RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Measurements and Tools

Training Course

Training Services | RIPE NCC | July 2019

Schedule

09:00 - 09:30	**Coffee, Tea**
11:00 - 11:15	**Break**
13:00 - 14:00	**Lunch**
15:30 - 15:45	**Break**
17:30	**End**

Introduction

- **Name**
- **Number on the list**
- **Experience**
  - RIPE Database
  - RIPEstat
  - RIPE Atlas
- **Goals**

Overview 1 - RIPEstat

RIPEstat

- Introduction to RIPE and the RIPE NCC
- Introduction to RIPEstat
- More about widgets
  - ***Exercise A: Querying for a Resource***
- Visualising BGP Routing Information
  - ***Exercise B : BGPlay***
- Reporting Abuse
- Visualising RIPE Database Data
- Personalising RIPEstat
- Comparing Networks
  - ***Exercise C : Kahoot***

Overview 2 - RIPE Atlas

RIPE Atlas

- Introduction to RIPE Atlas
- Using RIPE Atlas as a Visitor
- Looking up Public Probes
- Finding Results of Public Measurements
- Creating a Measurement
  - *Demo and Exercise D*
- Network Monitoring
  - *Exercise E: Using Streaming API*
- Command-line Interface Toolset
  - *Exercise F: Using RIPE Atlas CLI*
- Use Cases
- More RIPE Atlas Features
- Take Part in the Atlas Community
  - *Exercise G : Kahoot*

Course Goals

- RIPEstat Goals:
  - Debug your own networks using RIPE stat
  - Find routing information about other networks to enable decision making and troubleshooting

- RIPE Atlas Goals:
  - Monitoring and troubleshooting your network using RIPE Atlas
  - Create specific tailor-made measurements using API calls or the command line interface

Introduction to the RIPE NCC

Section 1

RIPE NCC - Who are we?

- Located in Amsterdam
- Not-for-profit organisation
- One of the five Regional Internet Registries (RIRs)
- 21,225 members (LIRs)

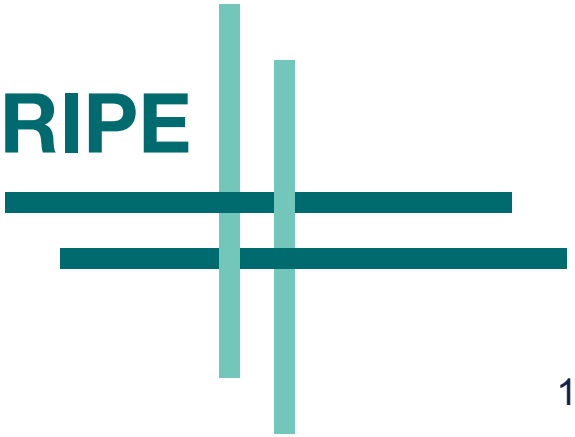
Our service region

What do we do?

- Distribute IPv4, IPv6, ASNs
- Training courses
- RIPE Database
- Support RIPE community
- RIPE Atlas, RIPEStat, Resource Certification

RIPE (Réseaux IP Européens)

- Started in 1989
- Discussion forum open to all parties
- Not a legal entity, no formal membership
- Develops policies
- Work done in Working Groups
- Activities on a voluntary basis
- Decisions by consensus



Introduction to RIPEstat

Section 2

What is RIPEstat?

One interface for Internet data and statistics

“One-stop shop”

RIPE NCC
RIPEstat

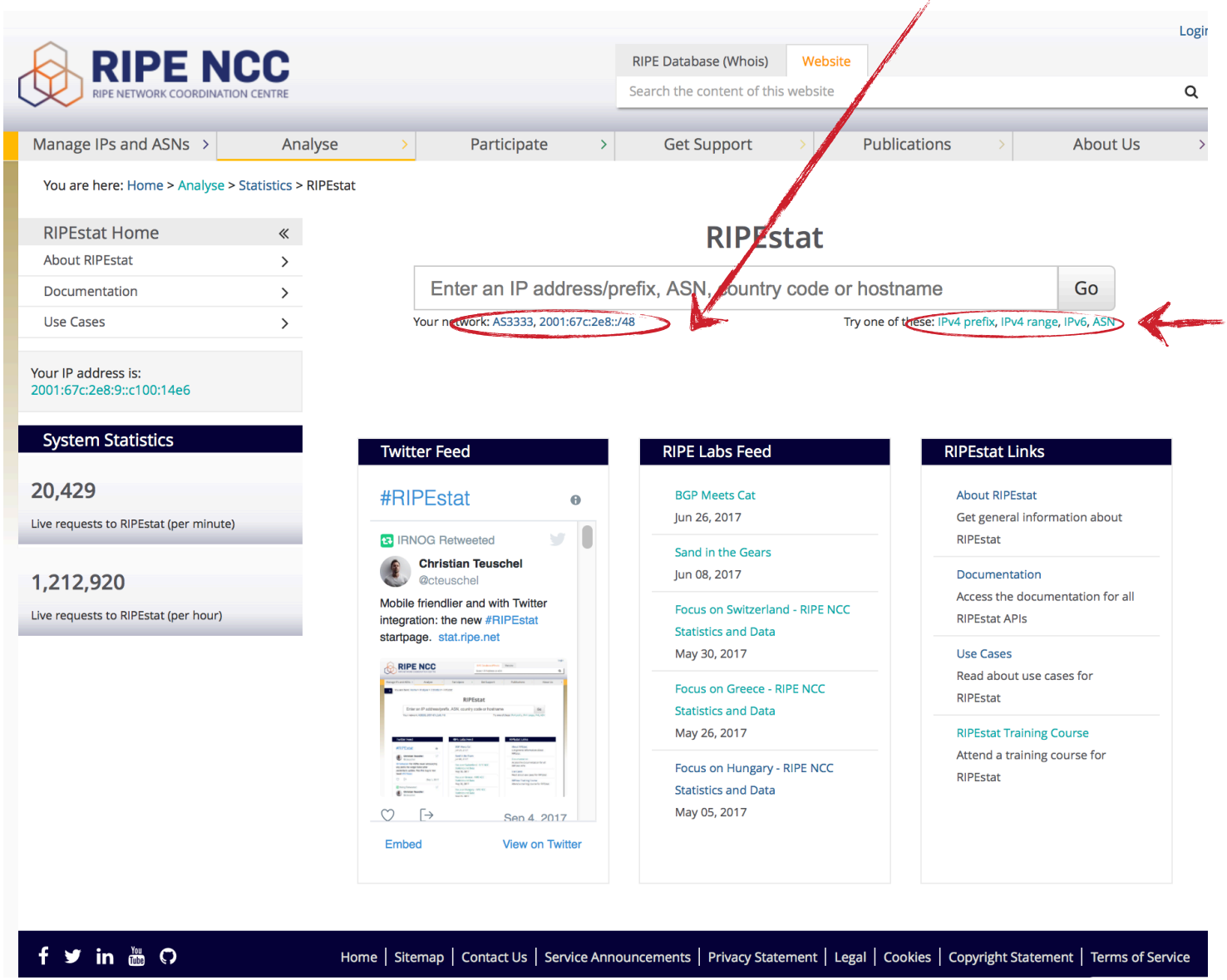
stat.ripe.net

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…

Landing page

RIPEstat shows your own IP/ASN

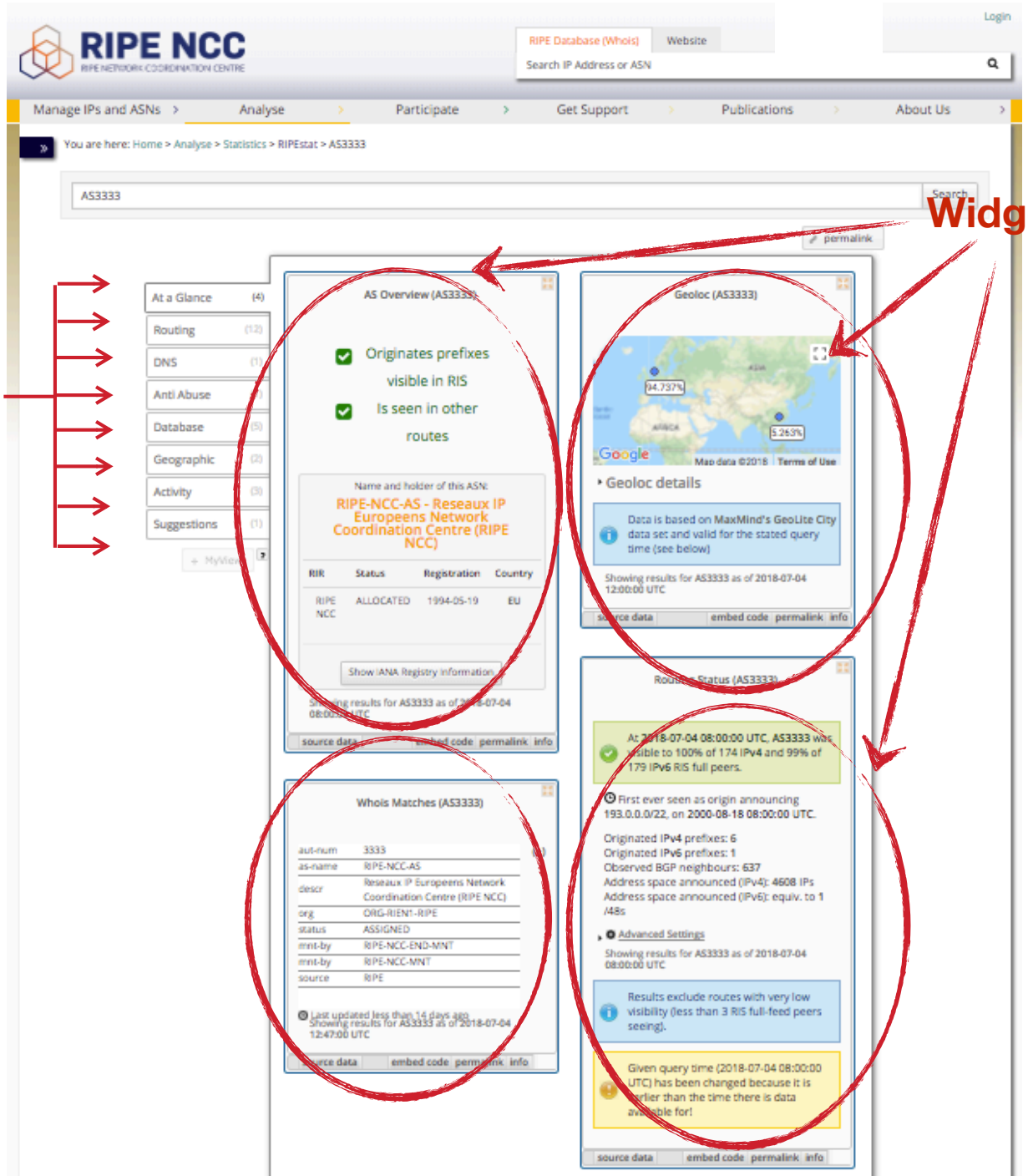


random IPs, and ASNs to try out RIPEstat

Query Types

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

Results page



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?

RIPEstat Interfaces

- Web interface

  https://stat.ripe.net

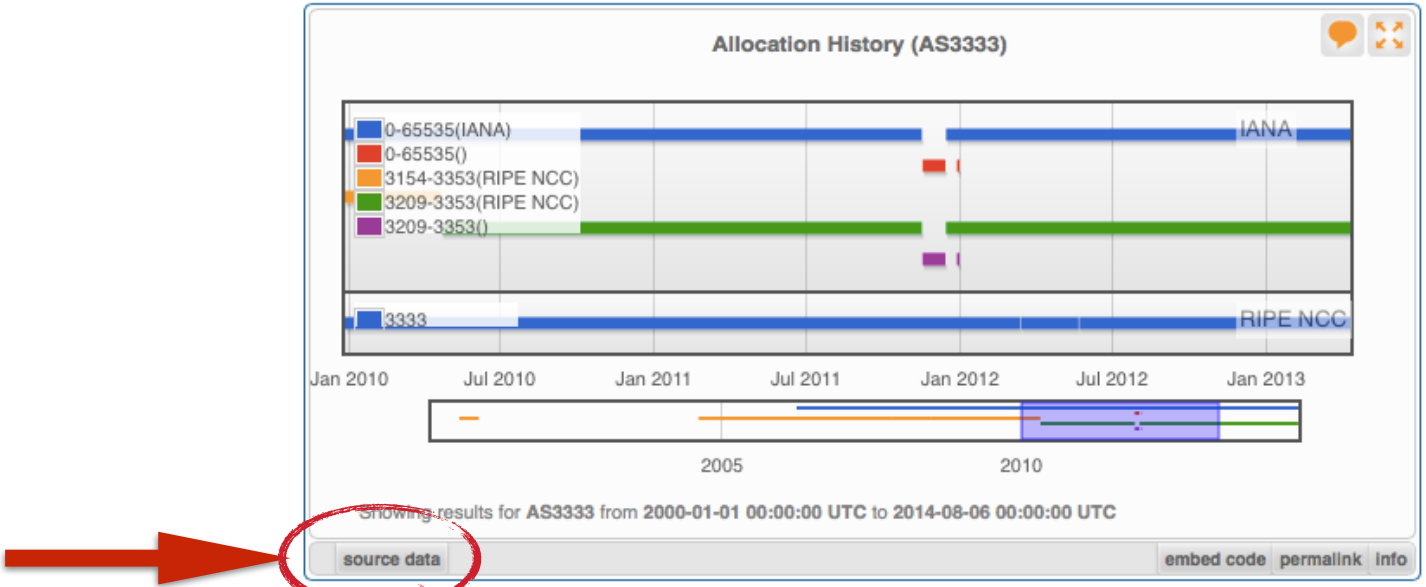
- RIPEstat widget API

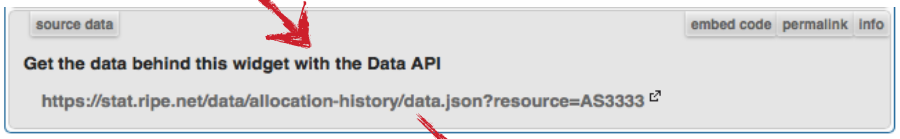
- RIPEstat data API

More About Widgets

Section 3

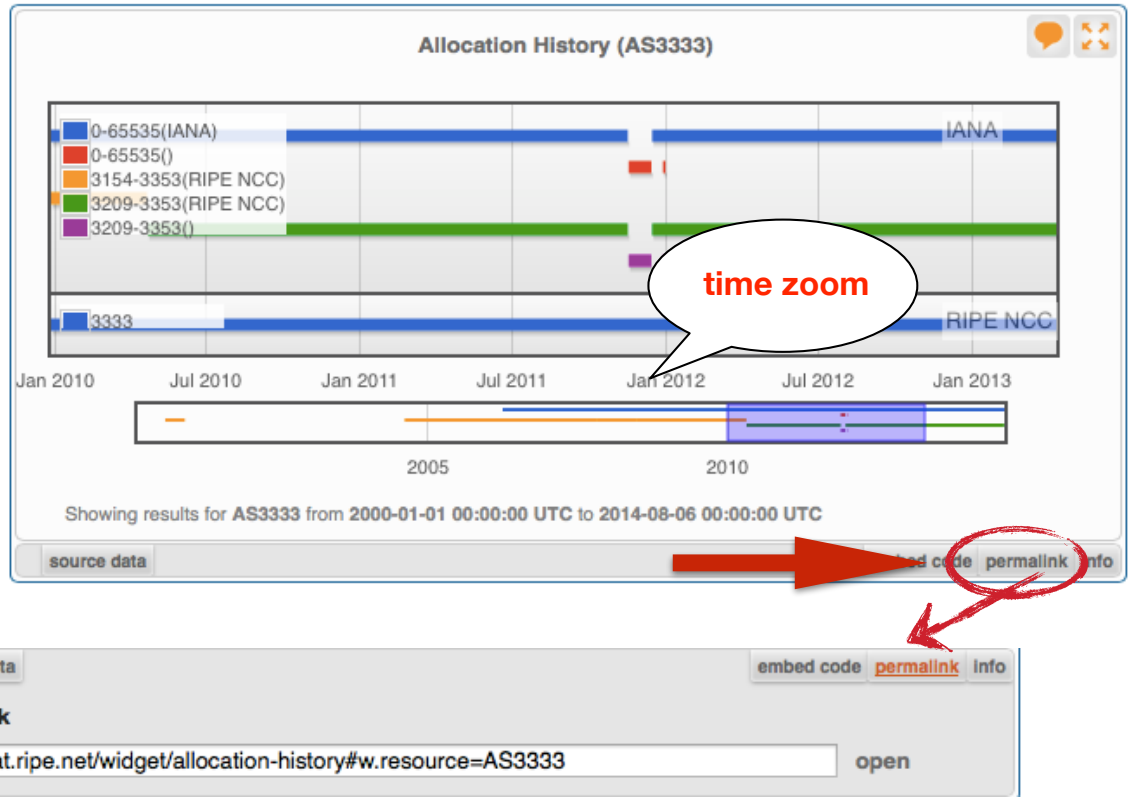
Get the data behind the widget!





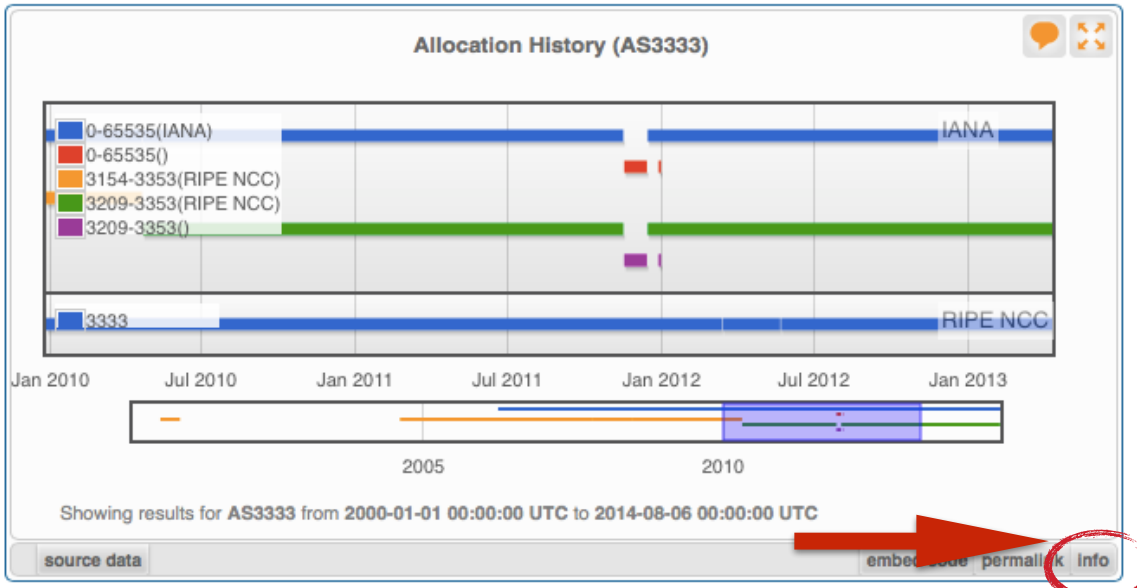

```
{
    "cached": true,
    "data": {
        "query_endtime": "2014-08-06T00:00:00",
        "query_starttime": "2000-01-01T00:00:00",
        "resource": "3333",
        "results": {
            "IANA": [
                {
                    "resource": "0-65535",
                    "status": "IANA",
                    "timelines": [
                        {
                            "endtime": "2007-10-11T00:00:00",
                            "starttime": "2007-10-11T00:00:00"
                        },
                        {
                            "endtime": "2008-11-03T00:00:00",
                            "starttime": "2007-10-27T00:00:00"
                        },
```

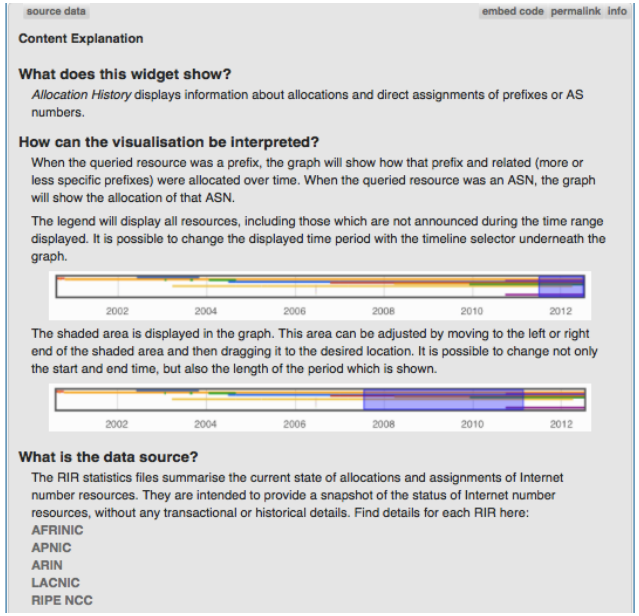
Shareable results URL



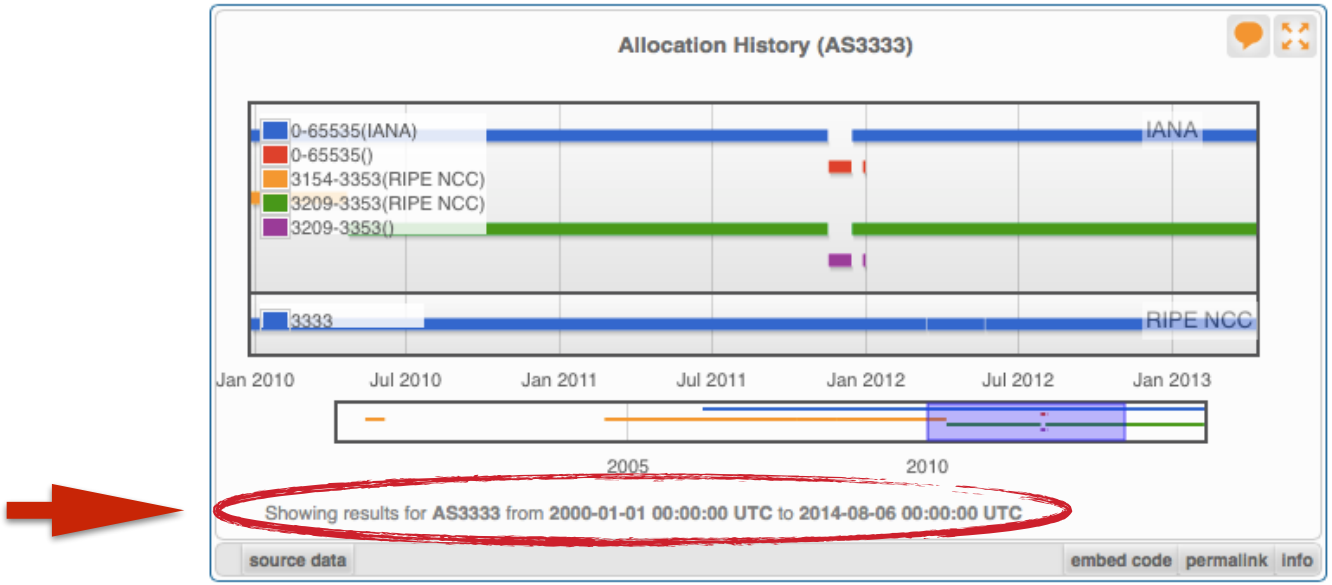
- Immutable shareable URL for each result!
- URL includes:
  - **widget** + queried **resource**
  - for some widgets: **settings**, **zoom**, **time period**

Where’s the data from?



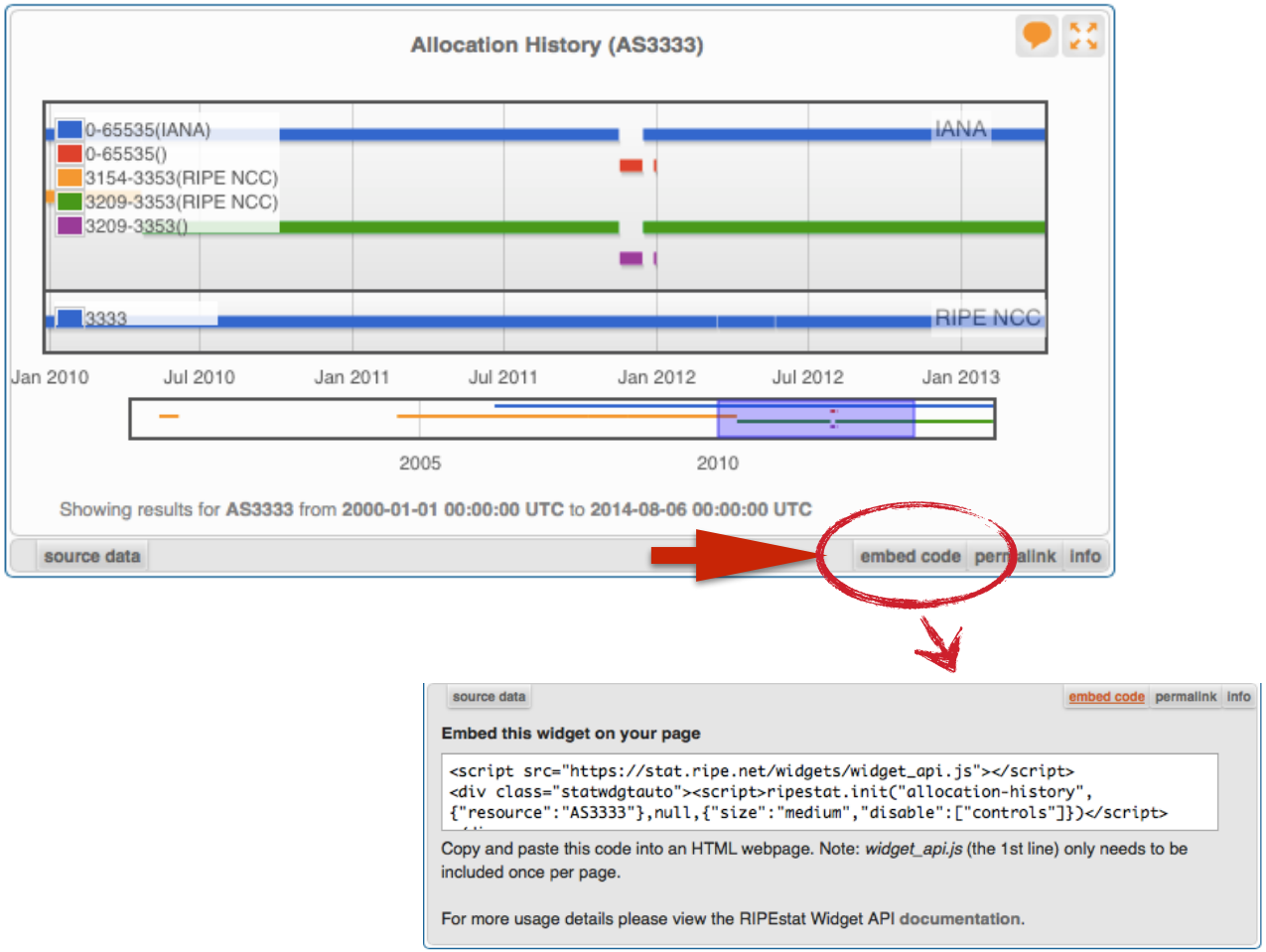


Freshness and timescale of the data



- Timestamp and time period
- Different widgets = different update frequency
- Adjustable usually
  - Limits: different maximum granularities

Embed the widget!

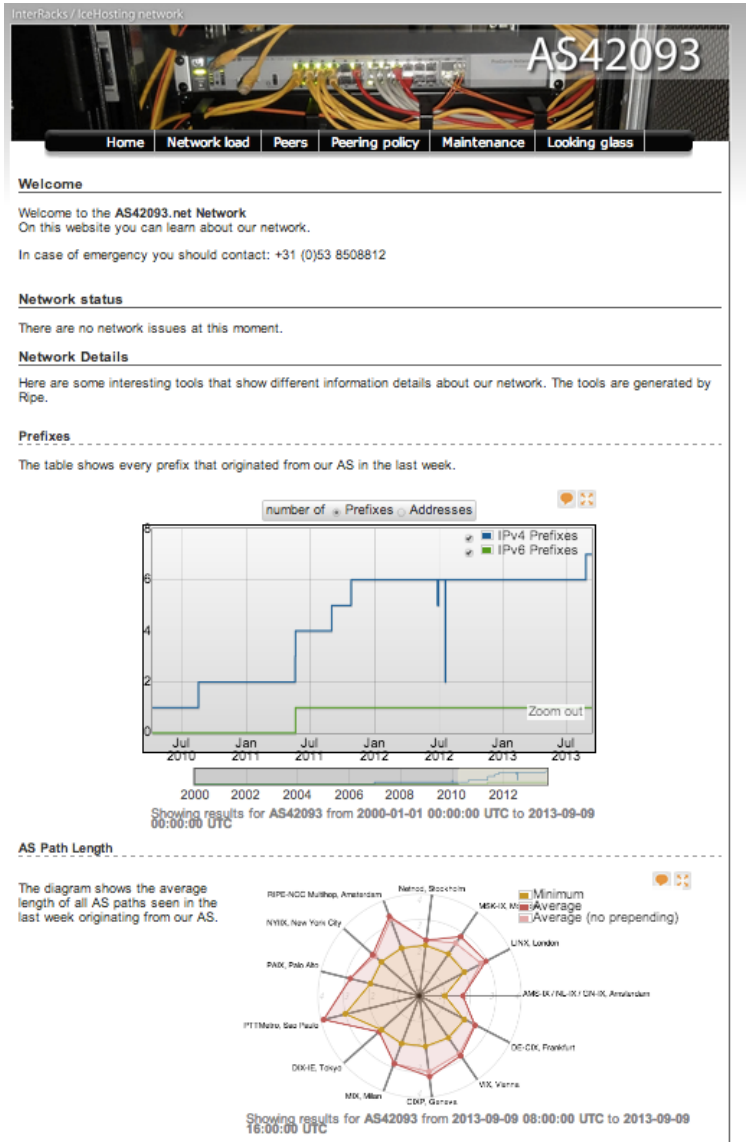


Embedding widgets on your site

- ISP embedded widgets on its page

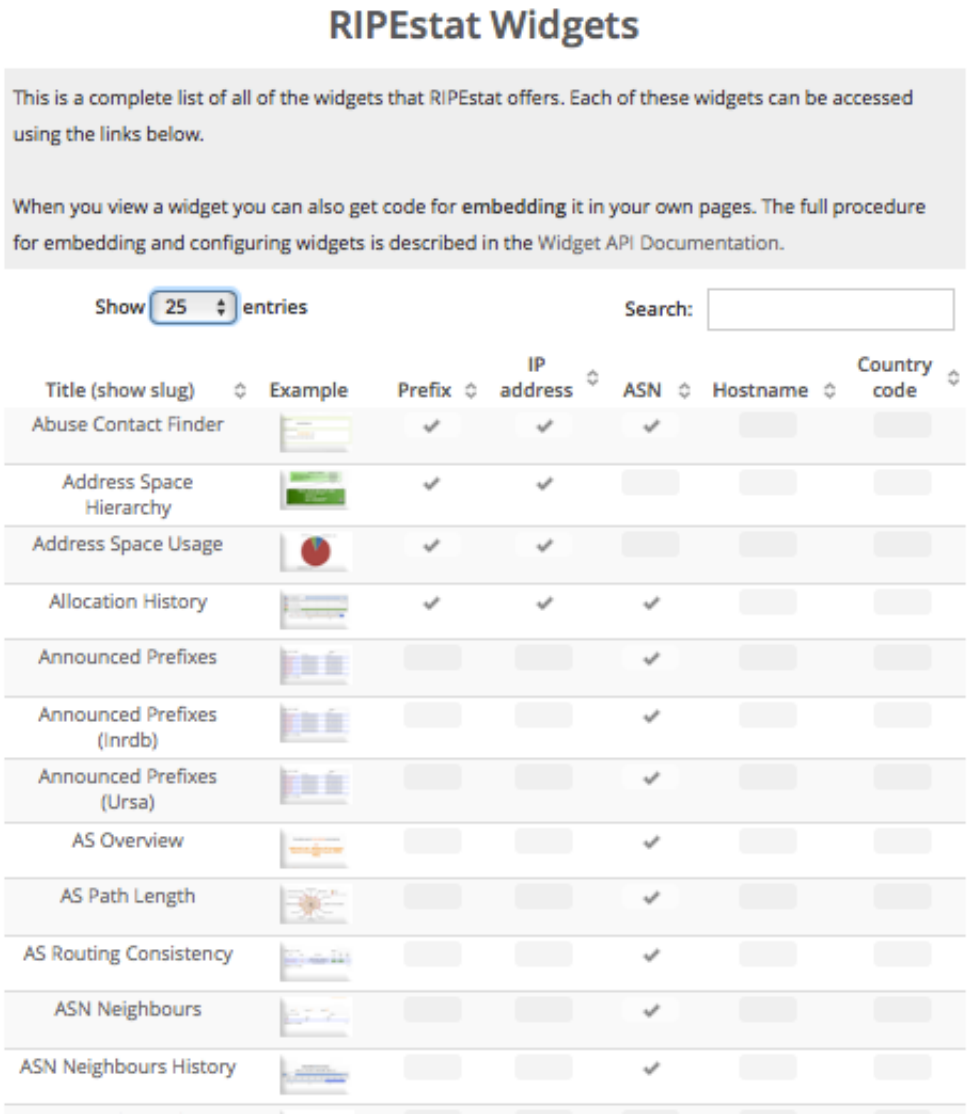
Prefix Count widget

AS Path Length widget



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 25 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				✓		
Announced Prefixes (lnrdb)				✓		
Announced Prefixes (Ursa)				✓		
AS Overview				✓		
AS Path Length				✓		
AS Routing Consistency				✓		
ASN Neighbours				✓		
ASN Neighbours History				✓		

Querying for a Resource

Exercise A

Tasks

- What network announces 140.78.50.90?
- Is 83.68.16.27 routed?
- In which country is 91.229.42.0/23 used?
- What is its corresponding inetnum object?
- What widget provides real-time routing status?
- By what percent did the number of prefixes announced within Greece increase over the last two years?
- How would you share interesting network events with a colleague?

Visualising BGP Routing Information

Section 4

Querying

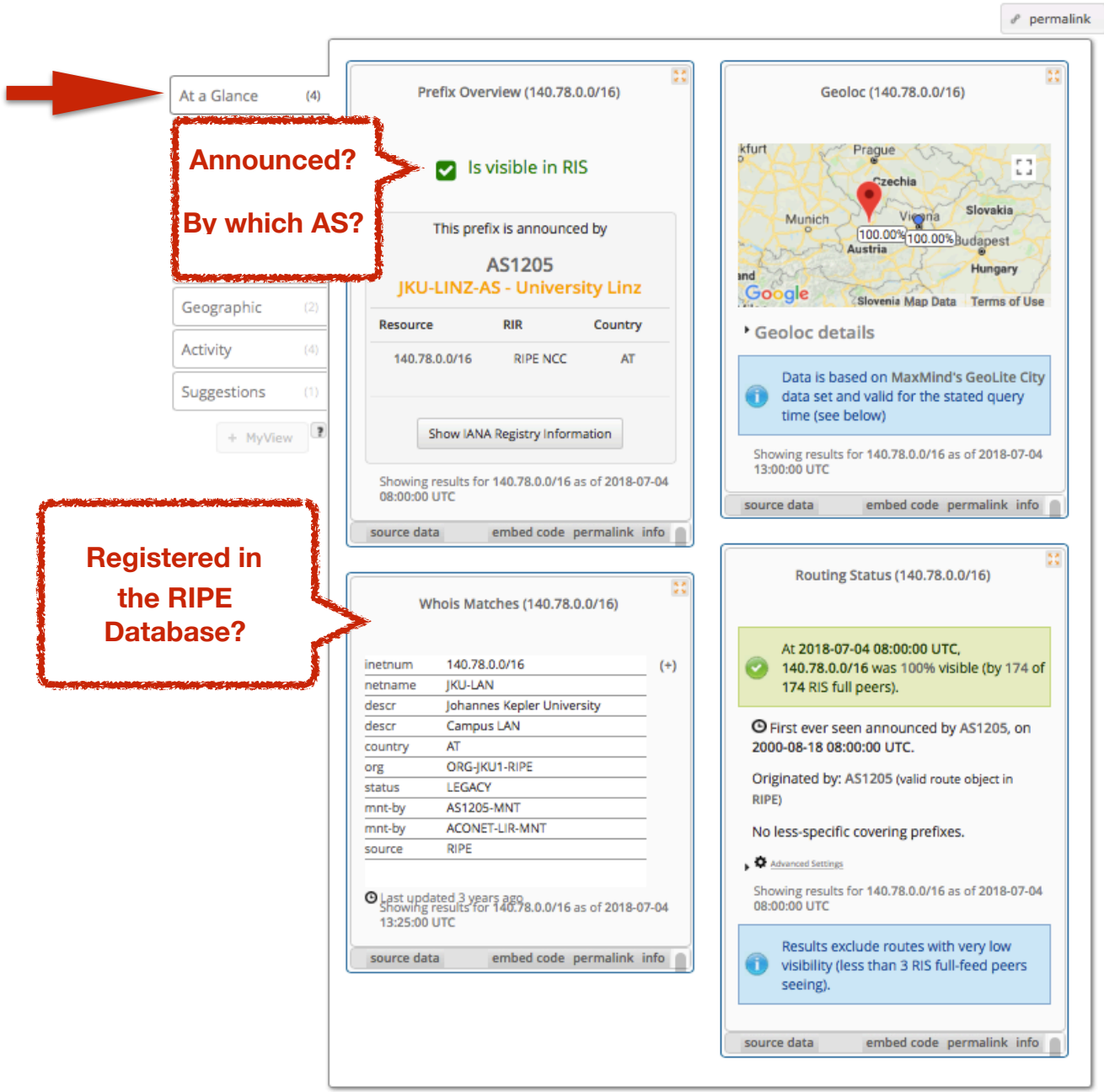
- IP or ASN queried?
  - You get different widgets!

- ASN often visualised based on the prefixes it announces

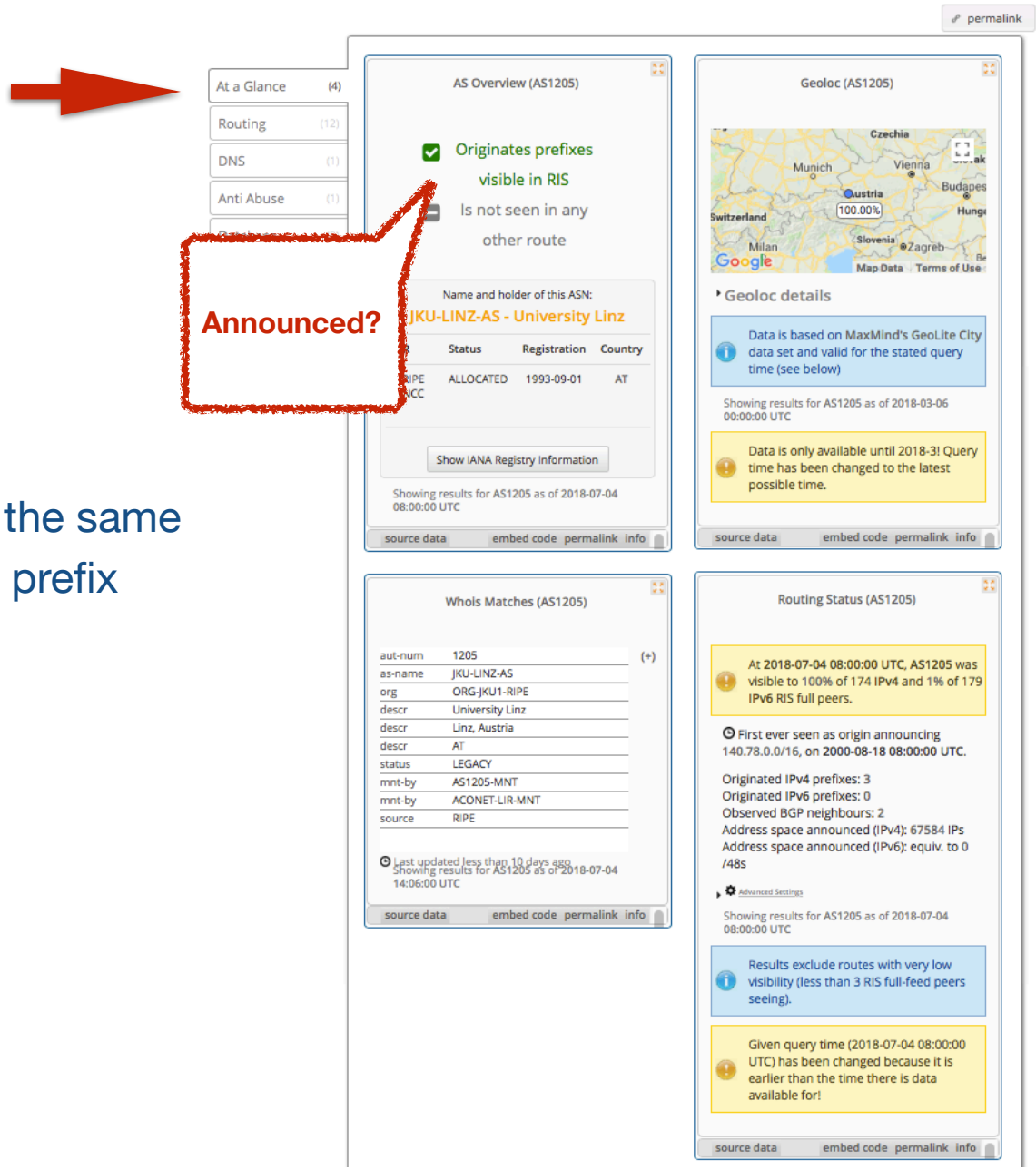
RIS - Routing Information Service

- RIPE NCC collecting BGP information since 1999
  - Raw data: ris.ripe.net
- 22 route collectors 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

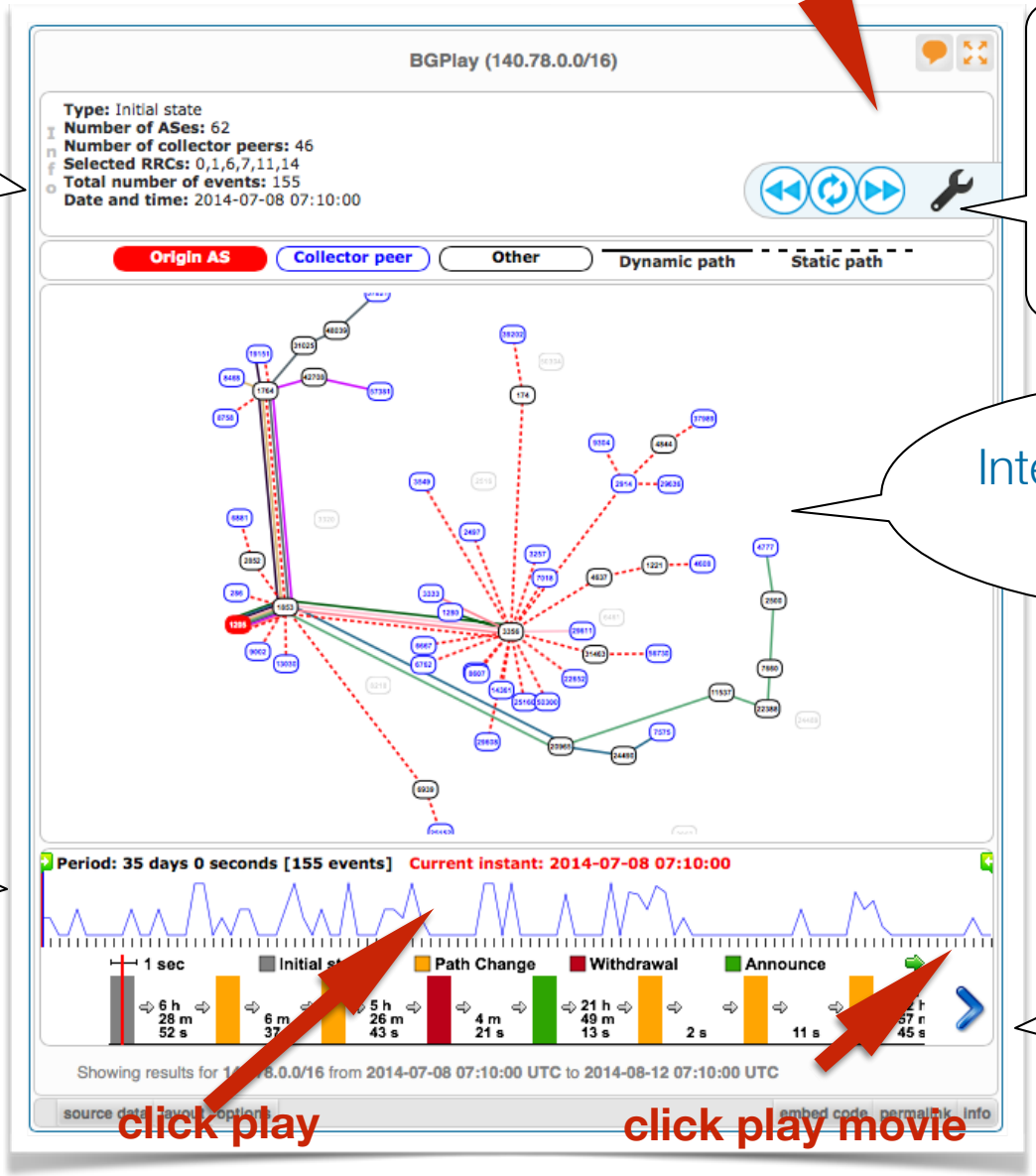
- See how your network is routed
  - Announcements
  - Withdrawals
  - Path changes
- Shows routing history
  - Animated graphic
  - Highly interactive

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

BGPlay

BGP event, ASN or ASN path details

click play



Control panel:

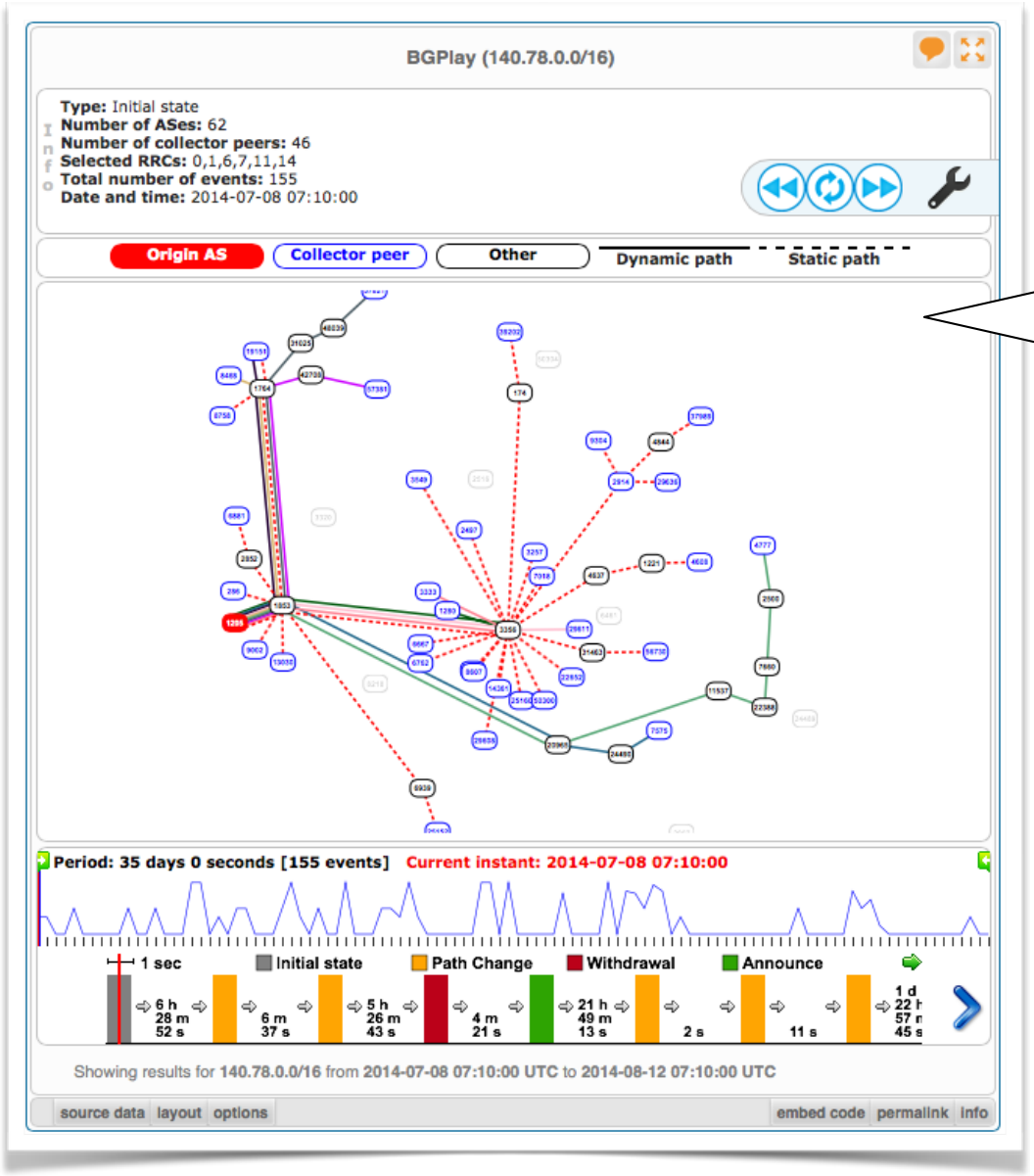
- Covered time period
- RRC selection

Interactive animated graph

Control timeline

Detailed timeline with events

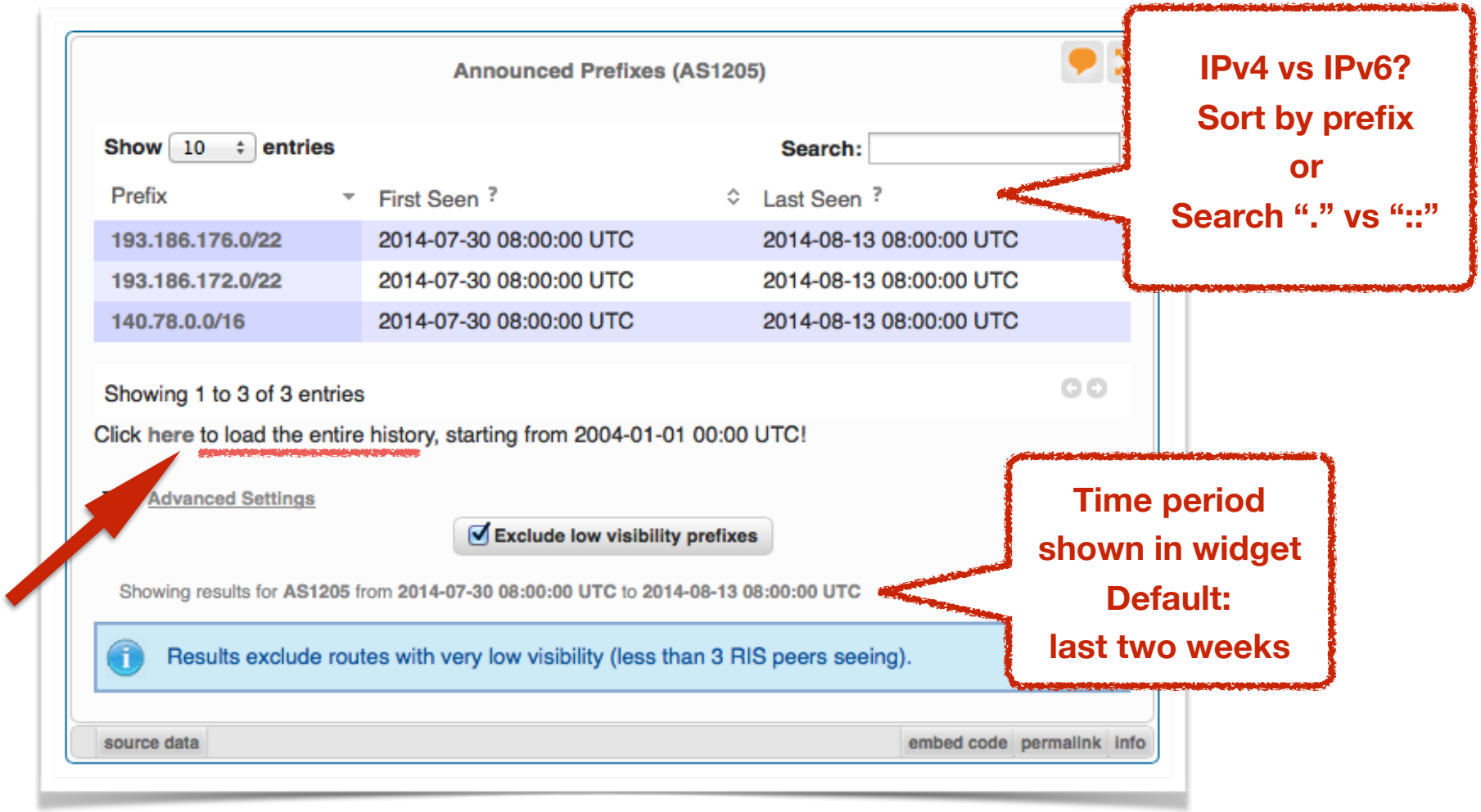
BGPlay



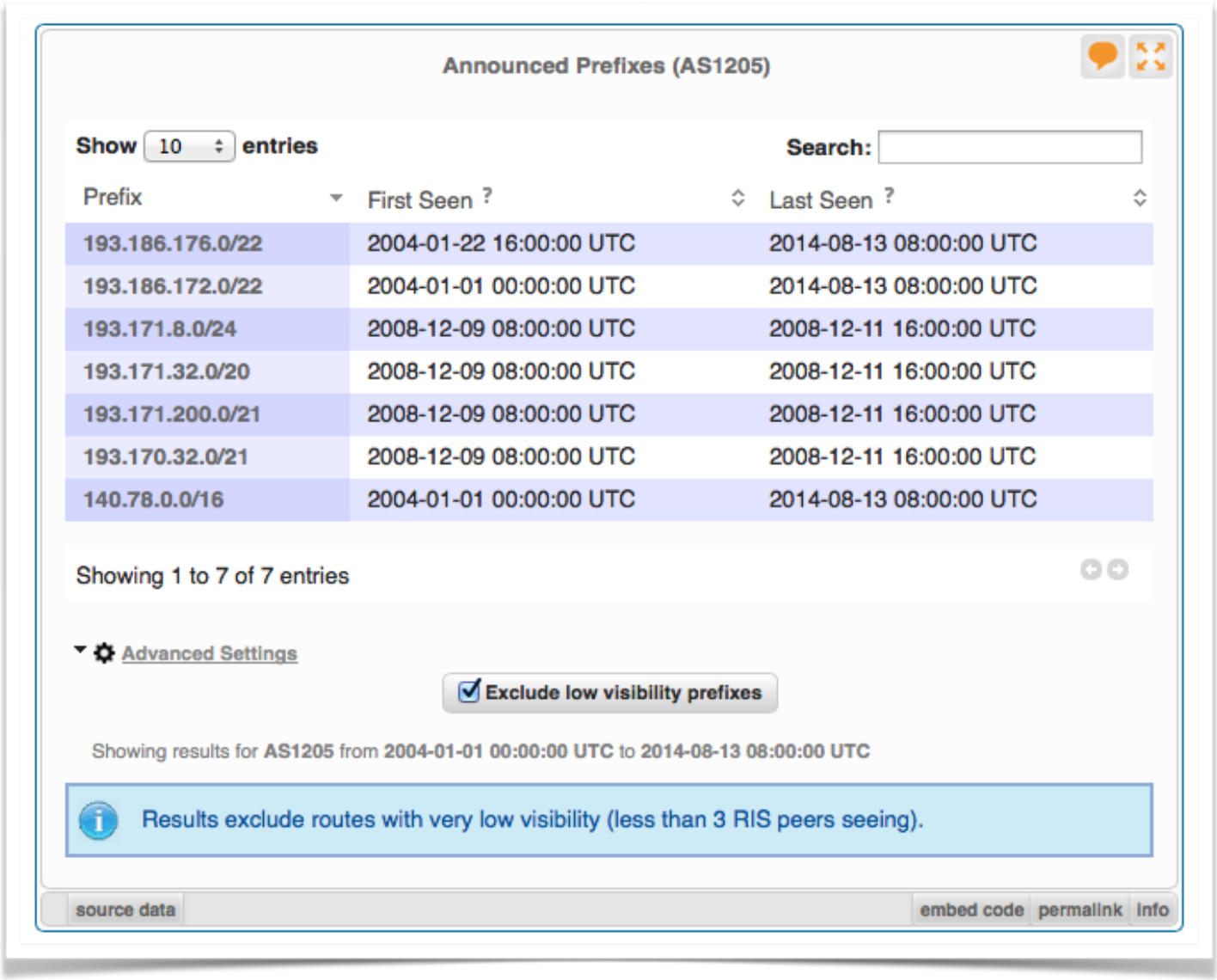
Examples: (2013/8/28-30)

- 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 2008-02-24, 18:30 UTC: 208.65.153.0/24 Youtube traffic by Pakistan Telecom AS17557
- Blackholing: 193.33.96.64

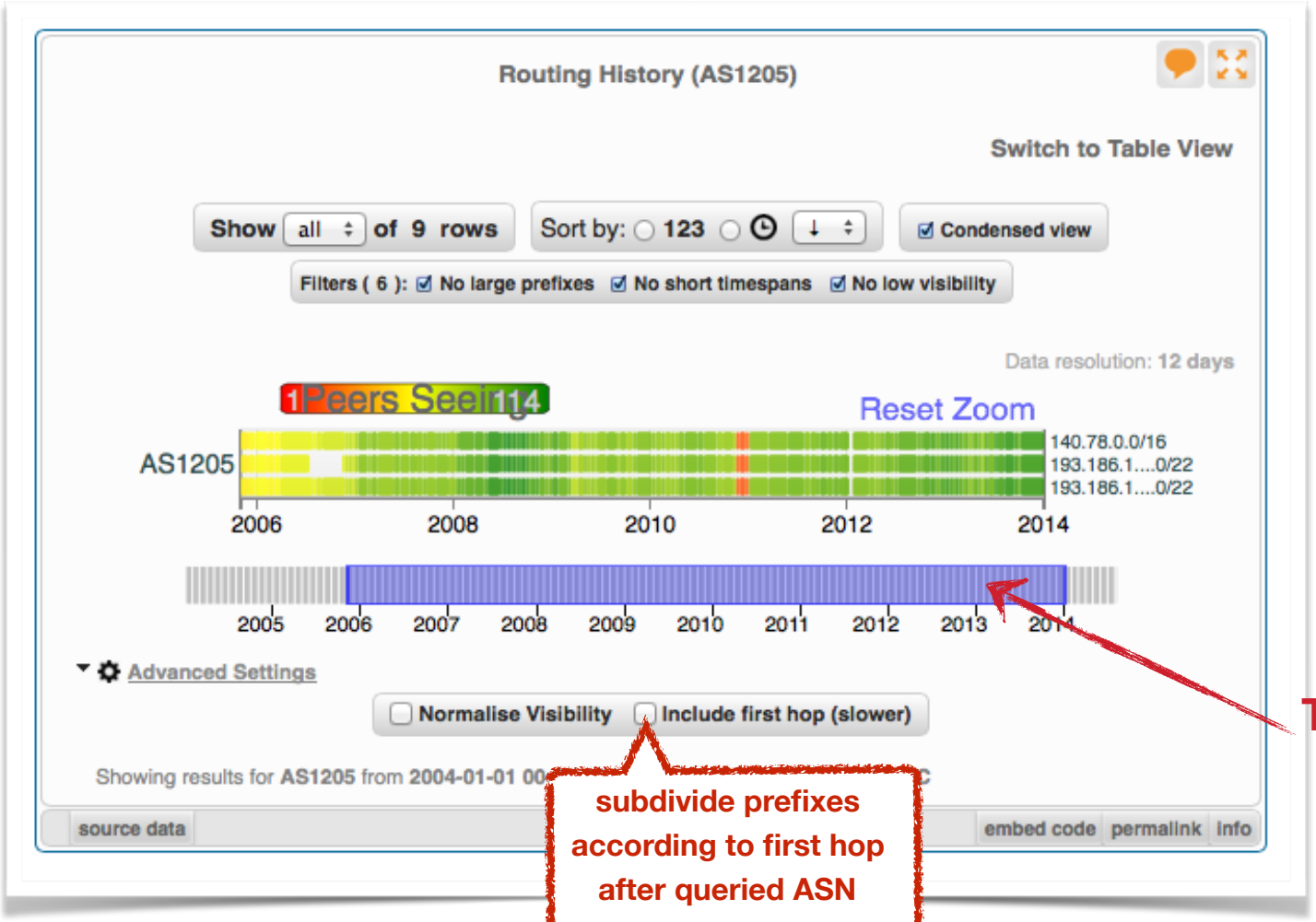
Prefixes visible for this ASN



Announced Prefixes: useful for ASN



History of Prefixes Announced by ASN



BGPlay

Exercise B

Tasks

- Find the up-stream provider for AS1205
- Is 69.36.157.0/24 originated by only one or more ASNs?
- Check the IPv6 connectivity of your own network

Reporting Abuse

Section 5

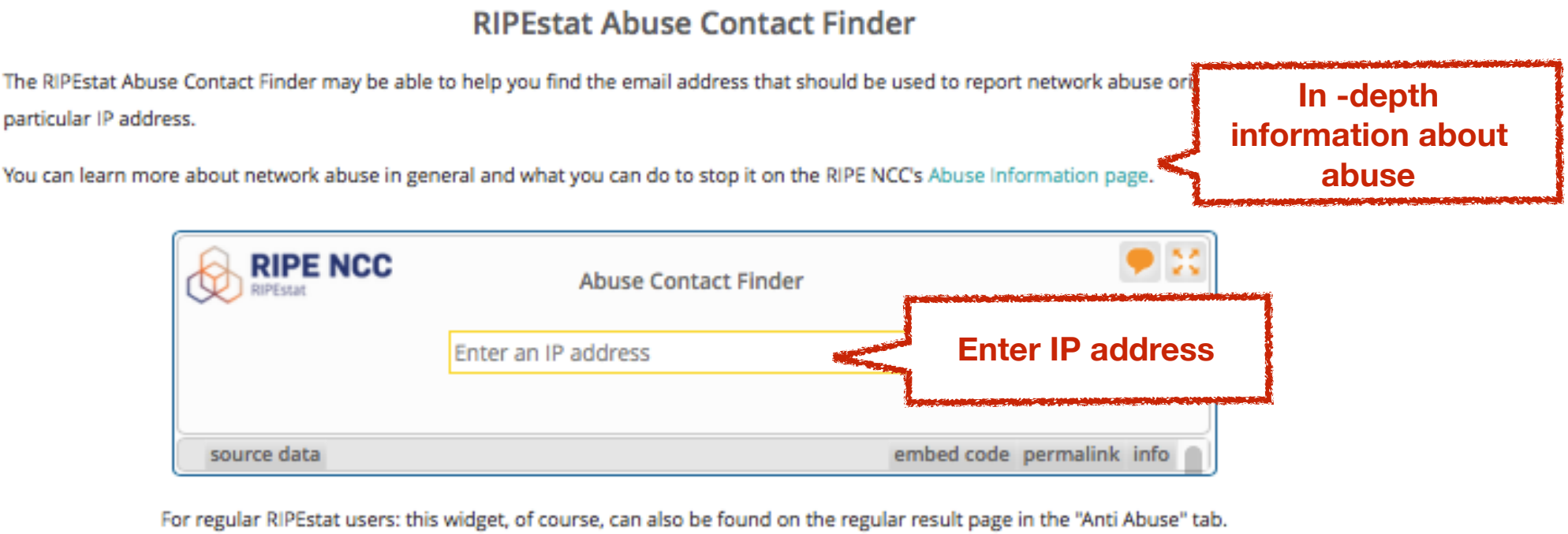
What to do if your network is attacked?

- 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, Middle East, Central Asia

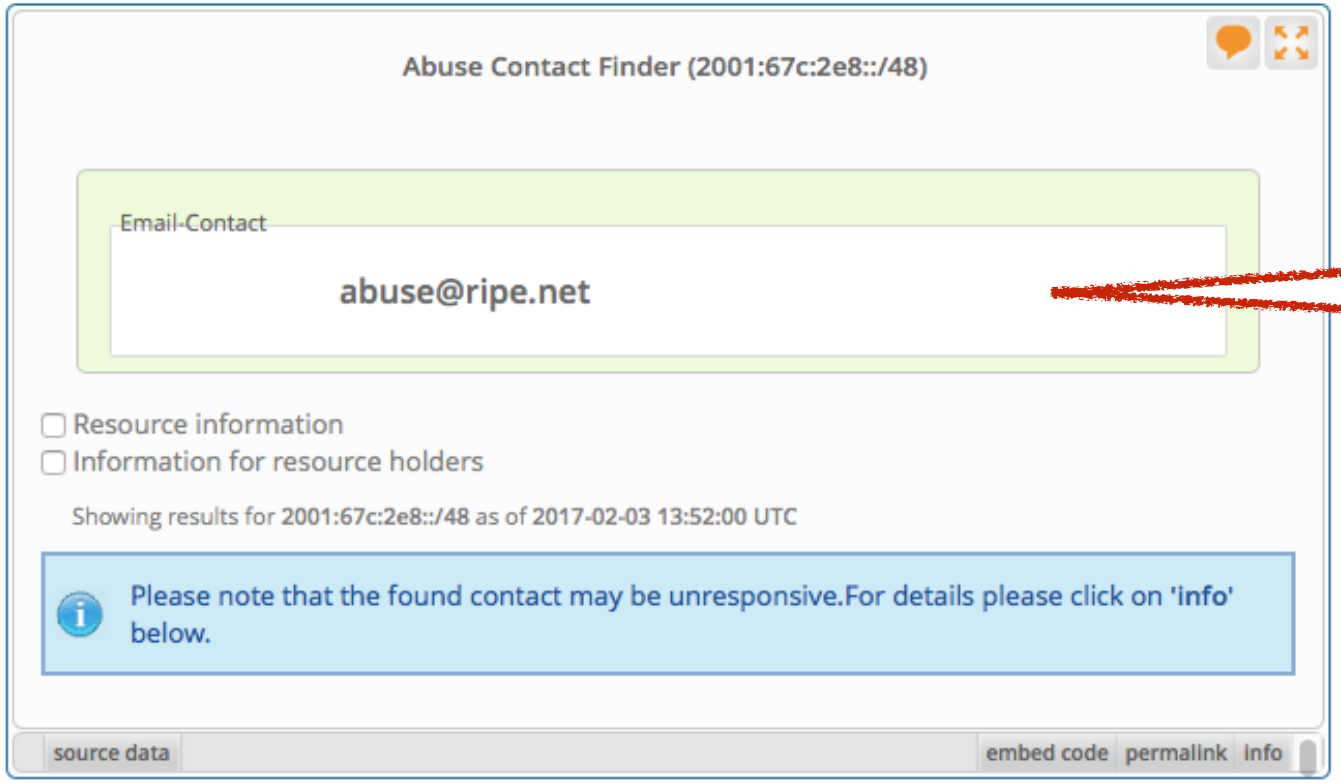
Reporting Abuse

- Take action with the Abuse Contact Finder

  https://stat.ripe.net/abuse

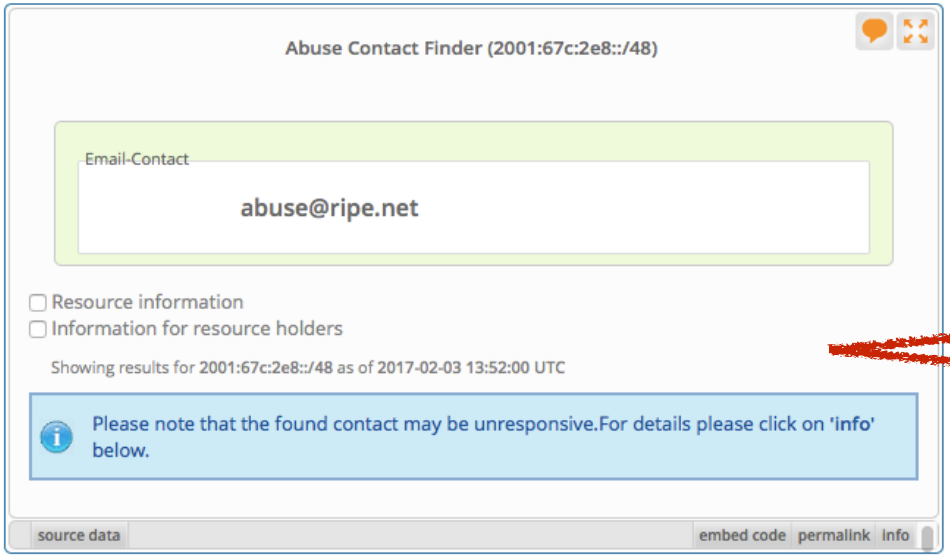


Reporting Abuse

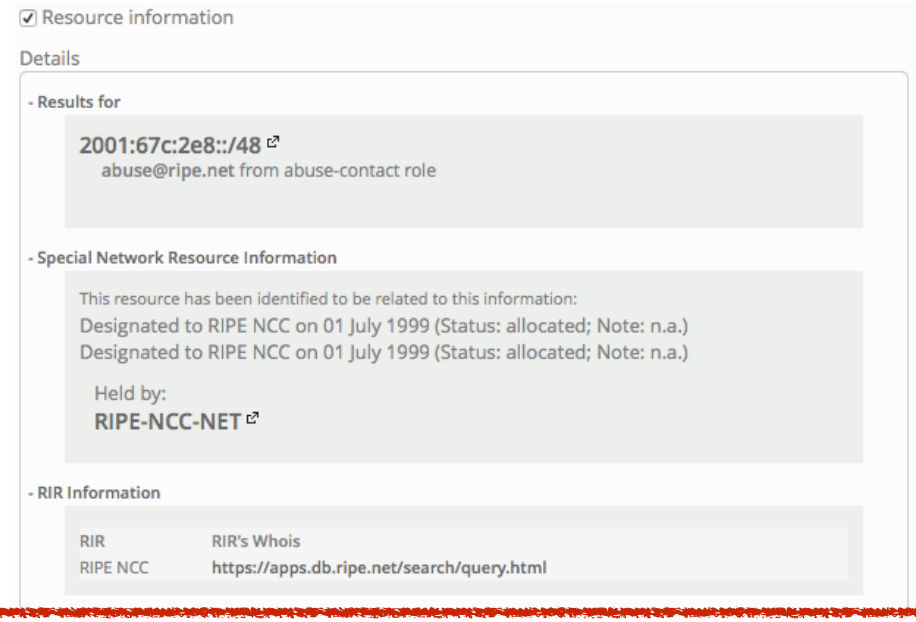


Email contact to report abuse

Reporting Abuse



Details about the resource and abuse contact:

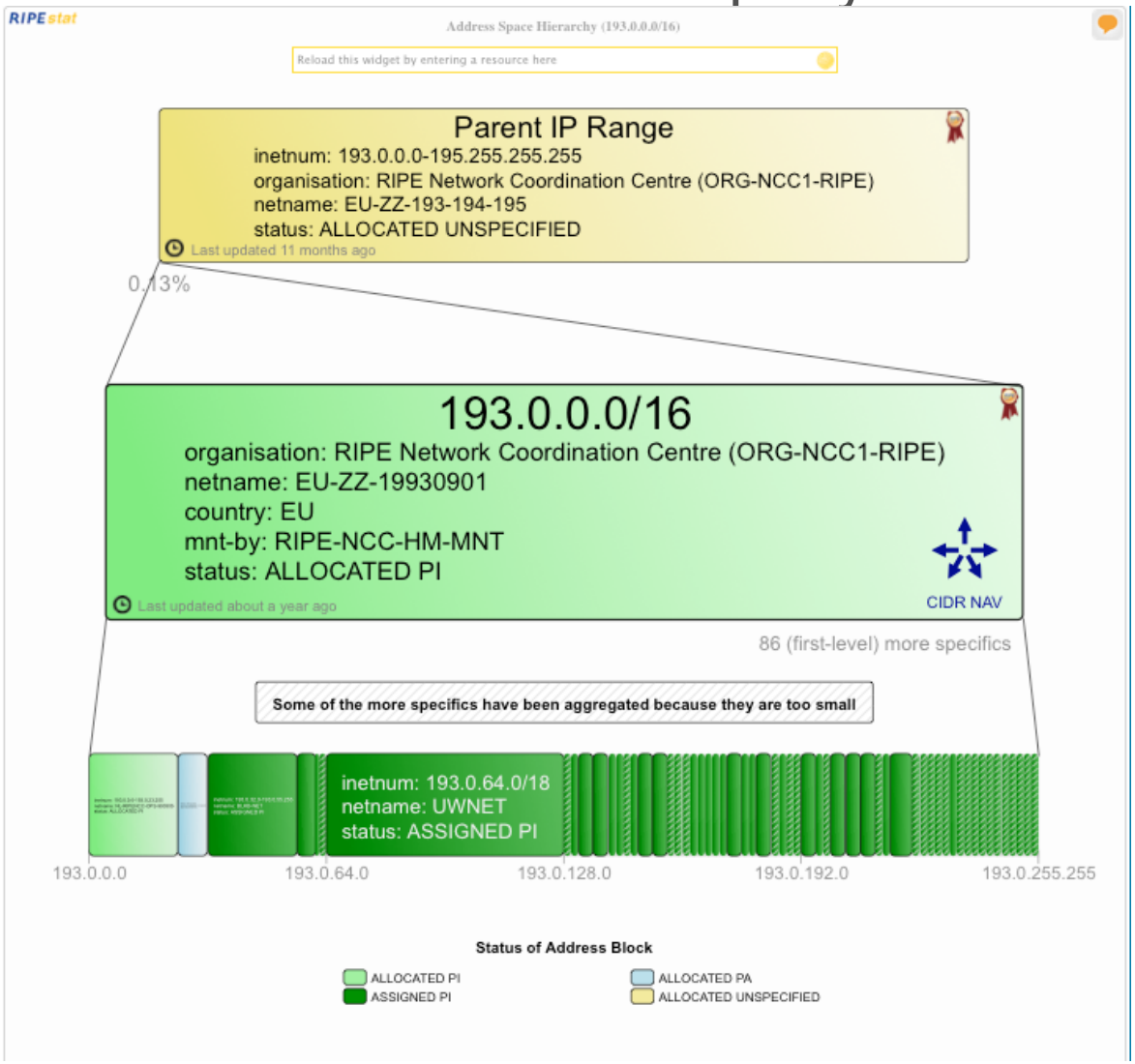


Visualising RIPE Database Data

Section 6

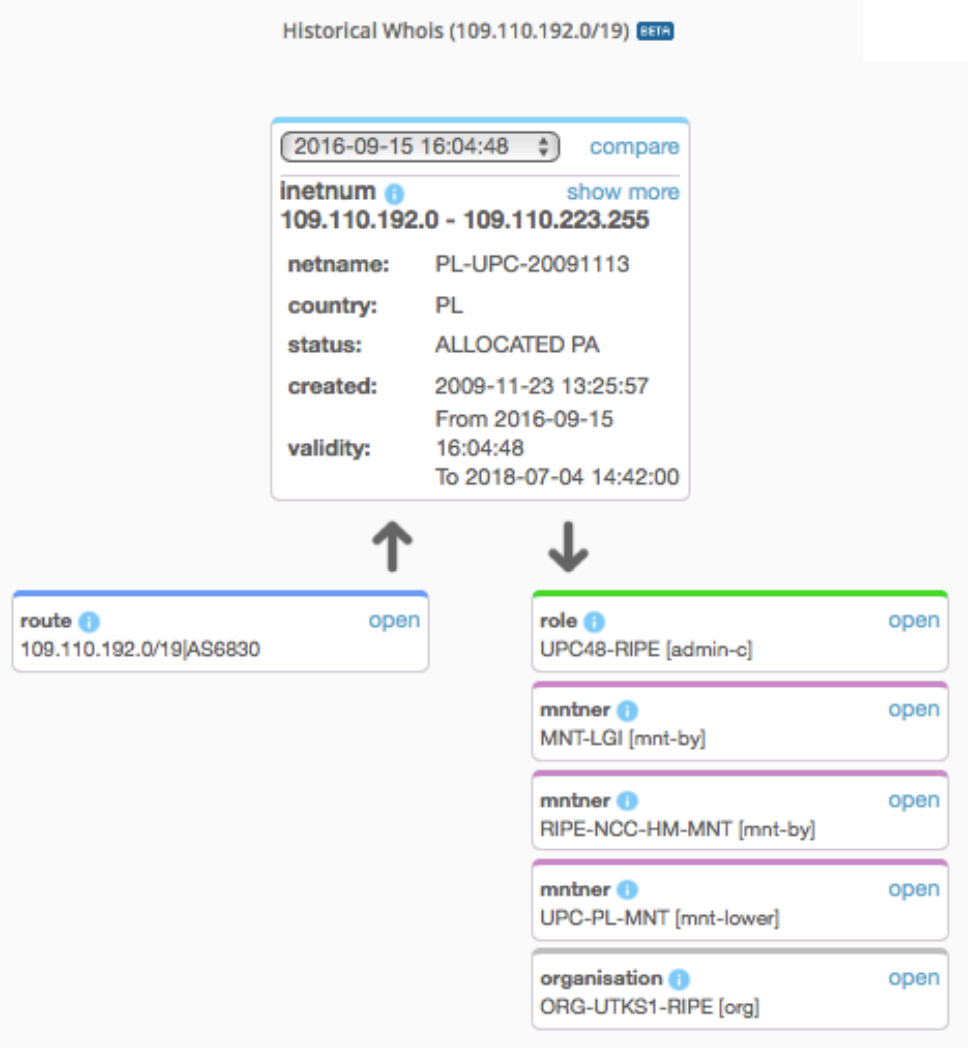
Address Space Hierarchy Widget

- click above or below to refocus query

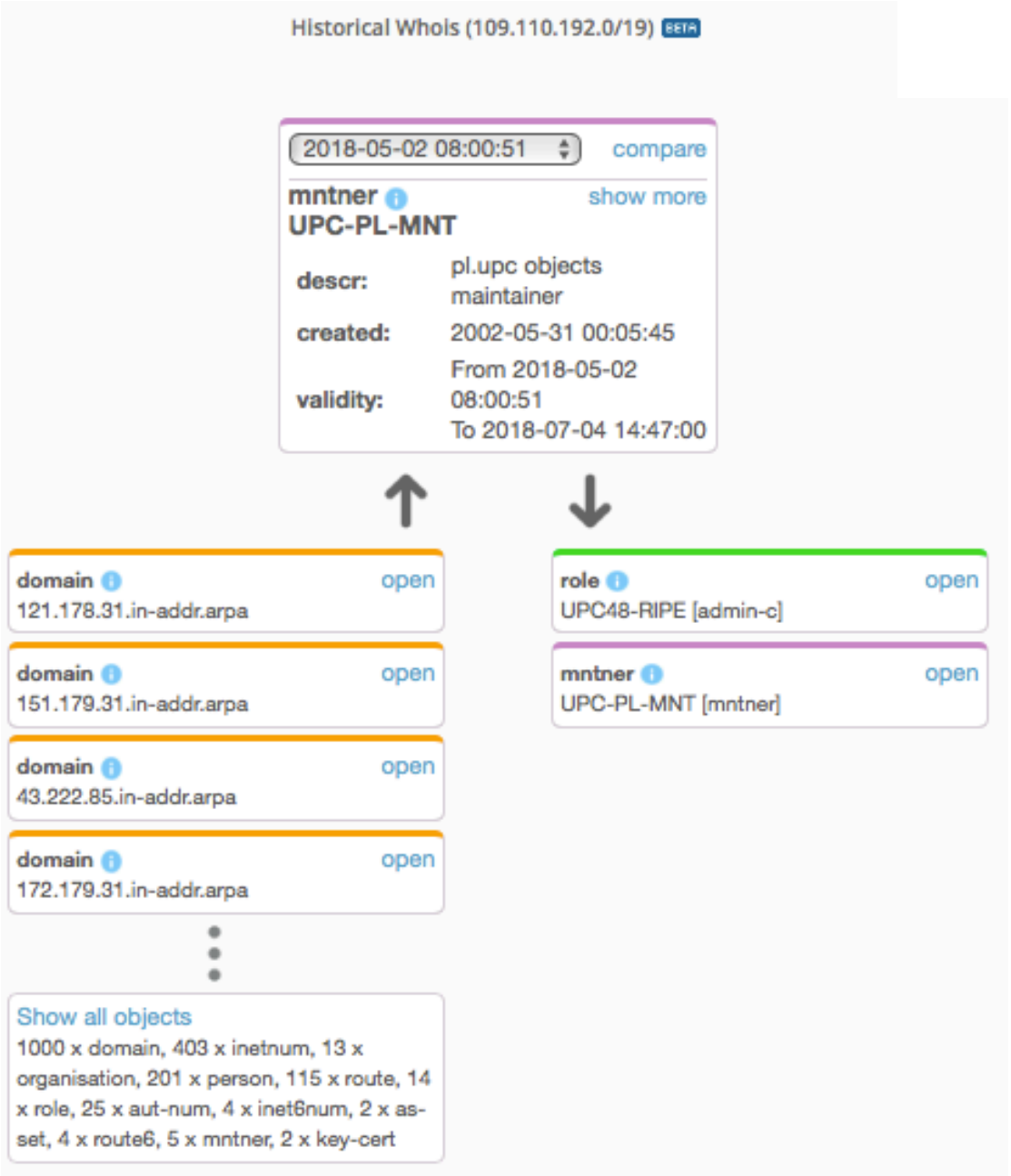


Historical Whois Widget

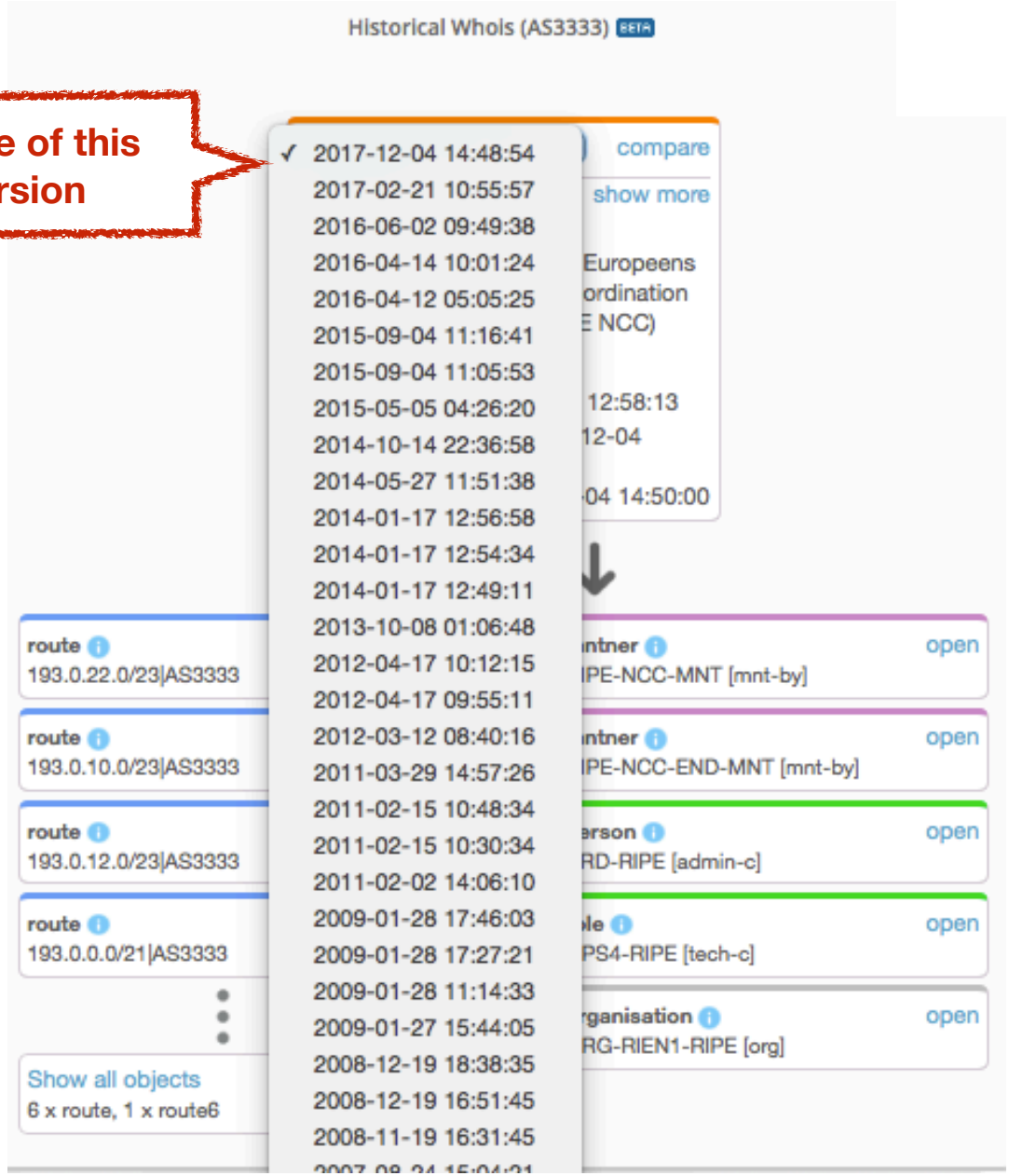
- click on another object to refocus query



Historical Whois Widget

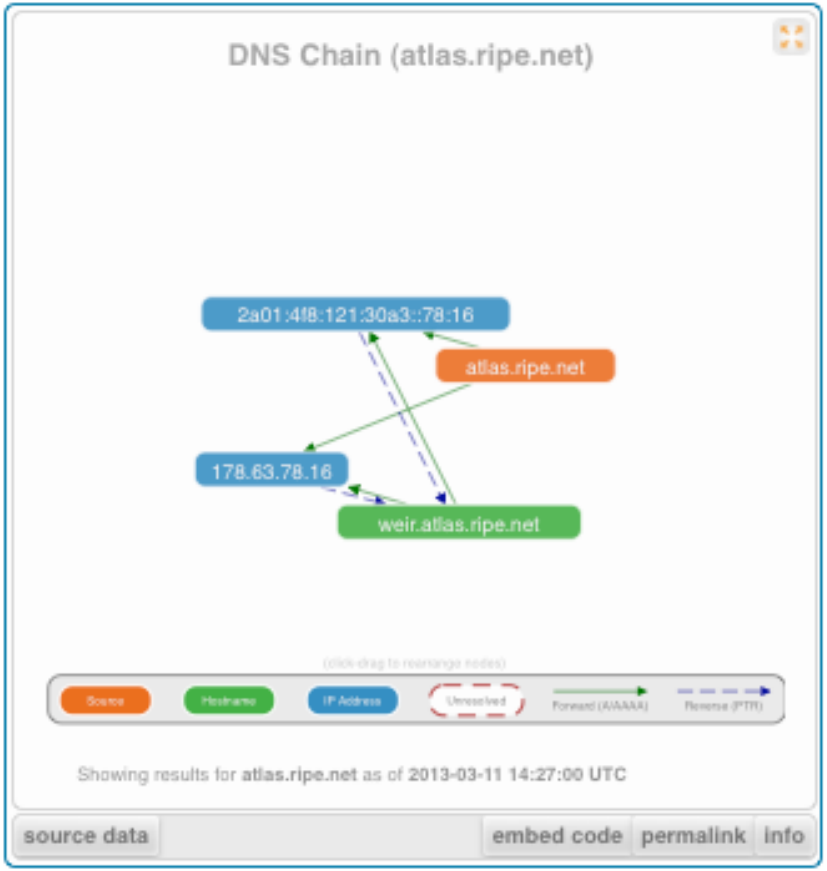


Historical Whois Widget

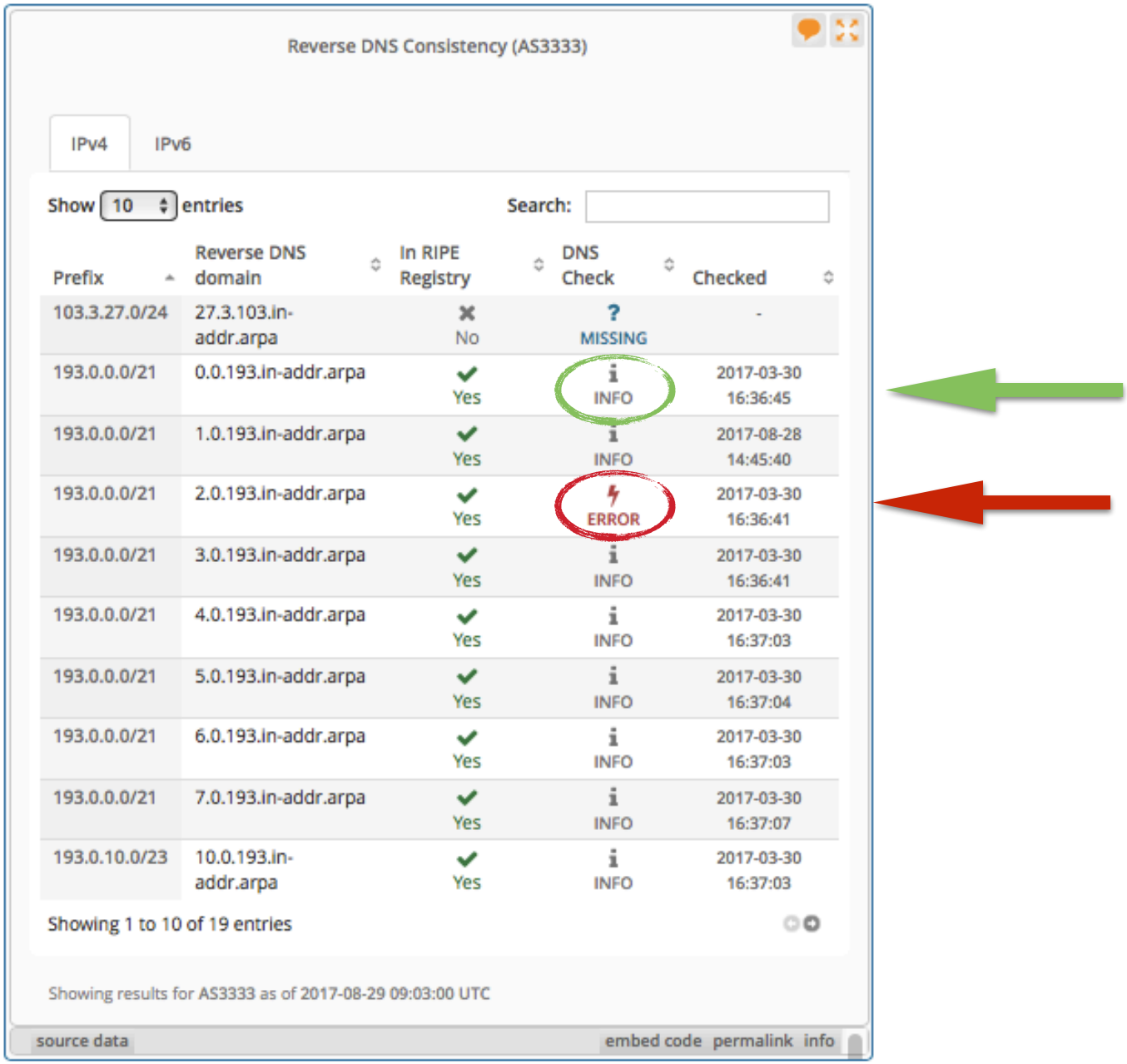


Reverse DNS and DNS

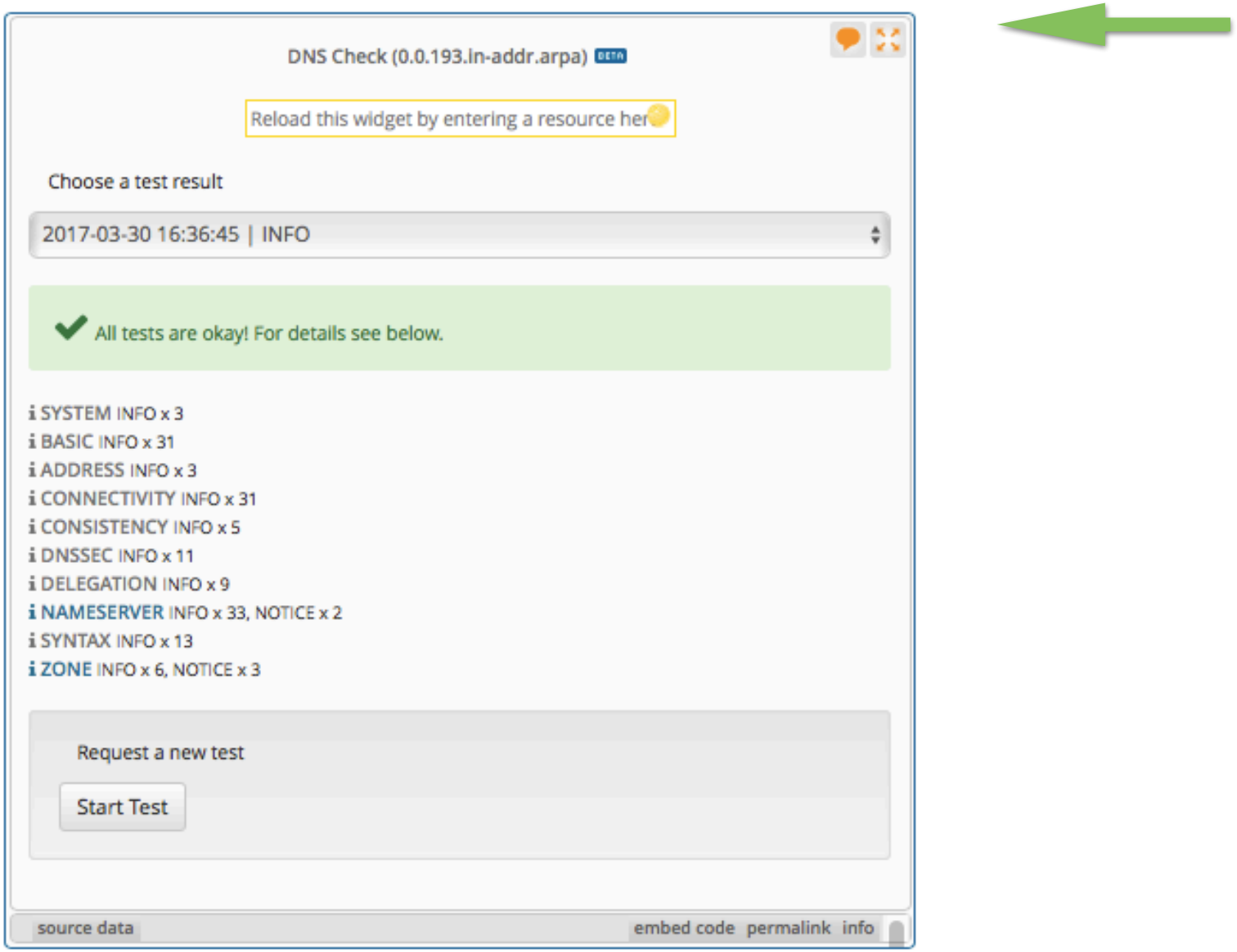
- For IP prefixes: reverse DNS whois registration
- For hostnames: resolves A and AAAA records
- DNS chain for both
  - hostnames & IP addresses



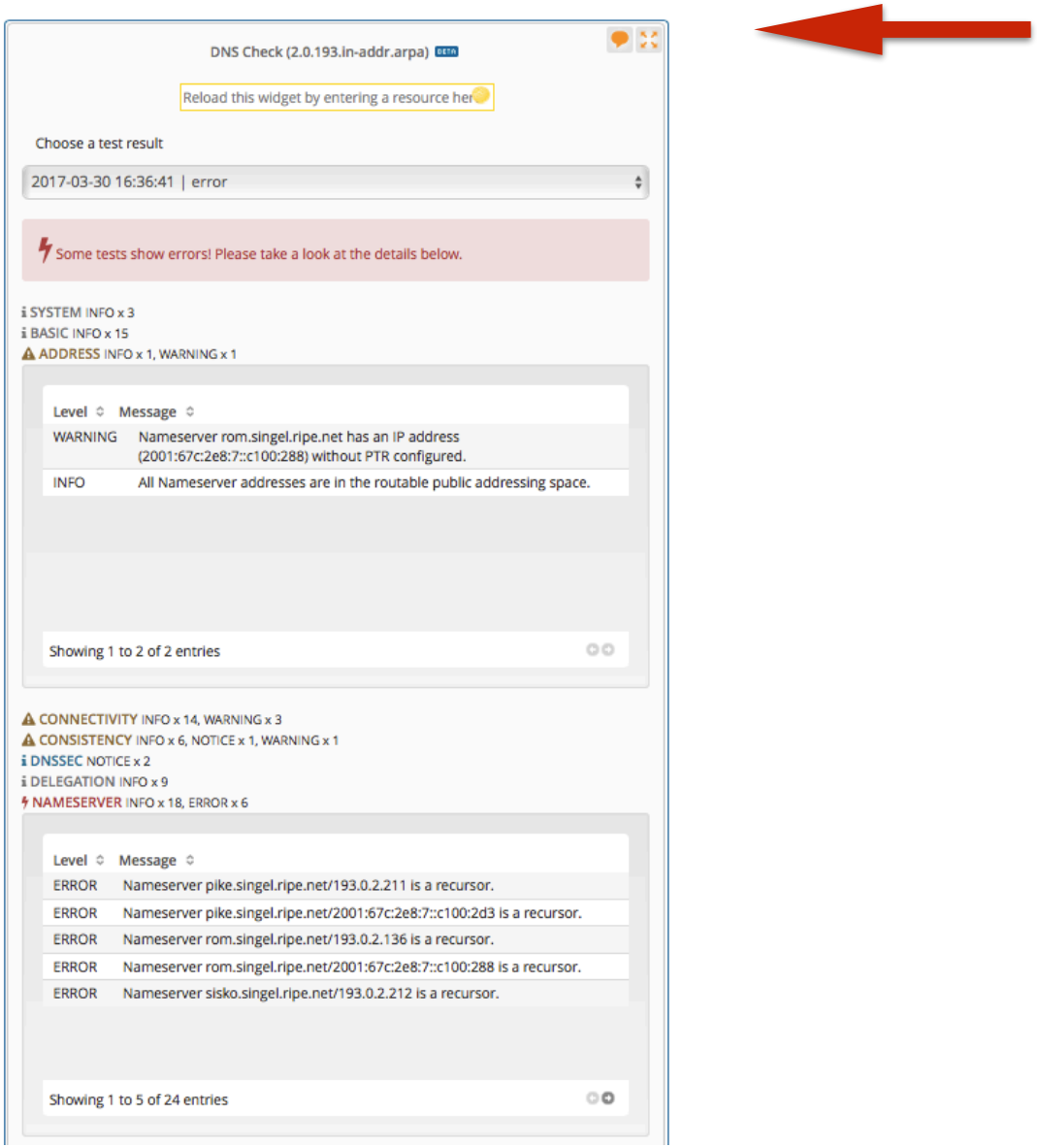
Reverse DNS Consistency



Reverse DNS Consistency (2)



Reverse DNS Consistency (3)

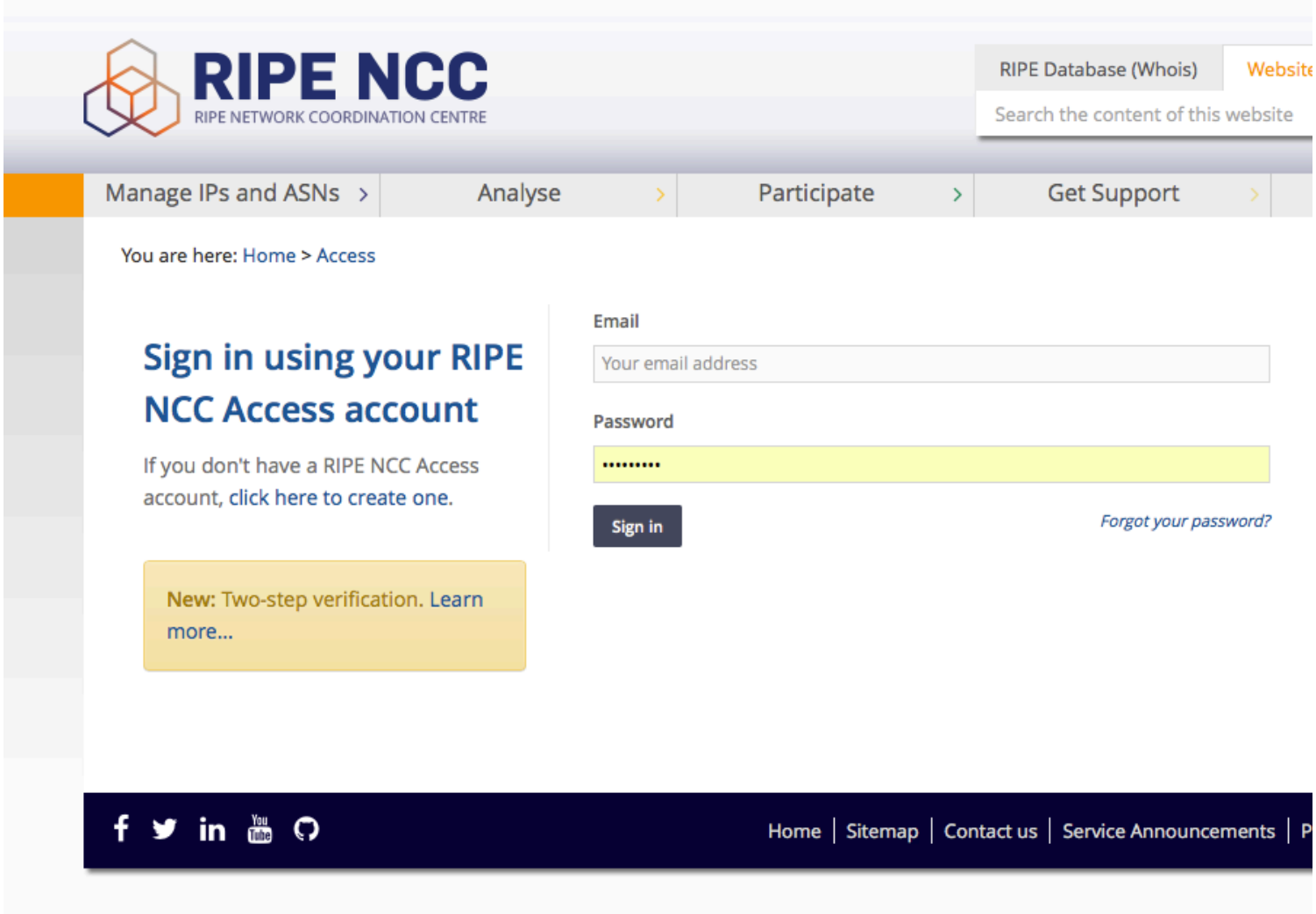


Personalising RIPEstat

Section 7

Create a RIPE NCC Access Account

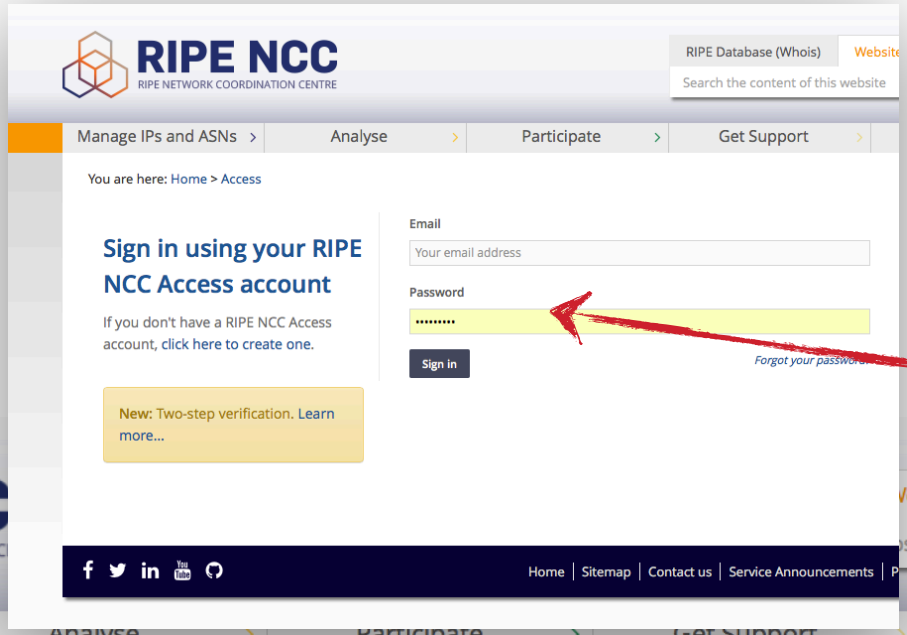
https://access.ripe.net

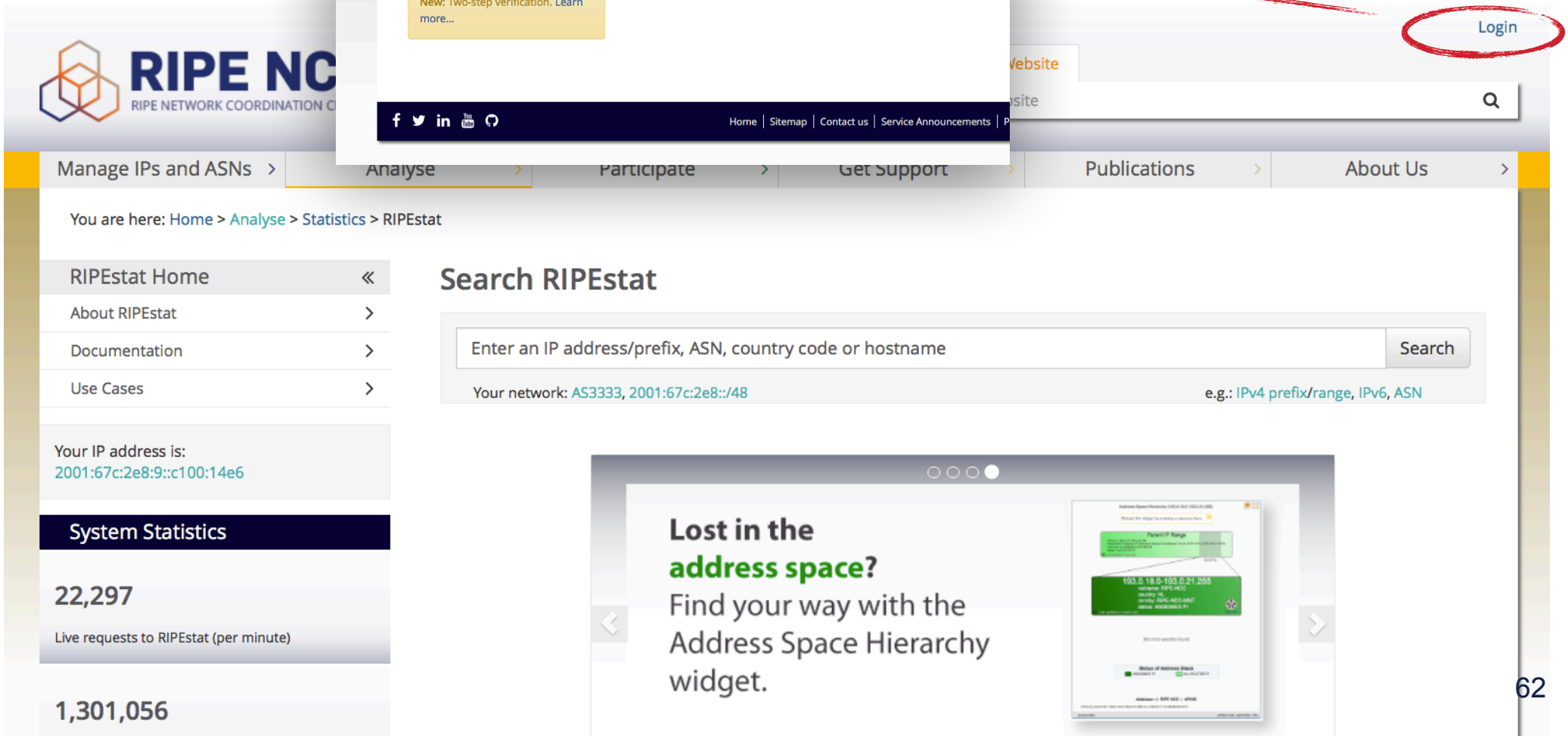


Why personalise RIPEstat?

- Recurring lookup tasks with different widgets over multiple tabs
- Building a “history” of your lookups

Log into RIPE NCC Access Account

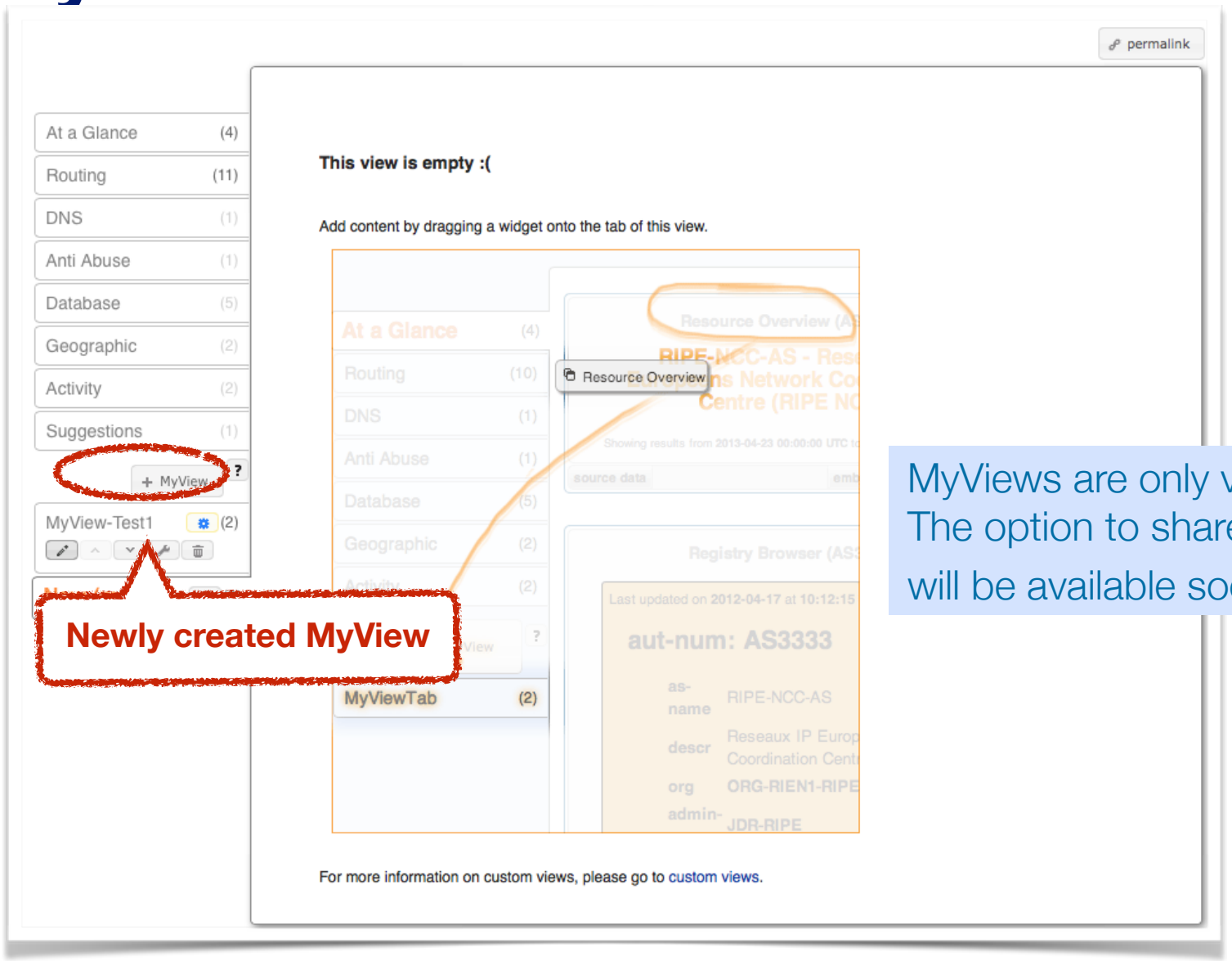




MyView

- Create custom views
  - Click the “MyView” button
  - Drag and drop the widgets you want on the MyView tab
- Created under “ASN” or “IP”

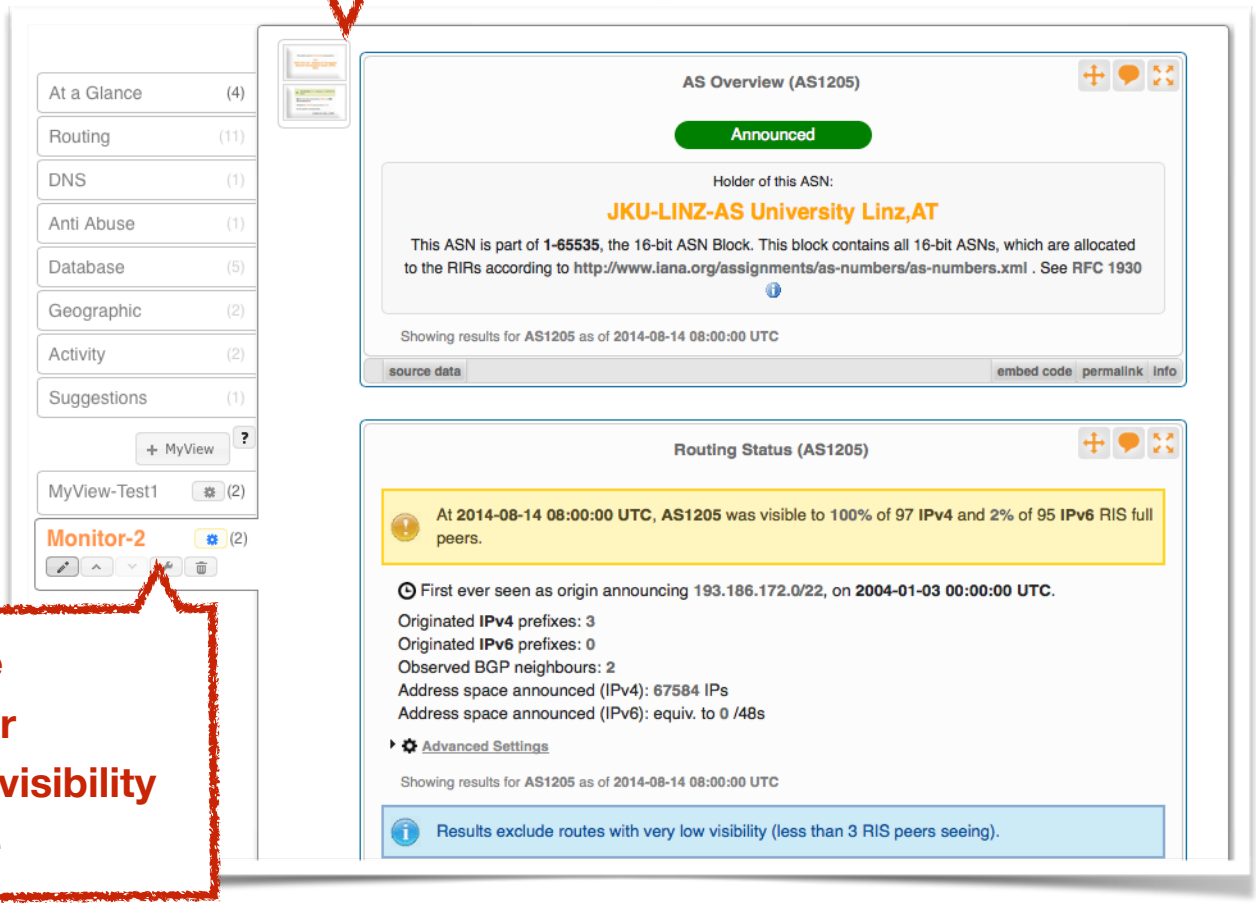
MyView



MyViews are only visible to you. The option to share your views will be available soon!

Customise MyView

Re-order widgets as you like

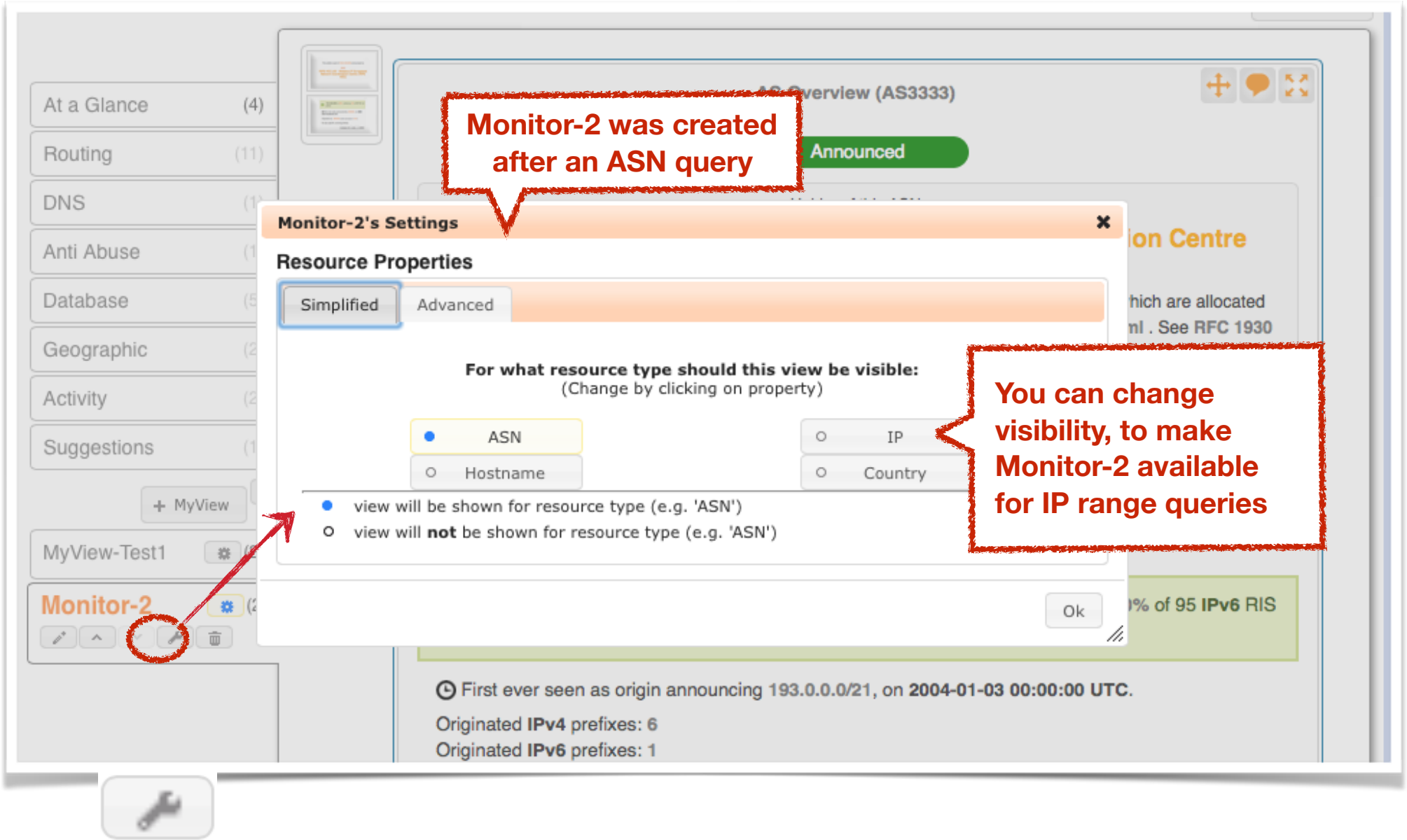


- Rename
- Re-order
- Control visibility
- Remove

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

Comparing Networks

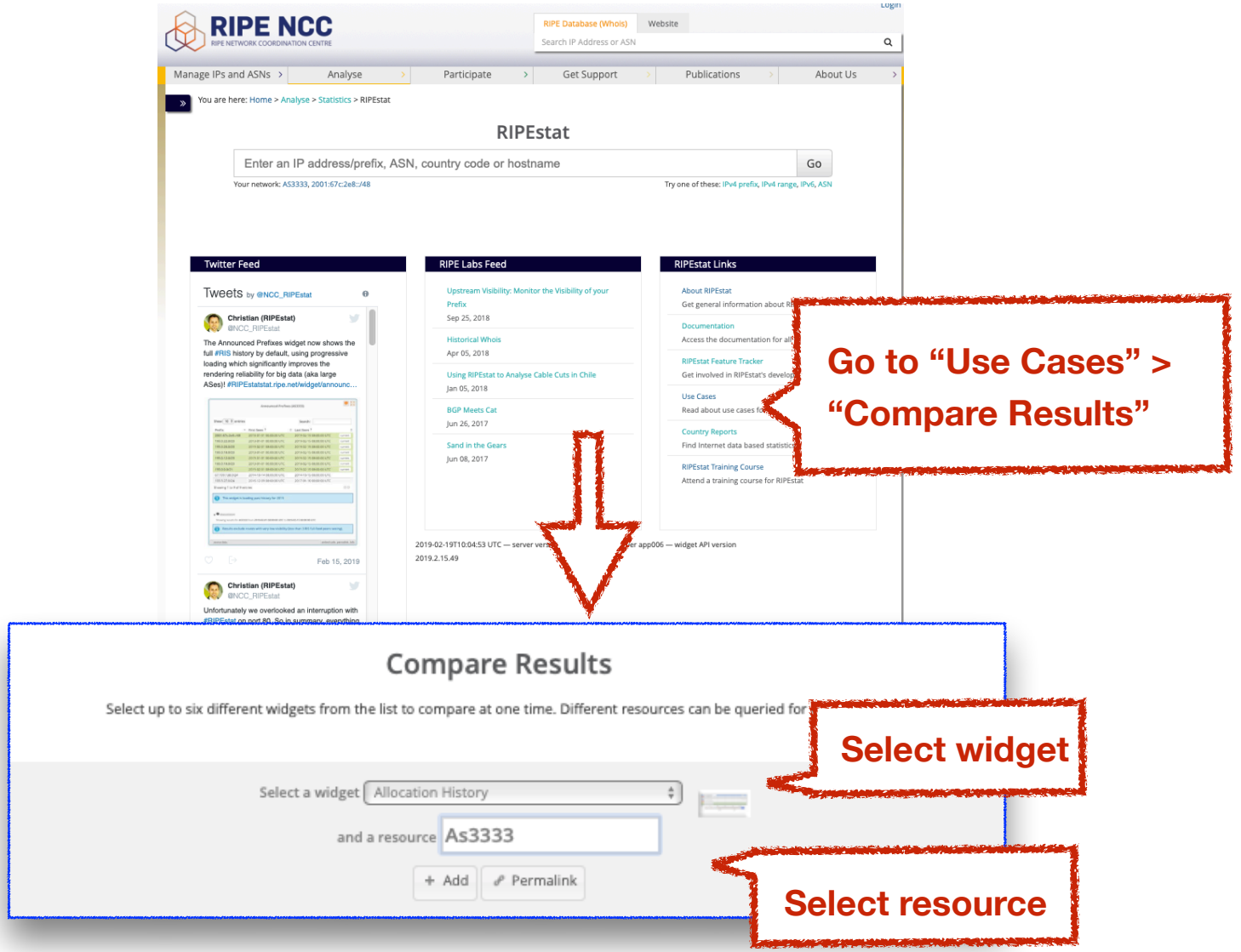
Section 8

Why compare networks?

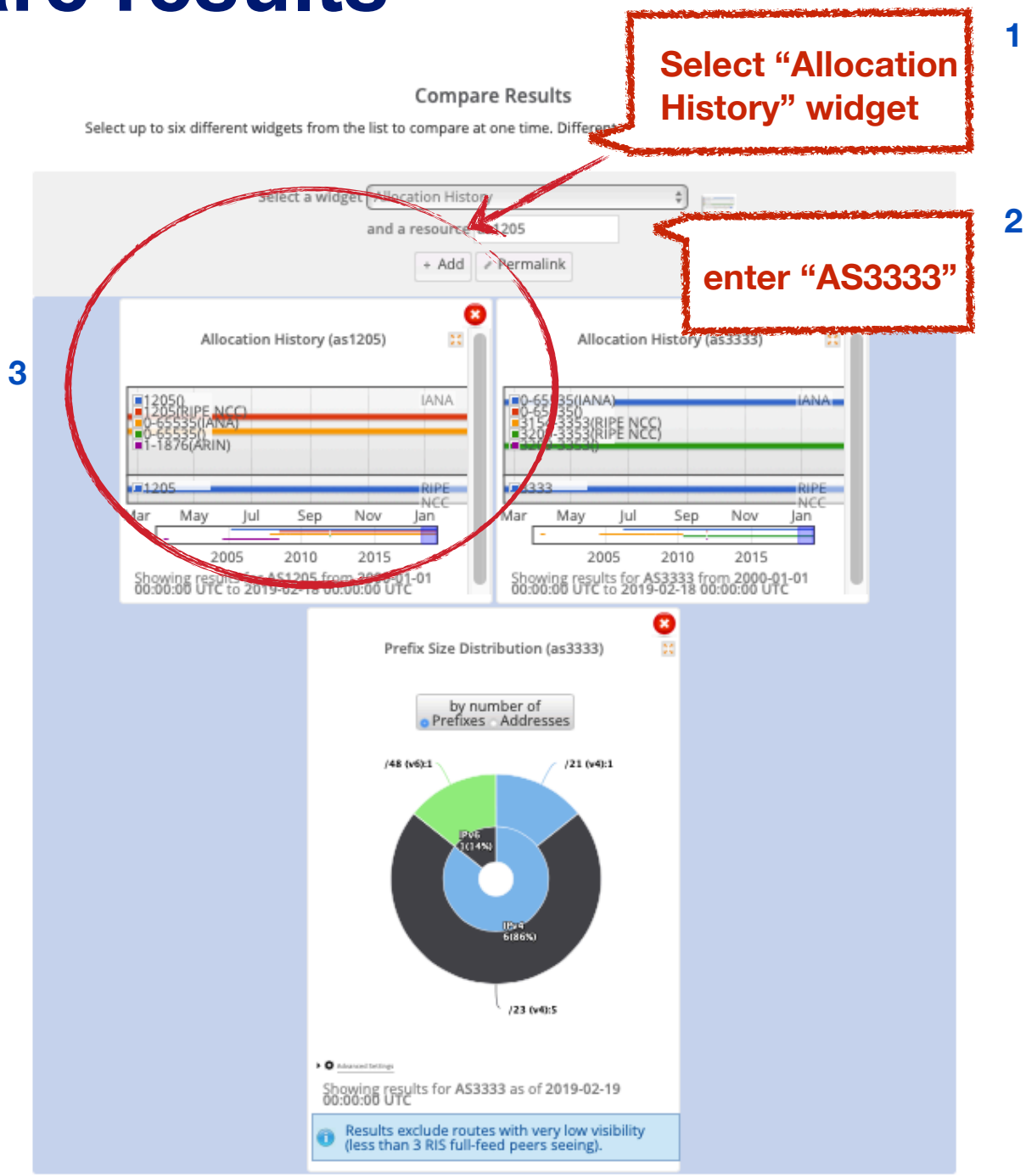
- Want to peer with AS-X?
  - Learn by opening multiple widgets about AS-X
- Choosing upstream ?
  - Compare AS-X with AS-Y by opening same widget loaded with two different ASNs
- Internet outage in a country?
  - Open multiple country-related widgets in same view

How to compare

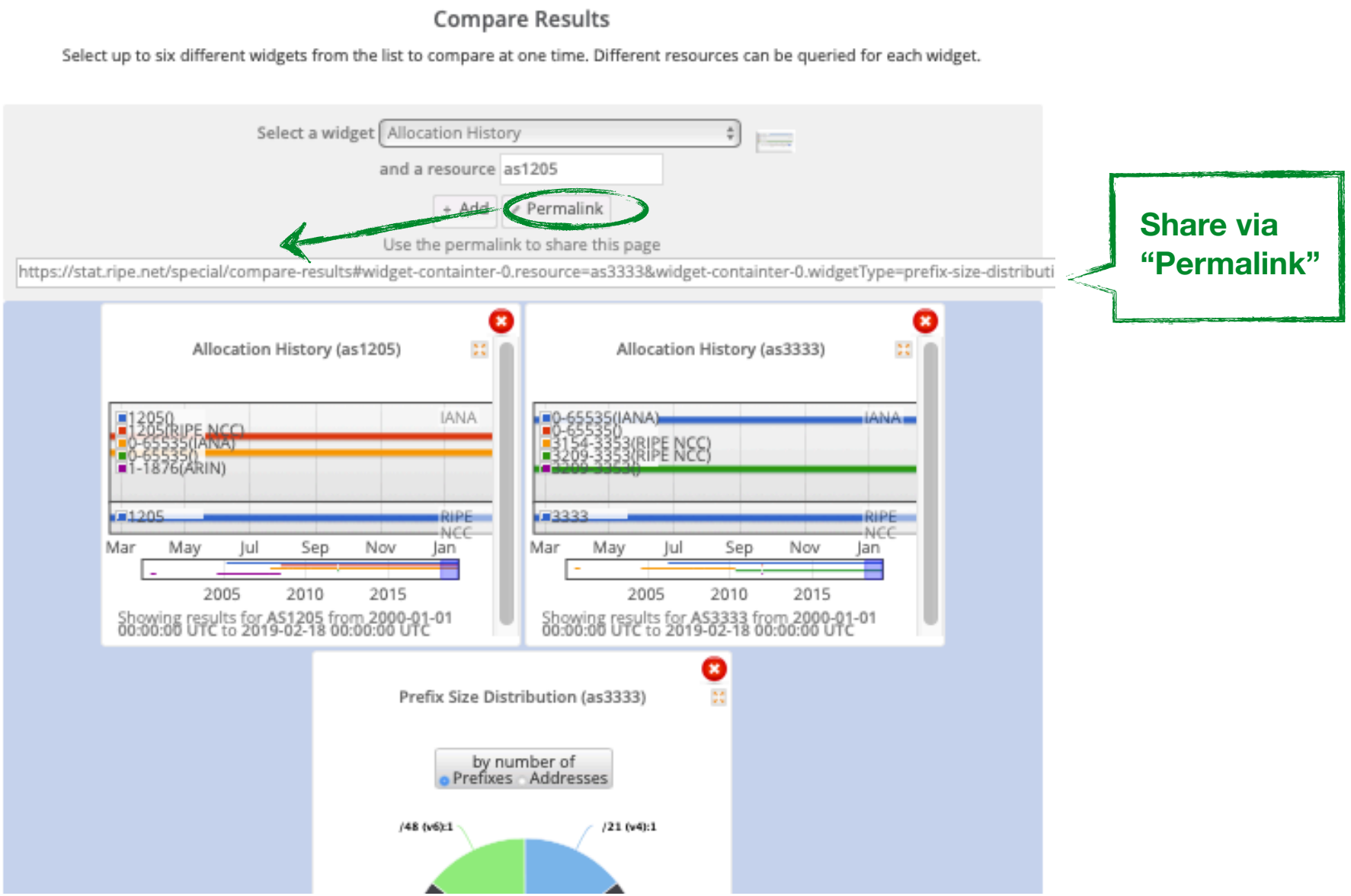
- Compare results in different widgets



Compare results



Compare results



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 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’
- Use “multi-resource” button in “Country Routing” widget

In-widget comparison

- Country Routing Statistics

kahoot

Exercise C

Questions

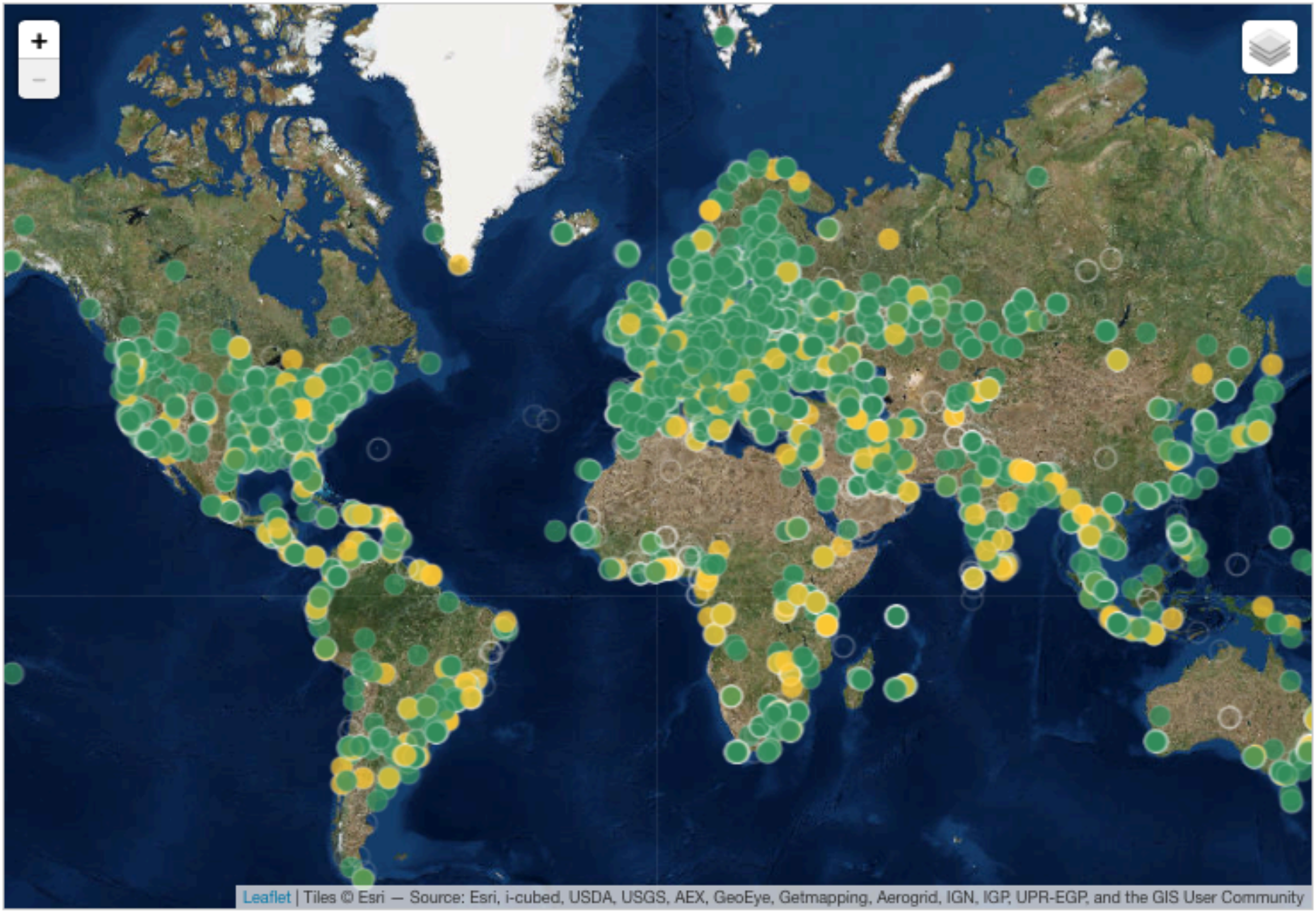
RIPE Atlas

Overview 2 - RIPE Atlas

RIPE Atlas

- Introduction to RIPE Atlas
- Using RIPE Atlas as a Visitor
- Looking up Public Probes
- Finding Results of Public Measurements
- Creating a Measurement
  - *Demo and Exercise D*
- Network Monitoring
  - *Exercise E: Using Streaming API*
- Command-line Interface Toolset
  - *Exercise F: Using RIPE Atlas CLI*
- Use Cases
- More RIPE Atlas Features
- Take Part in the Atlas Community

RIPE Atlas Global Coverage



Introduction to RIPE Atlas

Section 9

Goals

- Monitoring and troubleshooting your network using RIPE Atlas
- Create specific tailor-made measurements using API calls or the command line interface

Prerequisites

- We assume you have already used RIPE Atlas
- Do you have a RIPE NCC Access account?
  - If not - quickly create one: access.ripe.net
- Do you have credits to spend?
  - You get a voucher from us

An Introduction

- RIPE Atlas is a global active measurements platform
- Goal: view Internet reachability
- Probes hosted by volunteers
- Data publicly available

atlas.ripe.net

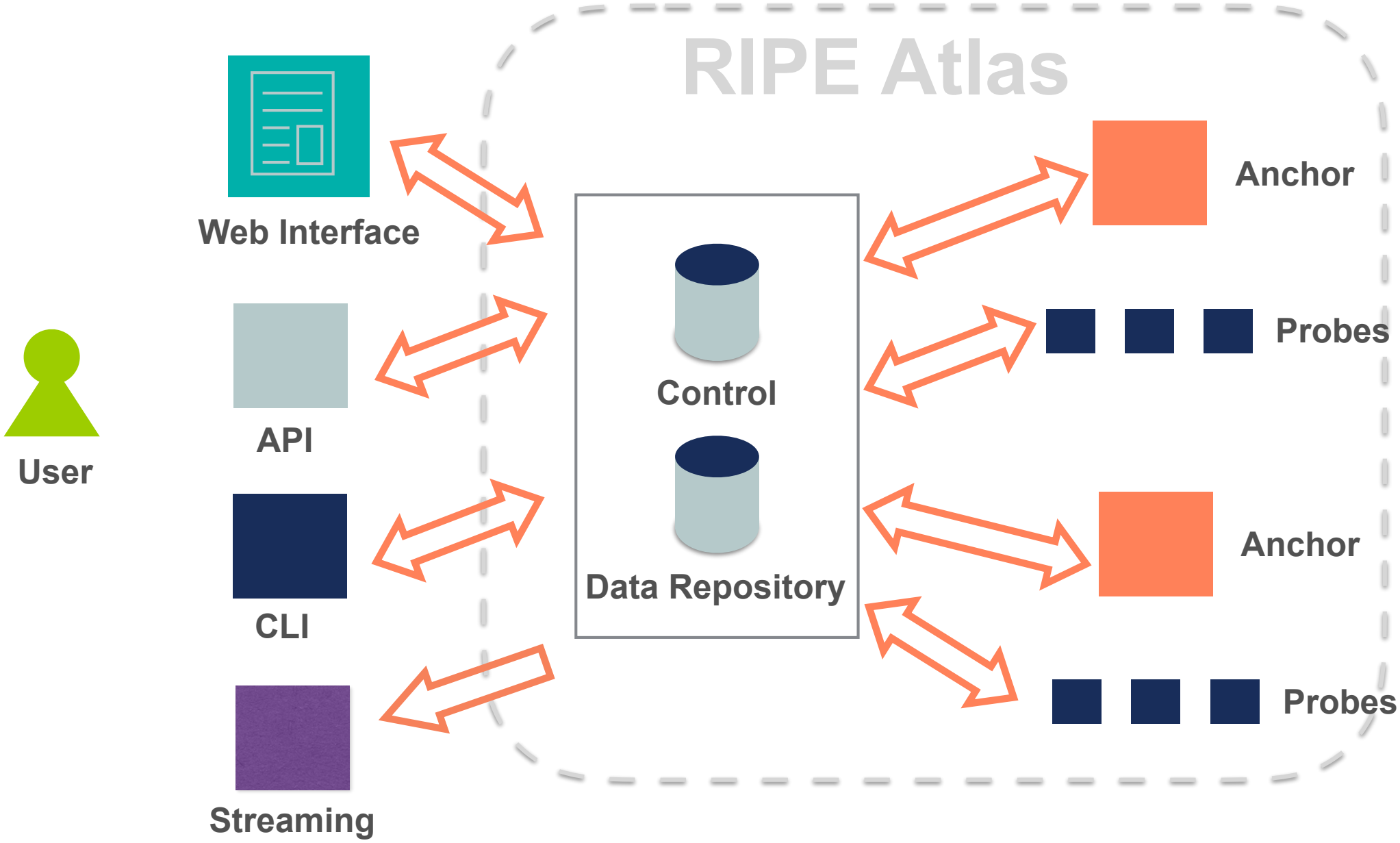
RIPE Atlas measurements

- **Built-in** global measurements towards root nameservers
  - Visualised as Internet traffic maps
- **Built-in** regional measurements towards “anchors”
- **Users** can run customised measurements
  - ping, traceroute, DNS, SSL/TLS, NTP and HTTP

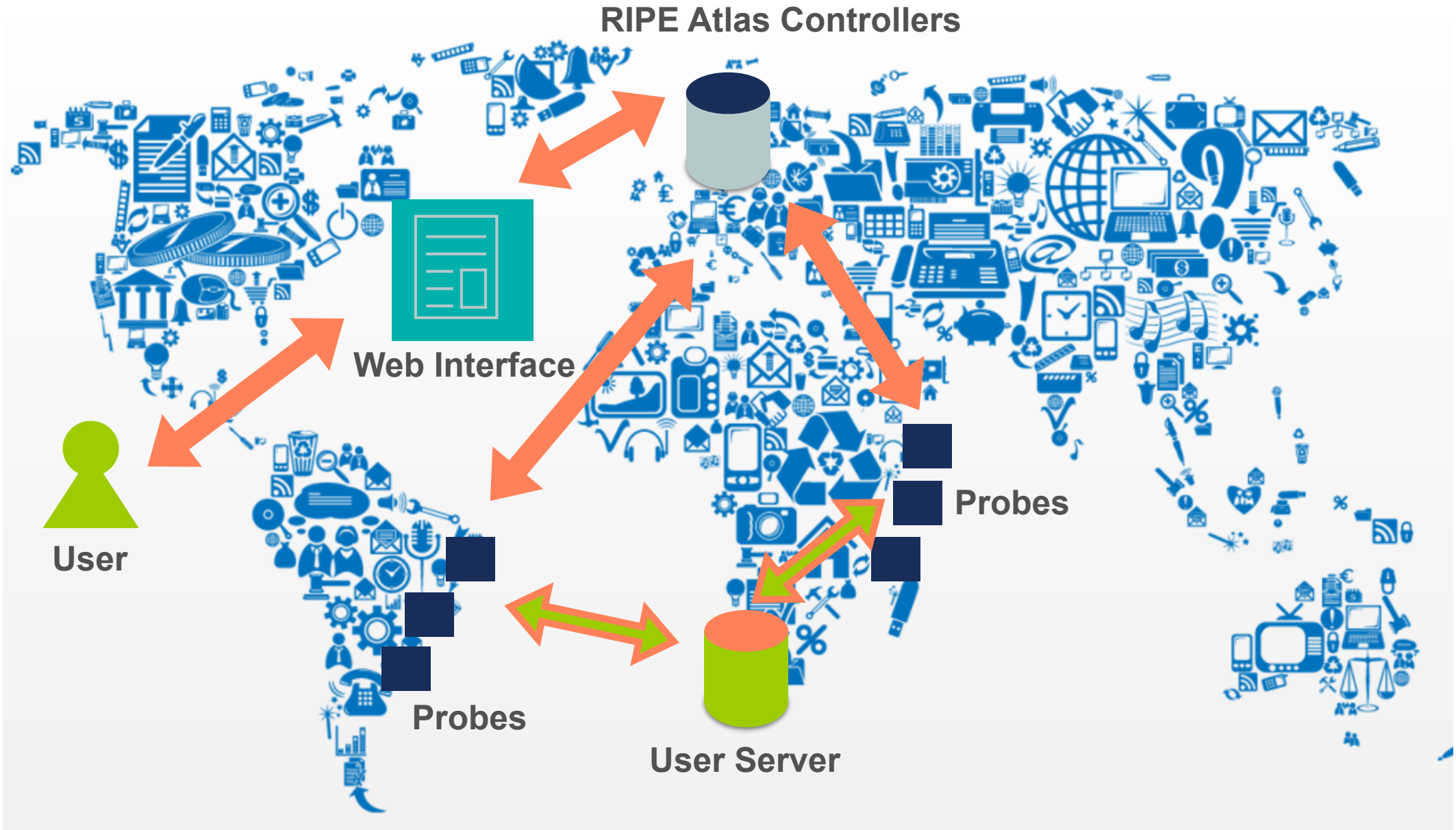
Probes and Anchors

- 10,300+ probes connected (427 RIPE Atlas Anchors)
- 7,900+ results collected per second
- 21,000+ measurements currently running

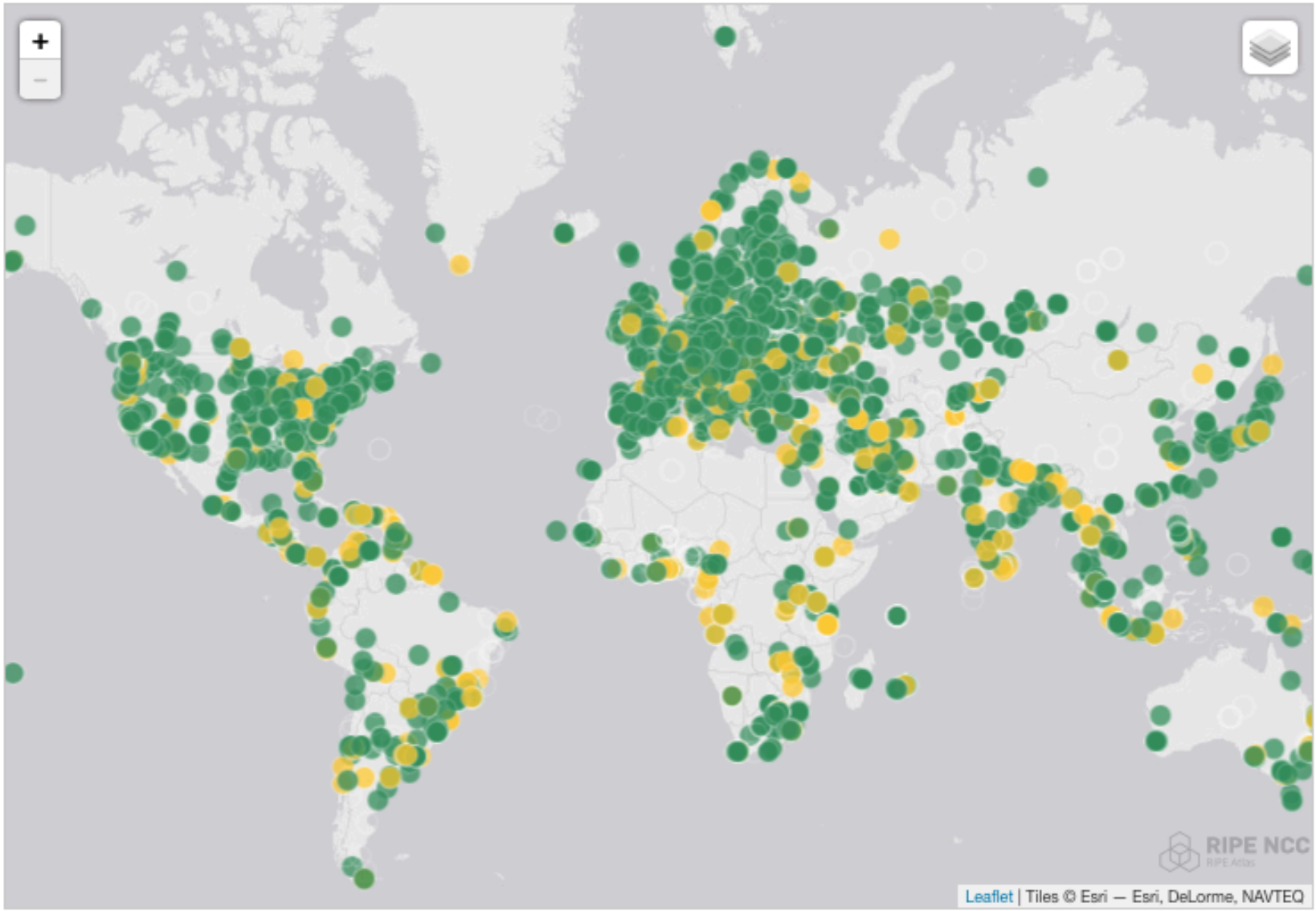
RIPE Atlas Overview (1)



RIPE Atlas Overview (2)



RIPE Atlas Global Coverage



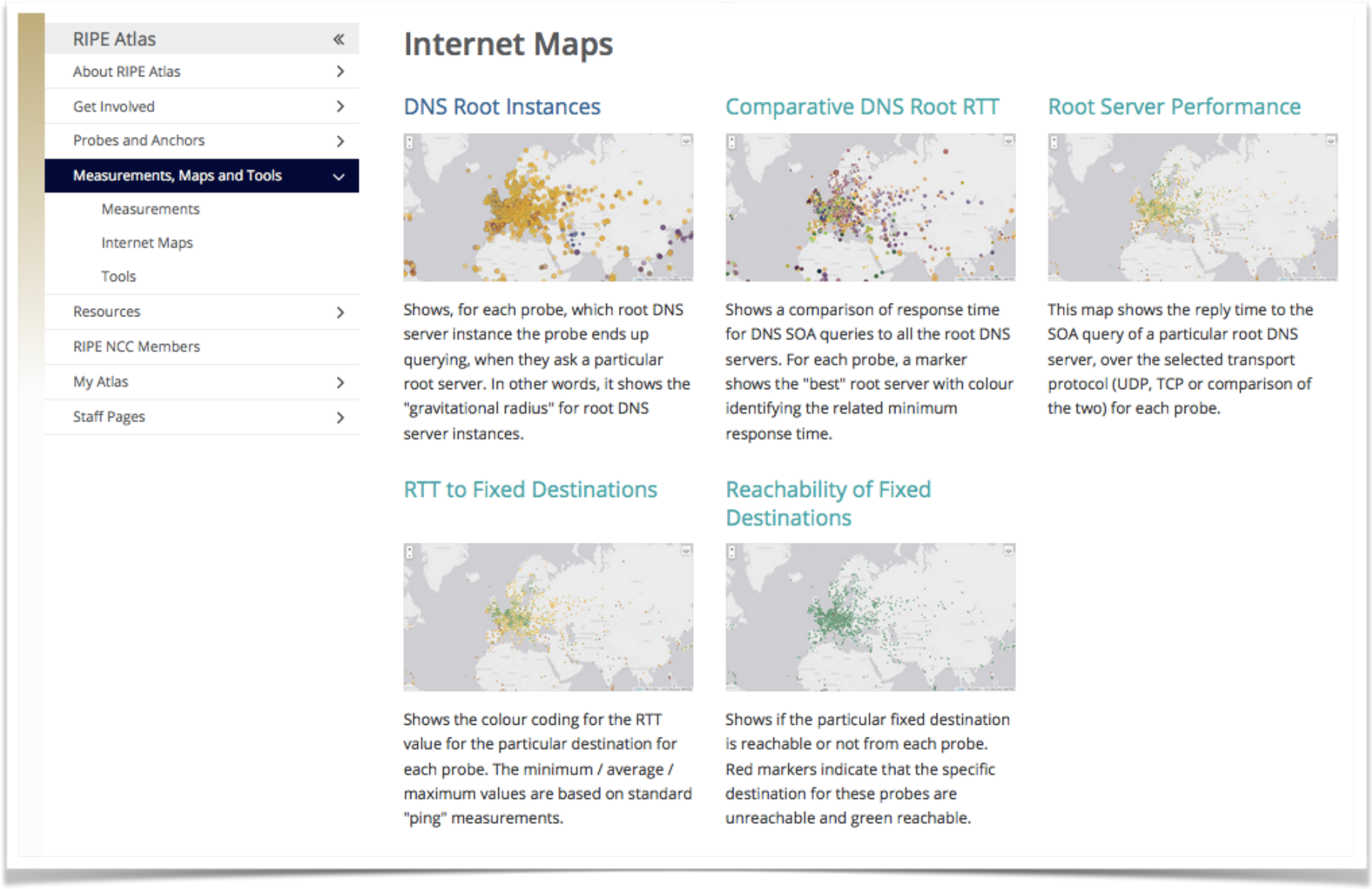
Most Popular Features

- 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, Tracemon
- Status checks (Icinga & Nagios)

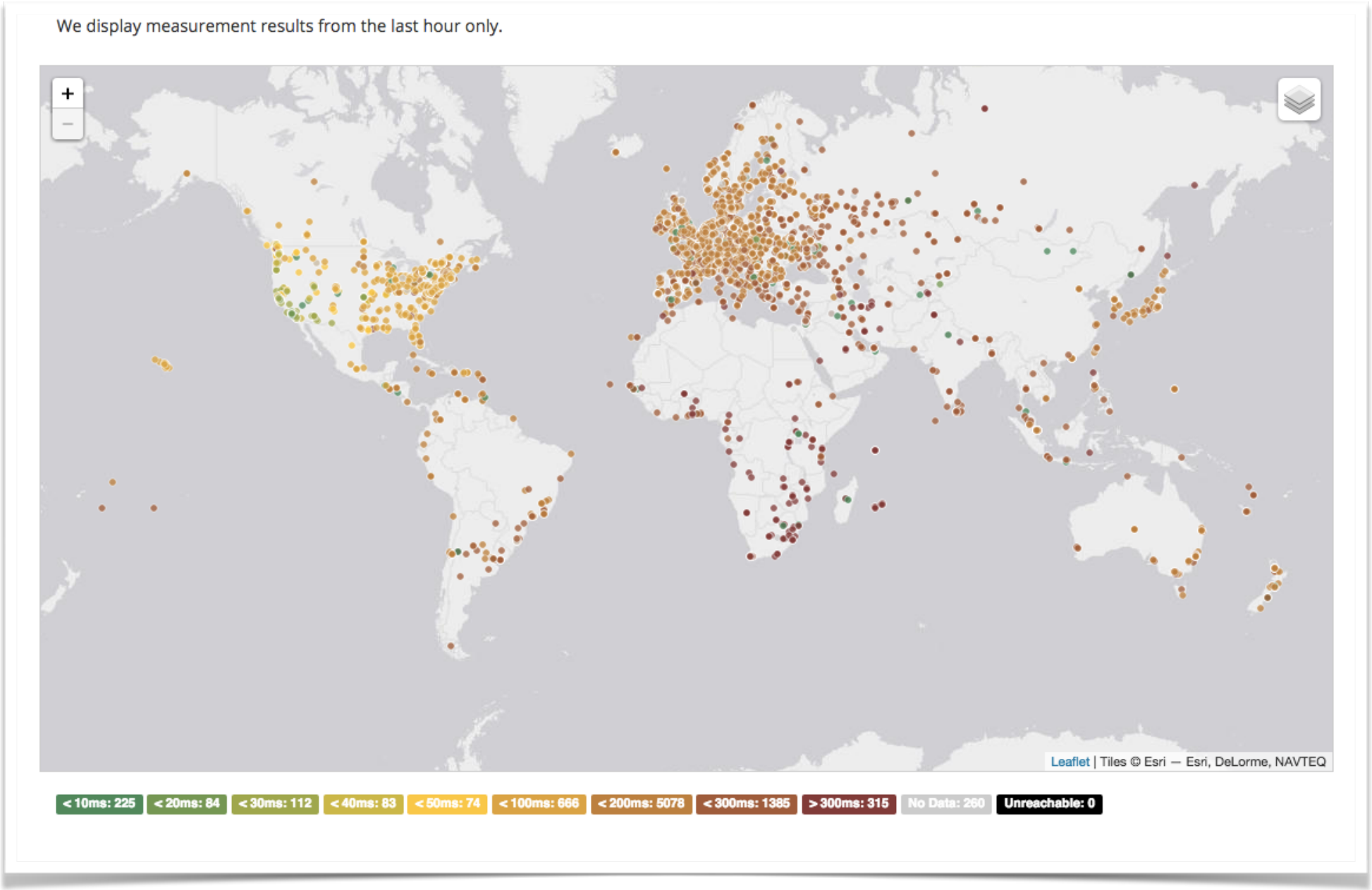
Using
RIPE Atlas As a Visitor

Section 10

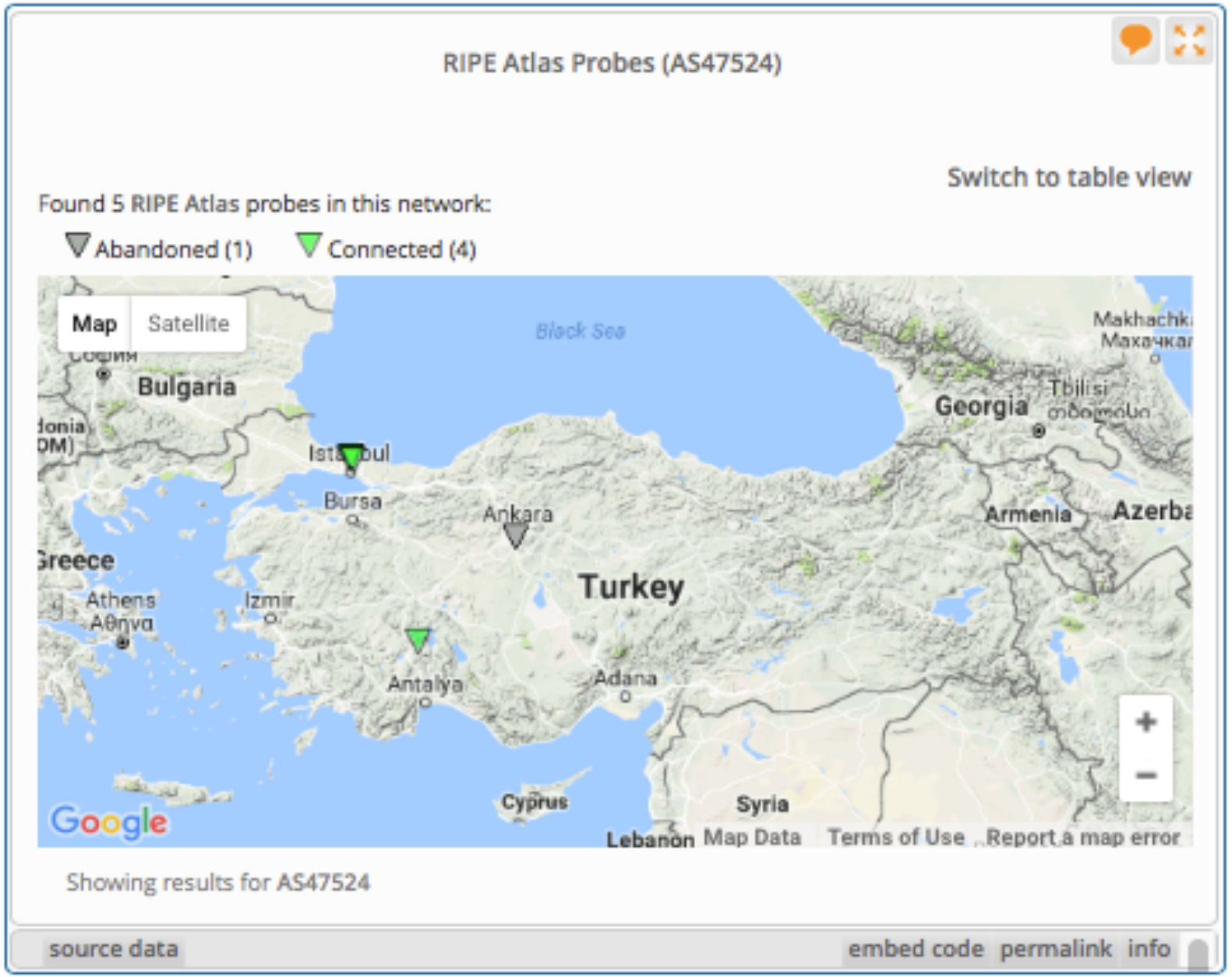
Internet Traffic Maps



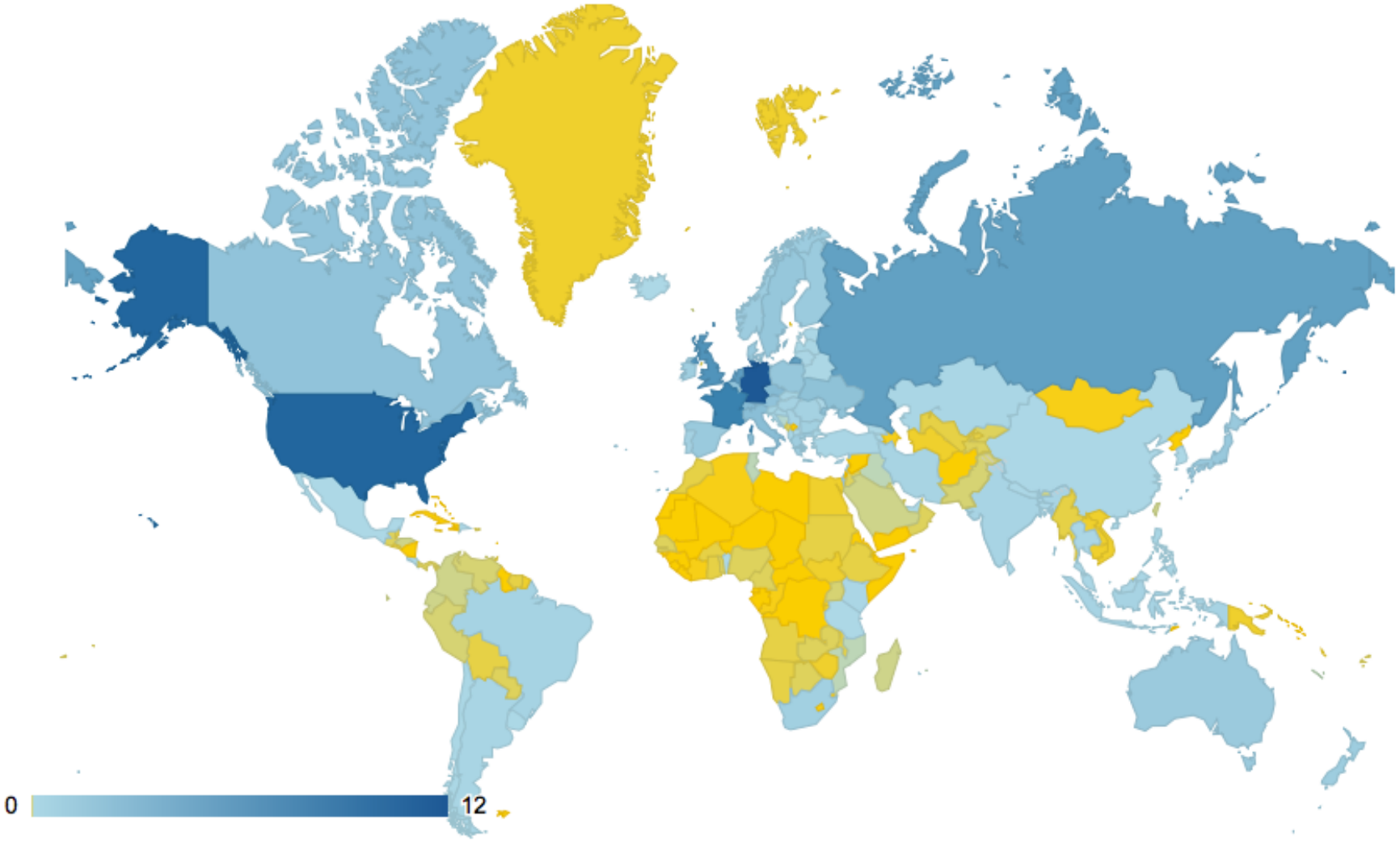
Where is B-root?



Probes per ASN (in RIPEstat)



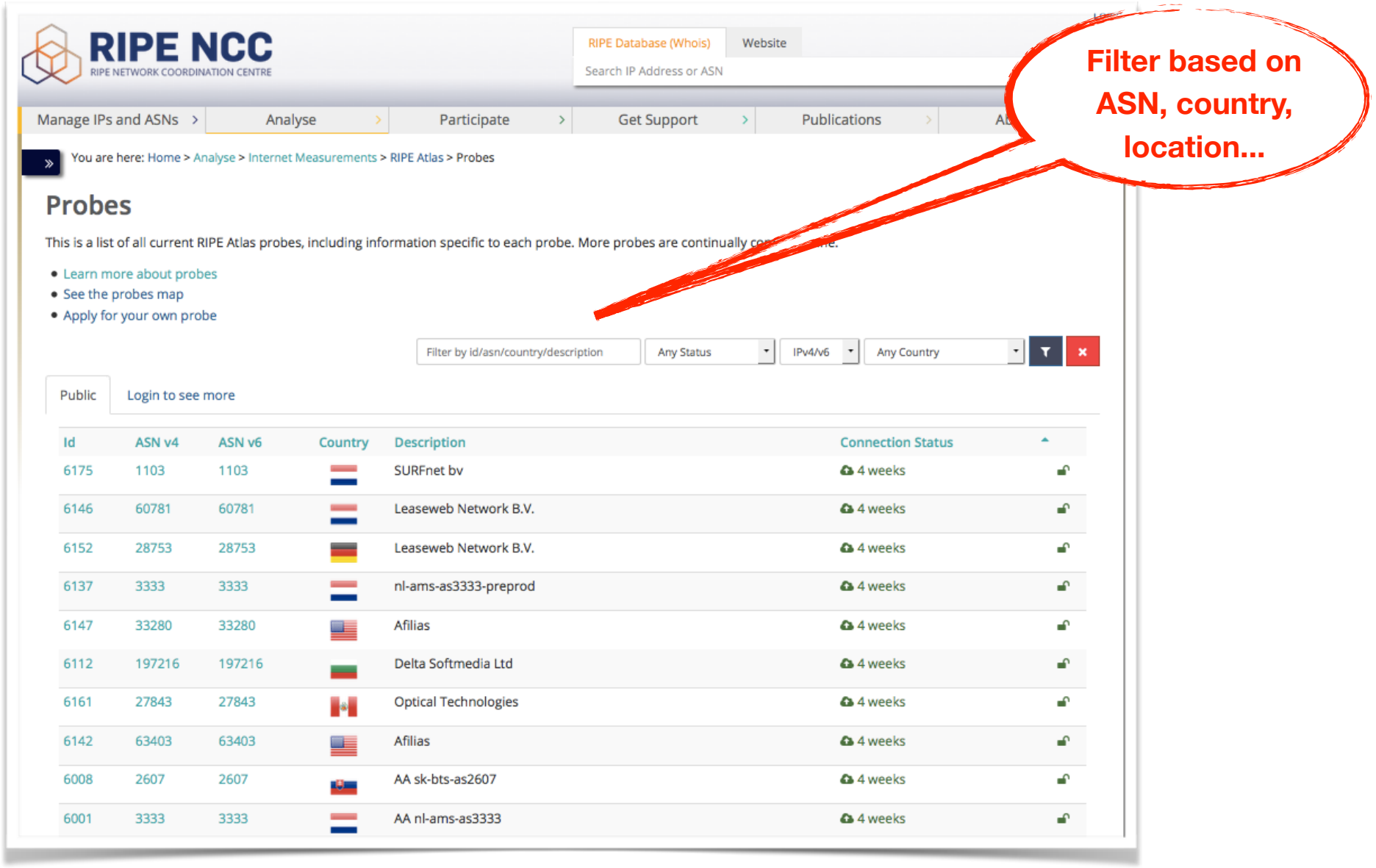
Where we want to place probes



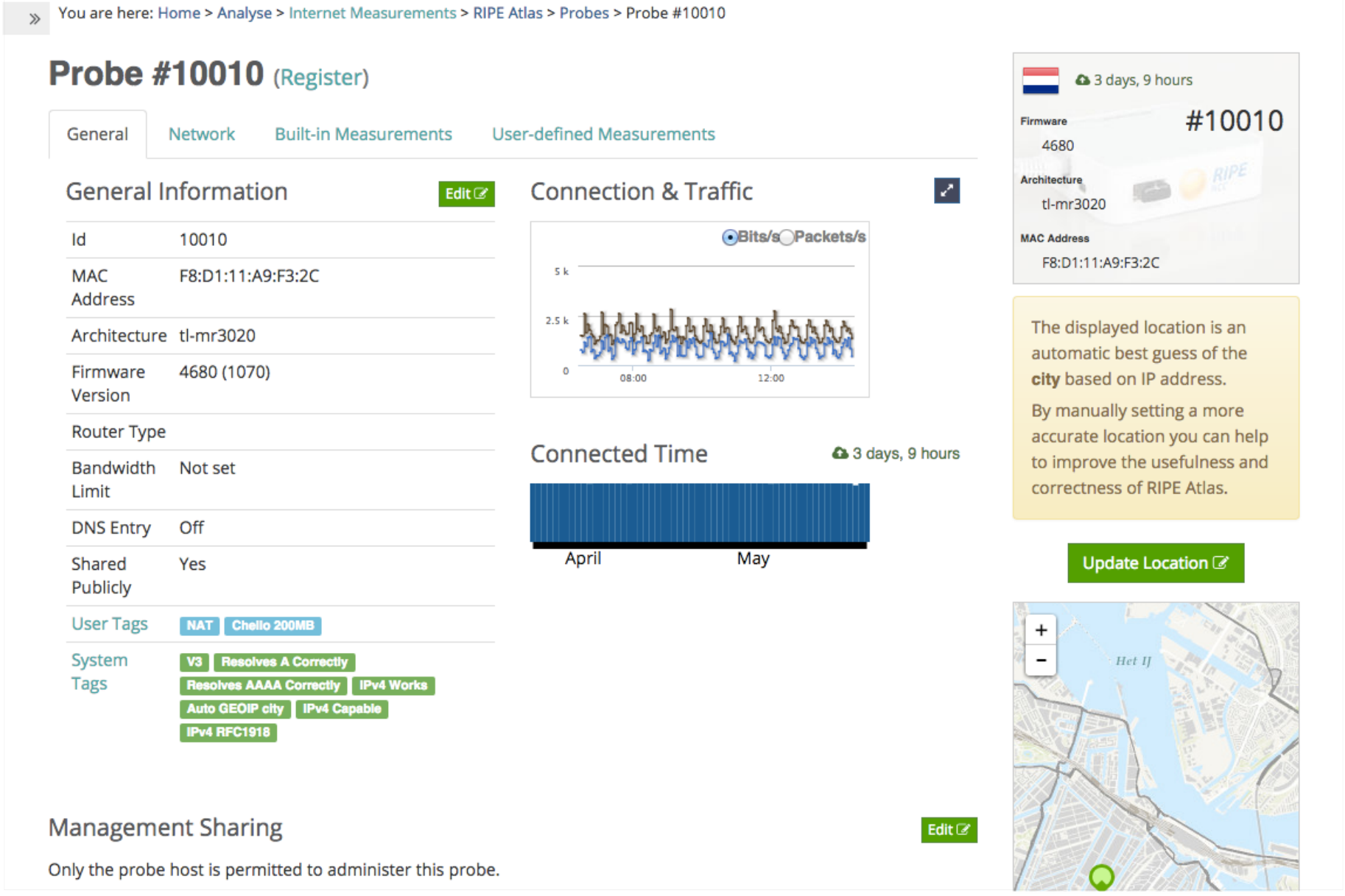
Looking Up Public Probes

Section 11

Searching for probes

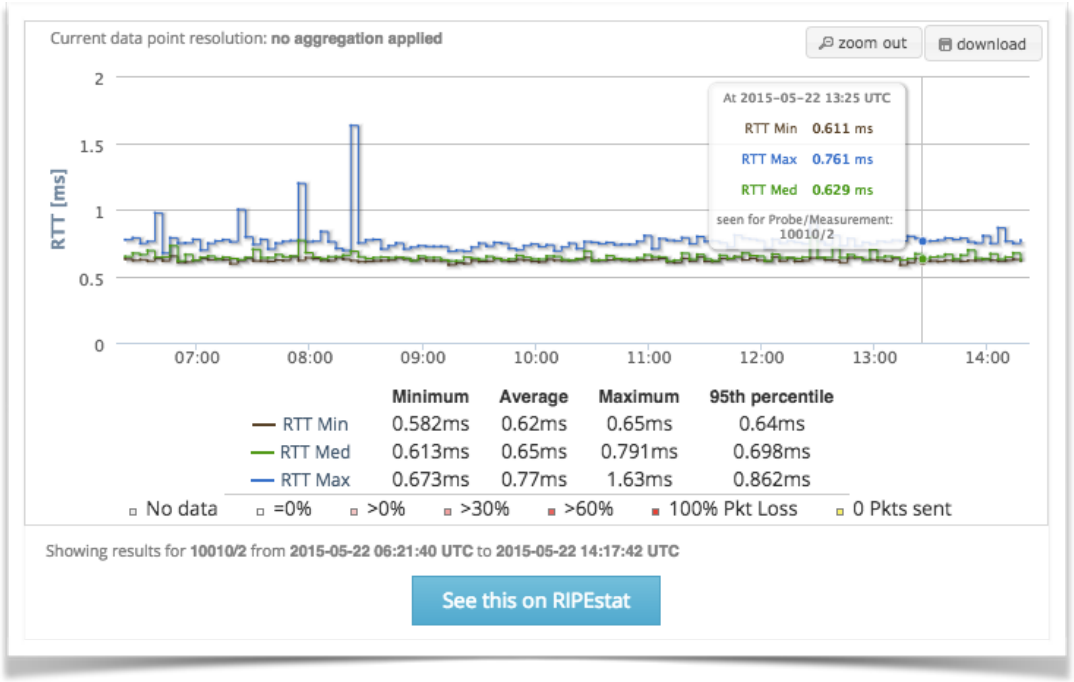


Probe page


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
Bits/s Packets/s
5 k
2.5 k
0
08:00
12:00
Connected Time
3 days, 9 hours
April
May
Management Sharing
Edit
Only the probe host is permitted to administer this probe.
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
Het IJ

Zoomable Ping Graph

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

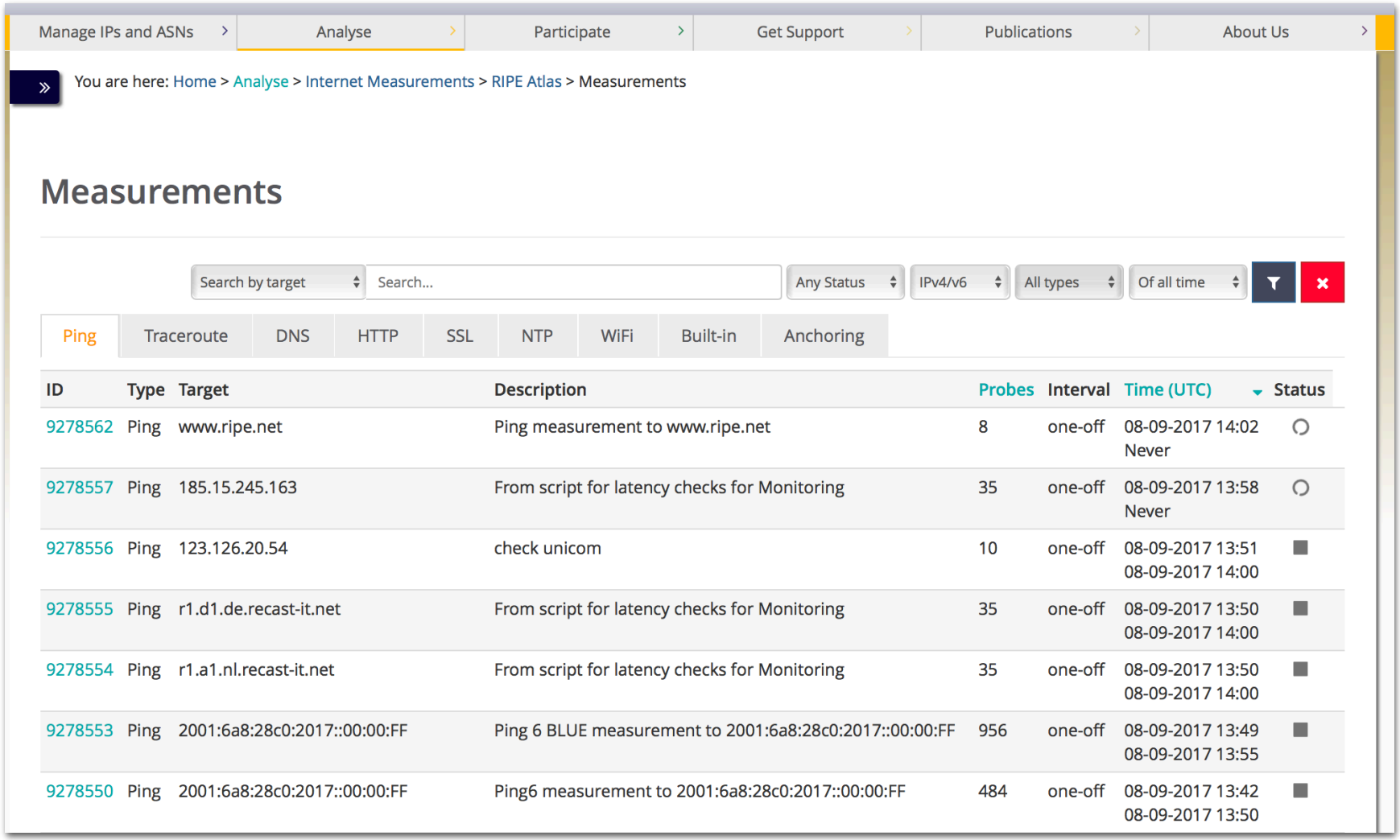


Finding Results of Public Measurements

Section 12

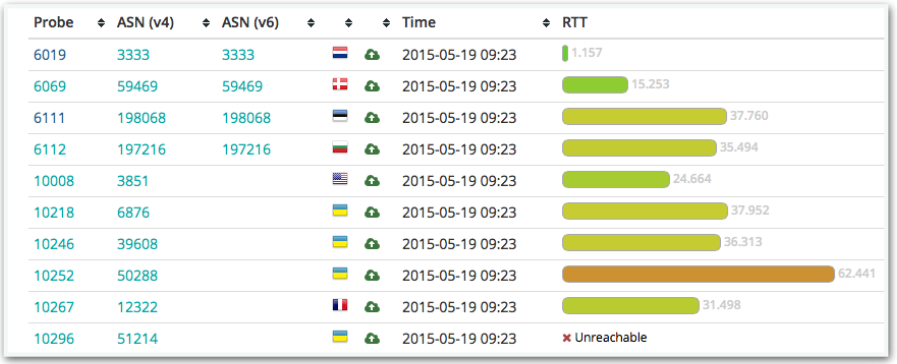
Looking up Measurements Results

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

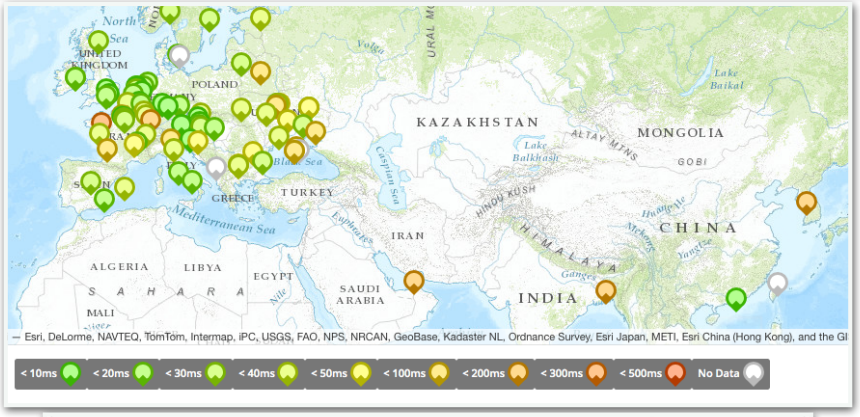


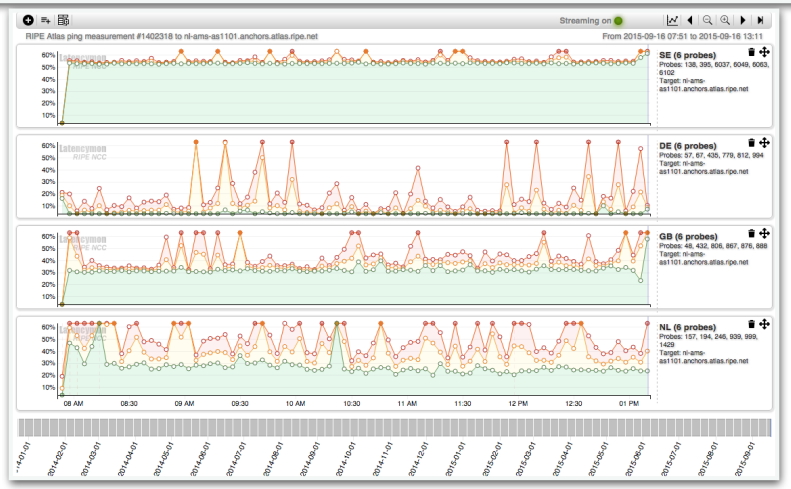
Available visualisations: ping

- List of probes: sortable by RTT
- Map: colour-coded by RTT
- LatencyMON: compare multiple latency trends



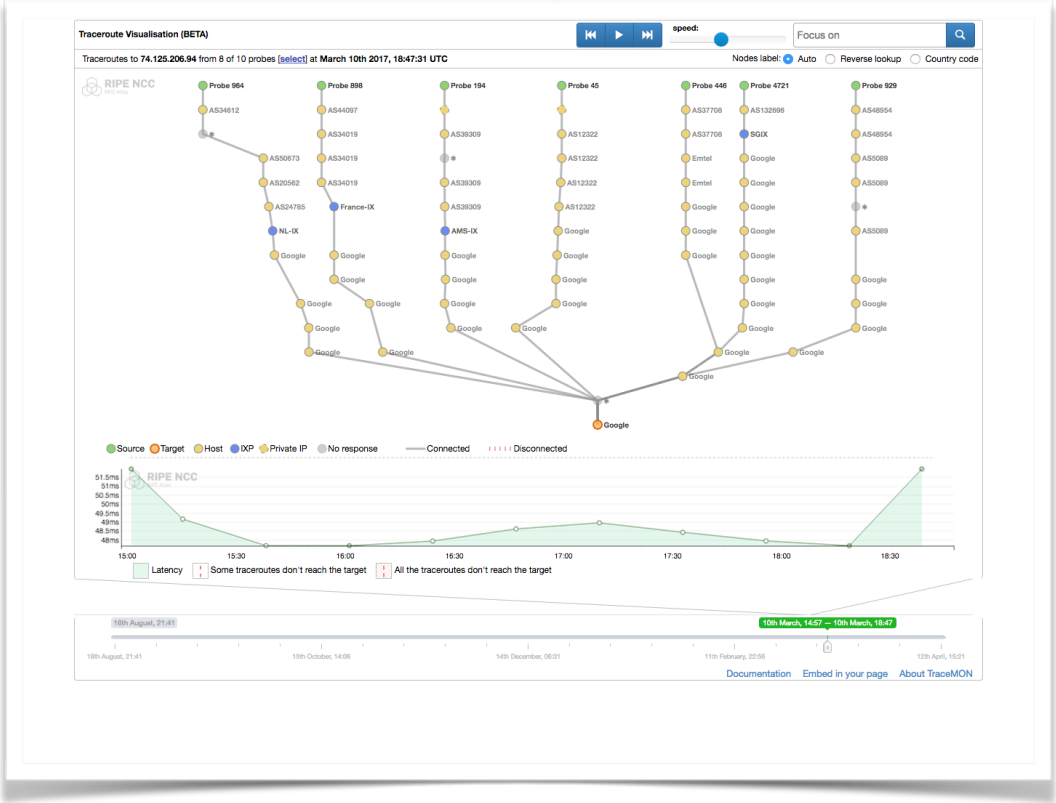
Probe	ASN (v4)	ASN (v6)	Time	RTT
6019	3333	3333	2015-05-19 09:23	1.157
6069	59469	59469	2015-05-19 09:23	15.253
6111	198068	198068	2015-05-19 09:23	37.760
6112	197216	197216	2015-05-19 09:23	35.494
10008	3851		2015-05-19 09:23	24.664
10218	6876		2015-05-19 09:23	37.952
10246	39608		2015-05-19 09:23	36.313
10252	50288		2015-05-19 09:23	62.441
10267	12322		2015-05-19 09:23	31.498
10296	51214		2015-05-19 09:23	Unreachable



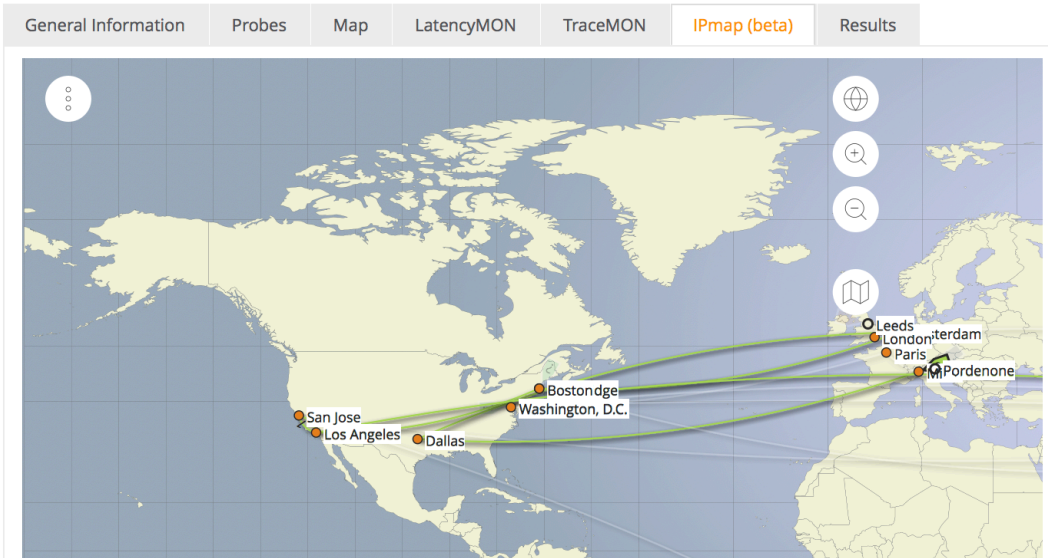


Available visualisations: traceroute

- TraceMON: network topology, latency and nodes information



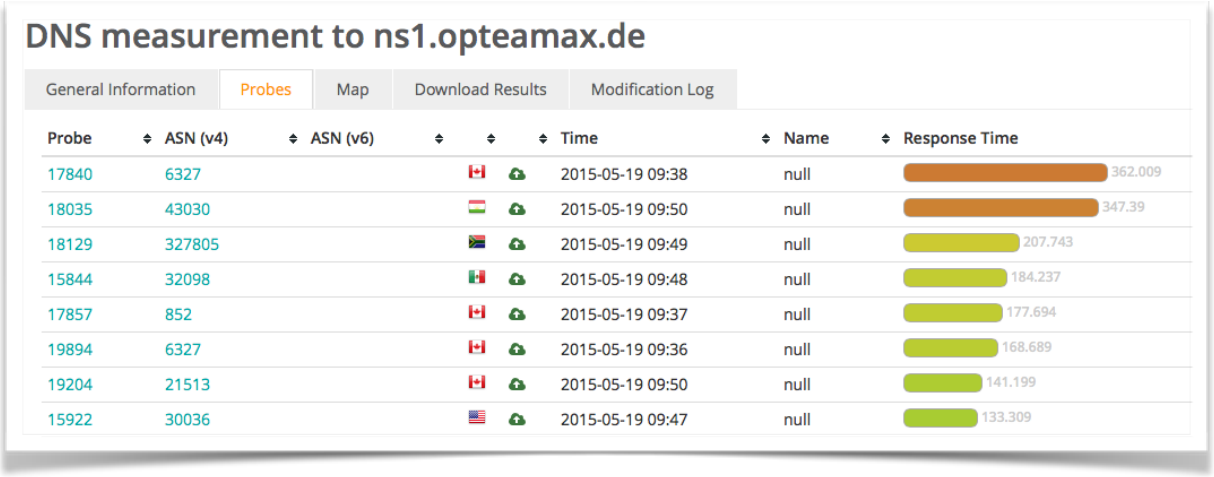
- IPMap(beta): hops geolocation on map (prototype)



Available visualisations: DNS

- Map, colour-coded response time or diversity

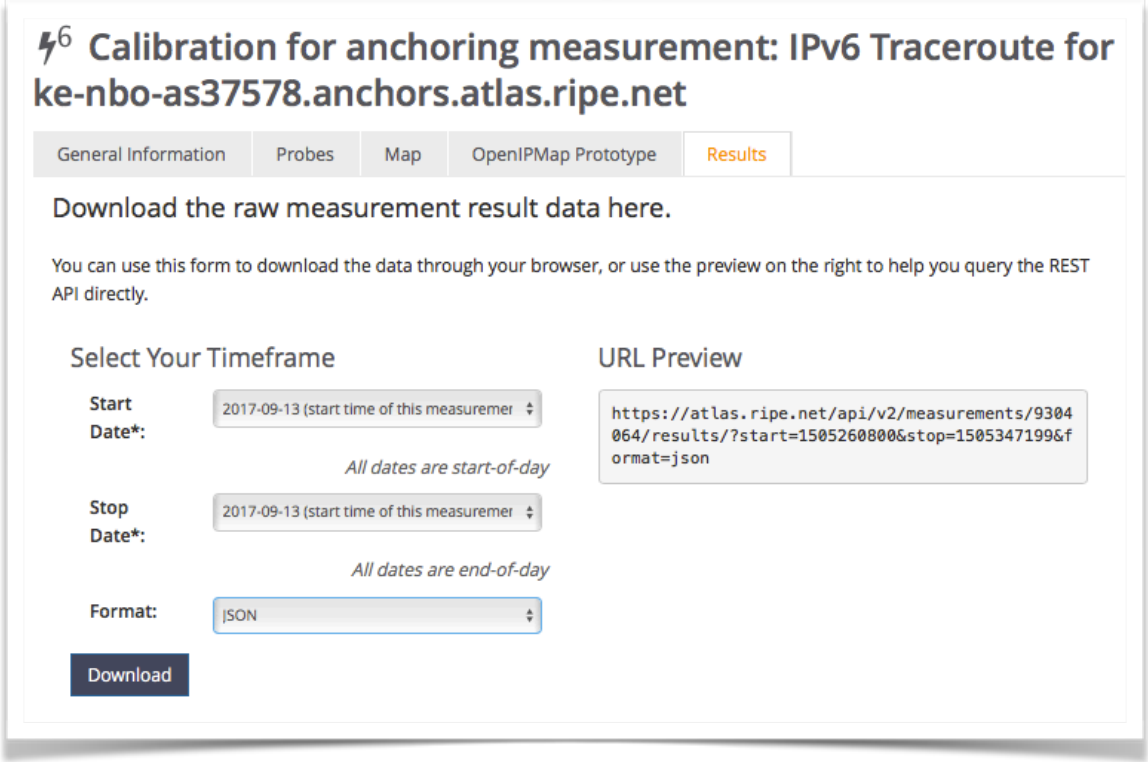
- List of probes, sortable by response time



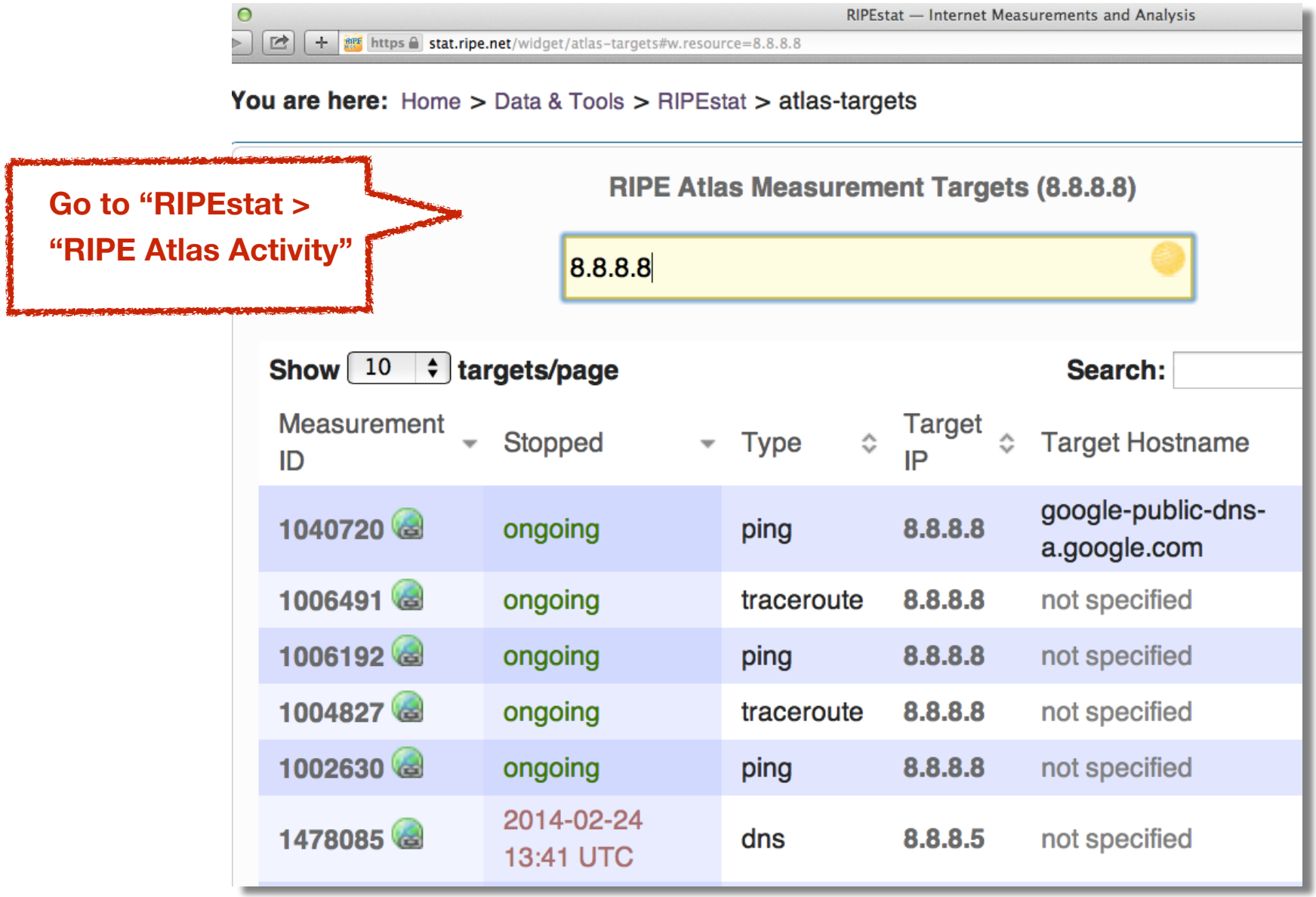
Probe	ASN (v4)	ASN (v6)	Time	Name	Response Time
17840	6327		2015-05-19 09:38	null	362.009
18035	43030		2015-05-19 09:50	null	347.39
18129	327805		2015-05-19 09:49	null	207.743
15844	32098		2015-05-19 09:48	null	184.237
17857	852		2015-05-19 09:37	null	177.694
19894	6327		2015-05-19 09:36	null	168.689
19204	21513		2015-05-19 09:50	null	141.199
15922	30036		2015-05-19 09:47	null	133.309

Downloading Measurements Results

- Click on “Results”, then “Download”
- Or URL
- Or API
- Results in JSON
- Libraries for parsing on GitHub



Search for Measurements by Target in RIPEstat



Finding one specific measurement

- If you know the measurement ID:
  - https://atlas.ripe.net/measurements/ID
  - https://atlas.ripe.net/measurements/2340408/

Use Existing Measurements

- Many measurements already running!
- Search for existing public measurements first…
- Only then schedule your own measurement

Creating a Measurement

Section 13

Benefits of your own measurements

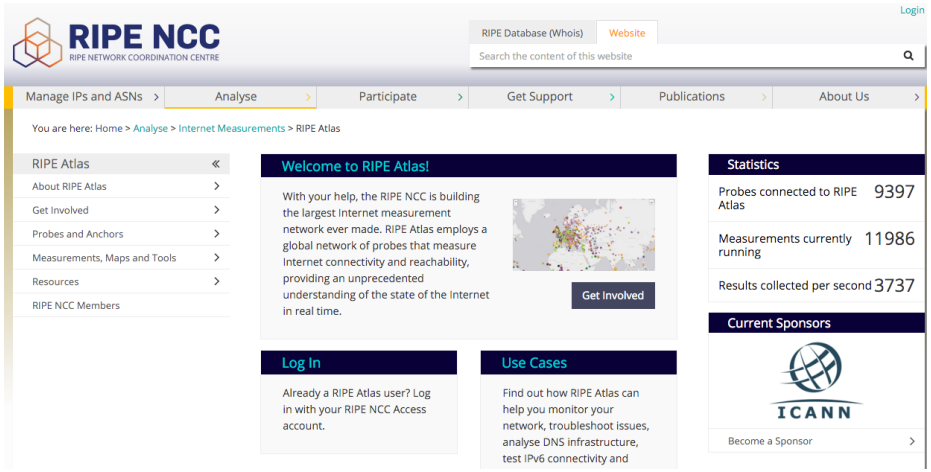
- Customer problem: cannot reach your server
  - Schedule measurements (pings or traceroutes) from up to 1,000 RIPE Atlas probes worldwide to check where the problem is
- Measuring packet loss on suspected “bad” link
- Testing anycast deployment

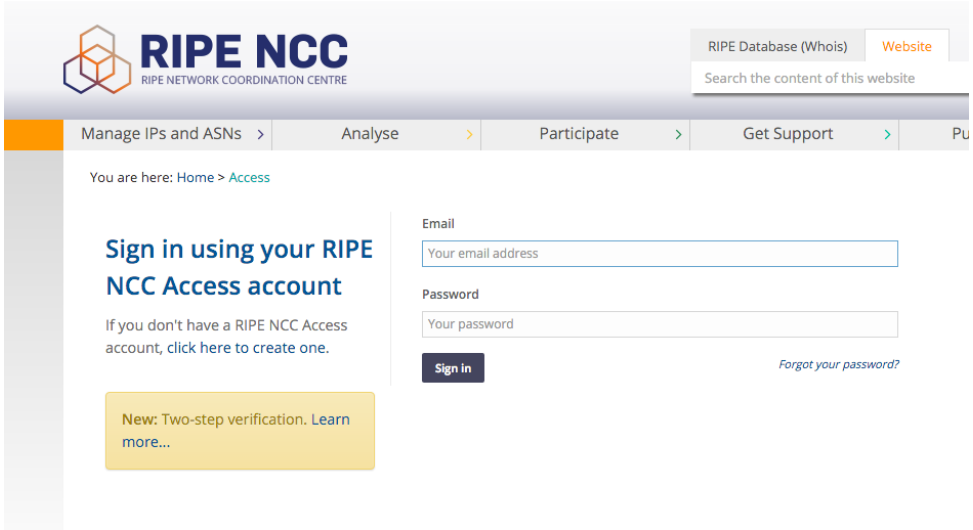
Prerequisites

- RIPE NCC Access account ?
  - If not, create one: ripe.net/register
- Do you have credits to spend?
  - Redeem voucher
- Redeem LIR credits monthly

Logging In

- Log in to atlas.ripe.net
  - Use your RIPE NCC Access account
  - Same account for LIR Portal, RIPE Atlas, RIPEstat, RIPE Labs...
  - Create an account if you don't already have one





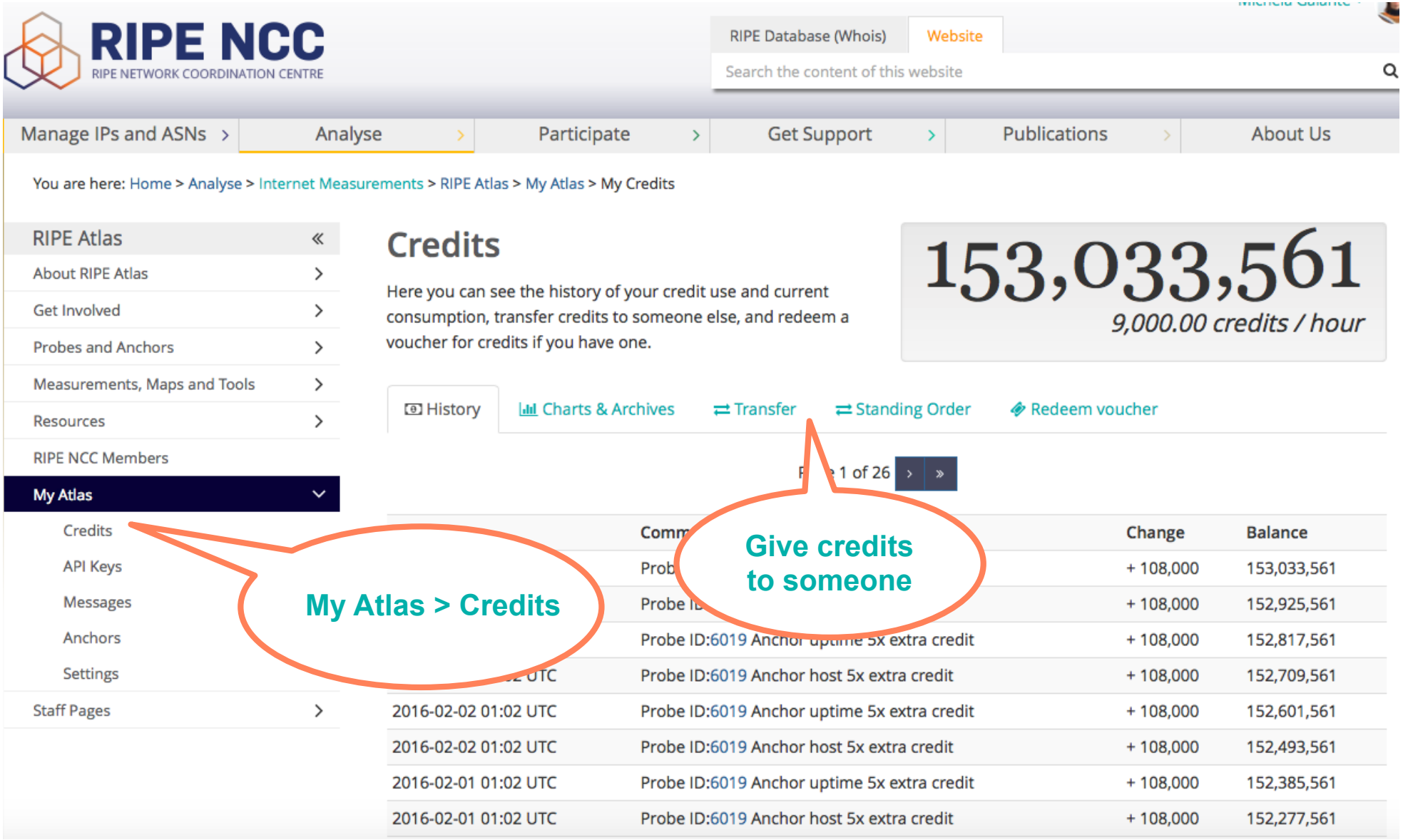
Credits system

- Measurements cost credits
  - ping = 10 credits, traceroute = 20, etc.
- Why? Fairness and to avoid overload
- Spending limit and max number of measurements

How can you earn credits?

- Hosting a RIPE Atlas probe
- Being a RIPE NCC member
- Hosting an anchor
- Sponsoring probes
- Being an ambassador
- Redeeming a voucher

Credits overview

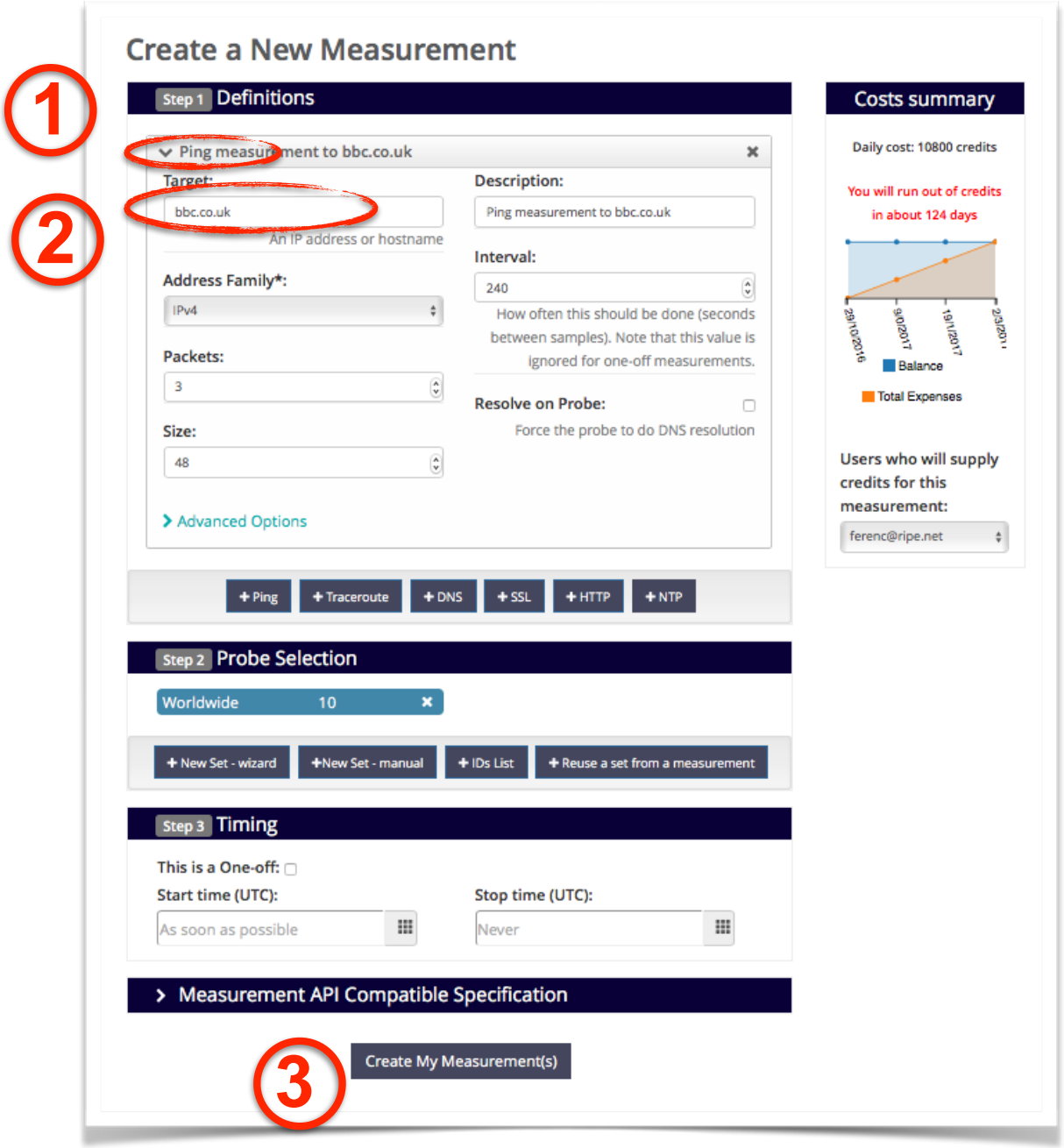


Scheduling a measurement

- Log in to atlas.ripe.net
- Four methods:

1. **Quick and easy**
2. **Advanced GUI usage**
3. **API (curl and JSON code)**
4. CLI

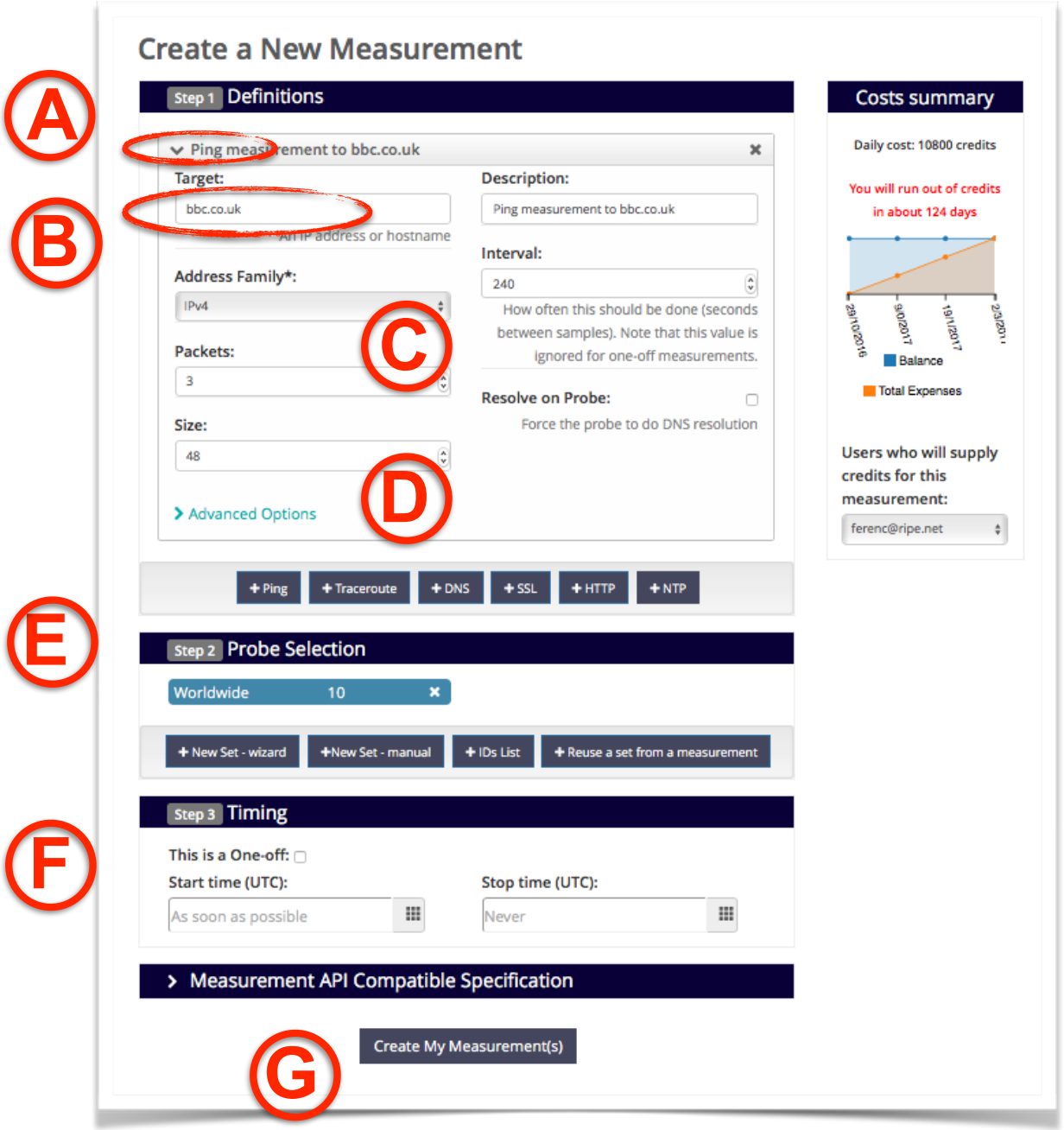
1. Quick and easy



2. Use GUI to schedule a measurement

- Mostly used for a periodic, long-term measurement
  - Or “One-off”
- Choose type, target, frequency, start/end time, # of probes, region…
- Each measurement will have **unique ID**
- “**API Compatible Specification**” is generated too

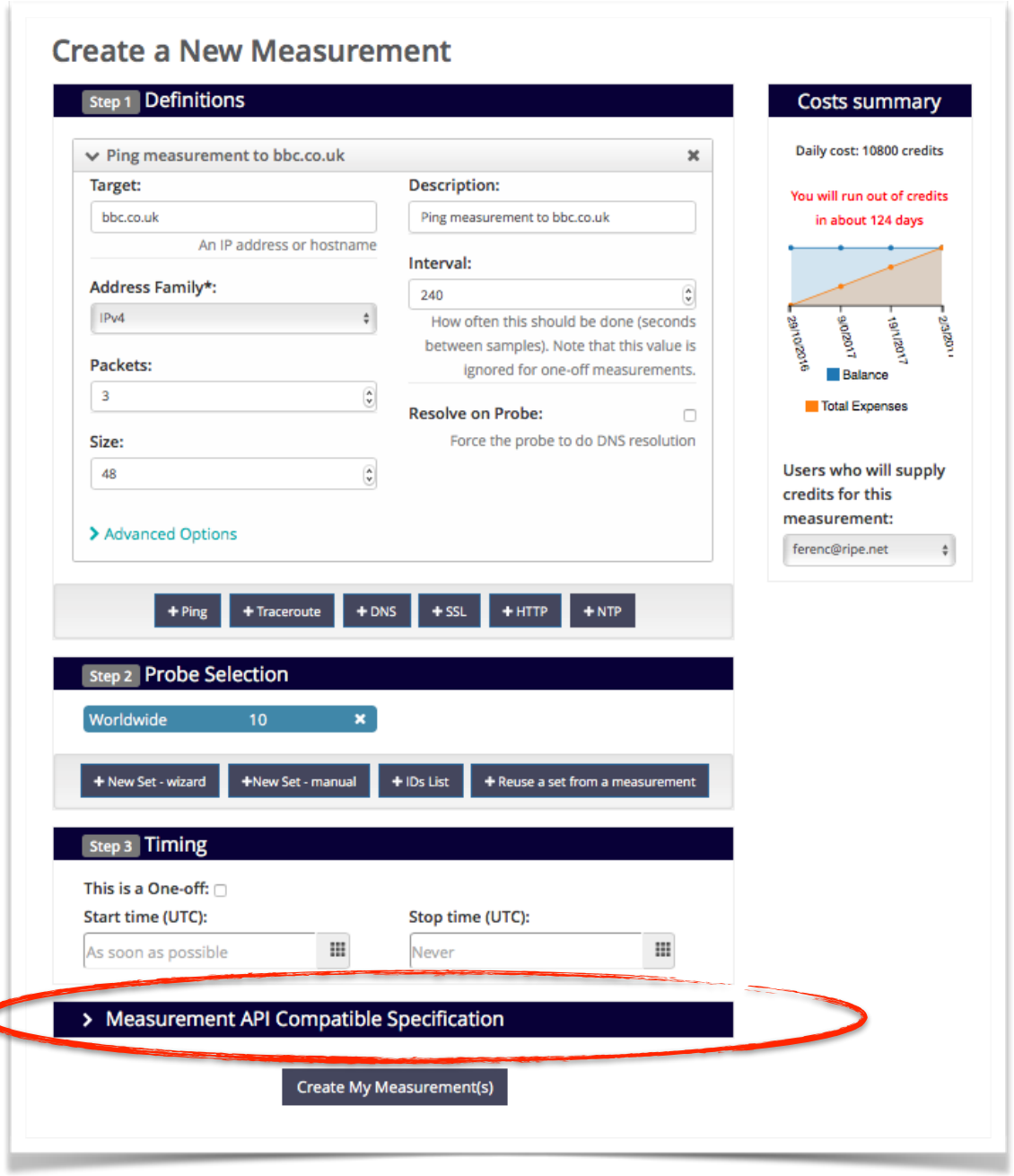
2. Advanced GUI



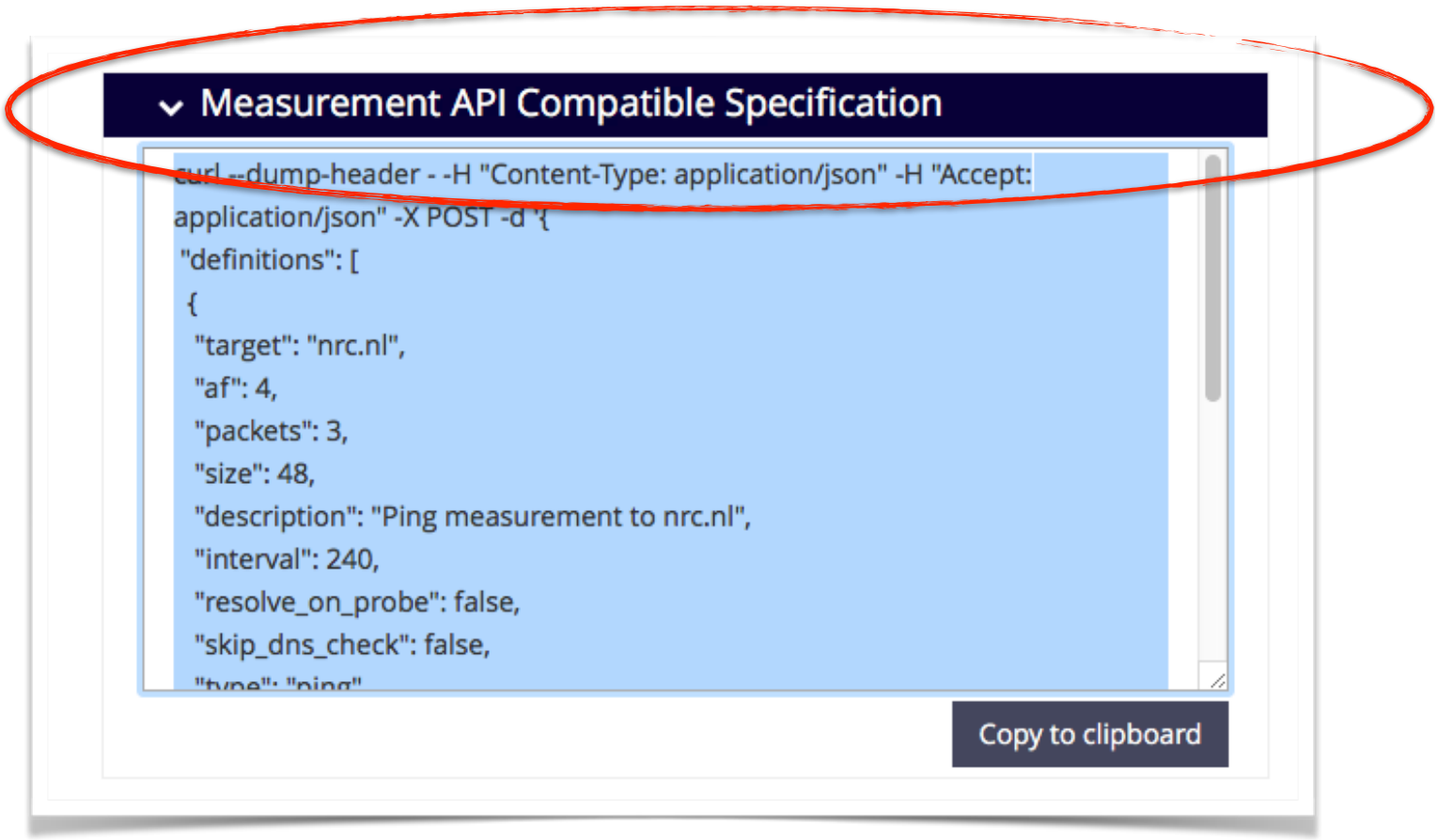
3: Use API to schedule a measurement

- Using command-line and scripting: Application Programming Interface (API)
  - https://atlas.ripe.net/docs/api/v2/manual/measurements/types/
  - https://atlas.ripe.net/keys/
- You will need API keys
  - To create measurements without logging in
  - To securely share your measurement data

3. API Compatible



[cont…] 3. API Compatible



Create API Key

- Go to MyAtlas
- Click on “Create an API Key”
- Choose “permission”: “schedule new measurement”
- Careful! Time is UTC!
- Give it a label

DEMO

Create a Measurement (GUI)
Explore advanced parameters

Create a Measurement

Exercise D

Exercise

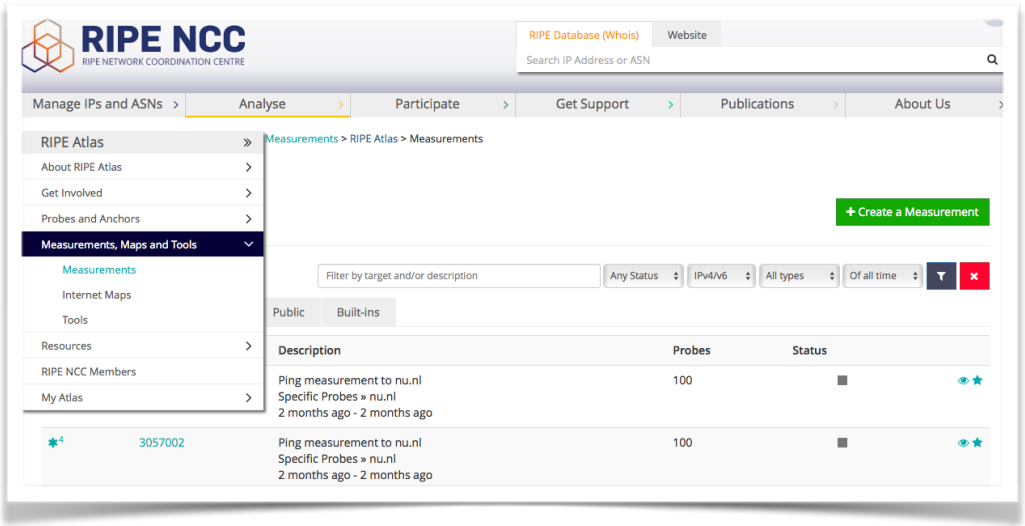
- Create a ping measurement:
  - Involving ten probes
  - To a target of your choice
  - Source is your country
  - Duration of two days

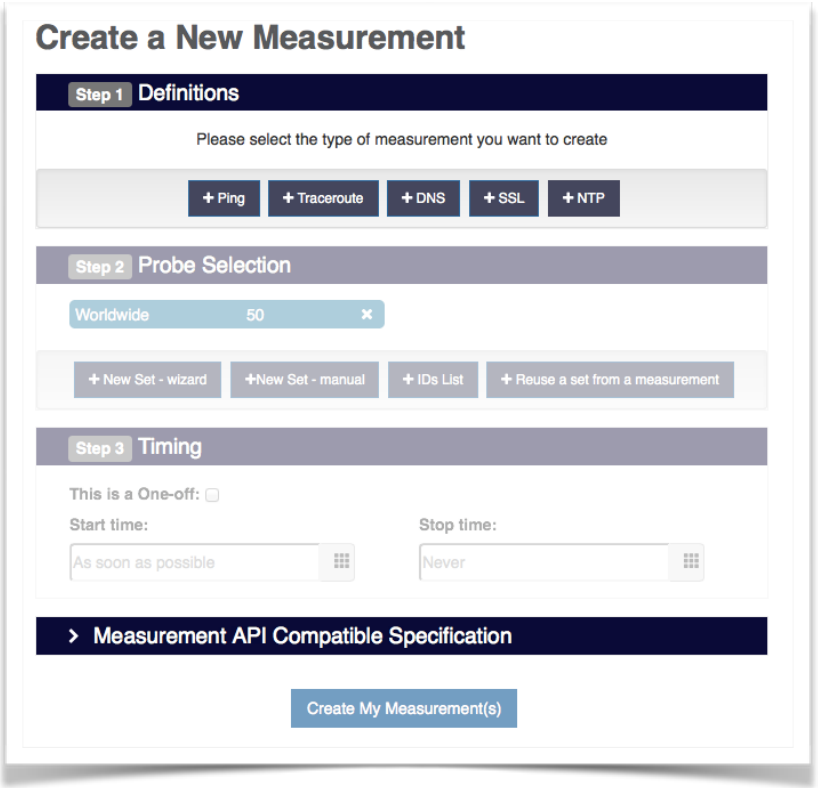
Tasks

- 1. Warm-up: Create a measurement using the GUI
- 2. Create API Key
- 3. Schedule a measurement using the API

Task 1: Use web interface

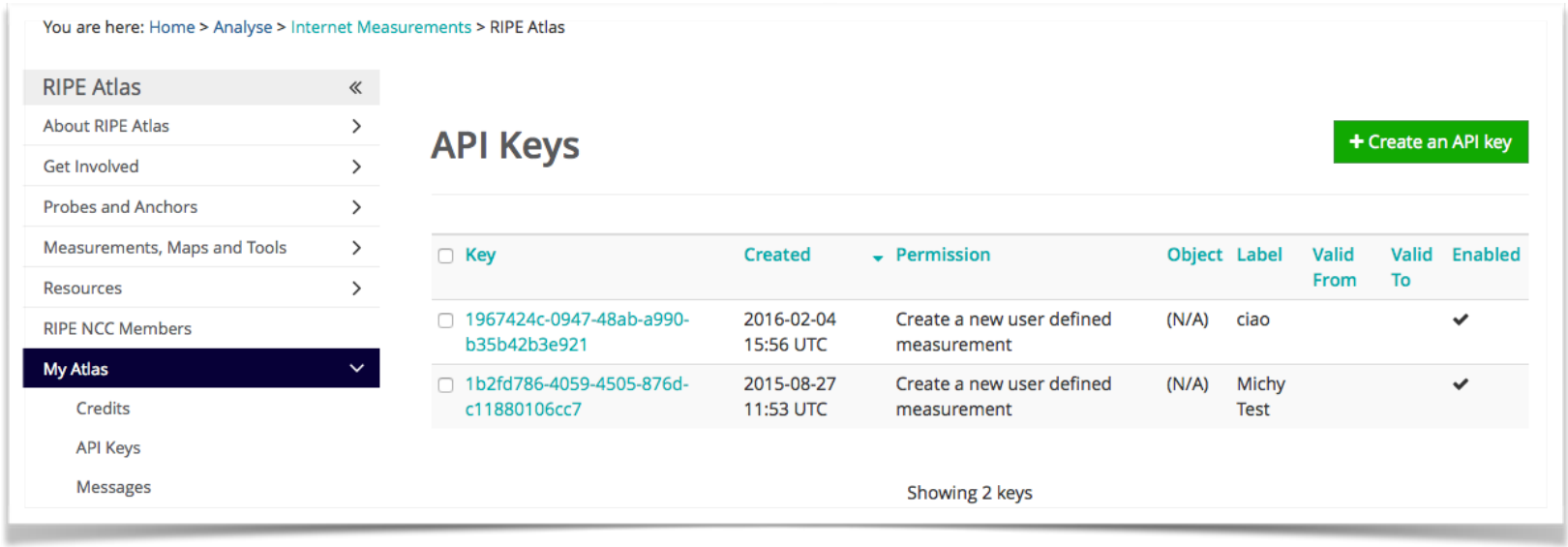
- Useful hint: once you generate a measurement, copy “API Compatible Specification” to text file
- Take note of the measurement ID!





Task 2: Create API key

1. Click on “Create an API Key”
2. Permission: “schedule a new measurement”
3. “Target” is not applicable (N/A) for this type



[cont…] Task 2: Create API key

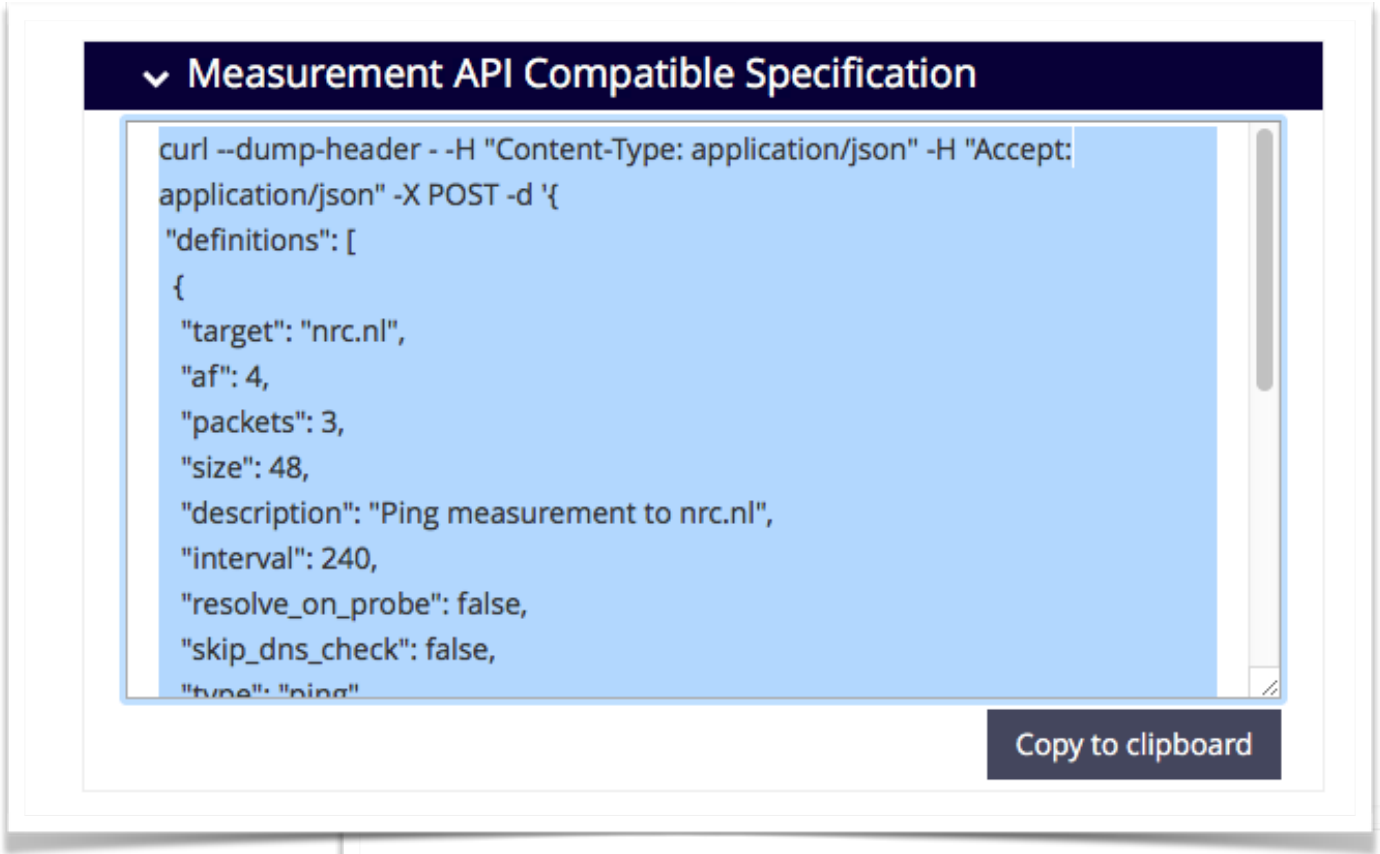
1. Give it a label
2. Give it a duration of validity (leave empty for defaults)
3. “Key” value to be passed on to the API call (next step)

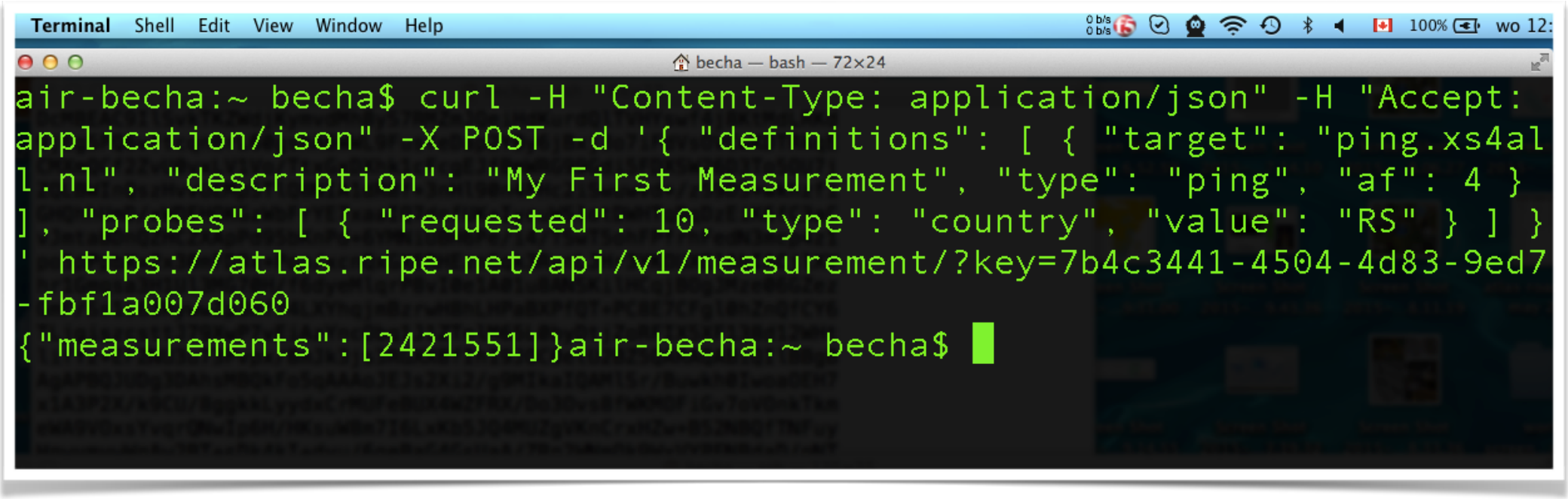
Task 3: Use API

- Schedule a measurement using API
  - Use the “key” you just generated
  - Hint: copy and past API call syntax from the measurement generated by the GUI
- Example:

```
curl -H "Content-Type: application/json" -H "Accept: application/json" -X
POST -d '{ "definitions": [ { "target": "ping.xs4all.nl", "description":
"My First API Measurement", "type": "ping", "af": 4 } ], "probes":
[ { "requested": 10, "type": "country", "value": "RS" } ] }' https://
atlas.ripe.net/api/v1/measurement/?key=YOUR_API_KEY
```

Copy


Measurement API Compatible Specification
curl --dump-header - -H "Content-Type: application/json" -H "Accept: application/json" -X POST -d '{
"definitions": [
{
"target": "nrc.nl",
"af": 4,
"packets": 3,
"size": 48,
"description": "Ping measurement to nrc.nl",
"interval": 240,
"resolve_on_probe": false,
"skip_dns_check": false,
Copy to clipboard
Measurement API Compatible Specification
}
],
"probes": [
{
"type": "area",
"value": "WW",
"requested": 10
}
],
"is_oneoff": false,
"bill_to": "ferenc@ripe.net"
}' https://atlas.ripe.net/api/v2/measurements//?key=YOUR_KEY_HERE
Copy to clipboard


Terminal Shell Edit View Window Help
becha — bash — 72×24
air-becha:~ becha$ curl -H "Content-Type: application/json" -H "Accept: application/json" -X POST -d '{ "definitions": [{ "target": "ping.xs4all.nl", "description": "My First Measurement", "type": "ping", "af": 4 }], "probes": [{ "requested": 10, "type": "country", "value": "RS" }] }' https://atlas.ripe.net/api/v1/measurement/?key=7b4c3441-4504-4d83-9ed7-fbf1a007d060
{"measurements":[2421551]}air-becha:~ becha$

Network Monitoring

Section 14

Network Monitoring

- Integrate “status checks” with existing monitoring tools (Icinga, Nagios)
- Using real-time data streaming
  - Server monitoring
  - Detecting and visualising outages

Steps for integration

1. Create a RIPE Atlas ping measurement
2. Go to “status checks” URL (RESTful API call)
   - https://atlas.ripe.net/api/v2/measurements/2340408/status-check?max_packet_loss=20
3. Documentation:
   - https://atlas.ripe.net/docs/api/v2/manual/measurements/status-checks.html
4. Add your alerts in Nagios or Icinga

RIPE Atlas streaming

- Allows users to receive the measurement results as soon as they are sent by the probes in real time
  - Publish/subscribe through web sockets
- There are three types of data:
  - Measurement results
  - Probe connection status events
  - Measurements metadata

RIPE Atlas streaming

- Visualising network outages
  - http://sg-pub.ripe.net/demo-area/atlas-stream/conn/
- Real-time server and performance monitoring
- Filtering and reusing measurement results
- Documentation:
  - https://atlas.ripe.net/docs/result-streaming/

Using streaming API

Exercise E

Preparation for the exercise

- Preconfigure web browser
- In Safari
  - Preferences > Advanced>Show Develop menu
- Chrome or Firefox needs no reconfiguration

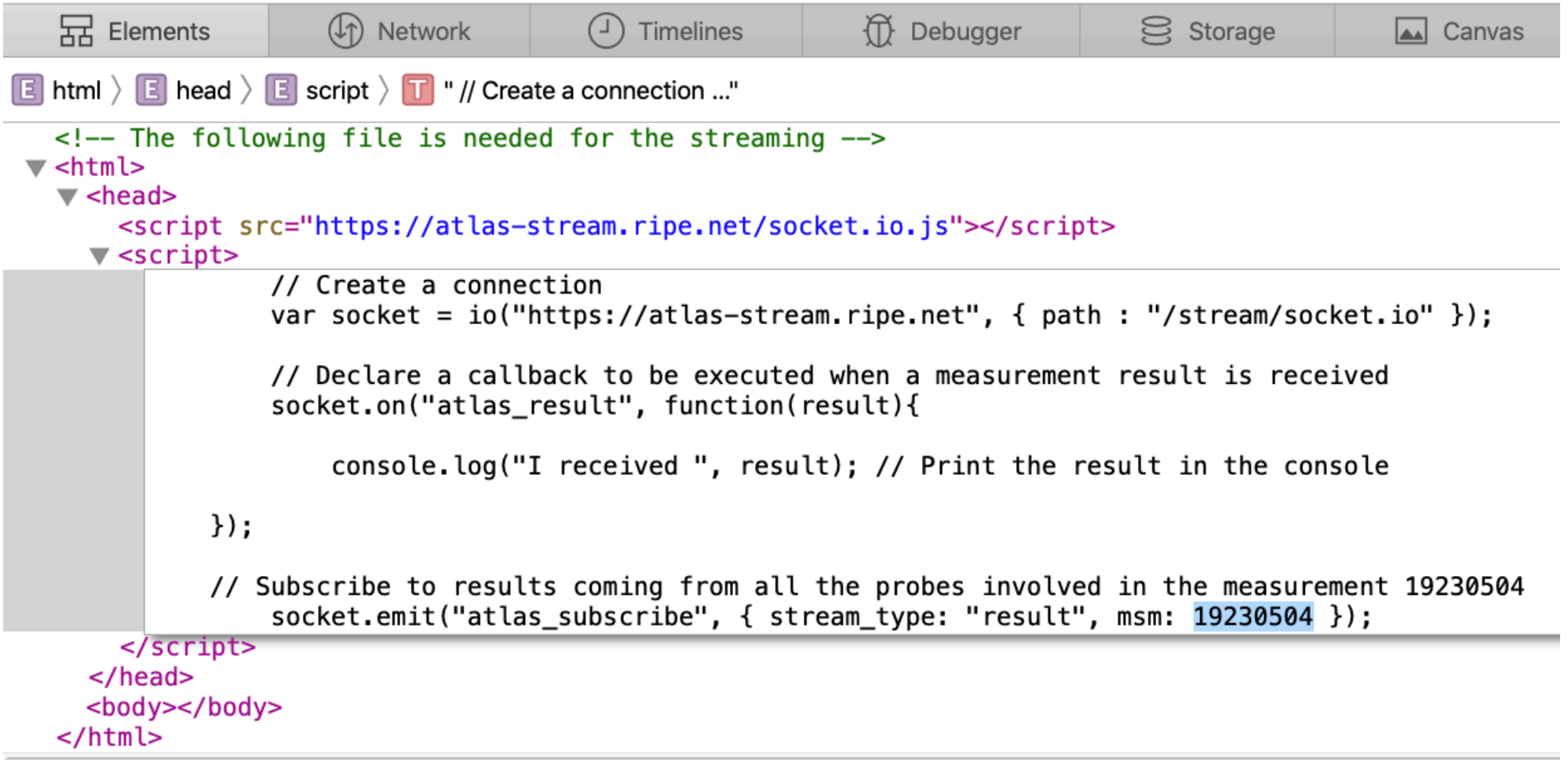
EX1: Monitoring server reachability

- Scenario: customers complain it takes a long time to reach your server
- Action: ping your server from 50 probes
  - Choose acceptable latency threshold
  - Notice and react when you start receiving samples
- Task: Use the ping measurement ID 19230504
  - Choose which threshold (e.g. greater than 30ms)
  - Impose threshold on “min” (the minimum result of the three ping attempts)

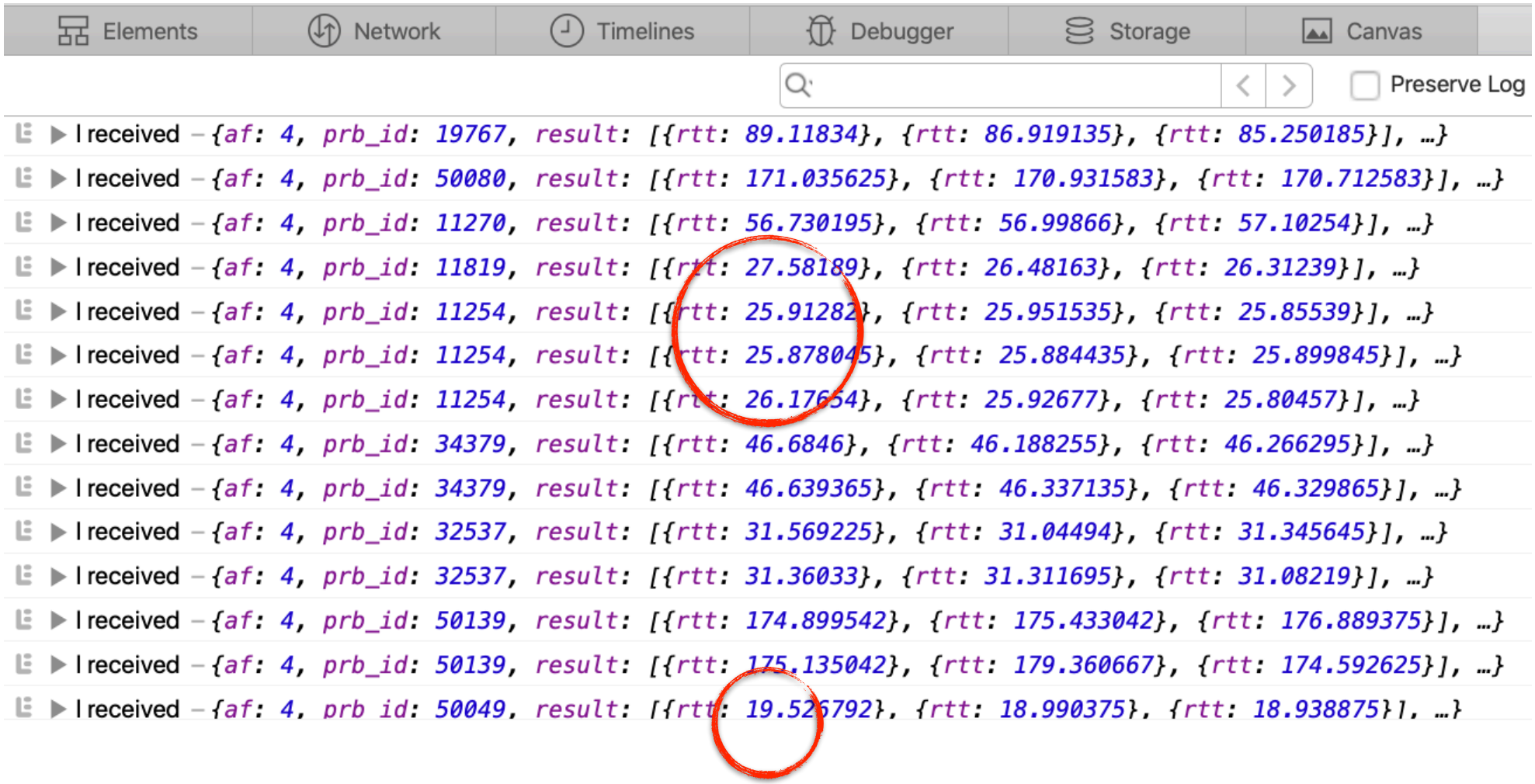
Steps

1. http://atlas.ripe.net/webinar/streaming01.html
2. Open the development console
3. Wait for results to arrive
4. Save the HTML file locally and edit the code
5. Open the edited html file in a browser and view results

Page Source


Elements
Network
Timelines
Debugger
Storage
Canvas
html 〉 head 〉 script 〉 " // Create a connection ..."
<!-- The following file is needed for the streaming -->
<html>
<head>
<script src="https://atlas-stream.ripe.net/socket.io.js"></script>
<script>
// Create a connection
var socket = io("https://atlas-stream.ripe.net", { path : "/stream/socket.io" });
// Declare a callback to be executed when a measurement result is received
socket.on("atlas_result", function(result){
console.log("I received ", result); // Print the result in the console
});
// Subscribe to results coming from all the probes involved in the measurement 19230504
socket.emit("atlas_subscribe", { stream_type: "result", msm: 19230504 });
</script>
</head>
<body></body>
</html>

Streaming results before editing



From the doc

Common parameters (in addition to stream_type)

Name	Description
prb	A specific probe ID. If you don't set this parameter, you will receive results from all the probes
acceptedFields	A list of accepted fields name, the messages will be pruned server side. If you don't set this parameter you will receive all the fields
enrichProbes	If you want to enrich the information received with the "probestatus" stream about the probes (e.g. lat, long), set this option to true
equalsTo	Allows to filter by values. E.g. with {status: "connected", asn: "3333|4444"} you will receive all the messages with a connected status and ASn equals to 3333 or 4444
lessThan	Allows to filter by values. E.g. with {valueX: 15} you will receive all the messages with a valueX less than 15
greaterThan	Allows to filter by values. E.g. with {valueX: 15} you will receive all the messages with a valueX greater than 15

Parameters for "result" stream_type

Name	Description
msm	A specific measurement ID
type	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl
sourceAddress	Streams all the results coming from a probe having the specified address
sourcePrefix	Streams all the results coming from a probe having an address in the specified prefix
destinationAddress	Streams all the results measuring the specified address
destinationPrefix	Streams all the results measuring an address in the specified prefix
passThroughHost	Streams all the traceroutes passing through the specified host. Only for traceroute measurements.
passThroughPrefix	Streams all the traceroutes passing through a host in the specified prefix. Only for traceroute measurements.
sendBacklog	Immediately fetch the last few minutes of results for a specific measurement ID. Mostly intended to cover the gap between the last available data in the REST API and the currently streamed results, and to recover results that might have been missed during brief disconnections.
buffering	If set to true, the samples will be sent in bundles in order to reduce the network overhead. When this option is true, the socket is not volatile. False by default.

EX2: Monitoring server reachability

- Same situation as in the exercise before, but you didn't schedule a measurement in advance
  - You don't have a measurement ID
- You want to get all the measurements reaching 216.58.212.227
- Now restrict the results to just include ping measurements

Command-line Interface (CLI) Toolset

Section 15

RIPE Atlas CLI

- Familiar output (ping, dig, traceroute)
- Linux/OSX
  - http://ripe-atlas-tools.readthedocs.org/en/latest/installation.html#requirements-and-installation
- Windows [experimental]
  - https://github.com/chrisamin/ripe-atlas-tools-win32

RIPE Atlas CLI

- Open source
  - RIPE NCC led community contribution
- Documentation
  - https://ripe-atlas-tools.readthedocs.org/
- Source:
  - https://github.com/RIPE-NCC/ripe-atlas-tools/

Install RIPE Atlas tools

- OSX:
  - sudo easy_install pip
  - sudo pip install ripe-atlas-tools
- Linux:
  - Available from many package repositories
  - …or same as in OSX

Configure RIPE Atlas CLI

- Reuse the API key of the first exercise
  - Or create a new one at https://atlas.ripe.net/keys/
- Configure your CLI
  - ripe-atlas configure --set authorisation.create=MY_API_KEY

Fetch an existing measurement

- Fetch the ping measurement 2340408
  - ripe-atlas report 2340408

Search probes

- Search all probes in AS 3333
  - ripe-atlas probe-search --asn 3333
- Show specific fields
  - ripe-atlas probe-search --asn 3333 --field asn_v6 --field country --field description --field status

Create a measurement

- Create a ping measurement to wikipedia.org
  - One-off, default parameters
  - ripe-atlas measure ping --target wikipedia.org

```
Looking good!  Your measurement was created and details about it can be found here:

  https://atlas.ripe.net/measurements/3499718/


Connecting to stream...

48 bytes from probe #18433 94.112.176.45   to 91.198.174.192 (91.198.174.192): ttl=50 times:41.979,  41.492,  40.769,
48 bytes from probe #20111 37.151.230.180  to 91.198.174.192 (91.198.174.192): ttl=57 times:100.511, 100.136, 100.325,
48 bytes from probe #25003 176.193.48.211  to 91.198.174.192 (91.198.174.192): ttl=59 times:47.967,  47.476,  47.403,
48 bytes from probe #20313 5.199.160.9     to 91.198.174.192 (91.198.174.192): ttl=58 times:36.501,  36.245,  36.285,
48 bytes from probe #22573 89.176.43.44    to 91.198.174.192 (91.198.174.192): ttl=52 times:28.747,  27.712,  28.446,
48 bytes from probe #19413 89.71.47.56     to 91.198.174.192 (91.198.174.192): ttl=51 times:49.89,   49.779,  50.277,
48 bytes from probe #18635 78.52.132.137   to 91.198.174.192 (91.198.174.192): ttl=57 times:37.462,  38.095,  37.73,
48 bytes from probe #23223 62.65.126.46    to 91.198.174.192 (91.198.174.192): ttl=53 times:23.169,  23.412,  33.067,
48 bytes from probe #17511 87.81.148.2     to 91.198.174.192 (91.198.174.192): ttl=56 times:13.281,  12.885,  13.039,
48 bytes from probe #12584 46.175.22.202   to 91.198.174.192 (91.198.174.192): ttl=59 times:36.073,  35.788,  35.883,
```

Other examples of ping

- Geo-specific from 20 probes from Canada:
  - ripe-atlas measure ping --target example.com --probes 20 --from-country ca
- 20 Canadian probes that definitely support IPv6:
  - ripe-atlas measure ping --target example.com --probes 20 --from-country ca --include-tag system-ipv6-works
- Create a recurring measurement:
  - ripe-atlas measure ping --target example.com --interval 3600

Using RIPE Atlas CLI

Exercise F

Preparation for the exercise

- UNIX/LINUX/OSX:
- Terminal:
  - sudo easy_install pip
  - sudo pip install ripe-atlas-tools
  - choose “Install” in pop-up
  - **ripe-atlas** configure --set authorisation.create=MY_API_KEY

Create measurement to test reachability

- Use the traceroute command to test the reachability of:
  - wikipedia.org
  - on TCP port 443
  - from 20 probes
  - in France

Use Cases

Section 16

Use cases (1)

Using RIPE Atlas to Validate International Routing Detours

Anant Shah — 30 Jan 2017

A Quick Look at the Attack on Dyn

Massimo Candela — 24 Oct 2016

Contributors: Emile Aben

Using RIPE Atlas to Monitor Game Service Connectivity

Annika Wickert — 14 Sep 2016

Using RIPE Atlas to Measure Cloud Connectivity

Jason Read — 06 Sep 2016

Using RIPE Atlas to Debug Network Connectivity Problems

Stéphane Bortzmeyer — 10 May 2016

RIPE Atlas IXP Country Jedi (1)

- Do paths between ASes stay in country?
- Any difference between IPv4 and IPv6?
- How many paths go via local IXP?
- Could adding peers improve reachability?

https://www.ripe.net/ixp-country-jedi

- Experimental tool
  - Feature requests welcome!
  - Depends on probe distribution in country

RIPE Atlas IXP Country Jedi (2)

- Methodology
  - **Trace route mesh** between RIPE Atlas probes
  - Identifying ASNs in country using RIPEstat
  - Identifying IXP and IXP LANs in PeeringDB

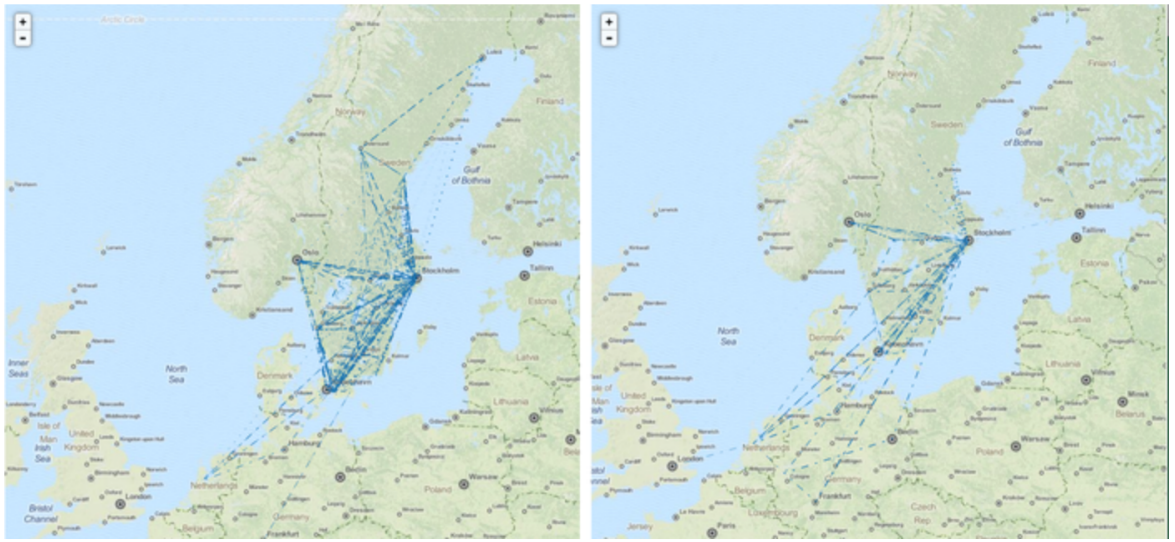
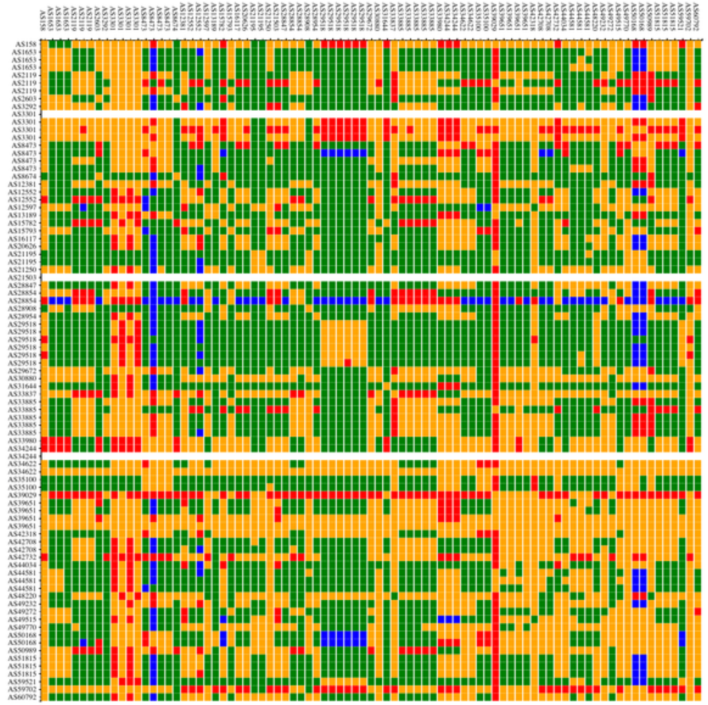


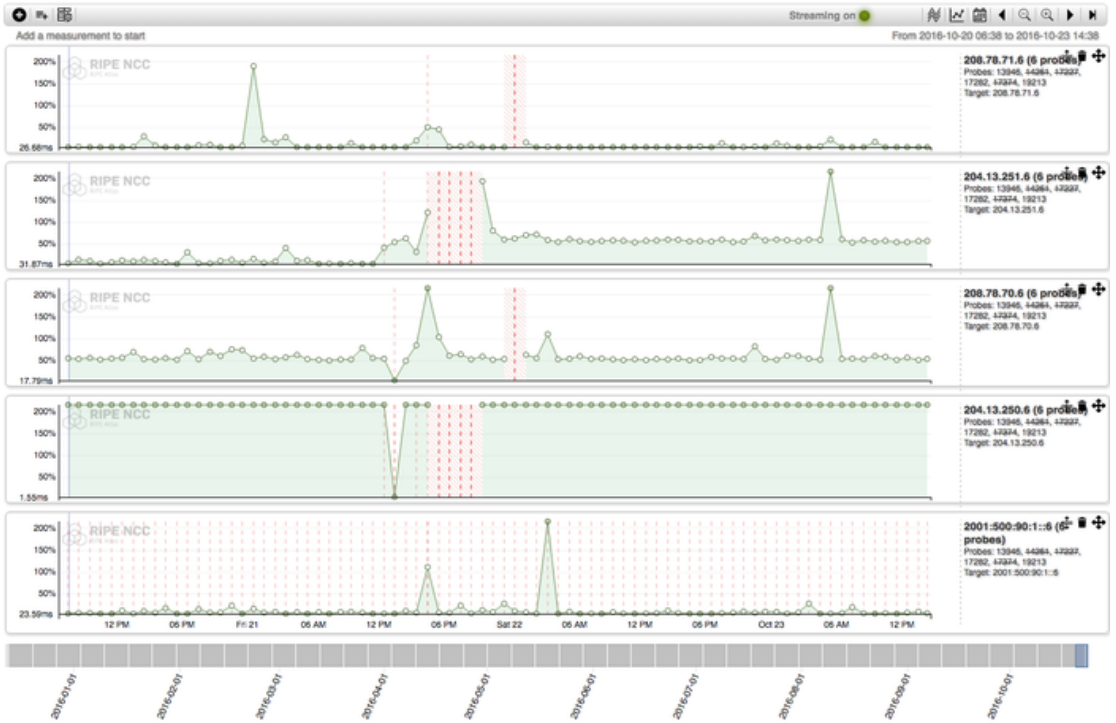
Figure 1: Visual representation of IPv4 paths (left) and IPv6 paths (right) between selected RIPE Atlas probes in Sweden



IXP IPs: YES, out-of-country IPs: NO
IXP IPs: NO, out-of-country IPs: NO
IXP IPs: YES, out-of-country IPs: YES
IXP IPs: NO, out-of-country IPs: YES

Use Cases (2)

- DDoS Attack on Dyn DNS Servers (Oct. 2016)
  - 10s millions devices - Mirai botnet
  - Legitimate requests

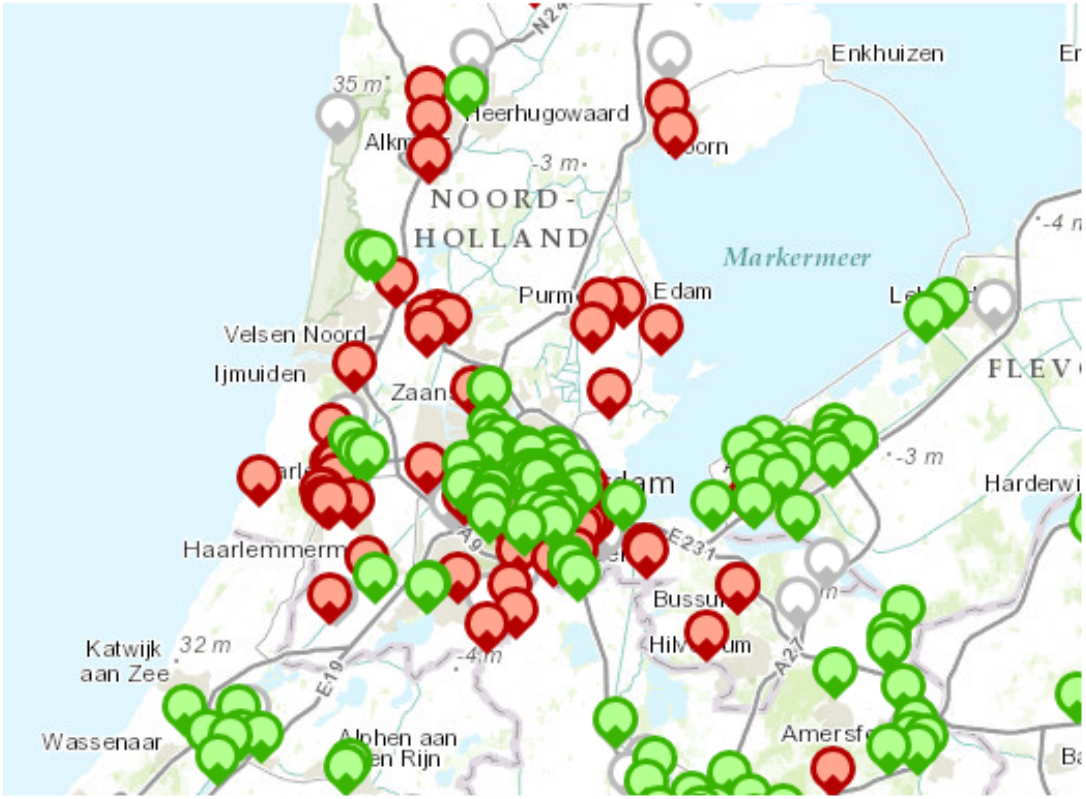


Use Cases (3)

- Monitor Game Service Connectivity (Sept. 2016)
- Requirements:
  - Check General Reachability, Latency, Historical data
  - Supported by an active and helpful community
  - Integrate with their existing logging system
- Track down an outage in one upstream
- Became sponsors

Use Cases (4)

- Amsterdam Power Outage (March 2015)
- When and where the outage was happening



More RIPE Atlas Features

Section 17

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”
  - SSH connections from probe to server
  - initiated by probe
- Measurement code published

Additional Membership Benefits

- RIPE Atlas:
  - Guaranteed to host a probe
  - Do NOT have to host probe to perform customised measurements
  - 1,000,000 extra credits monthly via LIR Portal
  - “Quick Look” measurements via LIR Portal
  - IPv6 reachability testing (free)
  - Share probe management with LIR colleagues
- RIPEstat:
  - Historical view of RIPE Database objects

Take Part in the RIPE Atlas Community

Section 18

RIPE Atlas community (part 1)

- 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!

Road map

- What we are planning to do:
- To involve the community
- To gather feedback

https://atlas.ripe.net/docs/roadmap/

Contact us

- https://atlas.ripe.net
- http://roadmap.ripe.net/ripe-atlas/

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

Questions

kahoot

RIPE NCC Academy

Graduate to the next level!

http://academy.ripe.net

@TrainingRIPENCC

Feedback!

https://www.ripe.net/training/mat/survey


The End!
Край
Y Diwedd
Fí
Finis
النهاية
Соңы
վերջ
Liðugt
Ende
Finvezh
Кінець
Konec
Kraj
Ënn
Fund
پایان
Son
Kpaj
Lõpp
Beigas
Vége
An Críoch
הסוף
Fine
Endir
Sfârşit
Fin
Τέλος
Einde
Канец
Конец
Slut
Slutt
დასასრული
Pabaiga
Tmiem
Fim
Amaia
Loppu
Koniec