



**RIPE
NCC**

Webinar: Advanced RIPE Atlas Usage

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RIPE NCC

Amsterdam | August 2015

- Learn how to:
 - Use RIPE Atlas measurements for network monitoring and troubleshooting
 - Use API calls to create measurements
 - Integrate RIPE Atlas with existing monitoring systems
- Opportunity for hands-on practice
- Get your questions answered by developers

- We assume you have already used RIPE Atlas
- Do you have a RIPE NCC Access account?
 - If not - quickly create one: ripe.net/register
- Do you have credits to spend?
 - If not - tell us your account in the chat window

- Who prefers using the graphical interface to schedule a measurement in RIPE Atlas?
- Who prefers RIPE Atlas API?

- Introduction to RIPE Atlas
- Creating measurements
- Integration with network monitoring systems
- Real-time performance monitoring
- Take part in the RIPE Atlas community
- Additional slides

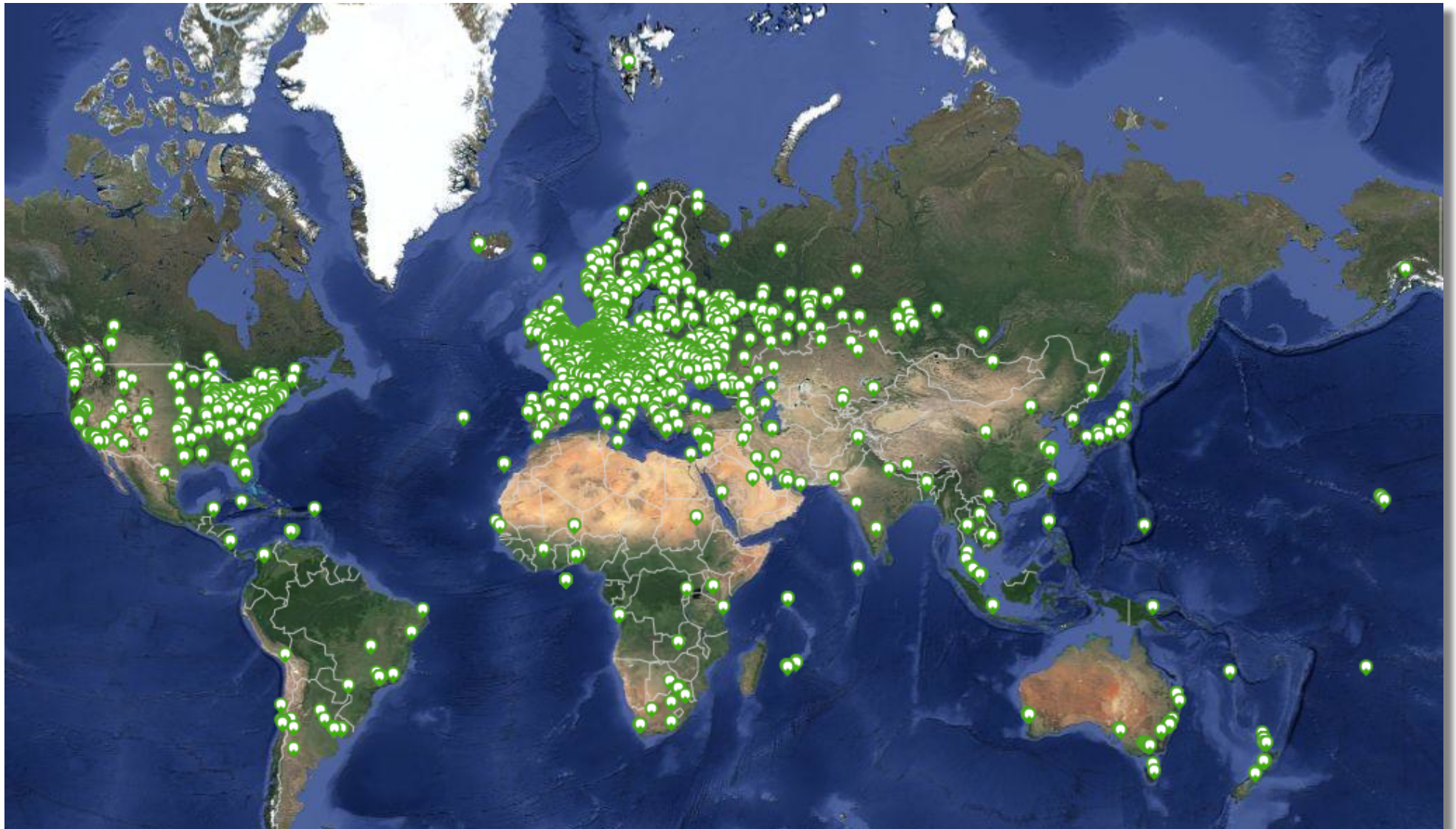


Introduction to RIPE Atlas



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



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

- 8,400+ probes connected
- 5,000+ active users in the last quarter
- 2,500+ results collected per second
- 35,000+ customised measurements weekly



Creating a Measurement



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- A customer reports a problem: they cannot reach one of your servers
 - You can schedule pings or traceroutes from up to 500 RIPE Atlas probes from a particular region to check where the problem might be
- Measuring packet loss on a suspected “bad” link
- Testing anycast deployment

- Running your own measurements cost credits
 - ping = 10 credits, traceroute = 20, etc.
- Why? Fairness and to avoid overload
- Daily spending limit & max measurements user can create
- Hosting a RIPE Atlas probe earns credits
- Earn extra credits by:
 - Being a RIPE NCC member
 - Hosting an anchor
 - Sponsoring probes

RIPE Atlas

About RIPE Atlas

Get Involved

Results

My Atlas

Probes

Measurements

Credits

API Keys

Messages (72 new)

Anchors

Sponsorships

Ambassador Probes

LIR Benefits

Claim 1 Million Credits

IPv6 Connectivity Test

Quick Look

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.

History

Charts & Archives

Transfer

40,901

22,931

History

My Atlas > Credits

Give credits to someone

Account Balance

Daily account balance over time

Balance

50M

40M

30M

20M

- Log in to atlas.ripe.net
- “My Atlas” > “Measurements”
- Three methods:
 1. Quick & Easy
 - Type
 - Target
 - Done! (default values are used...)
 2. Advanced GUI usage
 3. CLI scripting using API

- Mostly a periodic, long time measurement
 - If just once, ASAP, choose “One-off”
- Choose type, target, frequency, # of probes, region...
 - Improved interactive interface helps you at each step
- You will spend credits

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

- Go to “My Atlas” > “Measurements”

The screenshot shows the RIPE Atlas website interface. The browser address bar displays `https://atlas.ripe.net/measurements/`. The page header includes the RIPE NCC logo and navigation links like 'RIPE Database (Whois)' and 'Website'. A search bar is present for IP addresses or ASNs. The main navigation bar has links for 'Manage IPs and ASNs', 'Analyse', 'Participate', 'Get Support', 'Publications', and 'About Us'. The 'Analyse' section is active, showing a breadcrumb trail: 'You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements'. On the left sidebar, 'My Atlas' and 'Measurements' are circled in blue. The main content area is titled 'Measurements' and features a '+ Create a Measurement' button. Below this, there's a filter bar with a text input 'Filter by target and/or description', a status dropdown set to 'Any Status', and a type dropdown set to 'All types' (also circled in blue). The type dropdown menu is open, showing options: 'Ping', 'Traceroute', 'DNS', 'HTTP', and 'SSL Certificate'. Below the filters are tabs for 'Mine', 'Favourites', 'Hidden', 'Public', and 'All'. A table of measurements is displayed with columns: 'Id', 'Type', 'Target', 'Description', '(UTC)', and 'Status'. The first row shows measurement ID 1965015, type 'IPv4 ping', target 'b92.net', and a description 'Ping measurement to b92.net'.

Measurements – RIPE Atlas — RIPE Network Coordination Centre

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

RIPE NCC RIPE NETWORK COORDINATION CENTRE

RIPE Database (Whois) Website

Search IP Address or ASN

Manage IPs and ASNs > Analyse > Participate > Get Support > Publications > About Us >

You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements

RIPE Atlas <<

About RIPE Atlas >

Get Involved >

Results >

My Atlas v

Probes

Measurements

Credits

API Keys

Messages (72 new)

Measurements

+ Create a Measurement

Filter by target and/or description

Any Status

IPv4/v6

✓ All types

Ping

Traceroute

DNS

HTTP

SSL Certificate

(UTC)

Status

Id	Type	Target	Description	(UTC)	Status
1965015	IPv4 ping	b92.net	Ping measurement to b92.net	2015-04-21 08:20 2015-04-21 08:30	■ eye star

- List of probes: sortable by RTT

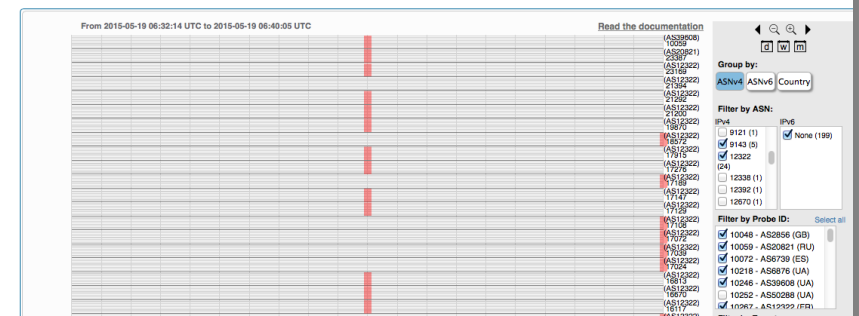
Probe	ASN (v4)	ASN (v6)		Time	RTT
6019	3333	3333		2015-05-19 09:23	1.157
6069	59469	59469		2015-05-19 09:23	15.253
6111	198068	198068		2015-05-19 09:23	37.760
6112	197216	197216		2015-05-19 09:23	35.494
10008	3851			2015-05-19 09:23	24.664
10218	6876			2015-05-19 09:23	37.952
10246	39608			2015-05-19 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

- Map: colour-coded by RTT



An interactive visualisation for ping measurements.

- Seismograph: stacked multiple pings with packet loss





Exercise: Create a Measurement



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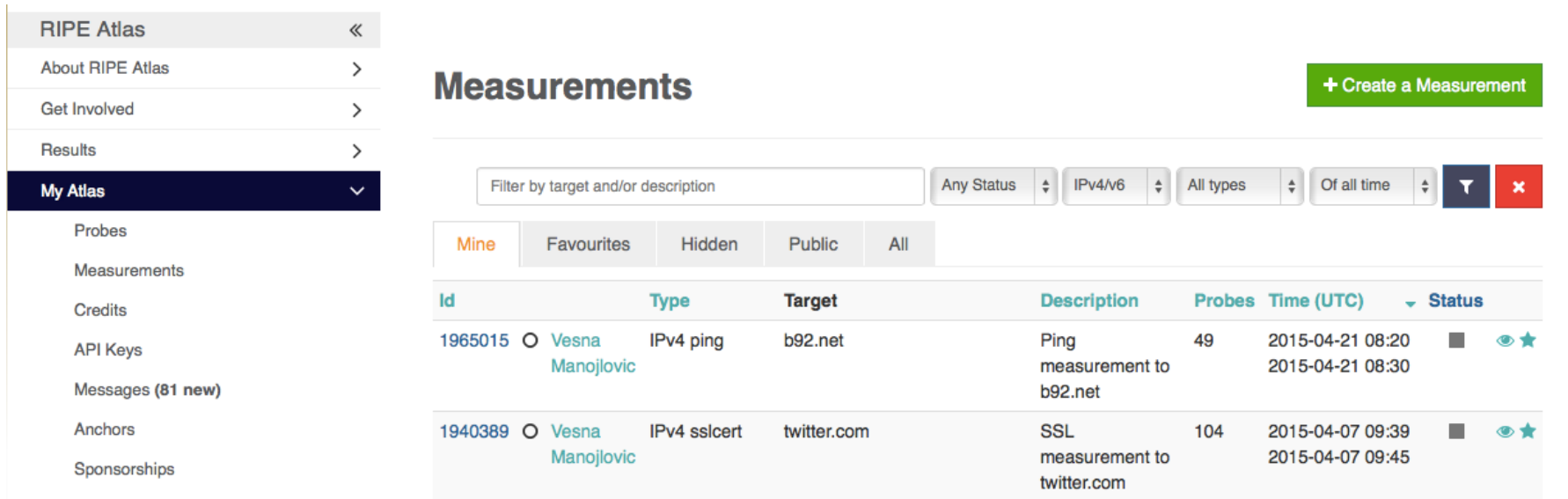
- Create a **ping** measurement:

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

1. Warm-up: Create a measurement using the GUI

2. Create API Key

3. Schedule a measurement using the API

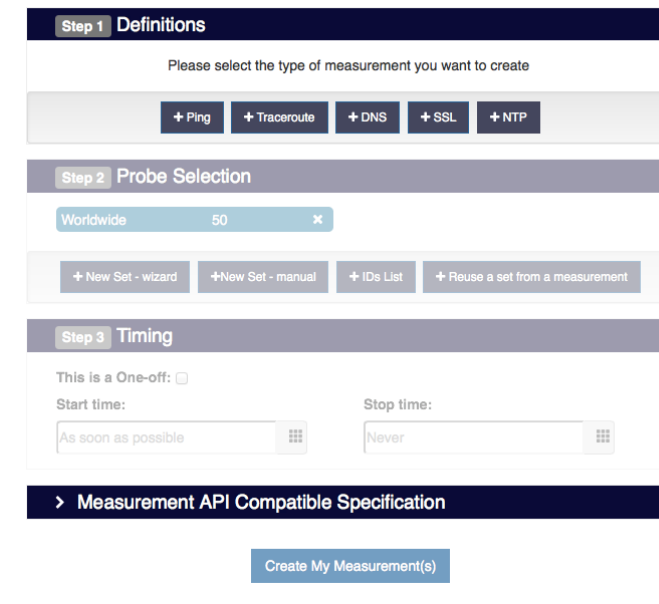


The screenshot shows the RIPE Atlas web interface. On the left is a sidebar with navigation links: RIPE Atlas, About RIPE Atlas, Get Involved, Results, My Atlas (selected), Probes, Measurements, Credits, API Keys, Messages (81 new), Anchors, and Sponsorships. The main content area is titled 'Measurements' and features a '+ Create a Measurement' button. Below this is a filter bar with a search input 'Filter by target and/or description' and dropdowns for 'Any Status', 'IPv4/v6', 'All types', and 'Of all time'. A tab bar shows 'Mine' (selected), 'Favourites', 'Hidden', 'Public', and 'All'. A table lists measurements with columns: Id, Type, Target, Description, Probes, Time (UTC), and Status. Two measurements are visible: one with Id 1965015 for a ping to b92.net, and another with Id 1940389 for an SSL measurement to twitter.com. Both are owned by Vesna Manojlovic.

Id	Type	Target	Description	Probes	Time (UTC)	Status
1965015	IPv4 ping	b92.net	Ping measurement to b92.net	49	2015-04-21 08:20 2015-04-21 08:30	Active
1940389	IPv4 sslcert	twitter.com	SSL measurement to twitter.com	104	2015-04-07 09:39 2015-04-07 09:45	Active

- Useful hint: once you generate a measurement, copy “API Compatible Specification” to text file
- Note MSM-ID, too

Create a New Measurement



The form is divided into three steps: Step 1: Definitions, Step 2: Probe Selection, and Step 3: Timing. Step 1 asks to select the type of measurement, with options: + Ping, + Traceroute, + DNS, + SSL, and + NTP. Step 2 shows 'Worldwide' selected for the probe set, with a count of 50. Step 3 shows the timing configuration, with 'Start time' set to 'As soon as possible' and 'Stop time' set to 'Never'. At the bottom, there is a link to the 'Measurement API Compatible Specification' and a 'Create My Measurement(s)' button.

The screenshot shows the RIPE Atlas web interface. On the left is a sidebar menu with options: RIPE Atlas, About RIPE Atlas, Get Involved, Results, My Atlas (selected), Probes, Measurements, Credits, API Keys, Messages (81 new), and Anchors. The main content area is titled 'API Keys' and features a '+ Create an API key' button in the top right. Below the title is a table listing existing API keys.

<input type="checkbox"/> Key	Created	Permission	Object	Label	Valid From	Valid To	Enabled
<input type="checkbox"/> 984a774c-33ce-4b97-9767-fb48efda6c12	2013-01-31 13:05 UTC	Download results of a user defined measurement	1002953 I b.hosteddnsservice.com				✓
<input type="checkbox"/> e5ba646b-abf1-4f01-8bf1-5267a9dd56ce	2013-01-31 12:52 UTC	Download results collected by a specific probe	13: k13				✓
<input type="checkbox"/> 9788b7e0-9d4b-4787-8a42-ice8f2f2e929	2013-01-11 14:53 UTC	Download results of a user defined measurement	1002676 I www.google.com				✓

- Click on “Create an API Key”
- Choose type: “create a new user-defined measurement”
- “Object” is not applicable (N/A) for this type
- Give it a label
- Give it a duration of validity (leave empty for defaults)
- “Key” value to be passed on to the API call (next step)

- 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": "ripe.net", "description": "My First  
Measurement", "type": "ping", "af": 4 } ], "probes": [ { "requested": 10,  
"type": "country", "value": "RS" } ] }' https://atlas.ripe.net/api/v1/  
measurement/?key=YOUR\_API\_KEY
```



Integration of RIPE Atlas with Network Monitoring Systems



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- Network operators use tools for monitoring network health (e.g. Nagios and Icinga)
- These tools can receive input from RIPE Atlas via the API
- Benefits:
 - pings from 500 out of 8,000+ probes around the world
 - See your network from the outside
 - Plug into your existing practices

1. Create a RIPE Atlas ping measurement
2. Go to “Status Checks” URL
3. Add your alerts in Nagios or Icinga



- 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 percentage of probes that successfully received a reply
 - How many of the most recent measurements to base it on
 - The maximum packet loss acceptable
- Documentation:
 - <https://atlas.ripe.net/docs/status-checks/>

- Community of operators contributed configuration code!
 - Making use of the built-in “check_http” plugin
- GitHub 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: Setting up “Status Checks”



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- Set up and configure a “status check”
 - For an existing ping measurement <https://atlas.ripe.net/measurements/2340408/>
 - Hint: <https://atlas.ripe.net/api/v1/status-checks/2340408/>
- Configure the status check in such a way that you will trigger an alert for this measurement
- Optional: set-up status check for your own ping measurement!

- One possible solution:
 - Set the median RTT to a lower level:
 - https://atlas.ripe.net/api/v1/status-checks/1004005/?median_rtt_threshold=10
- Example of the alerts

```
{"total_alerts":32,"global_alert":true,
"probes":{
  "18433":{"all":[null,null,null],"last":null,"last_packet_loss":100.0,"alert":true,"source":"Area: WW","alert_reasons":["loss"]},
  "15041":{"source":"Area: WW","last_packet_loss":0.0,"last":19.928,"alert":false},
  "18696":{"all":[null,null,null],"last":null,"last_packet_loss":100.0,"alert":true,"source":"Area: WW","alert_reasons":["loss"]},
  "16265":{"source":"Area: WW","last_packet_loss":0.0,"last":22.72,"alert":false},
  "20236":{"all":[null,null,null],"last":null,"last_packet_loss":100.0,"alert":true,"source":"Area: WW","alert_reasons":["loss"]},
  "12944":{"all":[null,null,null],"last":null,"last_packet_loss":100.0,"alert":true,"source":"Area: WW","alert_reasons":["loss"]},
  "2195":{"all":[null,null,null],"last":null,"last_packet_loss":100.0,"alert":true,"source":"Area: WW","alert_reasons":["loss"]},
```



Real-time performance monitoring



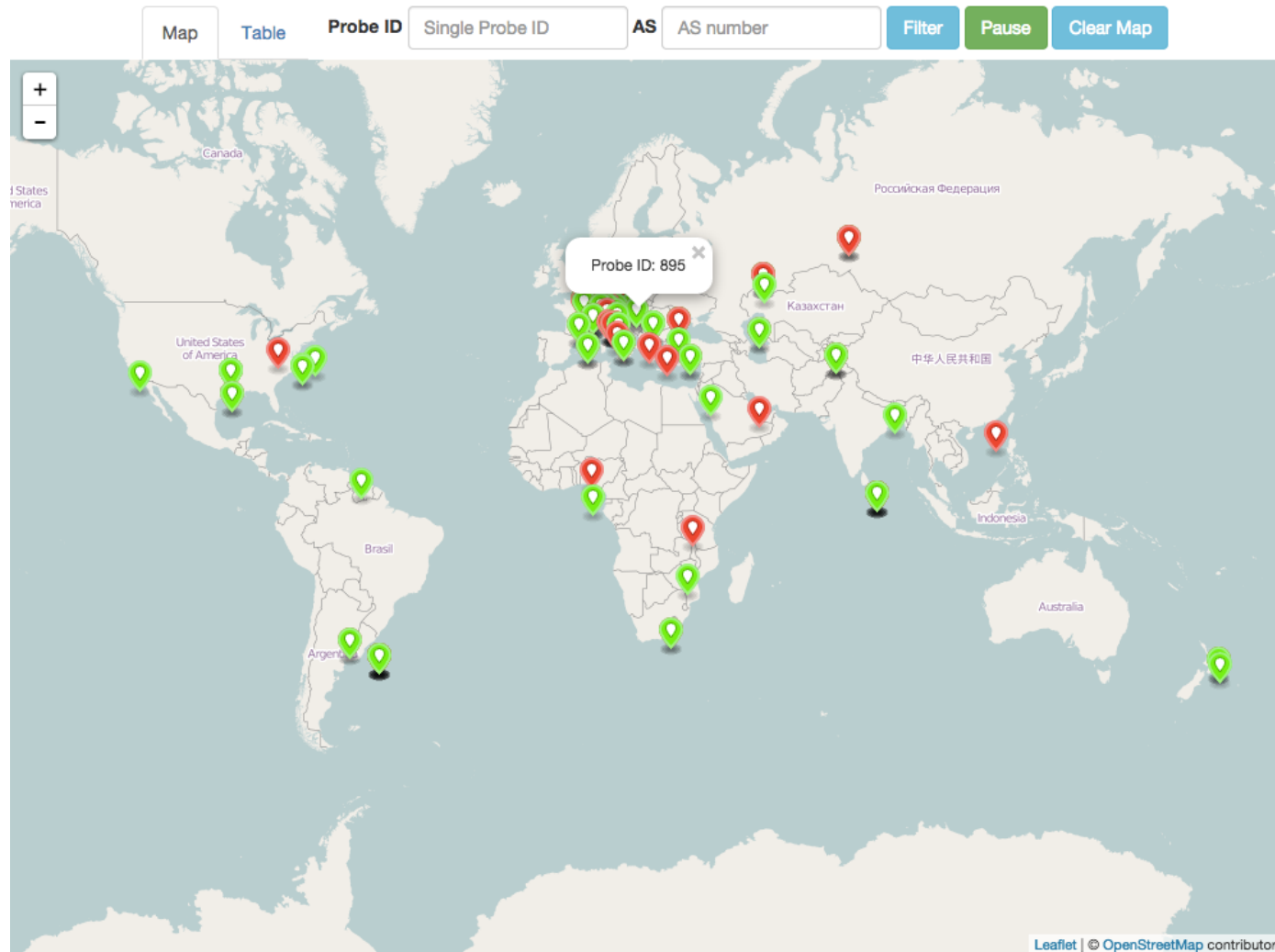
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- **RIPE Atlas streaming** is an architecture that allows users to receive the measurement results as soon as they are sent by the probes - **in real time**
 - Publish/subscribe through web sockets
- There are two types of data:
 - Measurement results
 - Probe connection status events

- Visualising network outages
- Server and performance monitoring
- In March 2015: used by almost all hackathon teams:
<https://labs.ripe.net/Members/becha/ripe-atlas-hackathon-results>
- Documentation:
 - <https://atlas.ripe.net/docs/result-streaming/>
 - https://labs.ripe.net/Members/suzanne_taylor_muzzin/data-streaming-in-ripe-atlas

Probe (dis)connection events

| 36



https://labs.ripe.net/Members/andreas_strikos/amsterdam-power-outage-as-seen-by-ripe-atlas



Exercise: Using streaming API



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- Scenario: customers are complaining that it occasionally takes a long time to reach your service or server
- Action: ping your server from 500 probes
 - Decide what is acceptable latency threshold to apply
 - Notice and react when you start receiving samples
- Task: Use the ping measurement ID1791207
 - Choose which threshold (e.g. greater than 30ms)
 - Imposes the threshold on “min” (the minimum result of the three ping attempts)

1. Go to
<https://stat.ripe.net/widgets/workshops/webinar/ripe-atlas/streaming-01.html>
2. Open the development console
3. Wait for results to arrive
4. Optional: Save the HTML file locally and edit the code to your liking

Q Elements Network Sources Timeline Profiles Resources Audits Console AngularJS

⊗ <top frame> ▾ ☐ Preserve log

Filter ☐ Regex **All** Errors Warnings Info Logs Debug ☐ Hide network messages

XHR finished loading: GET "http://atlas-stream.ripe.net/stream/socket.io/?EI0=2&transport=polling&t=1431095373684-0".

XHR finished loading: GET "http://atlas-stream.ripe.net/stream/socket.io/?EI0=2&transport=polling&t=1431095373739-1&sid=eB0kM7zfWFT2c-ScAAaH".

I received ▶ Object {af: 4, prb_id: 16669, result: Array[3], ttl: 42, avg: 326.841...}

I received ▶ Object {af: 4, prb_id: 16669, result: Array[3], ttl: 42, avg: 325.7933333333...}

I received ▶ Object {af: 4, prb_id: 16669, result: Array[3], ttl: 42, avg: 326.048...}

I received ▶ Object {af: 4, prb_id: 16669, result: Array[3], ttl: 42, avg: 327.3253333333...}

I received ▶ Object {af: 4, prb_id: 15965, result: Array[3], ttl: 45, avg: 47.6313333333...}

I received ▶ Object {af: 4, prb_id: 15965, result: Array[3], ttl: 45, avg: 47.6996666667...}

I received ▶ Object {af: 4, prb_id: 15965, result: Array[3], ttl: 45, avg: 47.4816666667...}

I received ▶ Object {af: 4, prb_id: 19566, result: Array[3], ttl: 40, avg: 47.054...}

I received ▶ Object {af: 4, prb_id: 19566, result: Array[3], ttl: 40, avg: 47.8626666667...}

I received ▶ Object {af: 4, prb_id: 19566, result: Array[3], ttl: 40, avg: 47.5946666667...}

I received ▶ Object {af: 4, prb_id: 19566, result: Array[3], ttl: 40, avg: 47.5003333333...}

I received ▶ Object {af: 4, prb_id: 18311, result: Array[3], ttl: 49, avg: 32.577...}

I received ▶ Object {af: 4, prb_id: 18311, result: Array[3], ttl: 49, avg: 34.0843333333...}

I received ▶ Object {af: 4, prb_id: 18311, result: Array[3], ttl: 49, avg: 32.7513333333...}

I received ▶ Object {af: 4, prb_id: 16010, result: Array[3], ttl: 46, avg: 182.4463333333...}

I received ▶ Object {af: 4, prb_id: 16010, result: Array[3], ttl: 46, avg: 193.9953333333...}

I received ▶ Object {af: 4, prb_id: 16010, result: Array[3], ttl: 46, avg: 182.2913333333...}

I received ▶ Object {af: 4, prb_id: 16010, result: Array[3], ttl: 46, avg: 191.6103333333...}

I received ▶ Object {af: 4, prb_id: 14918, result: Array[3], ttl: 49, avg: 34.817...}

I received ▶ Object {af: 4, prb_id: 14918, result: Array[3], ttl: 49, avg: 35.0093333333...}

I received ▶ Object {af: 4, prb_id: 14918, result: Array[3], ttl: 49, avg: 35.0843333333...}

I received ▶ Object {af: 4, prb_id: 20668, result: Array[3], ttl: 45, avg: 38.8846666667...}

I received ▶ Object {af: 4, prb_id: 20668, result: Array[3], ttl: 45, avg: 38.8626666667...}

I received ▶ Object {af: 4, prb_id: 20668, result: Array[3], ttl: 45, avg: 38.8806666667...}

I received ▶ Object {af: 4, prb_id: 6093, result: Array[3], ttl: 49, avg: 128.7273333333...}

I received ▶ Object {af: 4, prb_id: 6093, result: Array[3], ttl: 49, avg: 128.7373333333...}

I received ▶ Object {af: 4, prb_id: 6093, result: Array[3], ttl: 49, avg: 128.8883333333...}



**Take part in the RIPE
Atlas community**



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- 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



- **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



- <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



Additional slides



RIPE
NCC



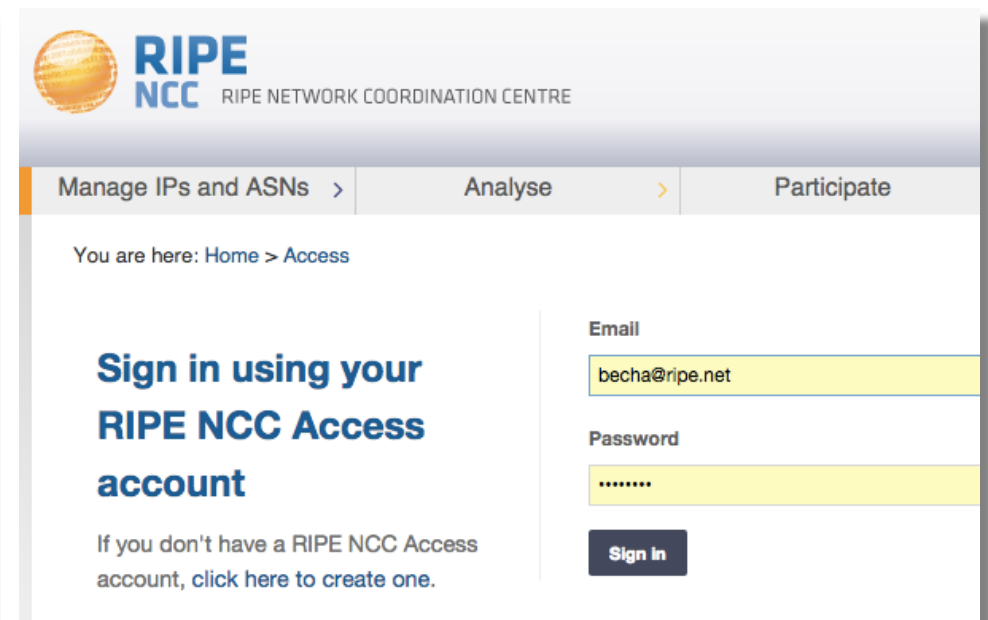
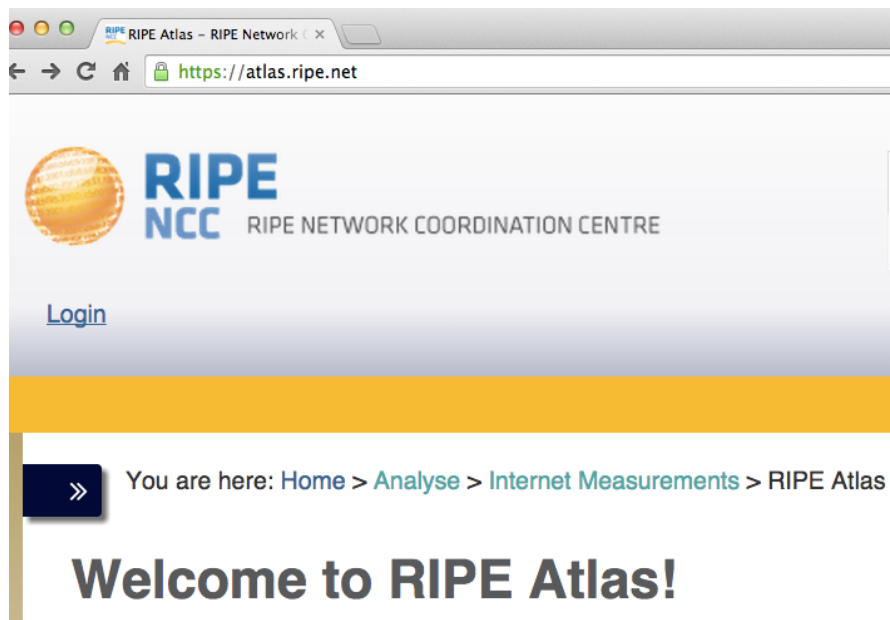
Finding Results of Public Measurements



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- There are many measurements already running!
- Search for existing public measurements first
- Schedule your own measurement if you don't find what you're looking for

- 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 have one already



- Go to “My Atlas” > “Measurements”

The screenshot shows the RIPE Atlas website interface. The browser address bar displays `https://atlas.ripe.net/measurements/`. The page header includes the RIPE NCC logo and navigation links like 'RIPE Database (Whois)' and 'Website'. A search bar is present for IP addresses or ASNs. The main navigation bar has links for 'Manage IPs and ASNs', 'Analyse' (highlighted), 'Participate', 'Get Support', 'Publications', and 'About Us'. A breadcrumb trail indicates the current path: 'Home > Analyse > Internet Measurements > RIPE Atlas > Measurements'. On the left sidebar, 'My Atlas' and 'Measurements' are circled in blue. The main content area is titled 'Measurements' and features a '+ Create a Measurement' button. Below this, there's a filter section with a text input 'Filter by target and/or description', a status dropdown set to 'Any Status', and a type dropdown set to 'All types' (also circled in blue). The type dropdown menu is open, showing options: 'Ping', 'Traceroute', 'DNS', 'HTTP', and 'SSL Certificate'. Below the filters are tabs for 'Mine', 'Favourites', 'Hidden', 'Public', and 'All'. A table of measurements is displayed with columns: 'Id', 'Type', 'Target', 'Description', '(UTC)', and 'Status'. The first row shows a measurement with ID '1965015', type 'IPv4 ping', target 'b92.net', and a description 'Ping measurement to b92.net'. The user 'Vesna Manojlovic' is associated with this measurement.

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

RIPE NCC RIPE NETWORK COORDINATION CENTRE

RIPE Database (Whois) Website

Search IP Address or ASN

Manage IPs and ASNs > Analyse > Participate > Get Support > Publications > About Us >

You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements

RIPE Atlas <<

About RIPE Atlas >

Get Involved >

Results >

My Atlas v

Probes

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Messages (72 new)

Measurements

+ Create a Measurement

Filter by target and/or description

Any Status

IPv4/v6

✓ All types

Ping

Traceroute

DNS

HTTP

SSL Certificate

(UTC)

Status

Id	Type	Target	Description	(UTC)	Status
1965015	IPv4 ping	b92.net	Ping measurement to b92.net	2015-04-21 08:20 2015-04-21 08:30	49

- List of probes: sortable by RTT

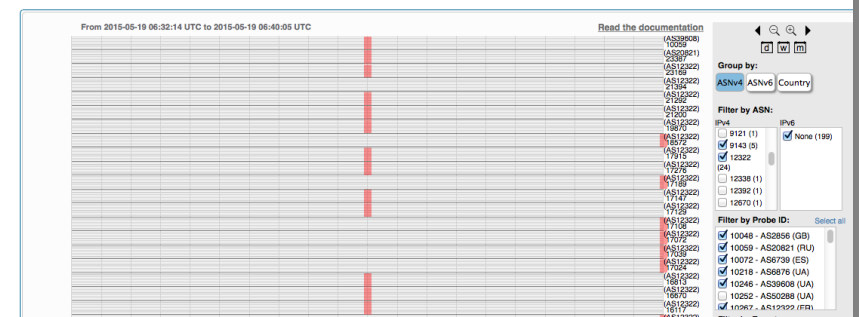
Probe	ASN (v4)	ASN (v6)		Time	RTT
6019	3333	3333		2015-05-19 09:23	1.157
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6111	198068	198068		2015-05-19 09:23	37.760
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10267	12322			2015-05-19 09:23	31.498
10296	51214			2015-05-19 09:23	Unreachable

- Map: colour-coded by RTT



An interactive visualisation for ping measurements.

- Seismograph: stacked multiple pings with packet loss



Seismograph tips

51

Red = packet loss

Vertical pattern:
possible problem in
your network

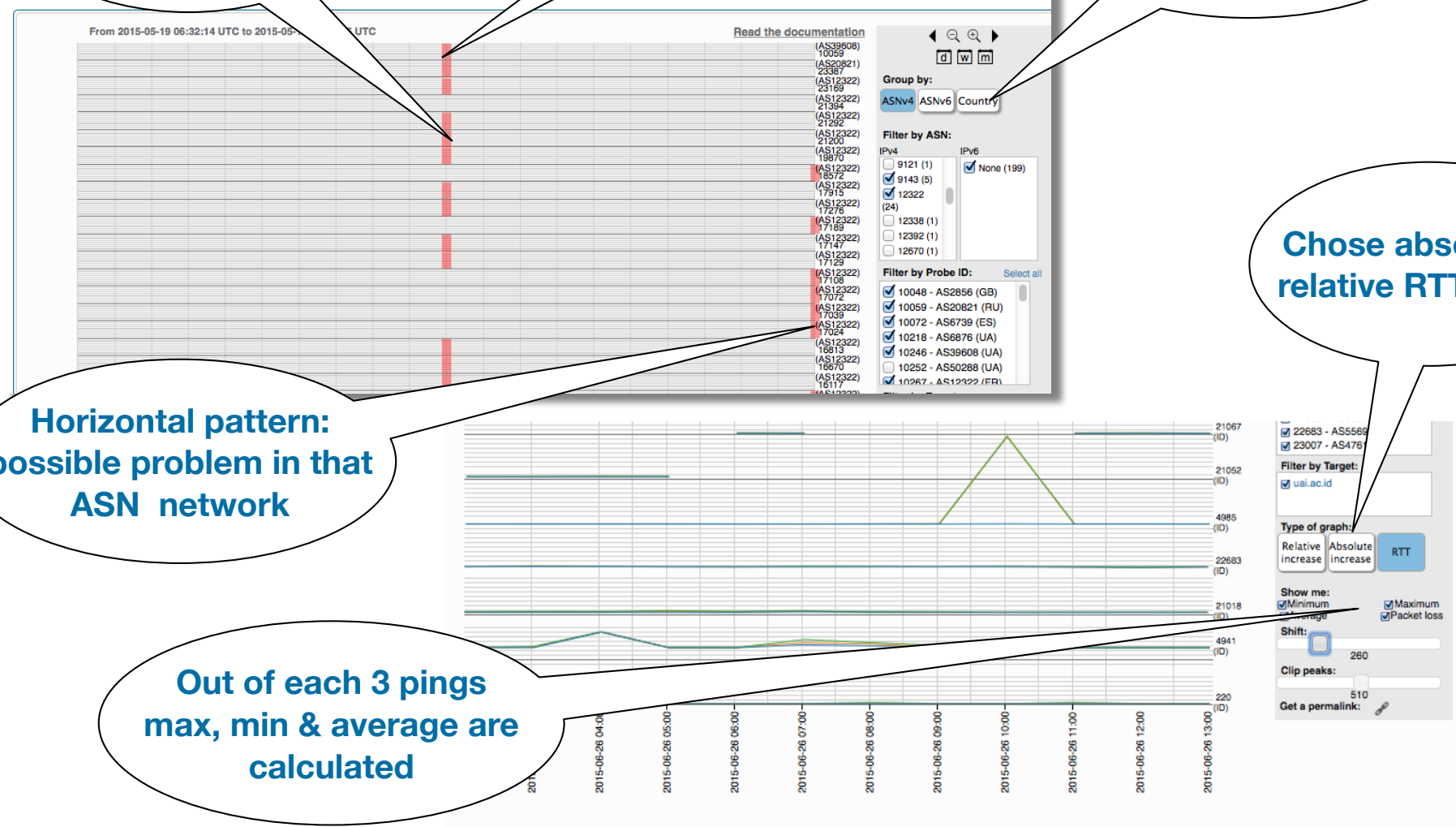
Filtering
& grouping by:
country, IPv4 ASN,
IPv6 ASN

Chose absolute or
relative RTT values

Horizontal pattern:
possible problem in that
ASN network

Out of each 3 pings
max, min & average are
calculated

An in... measurements.



- List of probes, colour-coded number of hops

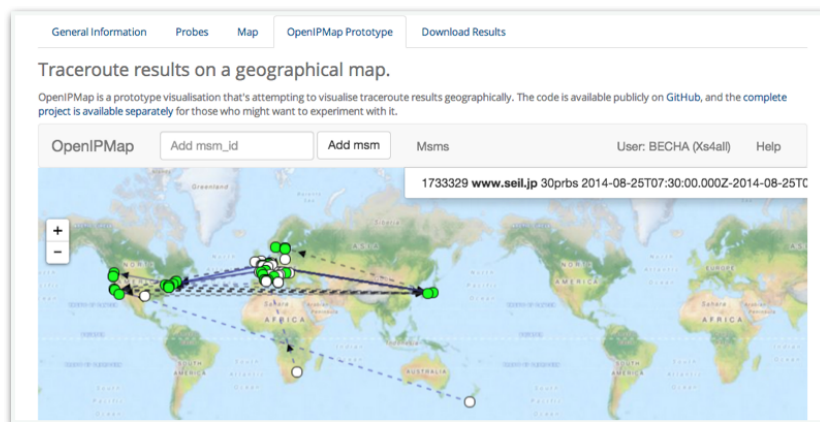
⚡ www.seil.jp

General Information Probes Map OpenIPMap Prototype Download Results

Probe	ASN (v4)	ASN (v6)			Time	RTT	Hops
2043	3313		🇮🇹	🟢	2014-08-25 07:44	308.018	21
3246	41135		🇧🇪	🔴	2014-08-25 07:41	259.912	12
3389	3302		🇮🇹	🟢	2014-08-25 07:43	285.608	17
4092	37497		🇸🇩	🟢	2014-08-25 07:40	452.889	19
4228	3269		🇮🇹	🟢	2014-08-25 07:41	329.862	20
10024	42353		🇬🇧	🟢	2014-08-25 07:44	×	1

- Map

- Traceroute paths map, geolocation using OpenIPMap:
<https://github.com/RIPE-Atlas-Community/openipmap>



- Map, colour-coded response time or diversity
- List of probes, sortable by response time



DNS measurement to ns1.opteamax.de

General Information							
Probes							
Map							
Download Results							
Modification Log							
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

- Documentation for analysing measurements results:
 - <https://atlas.ripe.net/docs/rest/>
 - <https://github.com/RIPE-NCC/ripe.atlas.sagan>
- More tools:
 - <https://github.com/RIPE-Atlas-Community>
 - <https://github.com/RIPE-Atlas-Community/ripe-atlas-community-contrib/blob/master/README.md>



Exercise: Analyse Measurement Results



RIPE
NCC

- Download results of a specific public measurement
- Read the text of the result, to understand structure

- Find the measurement
 - ping, IPv6 to google.com
 - msm-ID 1004005
- Click on measurement, then “Download”
 - Specify the time period
 - (for example, YESTERDAY)
- Results in JSON

- Solution URL:

- <https://atlas.ripe.net/api/v1/measurement/1004005/result/?start=1435104000&stop=1435276799&format=json>

- Save the measurement(s) locally

```
$ curl https://atlas.ripe.net/api/v1/measurement/1004005/result/?start=1435104000&stop=1435276799&format=json > measurement-test.json
```

Task 2: Look at the result

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Reference
(msm ID)

Destination
(IP & name)

Source (probe
public IP address)

Packet
loss: difference
between sent &
received!

```
[{"af":6,"avg" 61.32,  
  "dst_addr":"2a00:1450:4004:802::1014","dst_name":"www.google.com",  
  "dup":0,  
  "from":"2001:8a0:7f00:b201:220:4aff:fec5:5b5b",  
  "fw":4660,"lts":411,  
  "max":62.148,"min":60.372,  
  "msm_id":1004005,"msm_name":"Ping",  
  "prb_id":722,"proto":"ICMP","rcvd":10,  
  "result":[{"rtt":62.148}, {"rtt":61.437}, {"rtt":61.444}, {"rtt":61.448},  
 {"rtt":61.794}, {"rtt":61.533}, {"rtt":60.372}, {"rtt":60.373}, {"rtt":  
 61.384}, {"rtt":61.267}],  
  "sent":10,"size"64,  
  "src_addr":"2001:8a0:7f00:b201:220:4aff:fec5:5b5b",  
  "step":240,"timestamp":1410220847,"ttl":54,"type":"ping"}]
```

- Find out how many times RTT was above 60ms
 - Use Python o Javascript or something else
- For the Javascript solution, you can use this as a starting point:
 - https://stat.ripe.net/widgets/demo/script_me.html

Python:

Parse json and find total avg:

```
import json
f = open("measurement.json","r")
measurements = json.load(f)
for m in measurements:
    for r in m["result"]:
        rtt = r["rtt"]
        if rtt > 60: i += 1
i must be > than 14563.
```

Javascript:

```
<script>
var dataAPIUrl = "https://atlas.ripe.net/api/v1/
measurement/1004005/result/?start=1410220800";
jQuery.ajax({

url: dataAPIUrl, error: function() {

alert("error"); },

success: function( response ) { var i = 0;

for ( var i = 0, n = response.length; i < n; i++) { var
measurement = response[i];

for ( var j = 0, m = measurement.result.length; j < m; j++) {
var rtt = measurement.result[j].rtt;
console.log(rtt);
if (rtt > 60)

i++; }

}
jQuery("p").html("The RTT has been above 60ms for " + i
+ " times");

},

dataType: "json" });

</script>
```



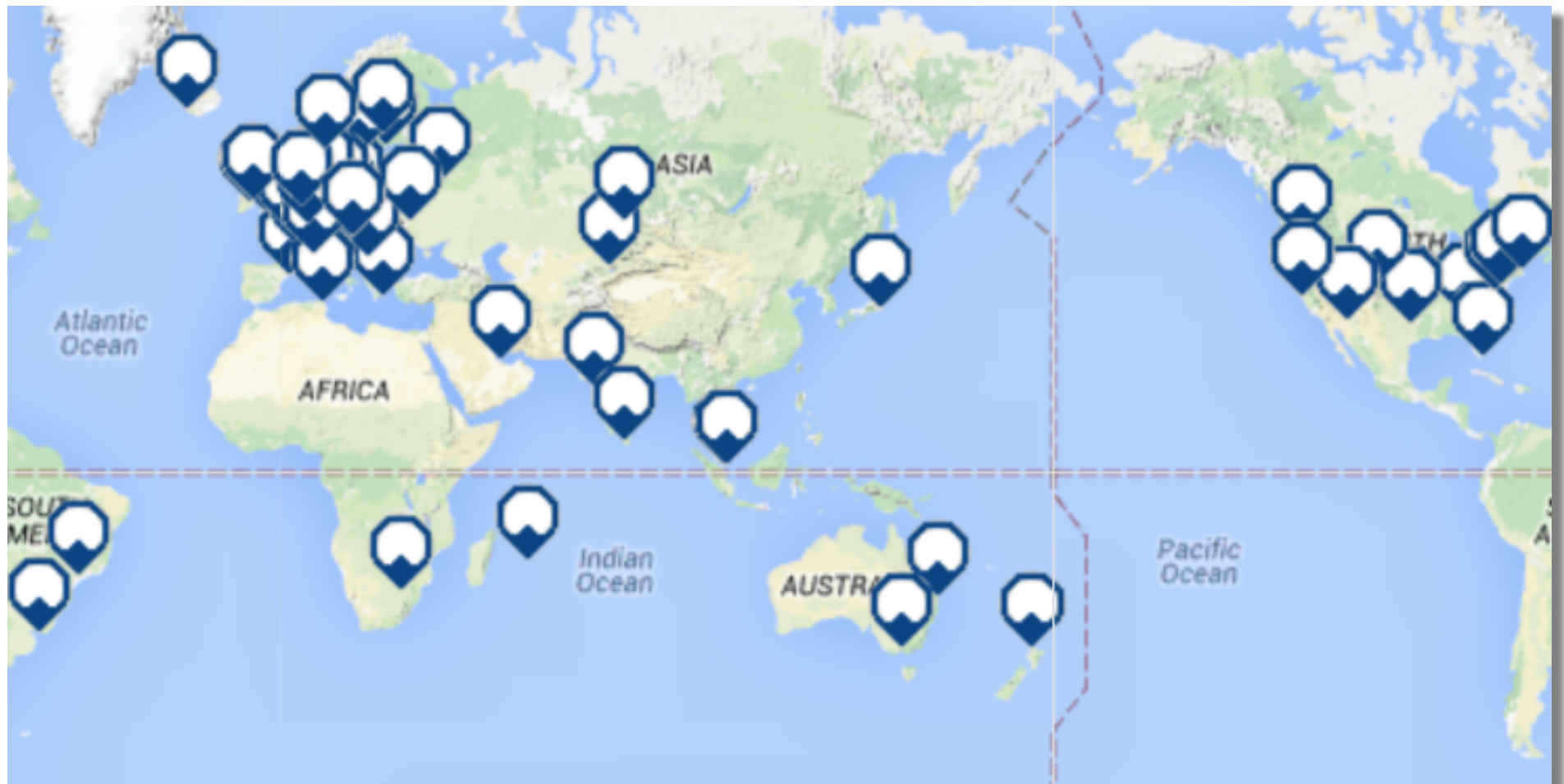
RIPE Atlas Anchors



RIPE
NCC

- Well-known targets and powerful probes
 - Regional baseline and “future history”
- Anchoring measurements
 - Measurements between anchors
 - 200 probes targeting each anchor with measurements
 - Each probe measures 4-5 anchors
 - Vantage points for DNSMON service
- 130+ RIPE Atlas anchors





[https://atlas.ripe.net/results/maps/network-coverage/
#anchors](https://atlas.ripe.net/results/maps/network-coverage/#anchors)



Measuring Impact of IXPs on Keeping Traffic Local

“IXP Country Jedi”

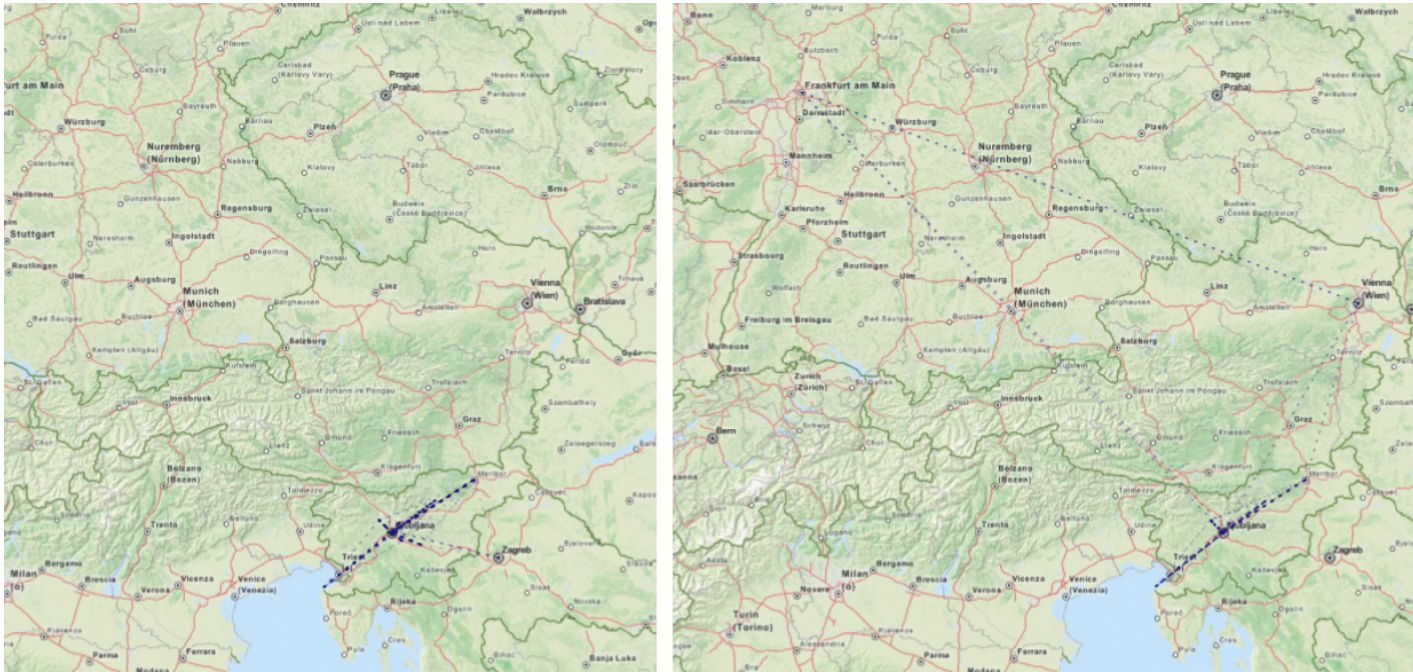


RIPE
NCC

- Operators
 - Routing and traffic optimisation
- IXP operators
 - Shows how IXPs help keep traffic local and regional
- IPv6 advocates
 - Comparing IPv4 and IPv6 paths
- Country level: regulators, politicians, cyber-security...
 - How much traffic stays within the country? Where do the paths go?
 - Comparing countries with each other

- RIPE Atlas community
 - More probes in more networks = higher quality of measurements data
- Geolocation data community
 - Use case for improving data quality
- Examples:
 - <https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas>
 - <https://labs.ripe.net/Members/emileaben/measuring-countries-and-ixps-in-the-see-region>
 - <http://sg-pub.ripe.net/emile/ixp-country-jedi/CL+AR-2015-04/geopath/>

- Difference between IPv4 and IPv6 paths

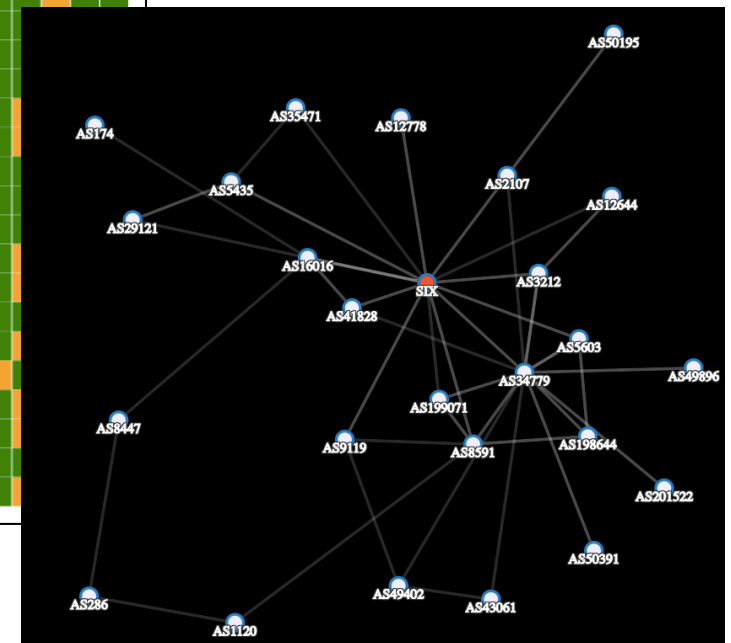
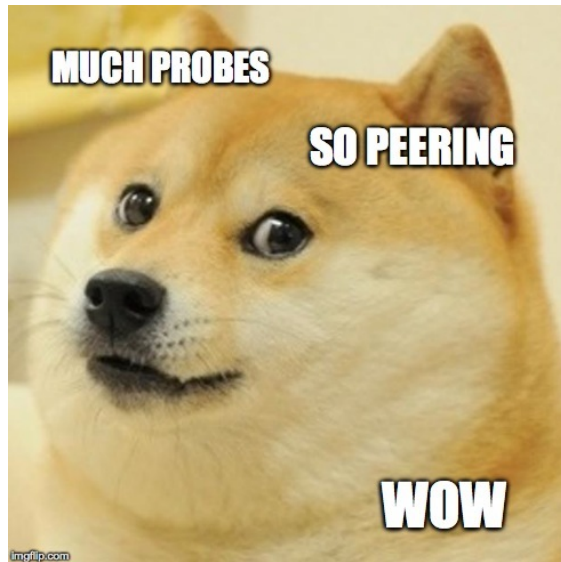


<http://sg-pub.ripe.net/emile/ixp-country-jedi/SI-2015-04/geopath/s/SI/{RO, BG, HR, BA, ME, AL, GR}/>

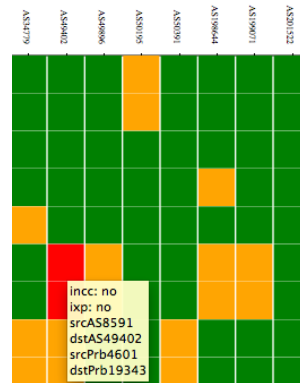
Paths going via an IXP?

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<http://sg-pub.ripe.net/emile/ixp-country-jedi/SI-2015-04/>



<http://sg-pub.ripe.net/emile/ixp-country-jedi/SI-2015-04/ixpcountry/>



```
## msm_id:1962254 prb_id:4601 dst:193.169.48.40 ts:2015-04-16 09:01:06 -00:00
1 (AS8591) maribor10-ge-2-20-v987.amis.net [1.593, 1.602, 2.292] |Maribor,Maribor,SI|
2 (AS8591) mx-mbl-te-1-2-0.amis.net [1.619, 1.697, 1.944] ||
3 (AS8591) mx-ljl-te-2-3-1.amis.net [3.599, 3.865, 5.148] ||
4 (AS8591) mx-zgl-xe-2-0-1.amis.net [5.568, 5.576, 5.69] ||
5 () 75.64-127.15.192.193.in-addr.arpa [5.955, 5.98, 5.985] |Zagreb,Grad Zagreb,HR|
6 (AS9119) 212.13.240.249 [5.778, 5.83, 5.935] ||
7 (AS9119) 212.103.133.4 [7.099, 7.84, 7.926] ||
8 (AS9119) 212.13.240.62 [6.597, 7.674, 7.696] ||
9 (AS9119) hsl.gw0.hsl.eu [5.833, 6.079, 6.368] ||
10 (AS49402) ntp.hsl.eu [6.657, 7.273, 8.155] ||
11 (AS49402) 193.169.48.40 [6.661, 6.691, 6.872] ||
```

- Green: “good”, as far as we can see it
 - Not a judgment, only one way of visualising data
- Red or blue: path is going out of country
 - If this is a surprise: talk to your upstream(s)
- Yellow: path is not going via a local IXP
 - If this is undesired: make a new peering agreement

- traceroute measurements using RIPE Atlas probes
- Steps:
 - Identify ASNs in the country using RIPEstat
 - Identify IXPs and IXP LANs using PeeringDB
 - Construct mesh: from all (*) country's probes to each other

*Maximum of two probes per ANS and only “public” probes with “good” geolocation
- Hops geolocated using “OpenIPMap” database

- Use this tool to find possible suboptimal routing and fix it
 - Find your ASN in the mesh
 - Find the person from another ASN
 - Take them out for tea :)
- To improve accuracy of this diagnostic tool
 - If your ASN is not on the graph, apply for a RIPE Atlas probe
 - Add more probes to your country to increase “resolution”
 - If you move, remember to update your probe’s geolocation

- Re-use and rewrite the code: it is free and open source software
 - <https://github.com/emileaben/ixp-country-jedi>
- Improve infrastructure geolocation: contribute data to OpenIPMap!
 - <https://marmot.ripe.net/openipmap/>
 - <https://github.com/RIPE-Atlas-Community/openipmap>