



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

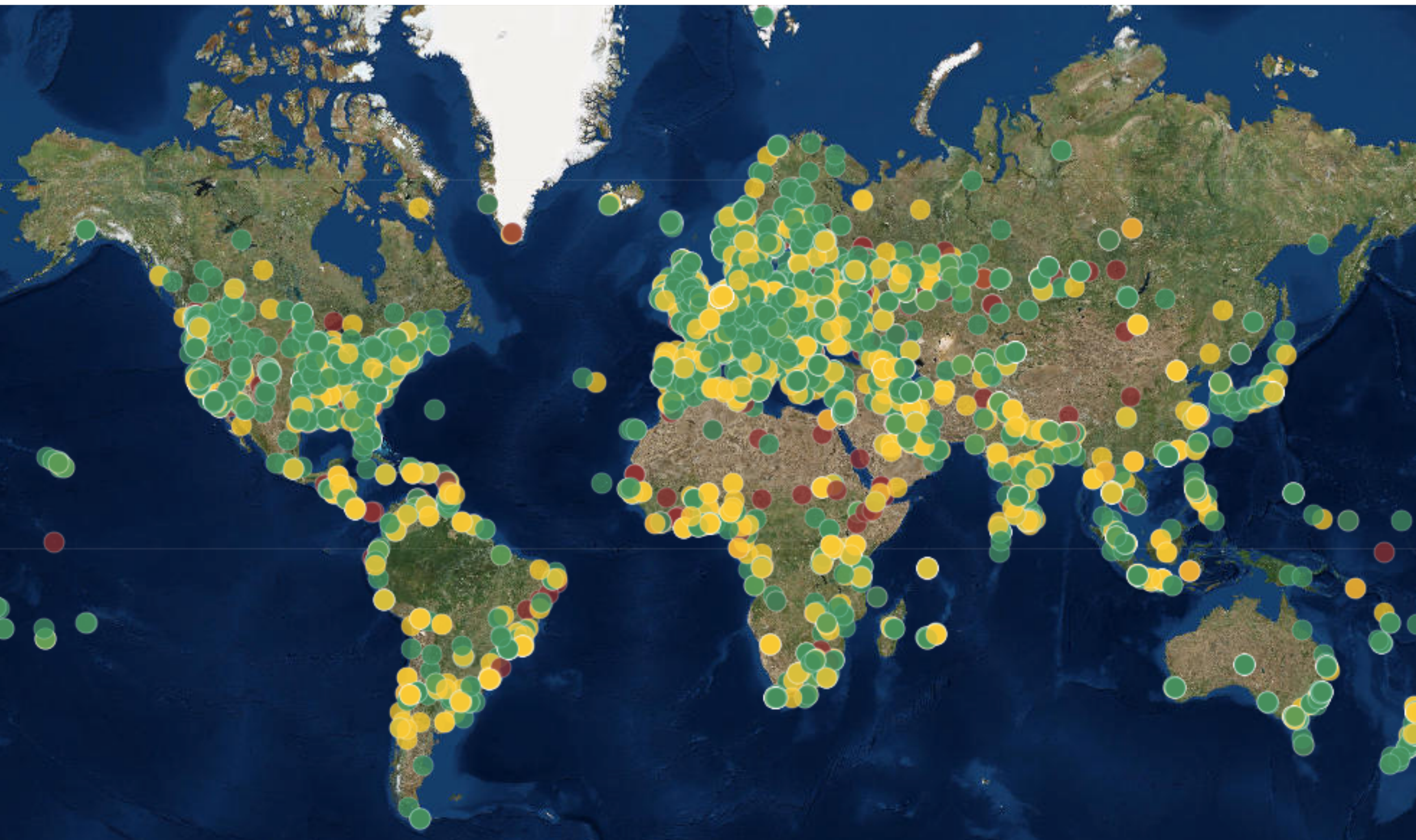
RIPE Atlas

Introduction and update

TLD CON 2023

Johan ter Beest - RIPE Atlas Team

RIPE Atlas coverage





Introduction to RIPE Atlas

Section 1

An Introduction



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

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*

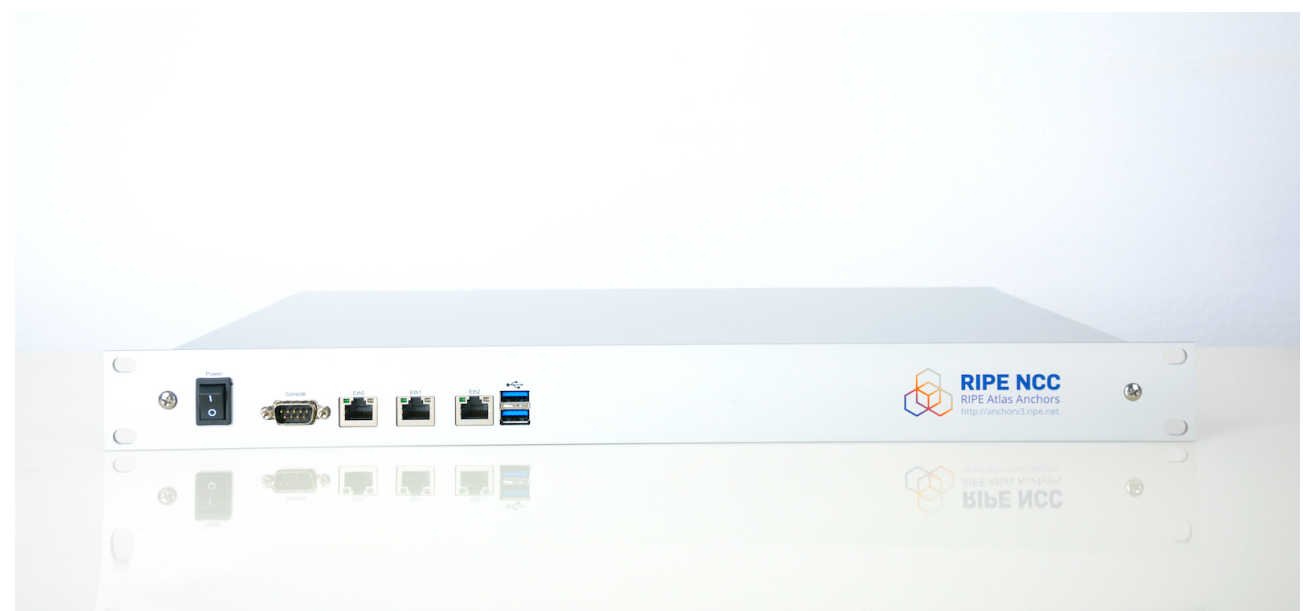
Probes and Anchors



- **12,000+** probes connected (**800+** RIPE Atlas Anchors)
- **15,000+** results collected per second
- **35,000+** measurements currently running



RIPE Atlas probe



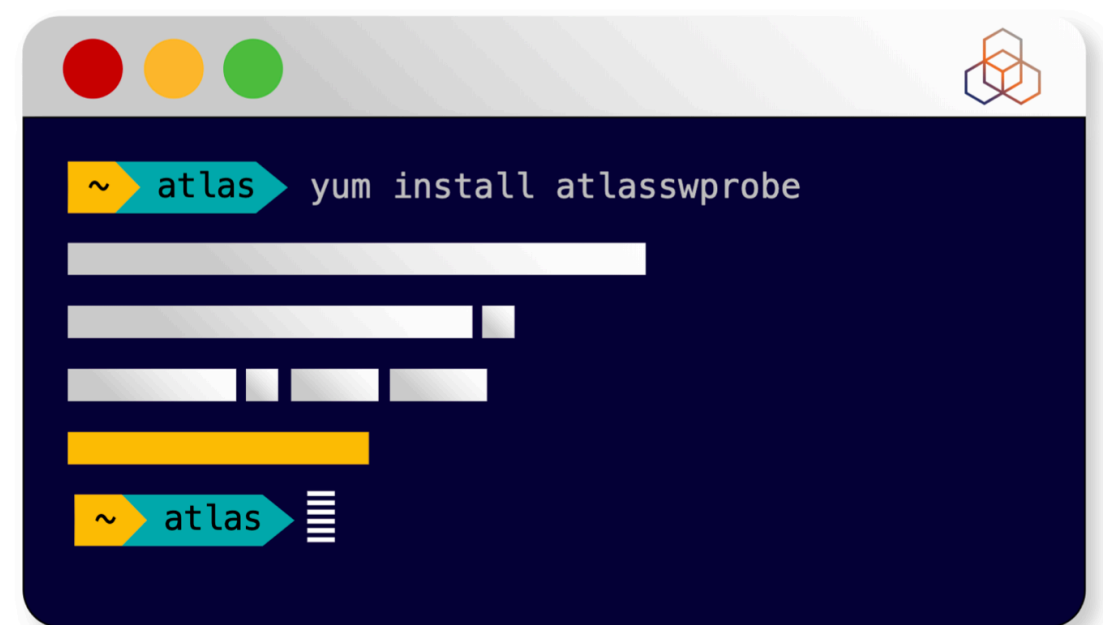
RIPE Atlas anchor

RIPE Atlas Software Probes



- Software packages that work like regular probes
- Install and run on your (virtual), machines, routers, servers etc
- Currently supporting:
 - CentOS 8; Debian (9, 10 and 11) and Raspbian; Docker; Turris Routers
- Further information: atlas.ripe.net/docs/software-probe/

Apply to host a software probe:
<https://atlas.ripe.net/apply/swprobe>





Creating a Measurement

Section 2

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 verify where the problem is;
- **Measuring** packet loss on suspected “bad” link;
- **Testing** anycast deployment.

Credits System



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

How Can you Earn Credits?



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

Credits Overview



My Atlas > Credits

×

RIPE Atlas

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Probes and Anchors

Measurements, Maps...

Measurements

Internet Maps

Tools

Resources

RIPE NCC Members

My Atlas

Credits

API Keys

Credits

Here you can see the history of your credit use and current consumption, transfer credits to someone else, and redeem a voucher for credits if you have one.

History

Charts & Archives

Transfer

Standing Order

Share Access

Redeem voucher

Time	Comment	Change	Balance
2020-11-17 12:19:30 UTC		-3,459	3,478,722
2020-11-17 06:19:30 UTC		-2,778	3,482,181
2020-11-17 00:19:30 UTC		-3,258	3,484,959
2020-11-16 18:19:30 UTC		-3,510	3,488,217
2020-11-16 17:01:01 UTC	Probe ID: 4989 Probe uptime Ambassador	2,160	3,491,727
2020-11-16 12:19:19 UTC	Measurement: 25611198 Samples: 1174	-3,522	3,489,567
2020-11-16 06:21:16 UTC	Measurement: 25611198 Samples: 1170	-3,510	3,493,089
2020-11-16 00:19:46 UTC	Measurement: 25611198 Samples: 1170	-3,510	3,496,599
2020-11-15 18:20:41 UTC	Measurement: 25611198 Samples: 1170	-3,510	3,500,109
2020-11-15 17:00:58 UTC	Probe ID: 4989 Probe uptime Ambassador	2,160	3,503,619
2020-11-15 12:19:30 UTC	Measurement: 25611198 Samples: 1189	-3,567	3,501,459
2020-11-15 06:19:38 UTC	Measurement: 25611198 Samples: 1151	-3,453	3,505,026
2020-11-15 00:19:30 UTC	Measurement: 25611198 Samples: 1169	-3,507	3,508,479
2020-11-14 18:19:24 UTC	Measurement: 25611198 Samples: 1171	-3,513	3,511,986
2020-11-14 17:01:01 UTC	Probe ID: 4989 Probe uptime Ambassador	2,160	3,515,499
2020-11-14 12:19:19 UTC	Measurement: 25611198 Samples: 1170	-3,510	3,513,339
2020-11-14 06:19:33 UTC	Measurement: 25611198 Samples: 1172	-3,516	3,516,849

3,478,722

-3,600.00 credits / hour

Give credits to someone

My Atlas > Credits

Looking Up Measurements Results



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

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Measurements [+ Create a Measurement](#)

Search by target Search... Any Status IPv4/v6 All types Of all time

ID	Type	Target	Description	Probes	Interval	Time (UTC)	Status
27416667	Ping	wikipedia.org	Ping measurement to wikipedia.org	49	one-off	2020-10-05 09:35 2020-10-05 09:45	■
27416368	Ping	nu.nl	Ping measurement to nu.nl	91	240 s	2020-10-05 09:19 Never	■
26285821	Ping	wikipedia.org	Ping measurement to wikipedia.org	50	one-off	2020-07-14 09:50 2020-07-14 10:00	■
26285799	Ping	bbc.co.uk	Ping measurement to bbc.co.uk	10	240 s	2020-07-14 09:42 2020-07-16 12:00	■
26285798	Ping	bbc.co.uk	Ping measurement to bbc.co.uk	10	240 s	2020-07-14 09:42 2020-07-16 12:00	■
26285752	Ping	trouw.nl	Ping measurement to trouw.nl	2	240 s	2020-07-14 09:31 Never	■
26285730	Ping	nu.nl	Ping measurement to nu.nl	10	240 s	2020-07-14 09:22 Never	■
26190071	Traceroute	wikipedia.org	Traceroute measurement to wikipedia.org	20	one-off	2020-07-07 09:29 2020-07-07 09:35	■
26190047	Ping	wikipedia.org	Ping measurement to wikipedia.org	49	one-off	2020-07-07 09:22 2020-07-07 09:30	■
26189995	Traceroute	trouw.nl	Traceroute measurement to trouw.nl	76	900 s	2020-07-07 19:05 2020-07-09 10:05	■
26189976	Ping	nu.nl	Ping measurement to nu.nl	10	240 s	2020-07-07 08:57 Never	■
25622447	Ping	wikipedia.org	Ping measurement to wikipedia.org	50	one-off	2020-06-04 13:46 2020-06-04 13:55	■
25611198	Ping	nu.nl	Ping measurement to nu.nl	13	240 s	2020-06-03 12:55 Never	○

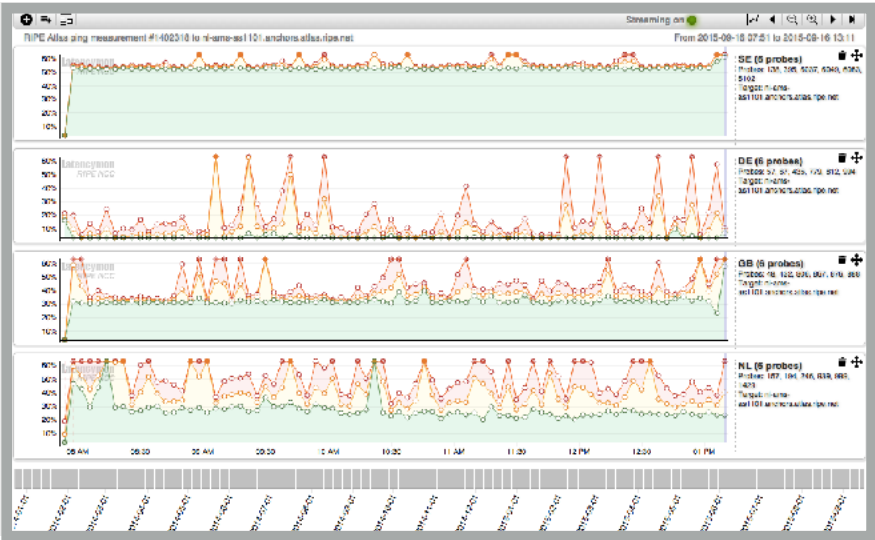
Available Visualisations: Ping



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

*List of probes
sortable by RTT*

*Map
colour-coded by RTT*



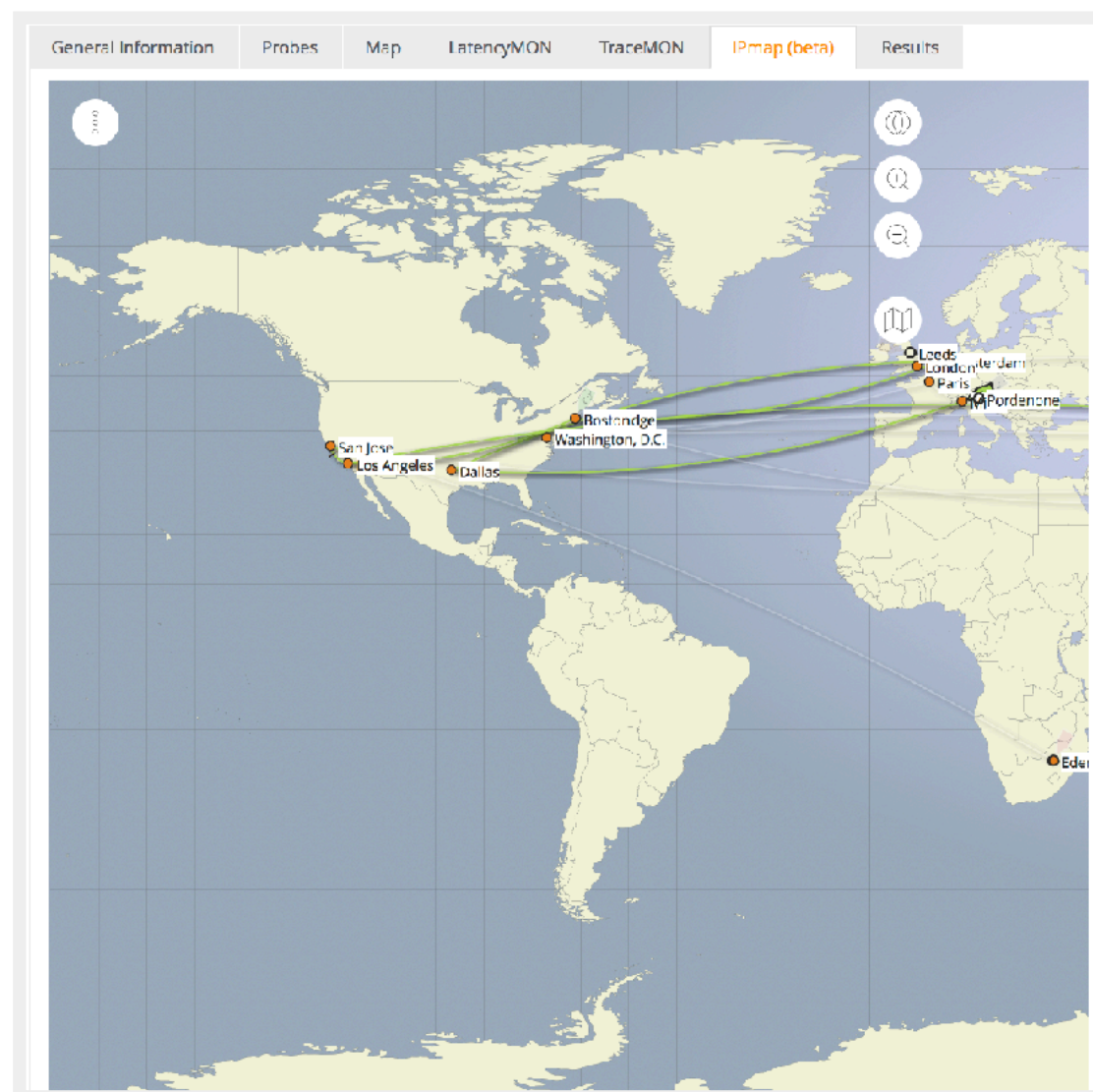
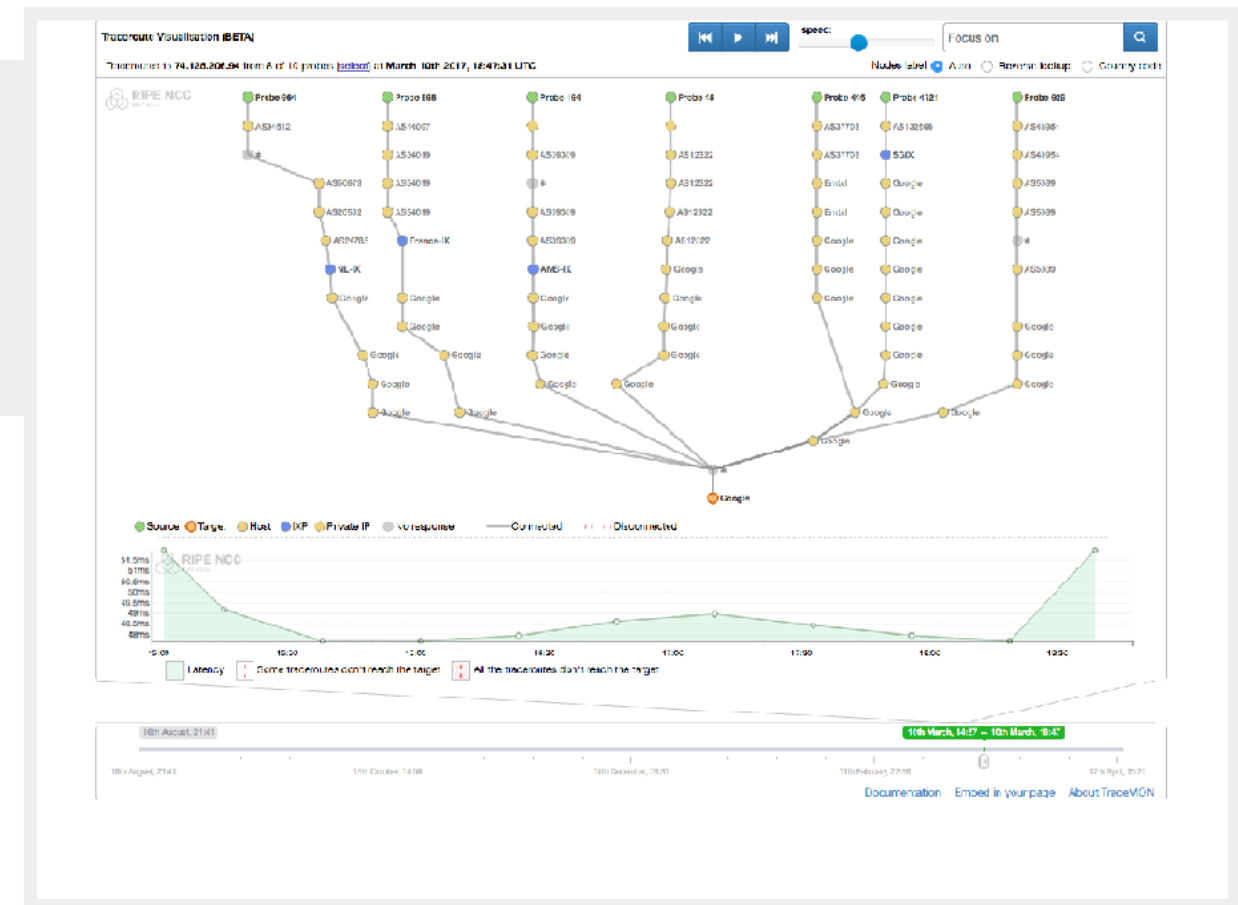
*LatencyMON
compare multiple latency trends*

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*



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	<div></div>	362.009
18035	43030			2015-05-19 09:50	null	<div></div>	347.39
18129	327805			2015-05-19 09:49	null	<div></div>	207.743
15844	32098			2015-05-19 09:48	null	<div></div>	184.237
17857	852			2015-05-19 09:37	null	<div></div>	177.694
19894	6327			2015-05-19 09:36	null	<div></div>	168.689
19204	21513			2015-05-19 09:50	null	<div></div>	141.199
15922	30036			2015-05-19 09:47	null	<div></div>	133.309

List of probes:
sortable by response time

Raw Measurement Data download



You are here: [Home](#) > [Analyse](#) > [Internet Measurements](#) > [RIPE Atlas](#) > [Measurements](#) > Measurement #13027

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Settings & Status Map Latencymon **Downloads**

Download the raw measurement result data here.

You can use this form to download the data through your browser, or use the preview on the right to help you query the REST API directly.

Select Your Timeframe

Start Date*:

2038-01-14 UTC

All dates are start-of-day

Stop Date*:

2038-01-14 UTC

All dates are end-of-day

Format:

json

Download

URL Preview

```
/api/v2/measurements/13027/results/?start=2147040000&stop=2147126399&format=json
```

RIPE Atlas Data on BigQuery



- RIPE Atlas measurement results available via Google BigQuery
- General purpose data warehouse
- SQL query language on top
- Great for rapid investigation
- Build complex analyses, or just heavy filtering prior to local analysis

<https://github.com/RIPE-NCC/ripe-atlas-bigquery/>

<https://labs.ripe.net/tools/>

The screenshot shows the Google Cloud Platform BigQuery interface. The top navigation bar includes 'Google Cloud Platform', 'Serious Research Project', and a search bar. The left sidebar contains a 'Query history' section and a 'Resources' section with a search bar and a tree view of data sets. The 'Query editor' on the right contains a SQL query:

```
1 select msm_id, count(*) result_count
2 from `ripenc-atlas`.samples.ping
3 group by msm_id
4 order by result_count desc
```

 Below the query editor, a 'Valid' status is shown. The 'Query results' section displays a table with 11 rows of data. The table has columns 'Row', 'msm_id', and 'result_count'. The results are sorted by 'result_count' in descending order.

Row	msm_id	result_count
1	1012	40299
2	1016	40185
3	1015	40102
4	1004	40058
5	1030	40046
6	1009	40038
7	1010	39993
8	1019	39992
9	1005	39924
10	1013	39906
11	1031	39878



Command-line Interface (CLI) Toolset

Section 3

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>

Installing the CLI tool

RIPE Atlas CLI



- Open source
 - RIPE NCC led community contribution
- Documentation
 - <https://ripe-atlas-tools.readthedocs.org/>
- Source, if you want to contribute:
 - <https://github.com/RIPE-NCC/ripe-atlas-tools/>

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

Contact Us



- <https://atlas.ripe.net>
- Users' mailing list: ripe-atlas@ripe.net
- Articles and updates: <https://labs.ripe.net/atlas>
- In the works: <https://atlas.ripe.net/docs/in-the-works/>
- Questions and bugs: atlas@ripe.net
- Twitter: @ripenncc and #RIPEAtlas



The future of RIPE Atlas

Things we are working on

Front end changes



- UX
 - Simplify probe management like transferring probes and measurements
 - Requesting credits as a researcher through RIPE Atlas using a special Research Credit Pool
 - Request elevated permissions for your measurement campaign
- UI
 - Atlas will become a real web app
 - Removal of all the promotional material into its own website

Backend Changes



- Data will be split into hot and cold storage
 - New data will be available faster
 - Cluster will be much more stable with fewer bottlenecks
 - Cold data (anything older than 1 month) will be available via the same API's but potentially a bit slower
- Many more API's
 - Some completely new
 - Many additional fields on the existing API's
- New measurements
 - StartTLS

Other improvements



- RIPE Atlas will run more measurements for our users
 - Common targets such as Google, Facebook and several CDN's
- Overhaul of the probe page to show more things interesting for the probe host
- Improvements to the Measurement creation page to be faster, improve probe selection and better support for finding existing measurements
 - Will be available for beta testing by September 18



Questions

