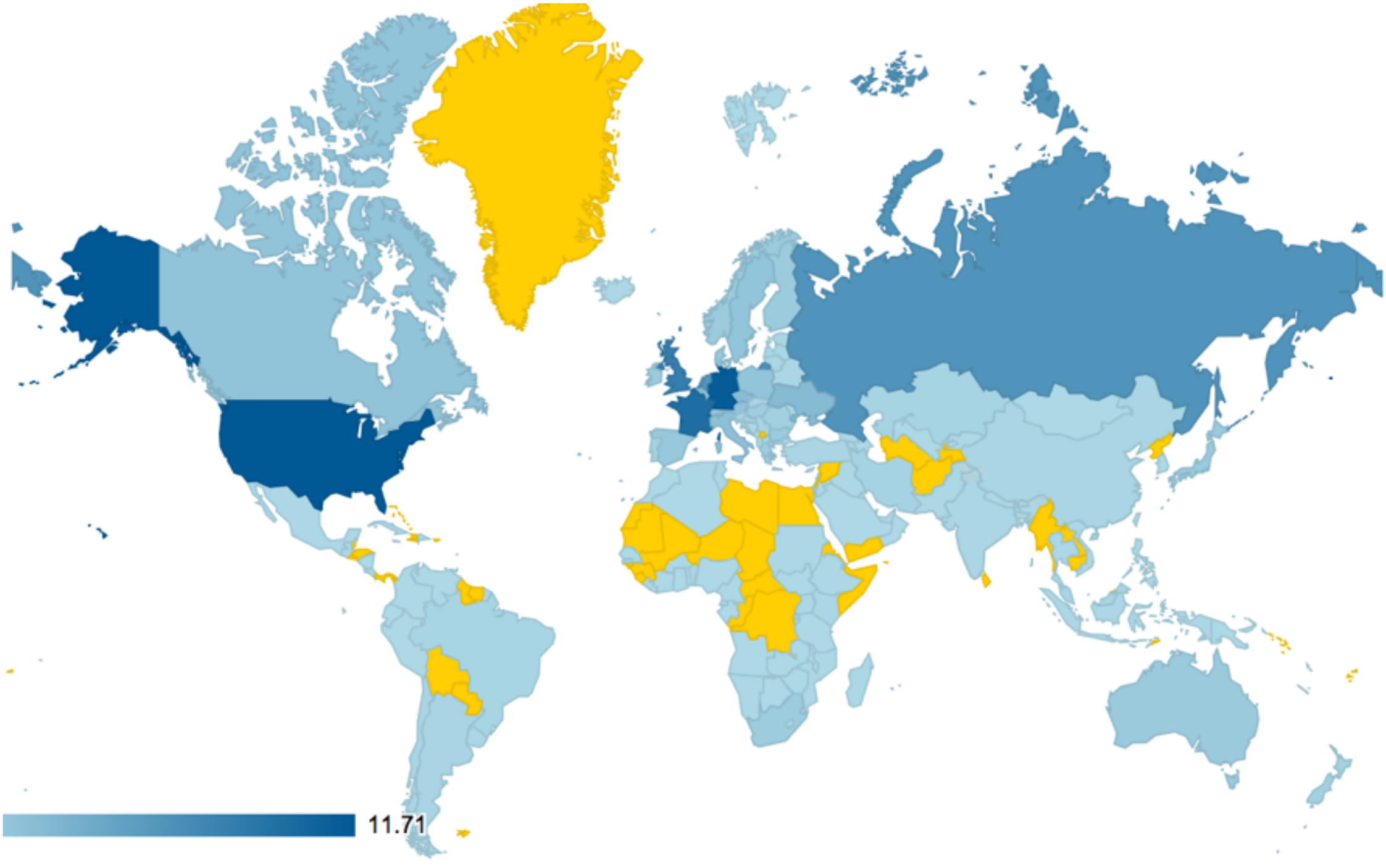
Found 37 RIPE Atlas probes in this network:

Abandoned (17) Connected (17) Disconnected (3)



Showing results for MK as of 2016-04-05 09:31:05 UTC

Where we want to place probes

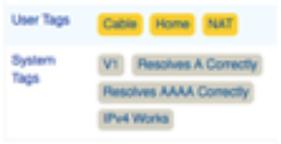


Articles, papers, use cases, experiences

0 comments

RIPE Atlas: Measurements With Tagged Probes Coming Soon

Suzanne Taylor Muzzin — Sep 12, 2014 12:05 PM



We've been busy working on a number of developments, and we're really excited about particular that will be ready soon: creating customised measurements using tagged pro Learn more about it - along with some other recent additions - and let us know what you

Tags: atlas, measurements, tools

» Read

0 comments

Time Warner Cable Outage

Emile Aben — Aug 28, 2014 04:50 PM

The Time Warner Cable network suffered an outage on 27 August 2014 between approximately 9:40 and 10:55 UTC. We looked at some interesting details of this outag RIS and RIPE Atlas.

Tags: atlas, routing

» Read

0 comments

RIPE Atlas Midsummer Update 2014

Fatemah Mafi — Jul 24, 2014 05:30 PM

Since RIPE 68 in Warsaw, the RIPE NCC has developed and releas Atlas. We would like to inform the community of what we've been wo benefit from the RIPE Atlas service.

Tags: atlas, statistics

0 comments

How RIPE Atlas Helped Wikipedia Users

Emile Aben — Jul 09, 2014 12:25 PM

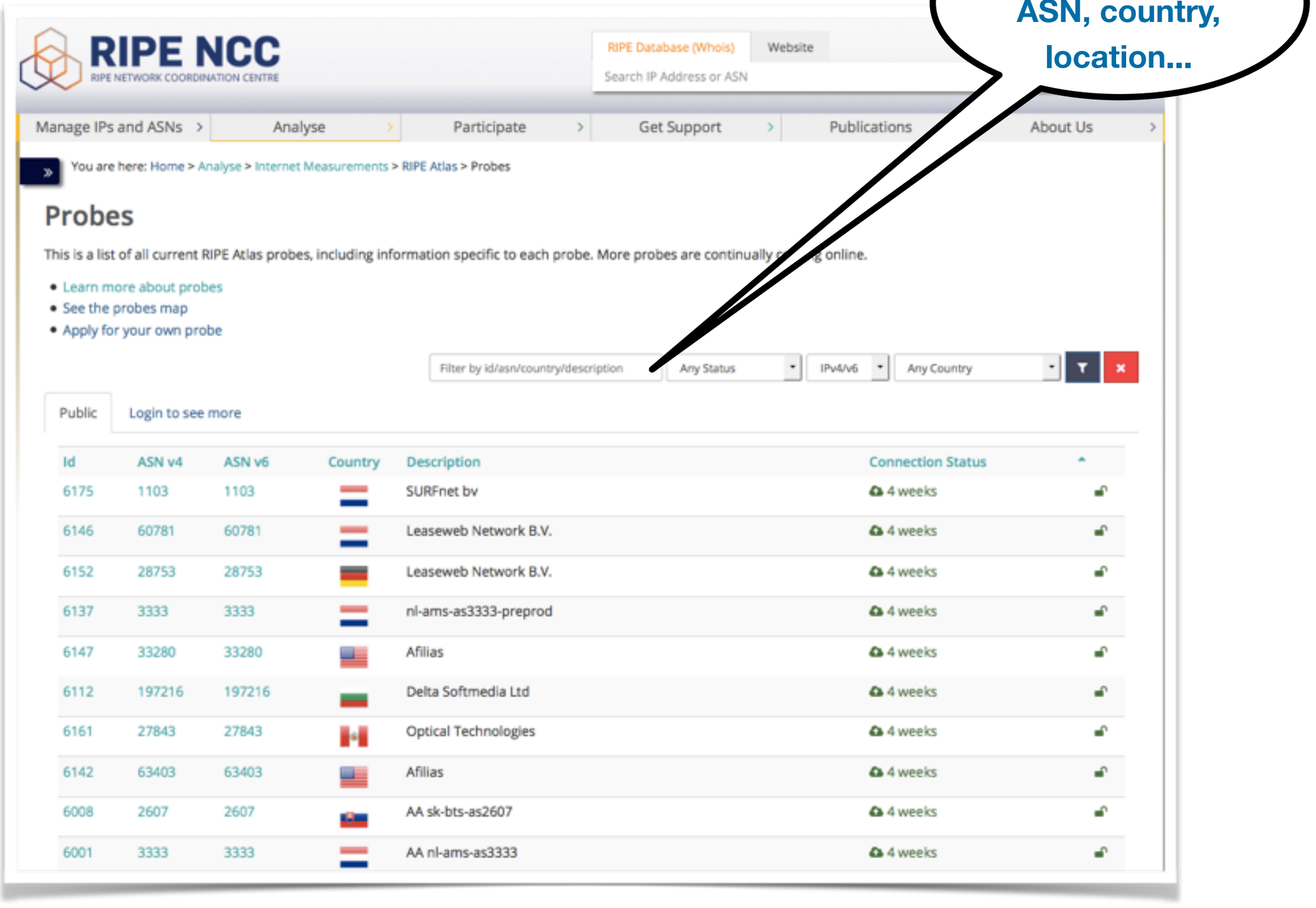
Engineers from the Wikimedia Foundation and the RIPE NCC recen project to measure the latency of Wikimedia sites for users worldwid ways to decrease latency and improve performance for users aroun

Looking Up Public Probes

Section 11

Searching for probes

- https://atlas.ripe.net/probes/



Probe page - Live demo

» You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Probes > Probe #10010

Probe #10010 (Register)

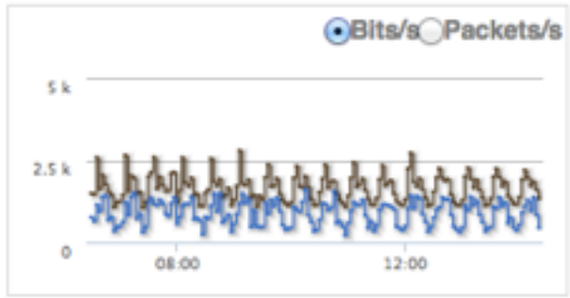
General | Network | Built-in Measurements | User-defined Measurements

General Information

Edit

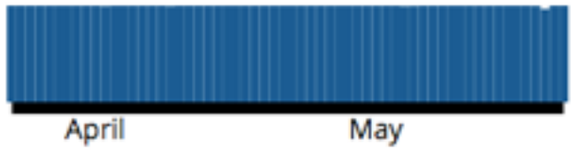
Id	10010
MAC Address	F8:D1:11:A9:F3:2C
Architecture	tl-mr3020
Firmware Version	4680 (1070)
Router Type	
Bandwidth Limit	Not set
DNS Entry	Off
Shared Publicly	Yes
User Tags	NAT, Chello 200MB
System Tags	V3, Resolves A Correctly, Resolves AAAA Correctly, IPv4 Works, Auto GEOIP city, IPv4 Capable, IPv4 RFC1918

Connection & Traffic



Connected Time

3 days, 9 hours



3 days, 9 hours

Firmware 4680

#10010

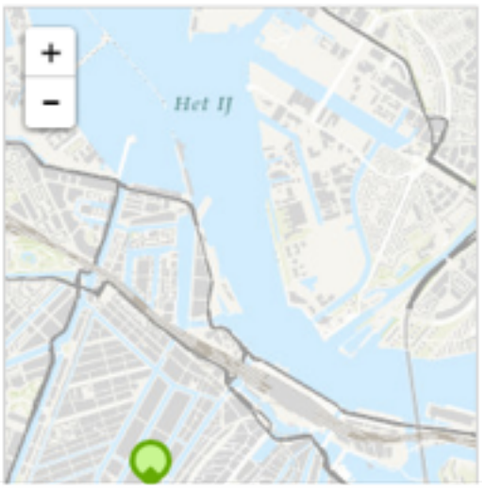
Architecture tl-mr3020

MAC Address F8:D1:11:A9:F3:2C

The displayed location is an automatic best guess of the **city** based on IP address.

By manually setting a more accurate location you can help to improve the usefulness and correctness of RIPE Atlas.

Update Location



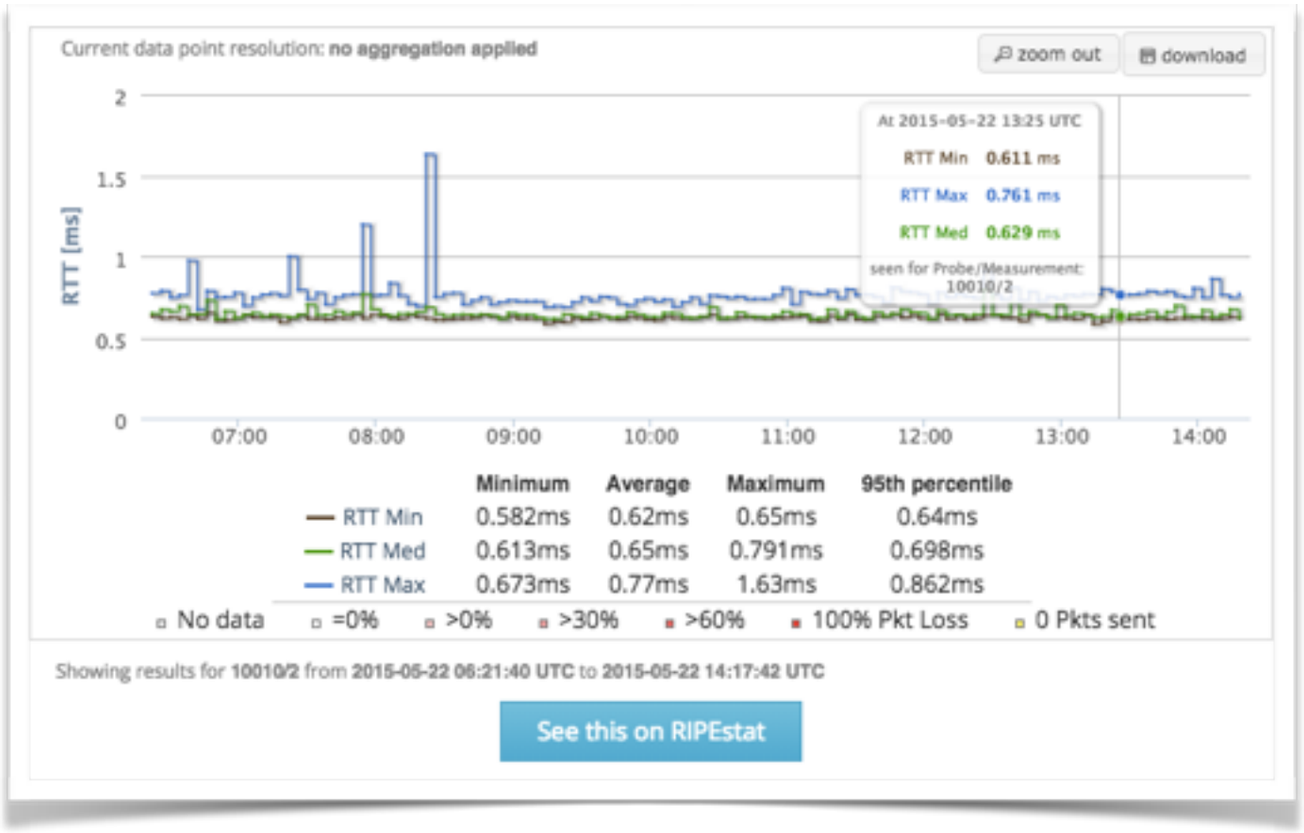
Management Sharing

Edit

Only the probe host is permitted to administer this probe.

Zoomable Ping Graph

- Replace multiple RRDs graphs: zoom in/out in time, in the same graph
- Easier visualisation of an event's details
- Selection of RTT class (max, min, average)

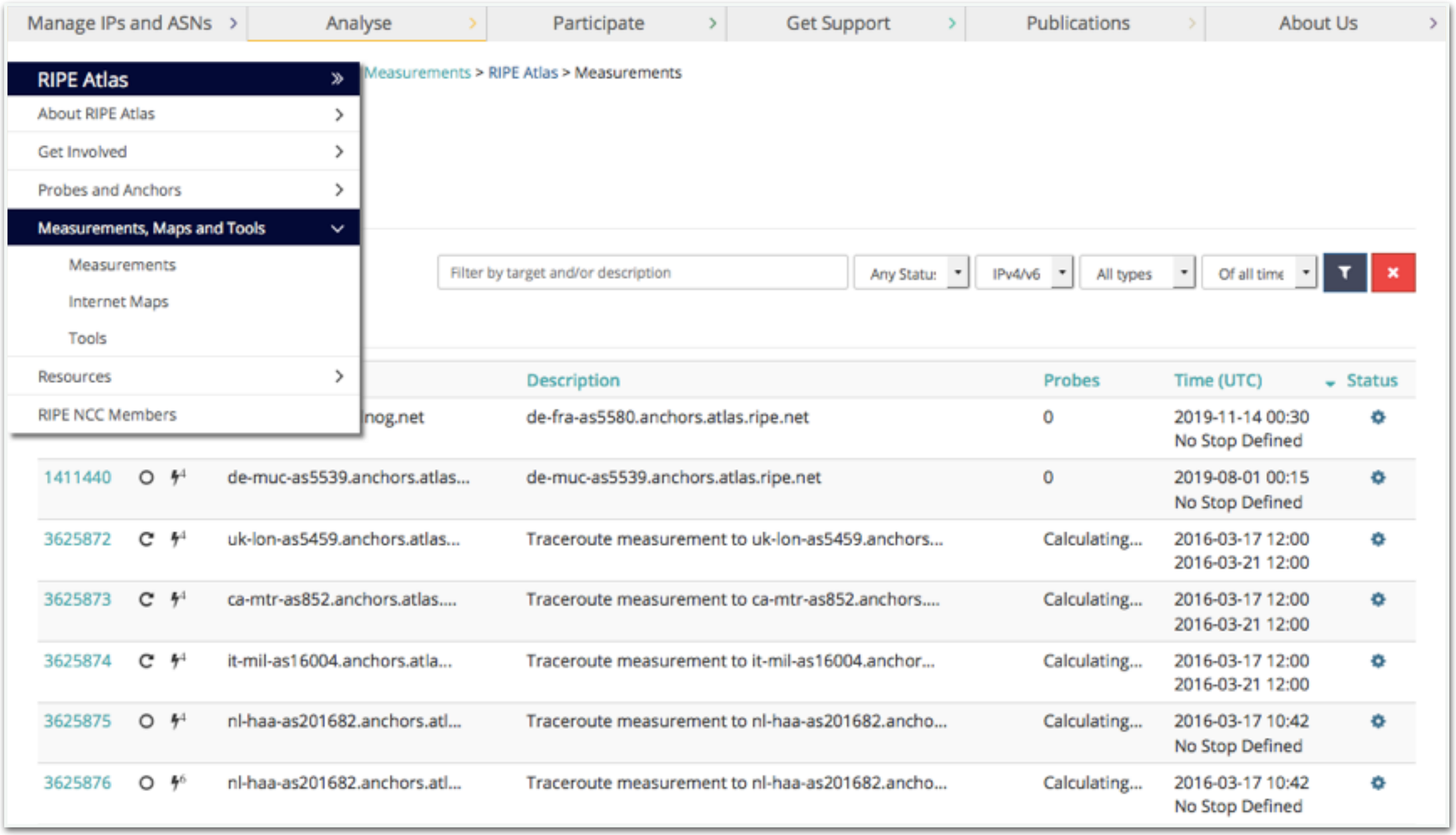


Finding Results of Public Measurements

Section 12

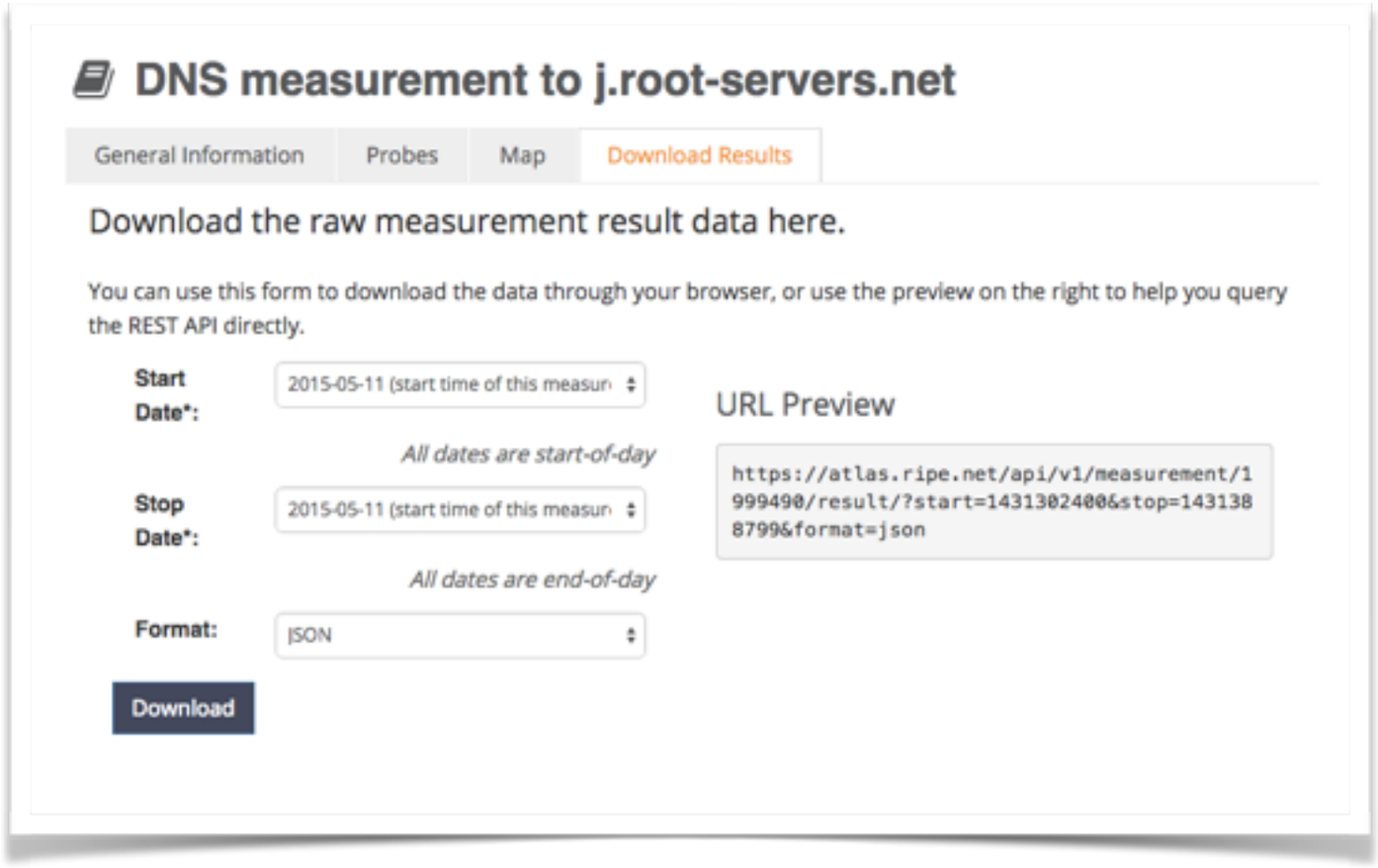
Looking up Measurements Results

- https://atlas.ripe.net/measurements/



Downloading Measurements Results

- Click on msm, then “Download”
- Or go to URL
- Or use the API
- Results in JSON
- Libraries for parsing available on GitHub
  - **https://github.com/RIPE-NCC/ripe.atlas.sagan**
  - **https://github.com/RIPE-Atlas-Community/**



Search for Measurements by Target in RIPEstat

Go to “RIPEstat > “RIPE Atlas Activity”

RIPEstat — Internet Measurements and Analysis

https stat.ripe.net/widget/atlas-targets#w.resource=8.8.8.8

You are here: Home > Data & Tools > RIPEstat > atlas-targets

RIPE Atlas Measurement Targets (8.8.8.8)

8.8.8.8

Show 10 targets/page Search:

Measurement ID	Stopped	Type	Target IP	Target Hostname
1040720	ongoing	ping	8.8.8.8	google-public-dns-a.google.com
1006491	ongoing	traceroute	8.8.8.8	not specified
1006192	ongoing	ping	8.8.8.8	not specified
1004827	ongoing	traceroute	8.8.8.8	not specified
1002630	ongoing	ping	8.8.8.8	not specified
1478085	2014-02-24 13:41 UTC	dns	8.8.8.5	not specified

Use Existing Measurements

- There are many measurements already running!
- Search for existing public measurements first…
- Only then schedule your own measurement if you don’t find what you’re looking for

Exercise G

Analyse Measurements Results

Refer to the exercise booklet

Creating a Measurement

Section 13

Logging In

- Create a RIPE NCC Access account

  - Same for LIR Portal, RIPE Atlas, RIPEstat, RIPE Labs...

- Advanced

- ‘LIR contact’: additional benefits!

  - Membership benefits for RIPE Atlas

  - Share probe management with LIR colleagues

  - Historical RIPE Database view in RIPEstat

- Add yourself as ‘contact’ in LIR Portal

Scheduling a Measurement

- Log into atlas.ripe.net
- “My Atlas” > “Measurements”
- “New Measurement” or “One-off”

  - Most are periodic and last a long time

  - Choose type, target, frequency, # of probes, region...

  - You will spend credits

- https://atlas.ripe.net/doc/udm
- Or use the API:

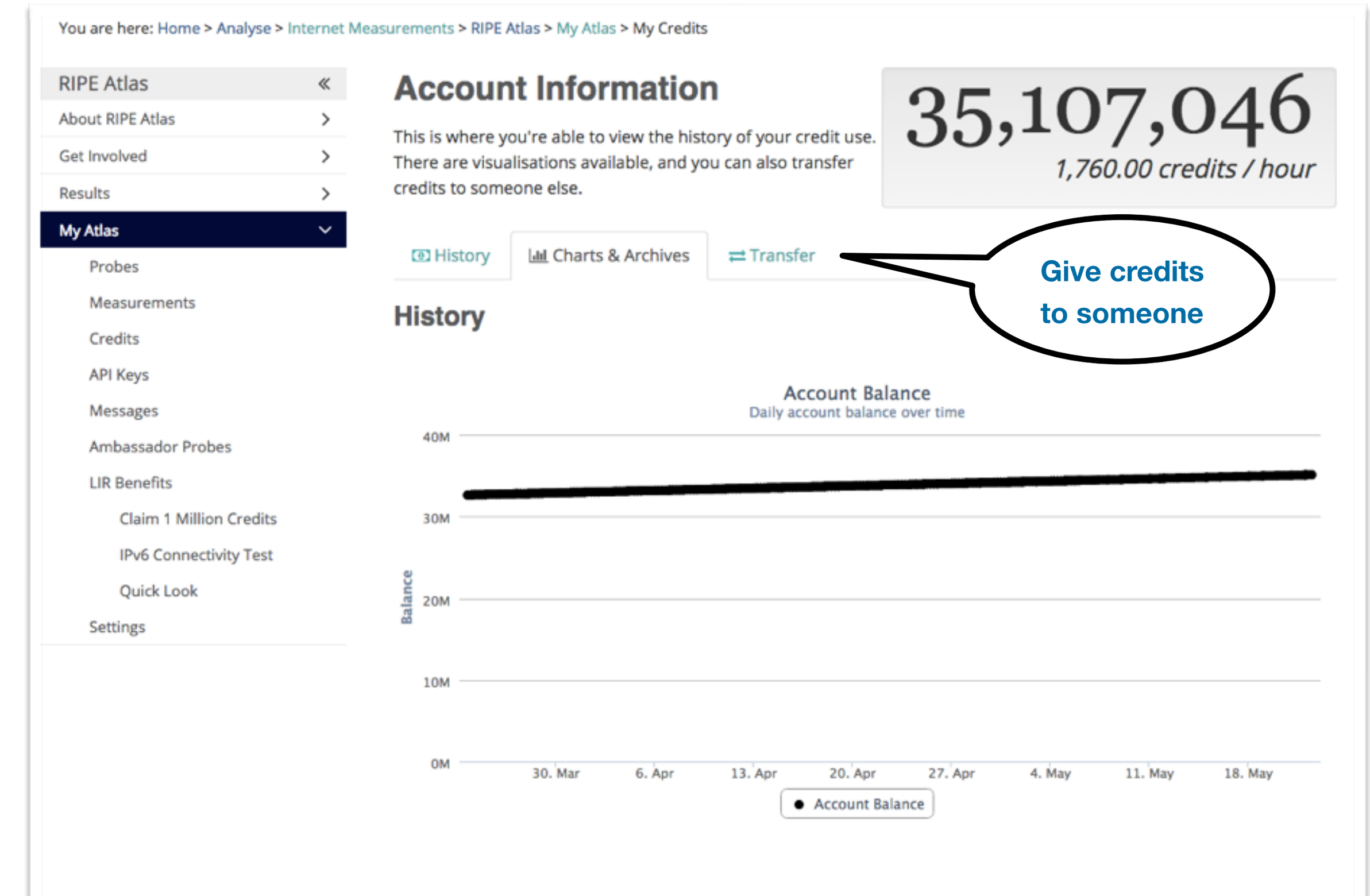
https://atlas.ripe.net/docs/measurement-creation-api/

Credit System

- Measurements cost credits
  - ping = 10 credits, traceroute = 20, etc.
- Why? Fairness and avoid overload
- Hosting a probe earns credits
- Earn extra credits by:
  - Being a member
  - Hosting an anchor
  - Sponsoring probes

https://atlas.ripe.net/doc/credits

Credits


You are here: Home > Analyse > Internet Measurements > RIPE Atlas > My Atlas > My Credits
RIPE Atlas
About RIPE Atlas
Get Involved
Results
My Atlas
Probes
Measurements
Credits
API Keys
Messages
Ambassador Probes
LIR Benefits
Claim 1 Million Credits
IPv6 Connectivity Test
Quick Look
Settings
Account Information
This is where you're able to view the history of your credit use. There are visualisations available, and you can also transfer credits to someone else.
35,107,046
1,760.00 credits / hour
History
Charts & Archives
Transfer
Give credits to someone
History
Account Balance
Daily account balance over time
40M
30M
20M
10M
0M
Balance
30. Mar
6. Apr
13. Apr
20. Apr
27. Apr
4. May
11. May
18. May
Account Balance

Exercise H

Create A Measurement

Refer to the exercise booklet

Network Monitoring

Section 13

Network Monitoring

- Network operators use tools to monitor network health

  - Nagios & Icinga

- Tools receive input from RIPE Atlas via the API

- Benefits:

  - Pings from 1000 out of thousands of probes around the world

  - See your network from the outside

  - Plug into your existing practices

Integration with Monitoring Systems

1. Create a RIPE Atlas ping measurement

2. Go to “Status Checks” URL

3. Add your alerts in Icinga or Nagios

Creating Status Checks

- Status Checks work via RIPE Atlas' RESTful API
  - https://atlas.ripe.net/api/v1/status-checks/MEASUREMENT_ID/
- You define the alert parameters, for example:
  - Threshold for the percentage of probes that successfully received a reply
  - How many most recent measurements to base it on
- What is the maximum packet loss acceptable
- Documentation:
  - https://atlas.ripe.net/docs/status-checks/

Icinga Examples

- Community of operators contributed configuration code!
  - Making use of the built-in “check_http” plugin
- GitHub repo examples:
  - https://github.com/RIPE-Atlas-Community/ripe-atlas-community-contrib/blob/master/scripts_for_nagios_icinga_alerts
- Post on Icinga blog:
  - https://www.icinga.org/2014/03/05/monitoring-ripe-atlas-status-with-icinga-2/

Exercise I

Setting Up Status Checks

Refer to the exercise booklet

More RIPE Atlas Features

Section 15

Latest Results API

- https://atlas.ripe.net/docs/measurement-latest-api/
  - Widget monitoring value in real time (100 probes pinging websites worldwide)
  - Alert based on average measurements per hour
  - Big network event, e.g. Internet outage in a region
  - DNS domain monitoring; configurable measurements using ten RIPE Atlas anchors
- https://labs.ripe.net/Members/suzanne_taylor_muzzin/ripe-atlas-latest-results-api-and-parsing-library

Secure Measurement creation and sharing

- Use API keys to:
  - Create measurements without logging in
  - Securely share your measurement data with others
- To create, manage and delete API keys:
  - https://atlas.ripe.net/keys/
  - https://atlas.ripe.net/docs/keys2/
- Examples:
  - https://atlas.ripe.net/docs/rest/

Security Aspects

- Probes:
  - Hardware trust material (regular server address, keys)
  - No open ports; initiate connection; NAT is okay
  - Don’t listen to local traffic
  - No passive measurements
- Measurements triggered by “command servers”
  - Inverse ssh tunnels
- Source code published

Additional Membership Benefits

- RIPE Atlas:
  - Guaranteed approval to host a probe
  - Do NOT have to host a probe in order to perform customised measurements
  - 1,000,000 extra credits monthly via LIR Portal
  - “Quick Look” measurements via LIR Portal
  - IPv6 reachability testing (free - no credits needed)
  - Sharing probe management with LIR colleagues
- RIPEstat:
  - Historical view of RIPE Database objects

Take part in the RIPE Atlas community

Section 16

RIPE Atlas community (part 1)

- Individual volunteers host probes in homes or offices
- Organisations host RIPE Atlas anchors
- Sponsor organisations give financial support or host multiple probes in their own networks

RIPE Atlas community (part 2)

- Ambassadors help distribute probes at conferences, give presentations, etc.
- Developers contribute free and open software
- Network operators create measurements to monitor and troubleshoot
- Researchers and students write papers

Hosting a probe

- Create a RIPE NCC Access account
- Go to https://atlas.ripe.net/apply
- You will receive a probe by post
- Register your probe
- Plug in your probe
- If you receive a probe from an ambassador (trainer, sponsor, someone at a conference), just register it and plug it in!

More Hackathons!

- Join the hackathons in 2016
  - Before each RIPE Meeting - save the dates!
  - 21-22 May, Copenhagen
  - 22-23 October, Madrid

Questions

atlas@ripe.net
@RIPE_Atlas

The End!

Край

Y Diwedd

Fí

Finis

النهاية

Соңы

Վերջ

Liðugt

Ende

Finvezh

Кінець

Konec

Kraj

Ënn

Fund

پایان

Kpaj

Lõpp

Beigas

Vége

Son

An Críoch

הסוף

Endir

Sfârşit

Fine

Fin

Τέλος

Einde

Канец

Конец

Slut

Slutt

დასასრული

Pabaiga

Tmiem

Fim

Amaia

Loppu

Koniec