

RIPE Atlas

Gigis Petros | 26 May 2017 | 1st GRNOG Workshop

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 (CLI) to create and inspect measurements
- Write code to manipulate RIPE Atlas data
- Receive measurement results in real-time

Try Yourself



Go to https://atlas.ripe.net

- Do you have a RIPE NCC Access account?
 - It's free, If not create one: <u>ripe.net/register</u>

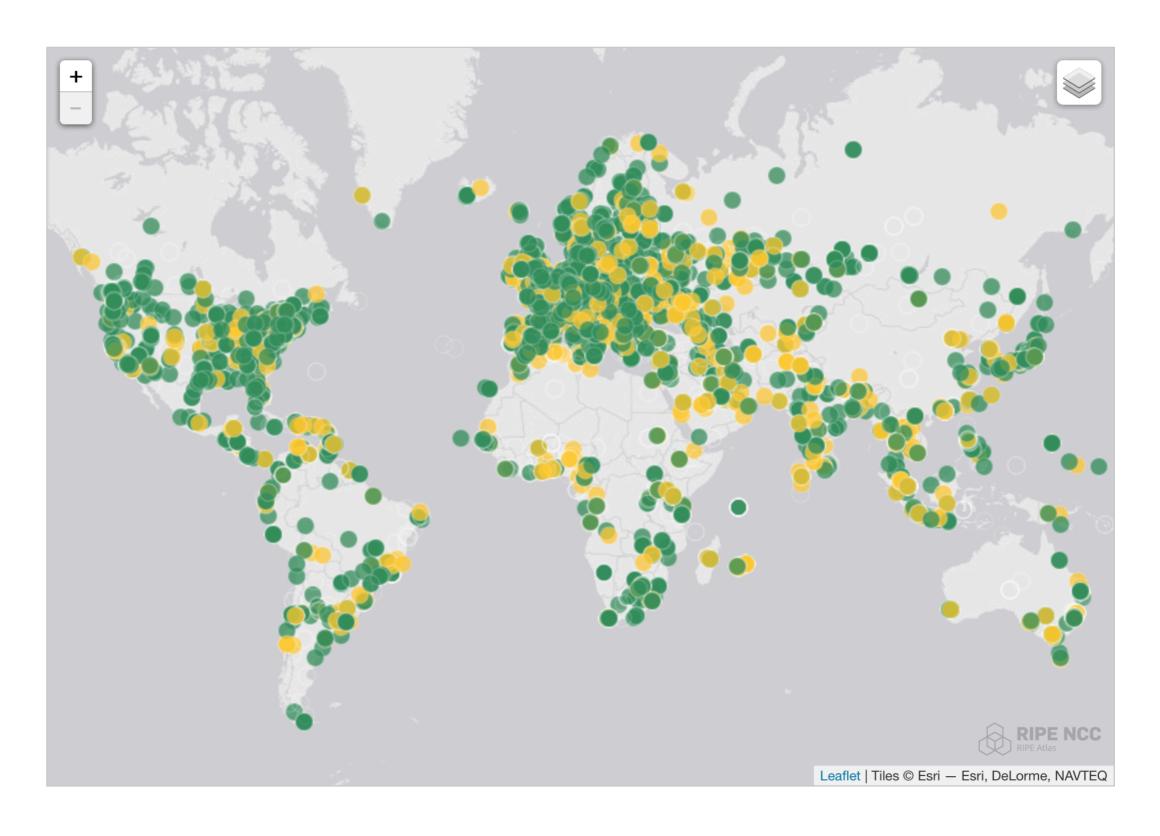
- Do you have credits to spend?
 - Reedem this voucher "GRNOG2017" on https://atlas.ripe.net/user/credits
 - It's free, credits are just to avoid platform abuse



Introduction to RIPE ATLAS

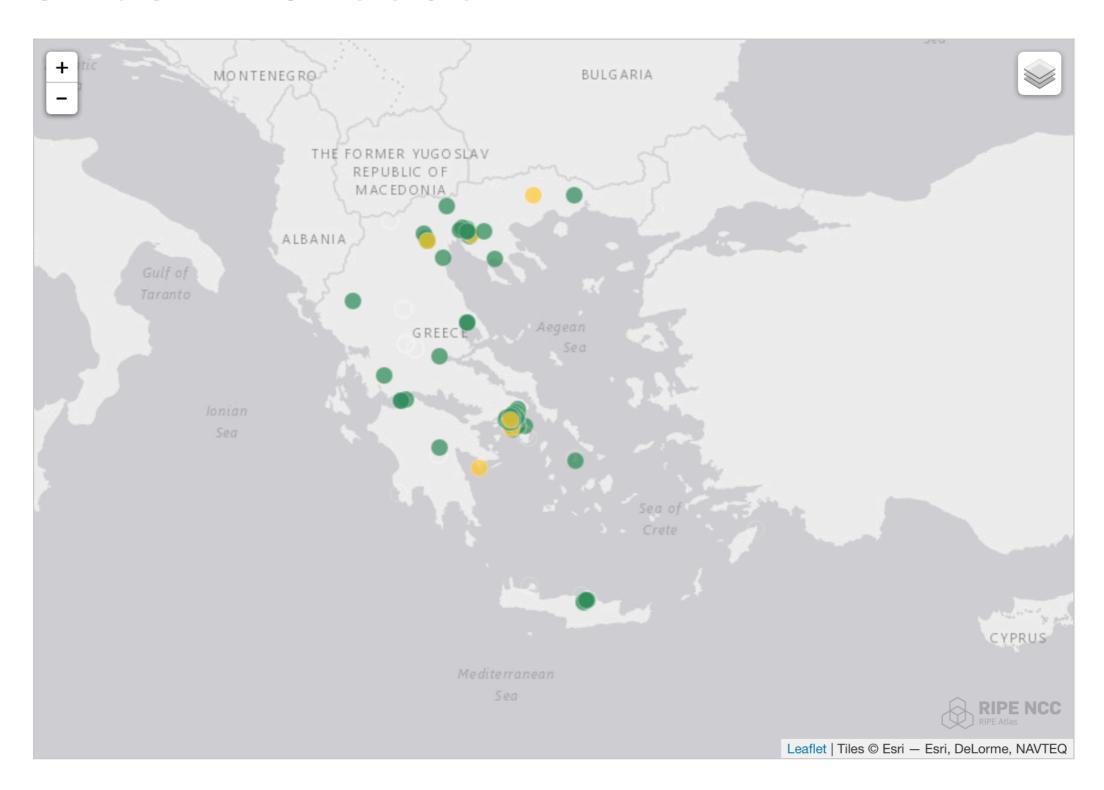
RIPE Atlas Measurement





Probes in Greece





https://atlas.ripe.net/results/maps/network-coverage/?filter=Greece+(gr)

RIPE Atlas Numbers





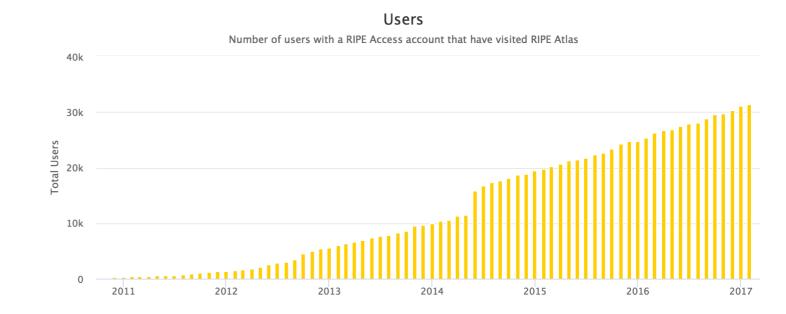


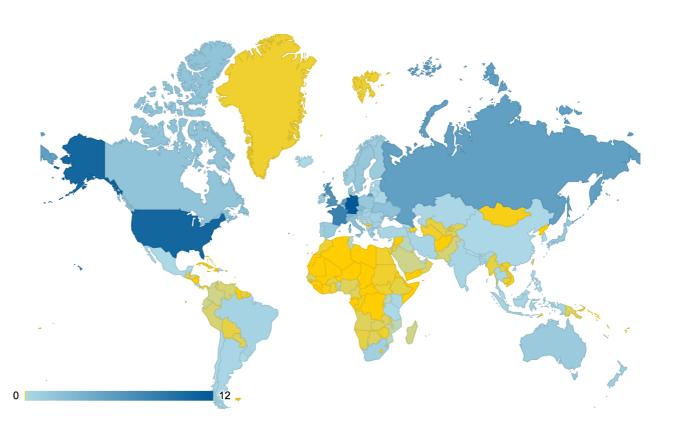
- 9,700+ probes connected (255+ Anchors)
- 4,400+ results collected per second
- 35,000+ user defined measurements weekly
 - Six types of user-defined measurements available to probe hosts and RIPE NCC members: ping, traceroute, DNS, SSL, NTP, WiFi You need credits!
 - Global measurements towards root name servers
 - Regional measurements towards "anchors"

RIPE Atlas Community



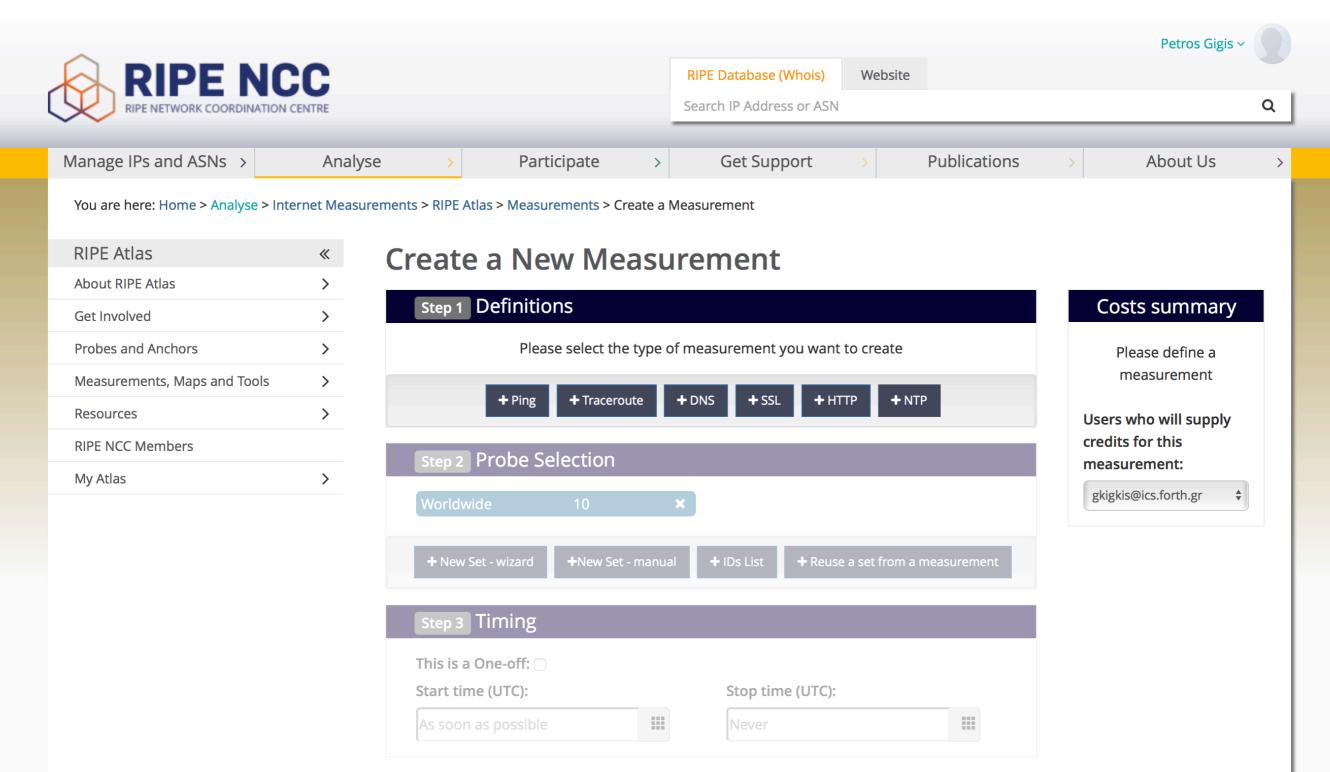
- Users
- Hosts
 - Probes
 - Anchors
- Sponsors
 - 5 sponsors in 2016
 - 2 already for 2017
- 300 +Ambassadors at many conferences





Schedule a Measurement





> Measurement API Compatible Specification

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/

```
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

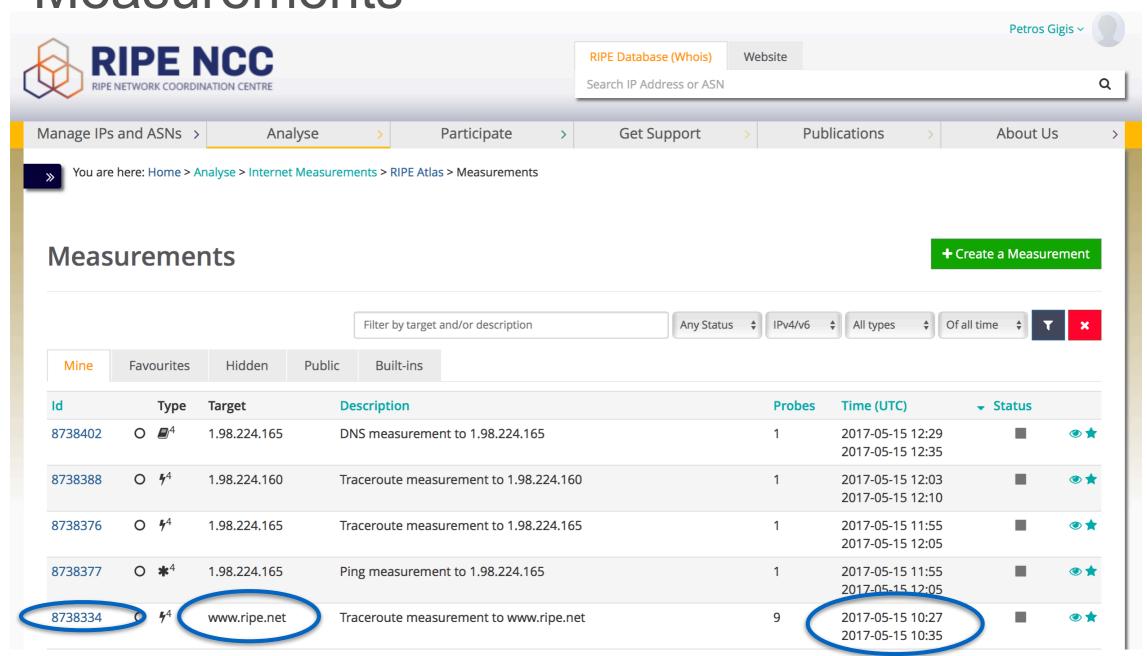


Measurement Results

Searching for Measurements



 Go to "Measurements, Maps and Tools" > "Measurements"



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

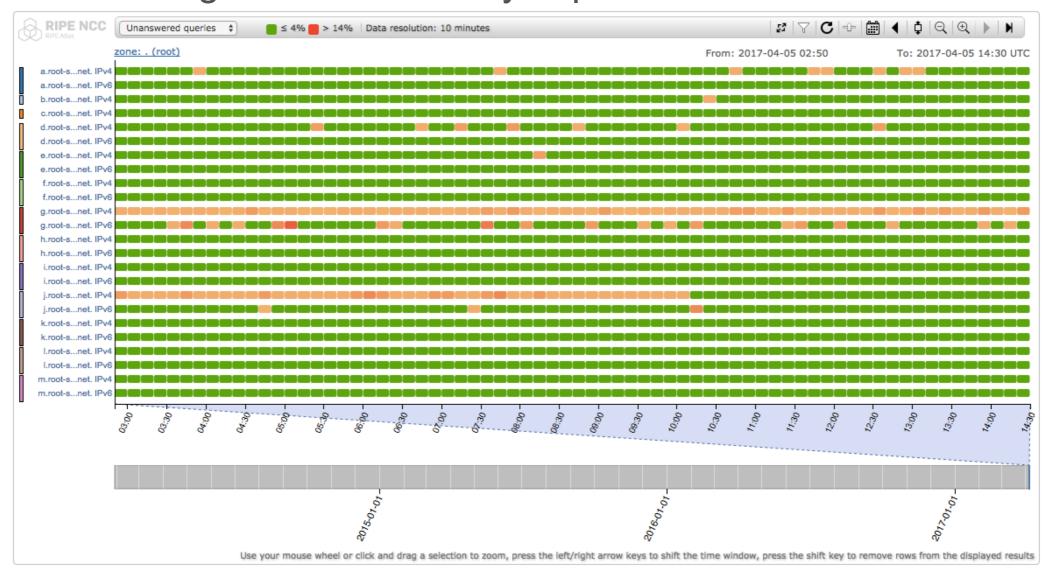




DomainMON and DNSMON

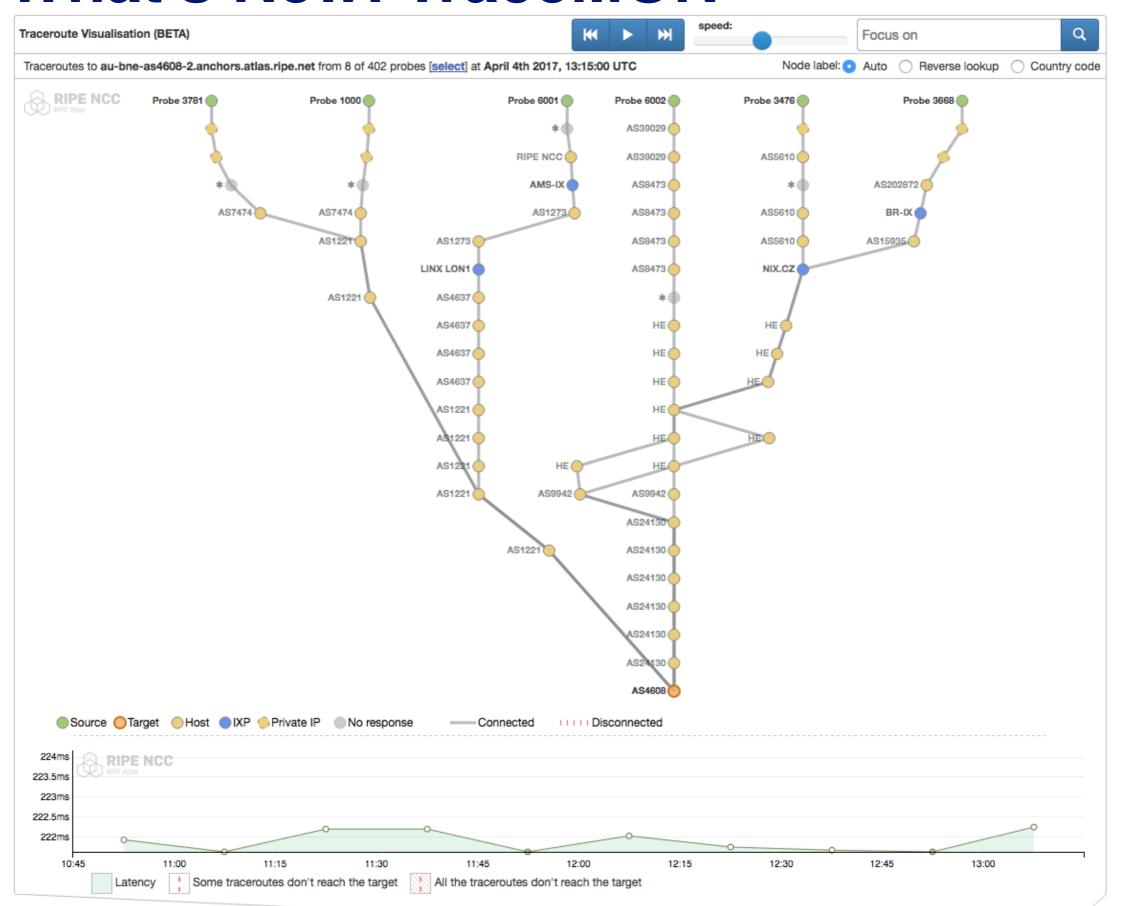


- DomainMON (<u>https://atlas.ripe.net/domainmon/</u>)
 - Up-to-date performance overview of your DNS zone
- DNSMON (<u>https://dnsmon.ripe.net</u>)
 - Monitoring of root and many Top-Level Domain zones



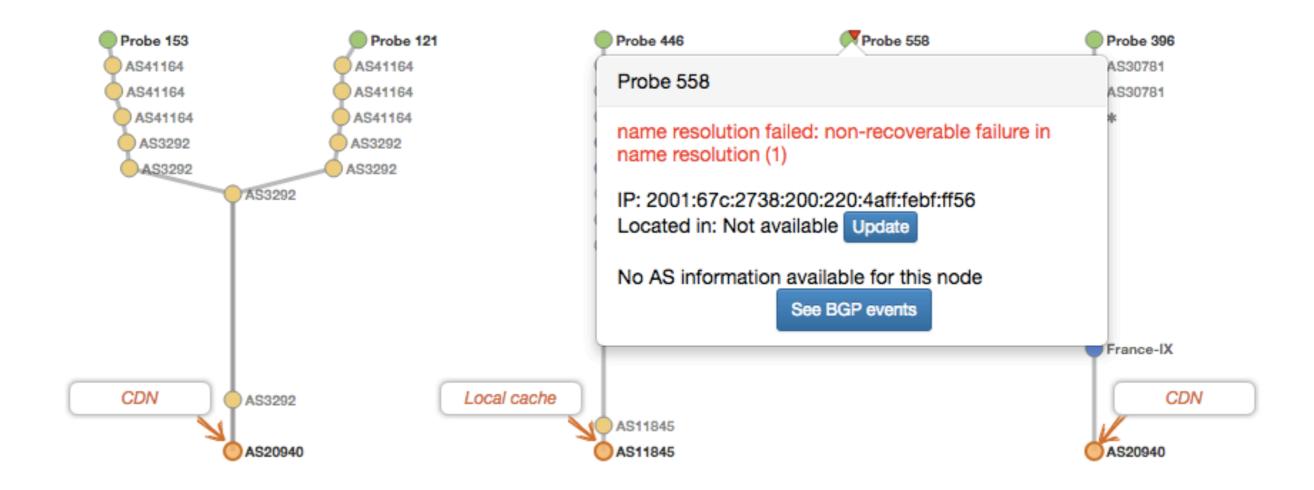
What's New: TraceMON





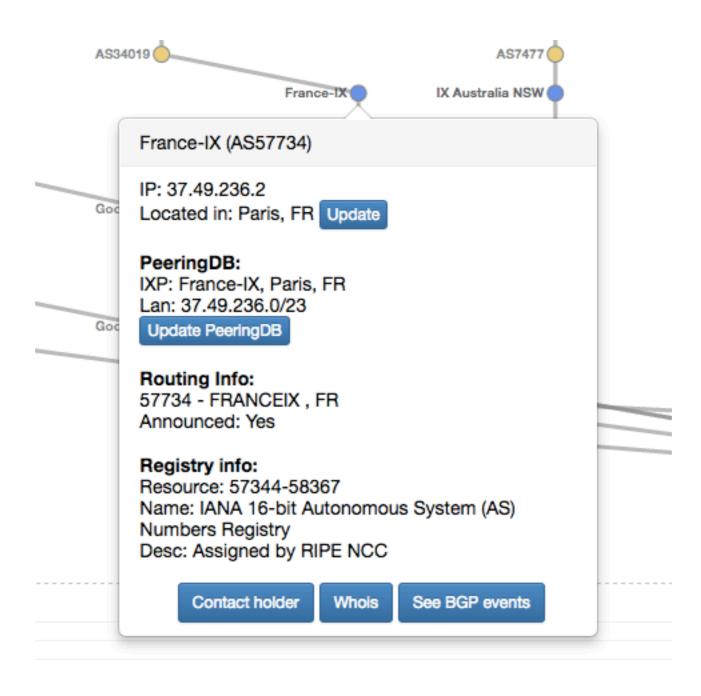
TraceMON: Network Annotation





TraceMON: Quick Info





Use Our Tools in your Dashboard





IXP Country Jedi

IXP Country Jedi



- Tool and concept by Emile Aben
 - https://github.com/emileaben/ixp-country-jedi
 - https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas

Method:

- Traceroute mesh between RIPE Atlas probes
- Detect whether they go via local IXP(s)' LAN IP
- Hops geolocated using OpenIPMap database

Data:

http://sg-pub.ripe.net/emile/ixp-country-jedi/

IXP Country Jedi



Benefits:

- Shows how IXPs help keep traffic local
- Comparing countries' performances with each other
- Routing and traffic optimisation
- Comparing IPv6 and IPv4

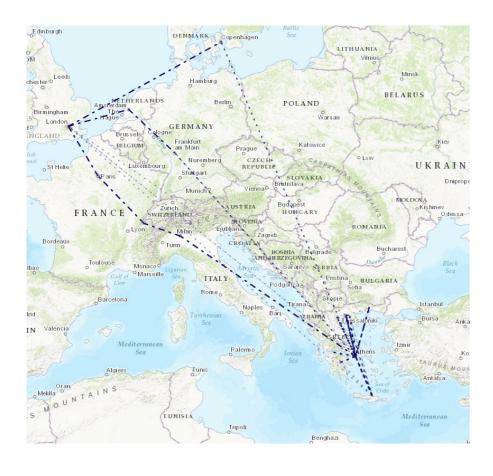
• Greece:

- http://sg-pub.ripe.net/emile/ixp-country-jedi/latest/GR/

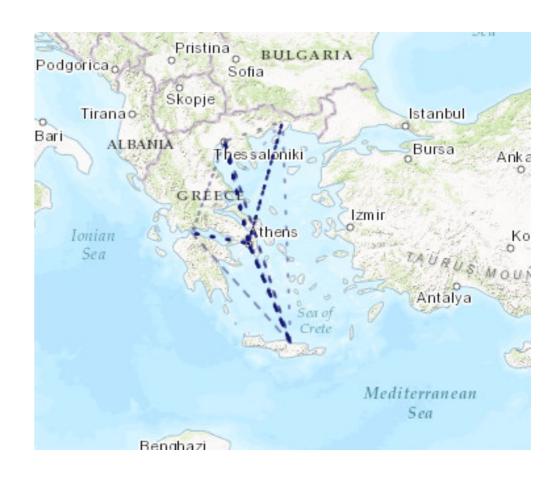
Paths for Greece



IPv4



IPv6



How Many Paths Go Via Local IXP?



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

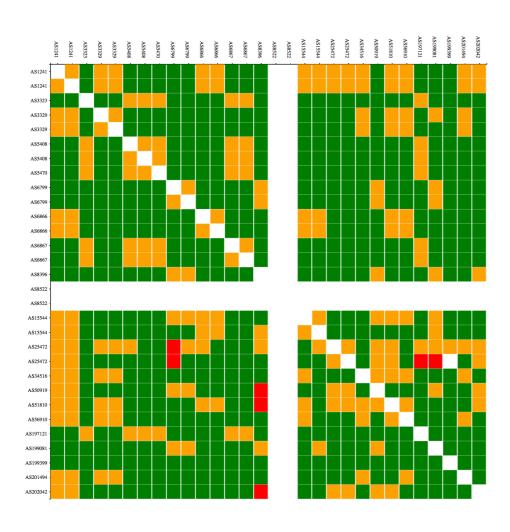
IXP IPs: YES, out-of-country IPs: YES

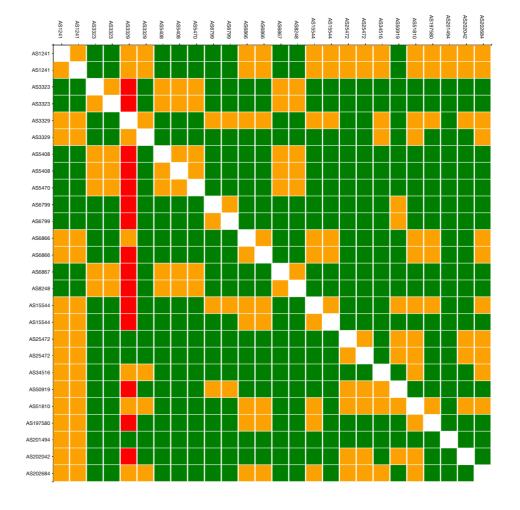
2016

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

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

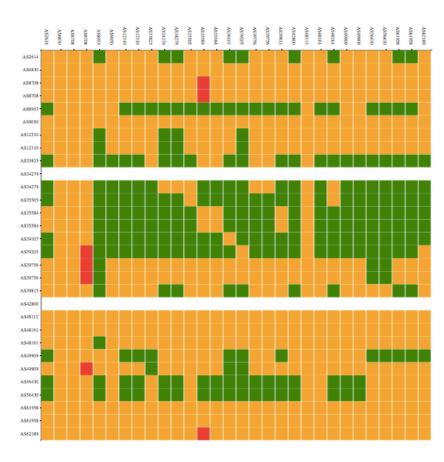
2017

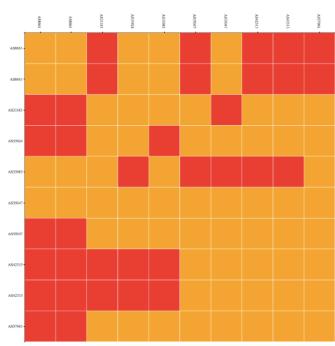


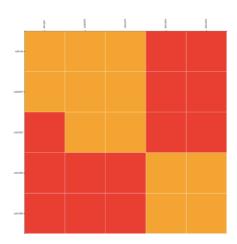


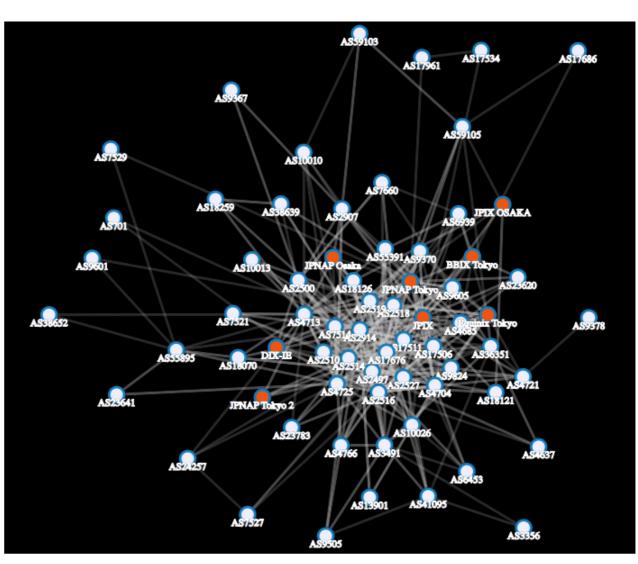
More Probes, Better Data Quality











Optimise Routing



- Interactive tool! (click over the cell...)
 - http://sg-pub.ripe.net/emile/ixp-country/latest/GR

```
2 (AS5408) ntua-zogr-3-gw.eier.access-link.grnet.gr [2.302, 2.732, 3.02] |Zografos,
Attica,GR|
3 (AS21320) grnet-ias-geant-gw.mx2.ath.gr.geant.net [2.499, 2.904, 3.276] |Athens,A
ttica,GR|
4 (AS21320) ae1.mx1.ath.gr.geant.net [81.843, 82.066, 82.261] |Athens,Attica,GR|
5 (AS21320) ae2.mx1.mil2.it.geant.net [82.119, 87.427, 88.638] |Milan,Lombardy,IT|
6 (AS21320) ae4.mx1.gen.ch.geant.net [81.549, 81.857, 211.132] |Geneva,Geneva,CH|
7 (AS21320) ae4.mx1.par.fr.geant.net [81.143, 81.495, 82.308] |Paris,?le-de-France,
FR|
8 (AS21320) ae1.mx1.lon2.uk.geant.net [81.149, 81.526, 81.752] |London,England,GB|
```

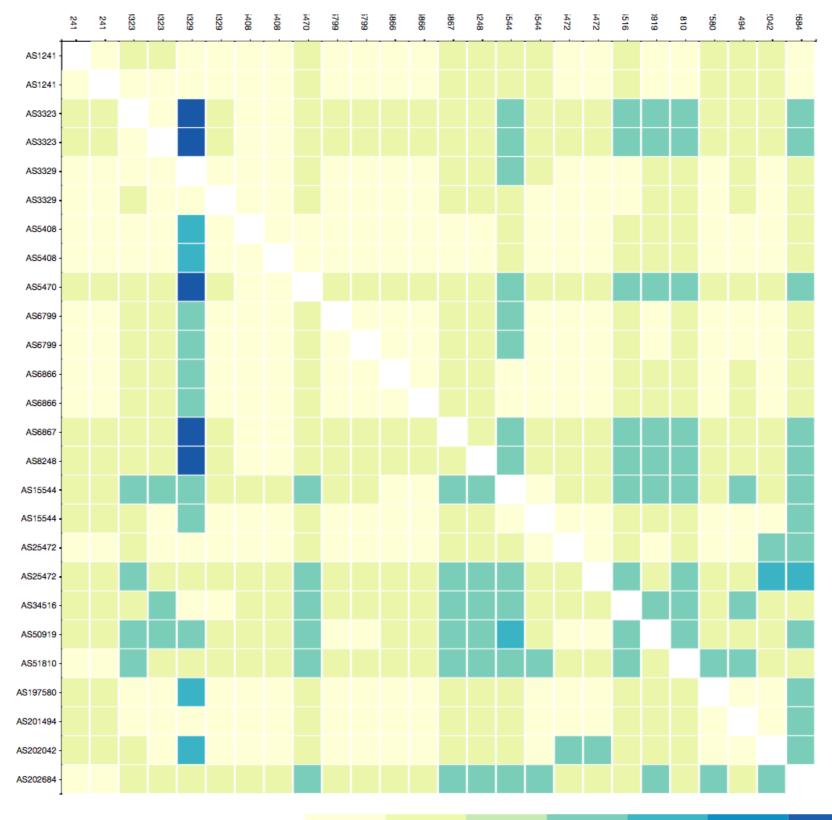
- Red or blue: the path is going out of country
 - If this is a surprise, talk to your upstream(s)
- Yellow: the path that is not going via local IXP
 - If this is undesired, make a new peering agreement

Intermediate ASNs



Greece

Snapshot: 1 May 2017



≥ 2

≥ 3

≥ 4

Direct

≥ 1

≥ 5

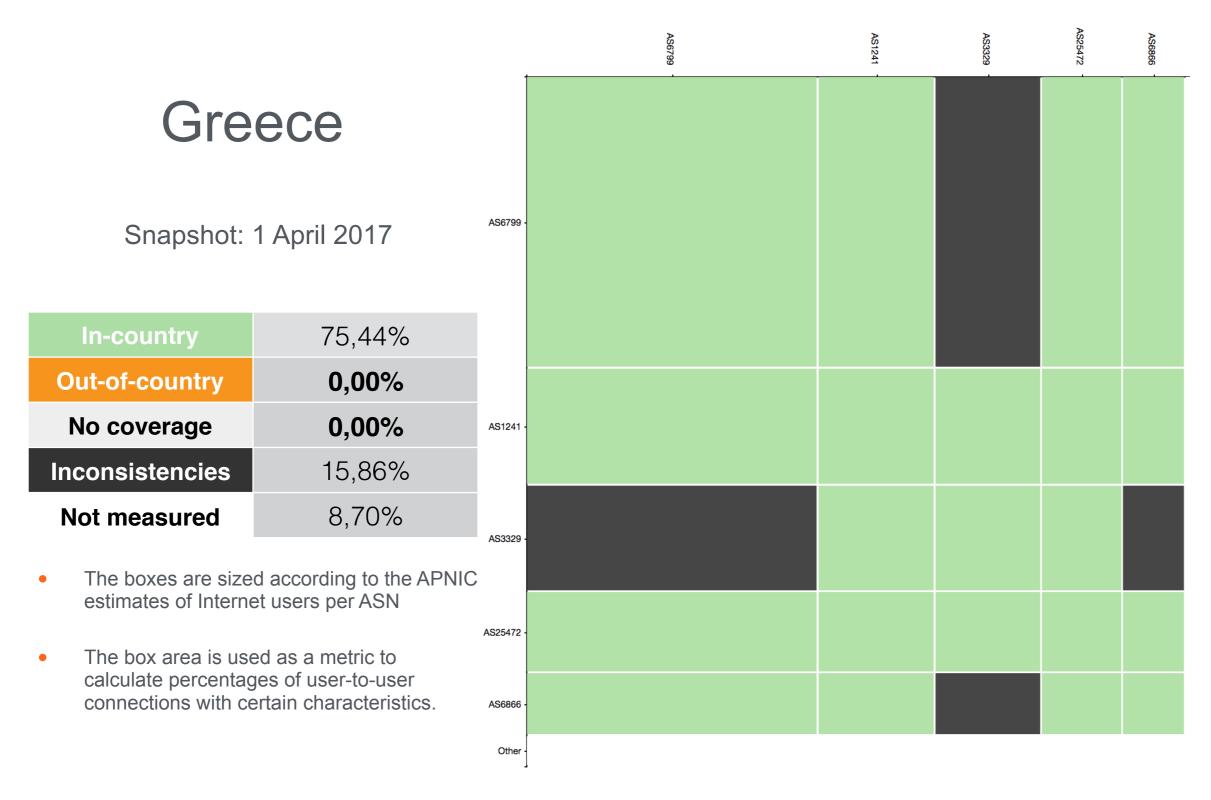
≥ 6



Eyeball Jedi

Eyeball to Eyeball matrix







Use cases

Examples of RIPE Atlas Use

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

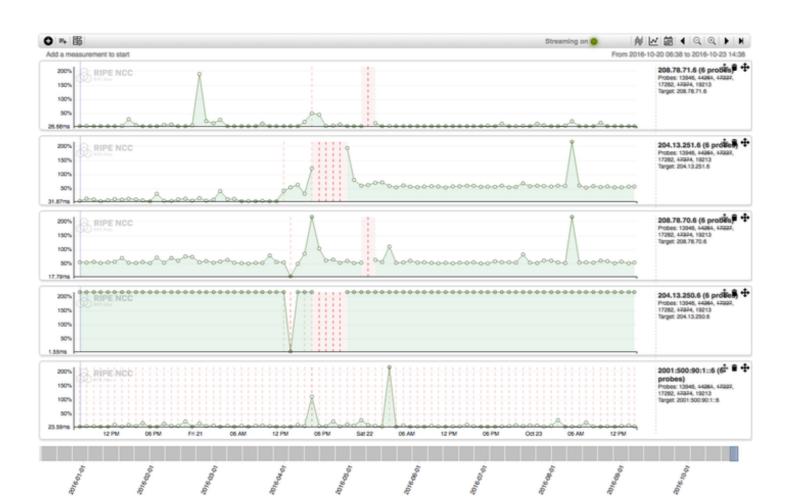
Using RIPE Atlas to Debug Network Connectivity Problems

Stéphane Bortzmeyer — 10 May 2016

Use Cases (2)



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



Use Cases (3)



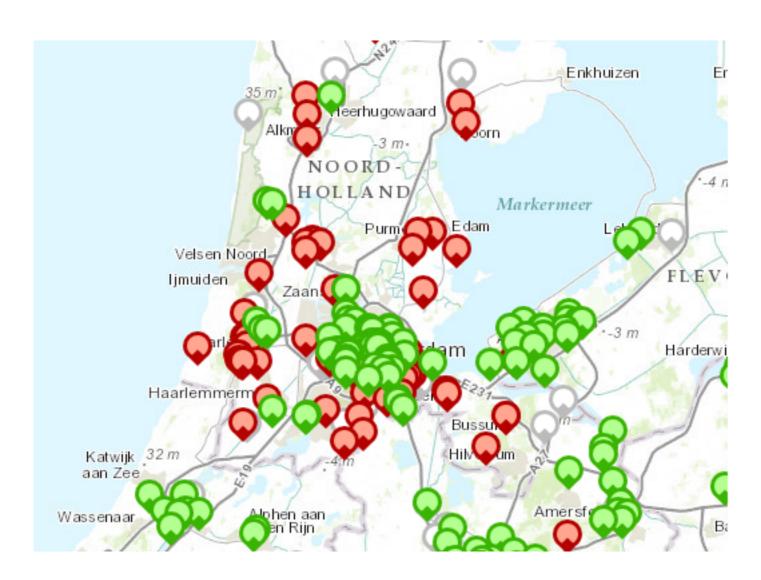
- Monitor Game Service Connectivity (Sept. 2016)
- Requirements:
 - Check General Reachability, Latency, Historical data
 - Supported by an active and helpful community
 - Integrate with their existing logging system
- Track down an outage in one upstream
- Became sponsors



Use Cases (4)



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





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/<measurementid>/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



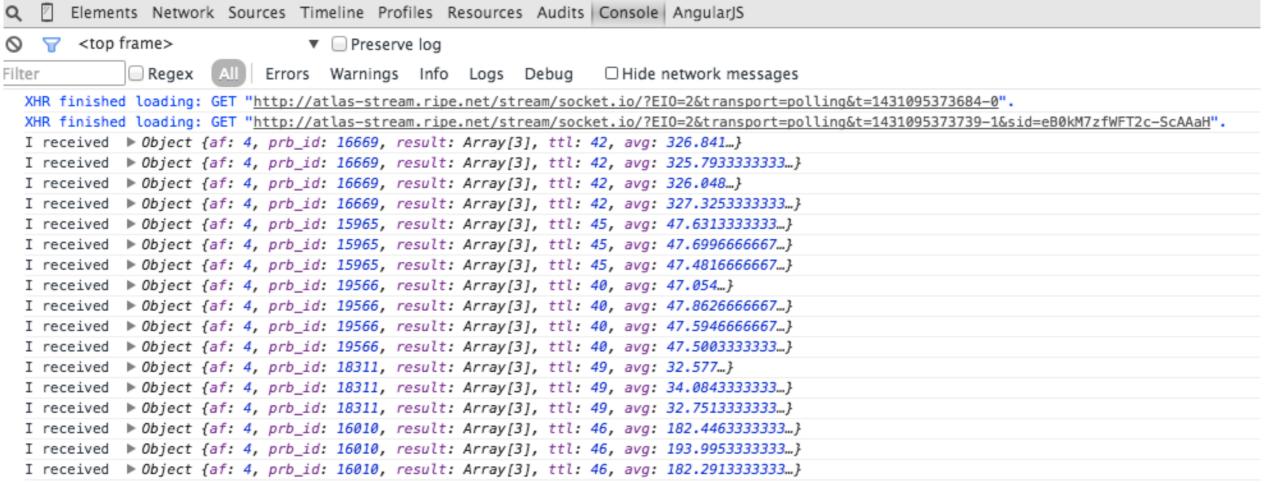
```
<script src="https://atlas-stream.ripe.net/socket.io.js"></script>

// 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>
```





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,
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,
                                          to 91.198.174.192 (91.198.174.192): ttl=58 times:36.501,
48 bytes from probe #20313 5.199.160.9
                                                                                                    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,
                                                                                                    38.095,
48 bytes from probe #18635 78.52.132.137
                                          to 91.198.174.192 (91.198.174.192): ttl=57 times:37.462,
                                                                                                             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

Get Involved!



- Use RIPE Atlas for your operations: monitoring, troubleshooting, measuring
- Do scientific research
- Participate in a webinar
- Add <u>multi-lingual</u> content
- Become an <u>ambassador</u> or a <u>sponsor</u>
- Place a probe in a new exotic location

Contact us



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



Questions

pgkigkis@ripe.net @GigisPetros



Reedem this voucher "GRNOG2017"