



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE Atlas

Big Data for Internet Operations

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Goals

- Learn how to:
 - Benefit from using RIPE Atlas measurements for network monitoring and troubleshooting
 - Integrate RIPE Atlas in your monitoring platform
 - Use API calls and Command line tool to create and inspect measurements
 - Write code to manipulate RIPE Atlas data
 - Receive measurement results in real-time
- Get your questions answered by a developer

Download Slides



- <https://massimo.ripe.net/slides/workshop.pdf>



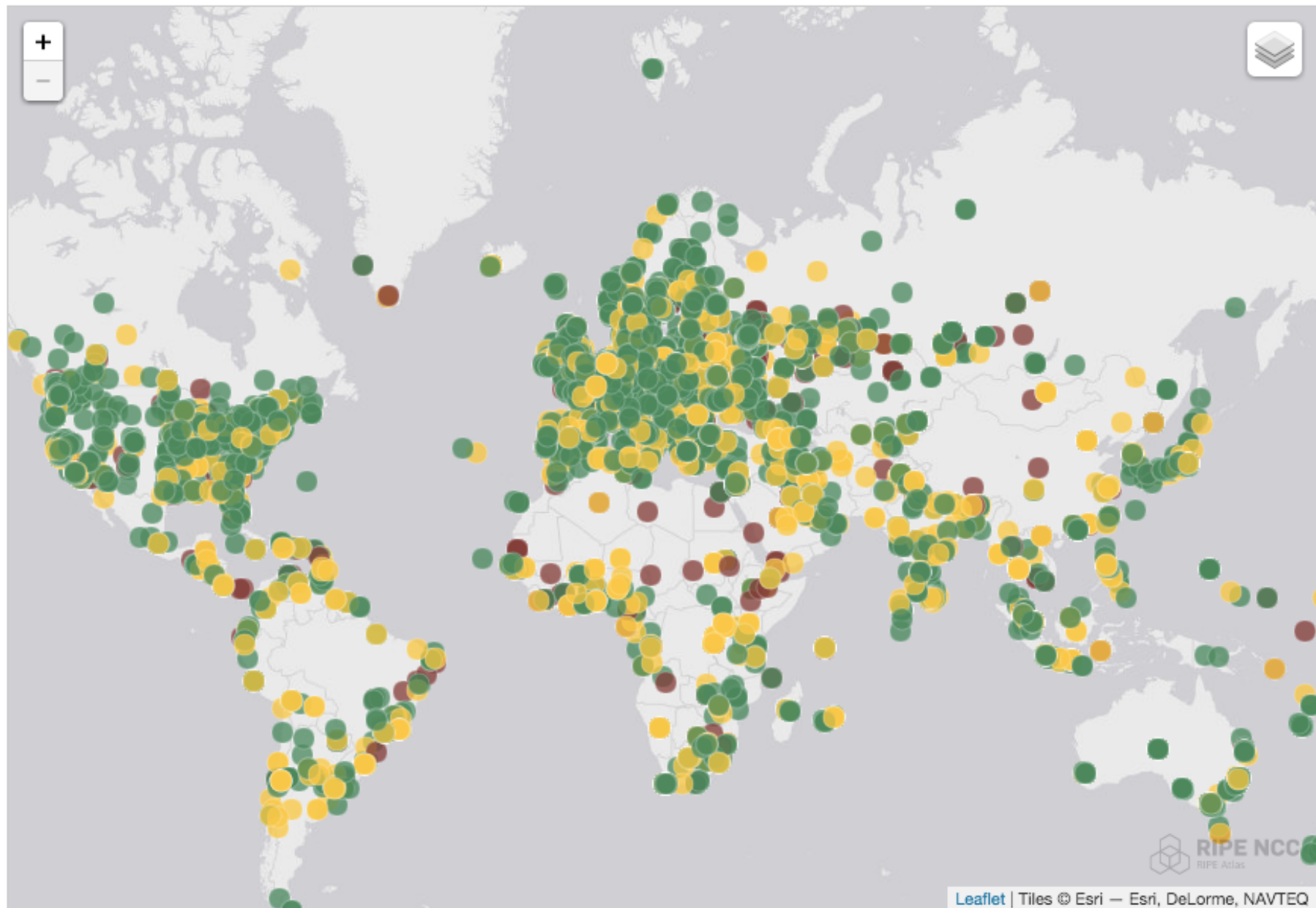
Try Yourself

- Go to <https://atlas.ripe.net>
- Do you have a RIPE NCC Access account?
 - If not - create one: ripe.net/register
- Do you have credits to spend?
 - Redeem this voucher “caribnog-2017-atlas” on <https://atlas.ripe.net/user/credits/>
 - It’s free, credits are just to avoid platform abuses

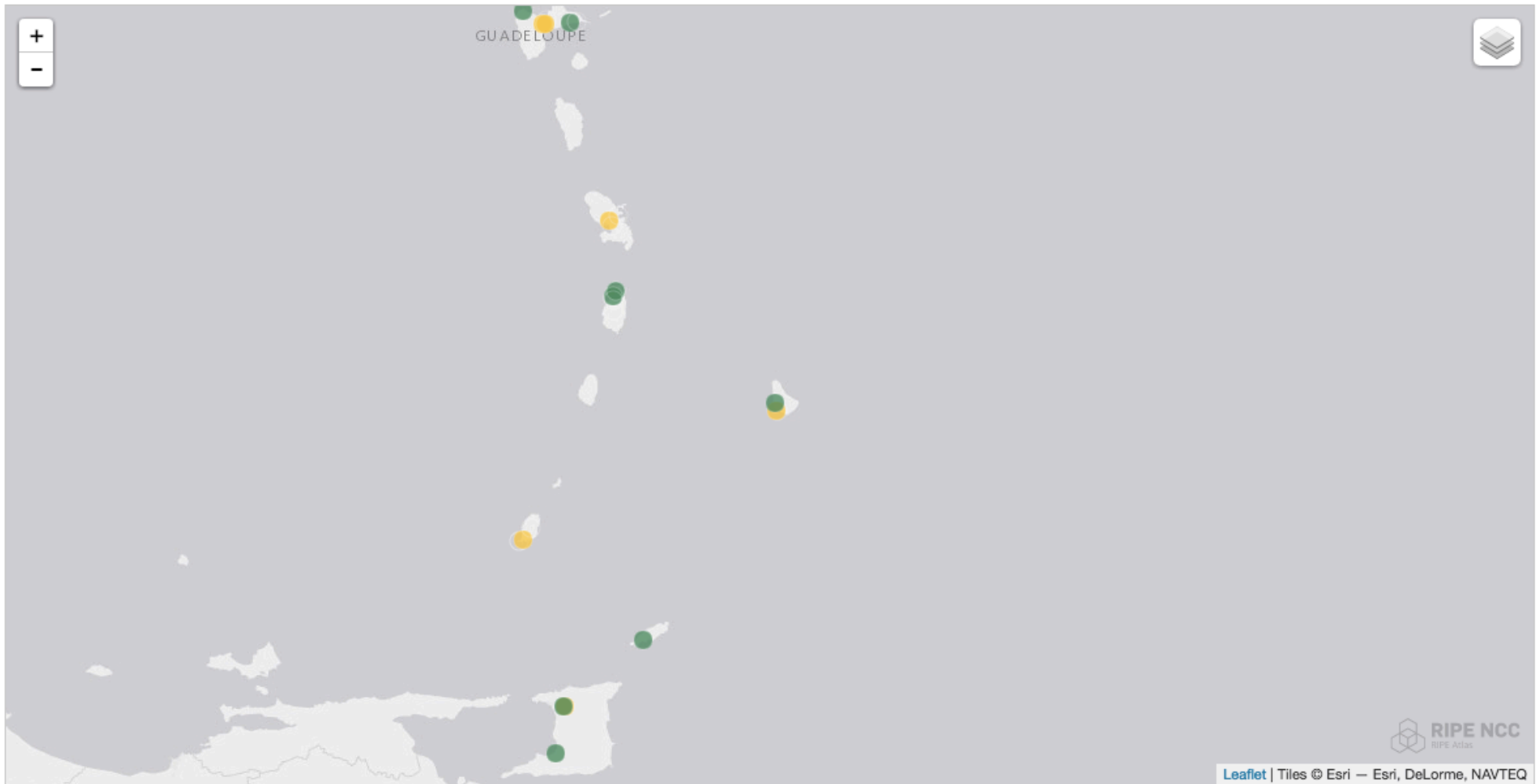


Introduction to RIPE Atlas

RIPE Atlas Measurement Network



Probes in Barbados



[https://atlas.ripe.net/results/maps/network-coverage/?filter=Barbados+\(bb\)](https://atlas.ripe.net/results/maps/network-coverage/?filter=Barbados+(bb))

RIPE Atlas Numbers



- 9,600+ probes connected (250+ Anchors)
- 3,700+ results collected per second
- 35,000+ user-defined measurements weekly
 - **Six** types of user-defined measurements available to probe hosts and RIPE NCC members: ping, traceroute, DNS, SSL, NTP, WiFi — **You need credits!**
 - Global measurements towards root name servers
 - Regional measurements towards “anchors”

>> You are here: [Home](#) > [Analyse](#) > [Internet Measurements](#) > [RIPE Atlas](#) > [Measurements](#) > [Create a Measurement](#)

Create a New Measurement

Step 1 Definitions

Please select the type of measurement you want to create

- + Ping**
- + Traceroute
- + DNS
- + SSL
- + HTTP
- + NTP
- + WIFI

Step 2 Probe Selection

Worldwide 10

- + New Set - wizard
- + New Set - manual
- + IDs List
- + Reuse a set from a measurement

Step 3 Timing

This is a One-off:

Start time:

As soon as possible

Stop time:

Never

> Measurement API Compatible Specification

[Create My Measurement\(s\)](#)

Costs summary

Please define a measurement

Users who will supply credits for this measurement:

mcandela@ripe.net



Schedule a Measurement (advanced)

- Using command-line & scripting:
 - <https://atlas.ripe.net/docs/measurement-creation-api/>
 - You will need an API key: <https://atlas.ripe.net/keys/>

```
Measurement API Compatible Specification

curl --dump-header - -H "Content-Type: application/json" -H "Accept:
application/json" -X POST -d '{
  "definitions": [
    {
      "af": 4,
      "packets": 3,
      "size": 48,
      "description": "Ping measurement",
      "interval": 240,
      "resolve_on_probe": false,
      "skip_dns_check": false,
      "type": "ping"
    }
  ]
}
```

- Using the Command Line Interface (explained later)
 - Resembles day-to-day operational input/output formats

Let's Summarise: Why RIPE Atlas?



- Monitor the performance of your network in real time from thousands of vantage points
- Troubleshoot problems close to your customers
- Validate your peering strategies
- Plan your content distribution
- Demonstrate performance to your customers

How RIPE Atlas has Been Used



- Using RIPE Atlas to Monitor Game Service Connectivity
 - https://labs.ripe.net/Members/annika_wickert/using-ripe-atlas-to-monitor-game-service-connectivity
- Using RIPE Atlas to Measure Cloud Connectivity
 - https://labs.ripe.net/Members/jason_read/using-ripe-atlas-to-measure-cloud-connectivity
- Using RIPE Atlas to Debug Network Connectivity Problems
 - https://labs.ripe.net/Members/stephane_bortzmeyer/using-ripe-atlas-to-debug-network-connectivity-problems



Measurement Results



Searching for Measurements

- Go to “Measurements, Maps and Tools” > “Measurements”

The screenshot shows the RIPE NCC website interface. The user is logged in as Massimo Candela. The navigation menu includes: Manage IPs and ASNs, Analyse, Participate, Get Support, Publications, and About Us. The breadcrumb trail is: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements. The left sidebar shows the 'Measurements, Maps and Tools' menu with 'Measurements' highlighted. The main content area is titled 'Measurements' and features a '+ Create a Measurement' button. Below the title is a filter bar with options: Filter by target and/or description, Any Status, IPv4/v6, All types, Of all time, and a search icon. The table below shows a list of measurements with columns: Id, Type, Target, Description, Probes, Time (UTC), and Status.

Id	Type	Target	Description	Probes	Time (UTC)	Status
7863010	Massimo Candela * ⁶	www.google.nl	Ping measurement to www.google.nl	50	2017-03-10 13:08 No Stop Defined	▶️👁️★
7863007	Massimo Candela * ⁶	www.google.nl	Ping measurement to www.google.nl	50	2017-03-10 13:06 No Stop Defined	▶️👁️★
7827948	Massimo Candela * ⁴	vietnam-railway.com	Ping measurement to vietnam-railway.com	15	2017-02-20 14:53 No Stop Defined	▶️👁️★
7819083	Massimo Candela * ⁴	magipac.it	HTTP measurement to magipac.it	10	2017-02-16 16:23 No Stop Defined	▶️👁️★
7818685	Massimo Candela * ⁴	google.nl	Ping measurement to google.nl	1	2017-02-16 11:05 No Stop Defined	▶️👁️★
7818683	Massimo Candela * ⁶	google.nl	Ping measurement to google.nl	1	2017-02-16 11:05 No Stop Defined	▶️👁️★



RIPE Atlas REST APIs

- List of scheduled measurements
 - <https://atlas.ripe.net/api/v2/measurements/>
 - <https://atlas.ripe.net/api/v2/measurements/{TYPE}/>
- Information about a specific measurement
 - <https://atlas.ripe.net/api/v2/measurements/{ID}/>
- Results of a specific measurement
 - <https://atlas.ripe.net/api/v2/measurements/{ID}/results>

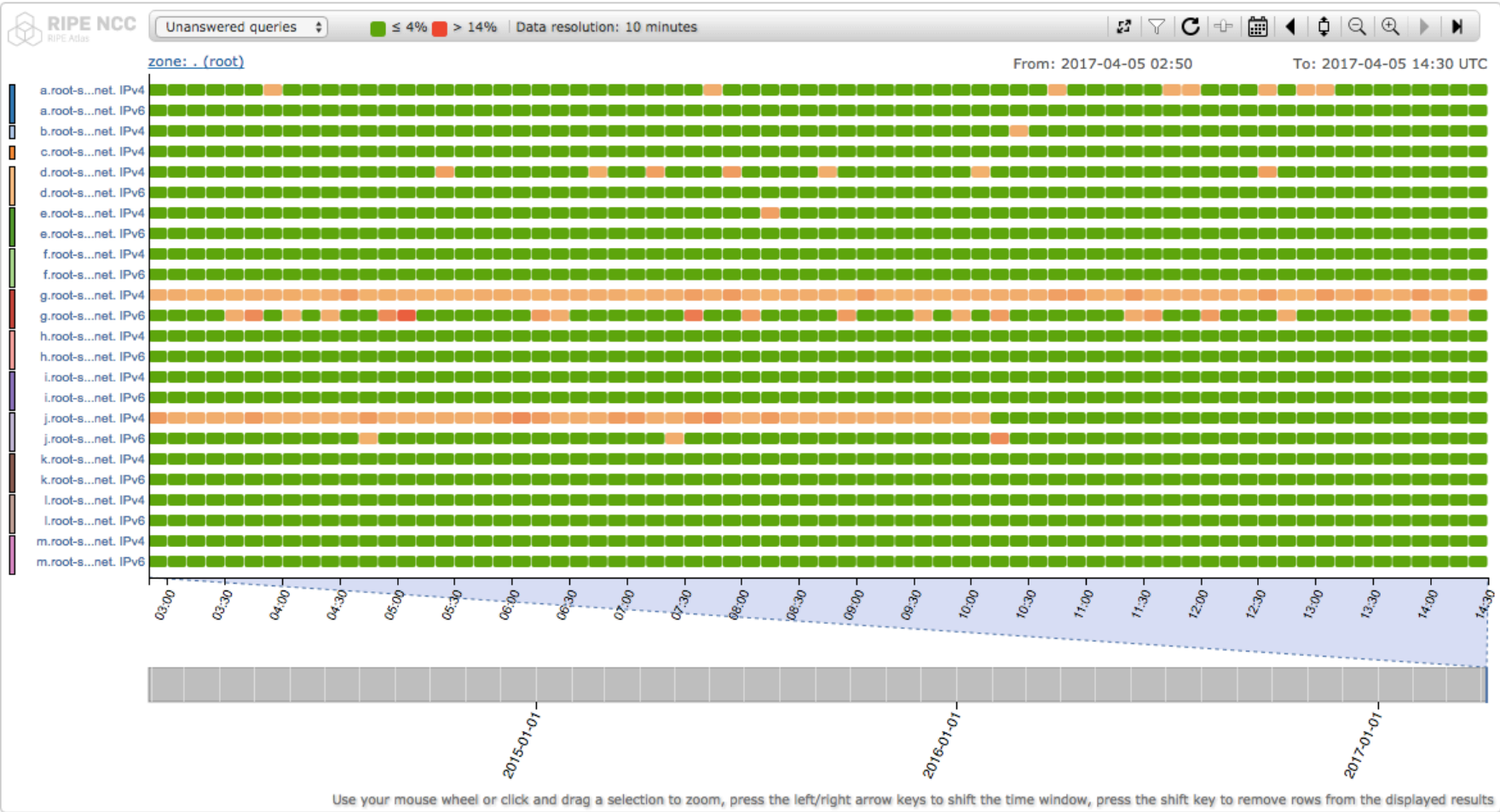
LatencyMON



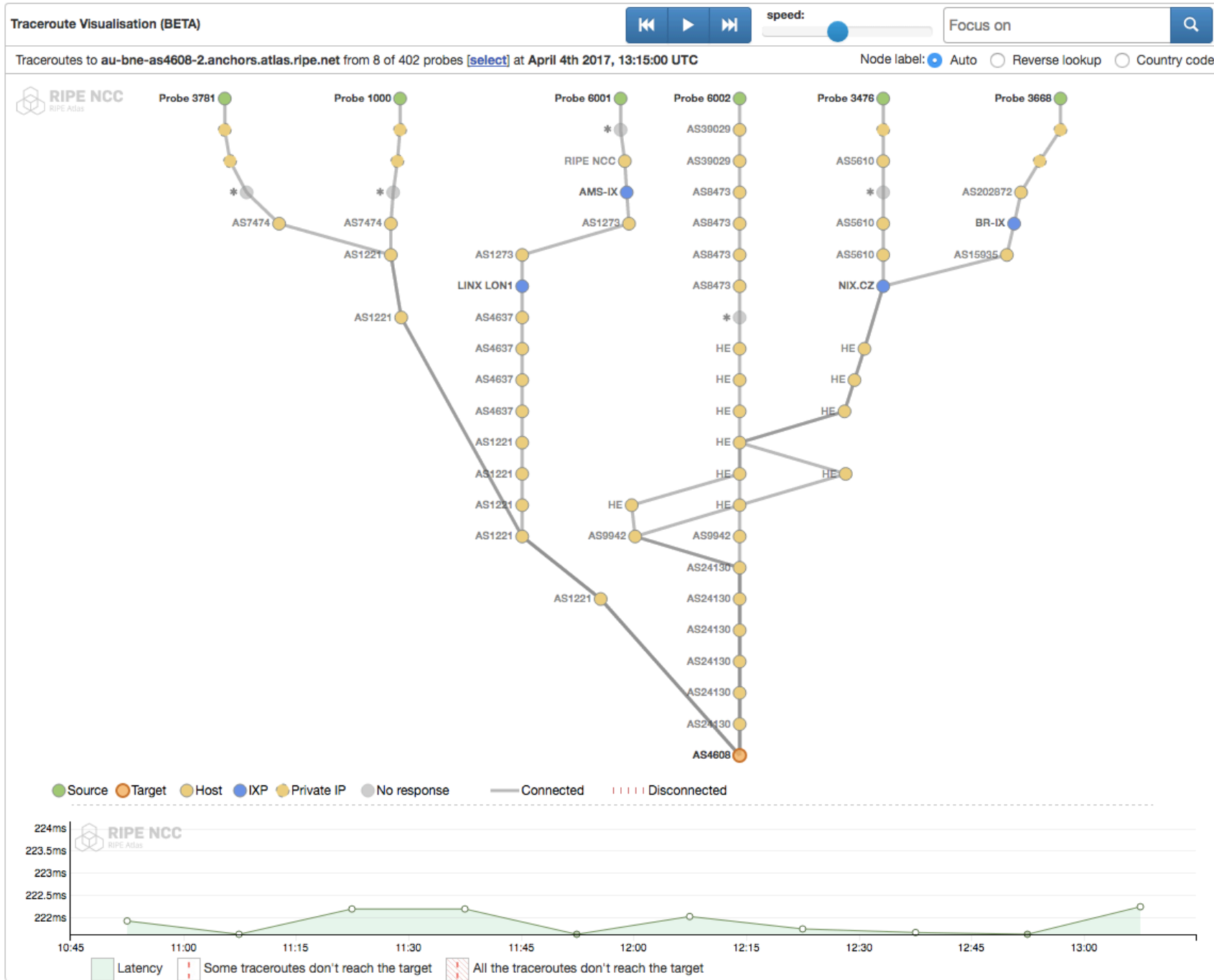


DomainMON and DNSMON

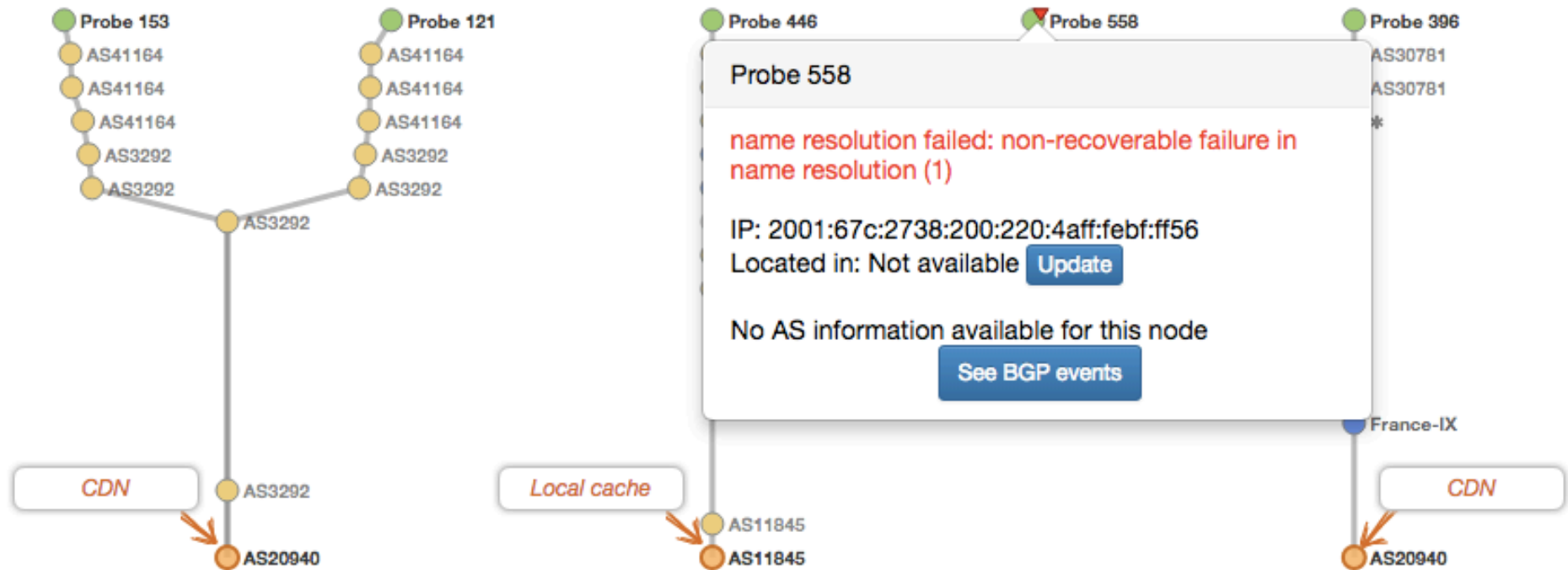
- DomainMON (<https://atlas.ripe.net/domainmon/>)
 - Up-to-date performance overview of your DNS zone
- DNSMON (<https://dnsmon.ripe.net>)
 - Monitoring of root and many Top-Level Domain zones



What's New: TraceMON



TraceMON: Network Annotation



TraceMON: Quick Info



AS34019 — France-IX — AS7477 (IX Australia NSW)

France-IX (AS57734)

IP: 37.49.236.2
Located in: Paris, FR [Update](#)

PeeringDB:
IXP: France-IX, Paris, FR
Lan: 37.49.236.0/23
[Update PeeringDB](#)

Routing Info:
57734 - FRANCEIX , FR
Announced: Yes

Registry info:
Resource: 57344-58367
Name: IANA 16-bit Autonomous System (AS)
Numbers Registry
Desc: Assigned by RIPE NCC

[Contact holder](#) [Whois](#) [See BGP events](#)

Use Our Tools in your Dashboard



```
<script src="https://atlas.ripe.net/resource/latencymon/latencymon-widget-main.js"></script>
<div id="place-here"></div>
<script>
  initLatencymon(
    '#place-here',
    {}, // Tool options, see table below for more info
    { measurements:[1791207, 2083078] } // Query options, see table below for more info
  );
</script>
```



IXP Country Jedi

- Prototype:
 - <http://sg-pub.ripe.net/emile/ixp-country-jedi/latest/>

- Barbados, Guadeloupe, Trinidad and Tobago:
 - <http://sg-pub.ripe.net/emile/ixp-country-jedi/specials/2017-04-18-BB-GP-TT/>



Integration with Network Monitoring Systems



Network Monitoring

- You can keep using your internal monitoring system and integrate Atlas in it with an API
 - <https://atlas.ripe.net/api/v2/measurements/<measurement-id>/status-check>
- Set thresholds:
 - E.g. https://atlas.ripe.net/api/v2/measurements/123456789/status-check/?max_packet_loss=95
- Documentation
 - <https://atlas.ripe.net/docs/api/v2/manual/measurements/status-checks.html>



Real-time Performance Monitoring



RIPE Atlas Streaming

- **RIPE Atlas streaming** is an architecture that allows users to receive the measurement results as soon as they are sent by the probes
 - Real-time server and performance monitoring
 - Advanced filtering: you can specify what thresholds/type to receive
- There are three types of data:
 - Measurement results
 - Probe connection status events
 - Measurements metadata

Example



```
<script src="https://atlas-stream.ripe.net/socket.io.js"></script>
<script>

  // Create a connection (it can be also http on port 80)
  var socket = io("https://atlas-stream.ripe.net:443", { path : "/stream/socket.io" });

  // Subscribe to results coming from all the probes involved in the measurement 1791207
  socket.emit("atlas_subscribe", { stream_type: "result", msm: 1791207 });

  // Declare a callback to be executed when a measurement result is received
  socket.on("atlas_result", function(result){
    console.log("I received ", result);
  });

</script>
```

The screenshot shows a browser's developer console with the following content:

- Navigation bar: Elements, Network, Sources, Timeline, Profiles, Resources, Audits, Console, AngularJS
- Filter: <top frame> (selected), Preserve log (unchecked)
- Filter: (empty), Regex, All, Errors, Warnings, Info, Logs, Debug, Hide network messages
- Network logs:
 - 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".
- Console logs (18 entries):
 - 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...}



Command-line Interface (CLI) Toolset



RIPE Atlas CLI

- Network troubleshooting from command line
- 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>
- Documentation:
 - <https://ripe-atlas-tools.readthedocs.org/>



Configure RIPE Atlas CLI

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



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,
```



Search Probes

- Search all probes in AS 3333
 - ripe-atlas probes --asn 3333
- Show specific fields
 - ripe-atlas probes --asn 3333 --field asn_v6 --field country --field is_public --field description --field status
- Search for probes in and around Paris
 - ripe-atlas probes --location "Paris, France" --radius 15



Other examples

- 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`



Fetch an Existing Measurement

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



Code with RIPE Atlas



Support Projects

- Sagan
 - A Python translation layer for RIPE Atlas measurement results
 - <https://github.com/RIPE-NCC/ripe.atlas.sagan>
- Cousteau
 - A Python wrapper around all the RIPE Atlas API
 - <https://github.com/RIPE-NCC/ripe-atlas-cousteau>
- The output is firmware version transparent
- You can install them with pip



**Take part in the
RIPE Atlas community**

RIPE Atlas Community



- Volunteers host **probes** in homes or offices
 - Register on our website and request a probe
 - You get it for free but **please keep it connected!**
- Organisations host RIPE Atlas **Anchors**
- **Sponsor** organisations give financial support or host multiple probes in their own networks

Contact us



- 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



Extras

- Secondary DNS service
- K-root expansion
- RIPEstat



Questions



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