



**RIPE NCC**

RIPE NETWORK COORDINATION CENTRE

# Measuring Reachability of your Web Server using RIPE Atlas

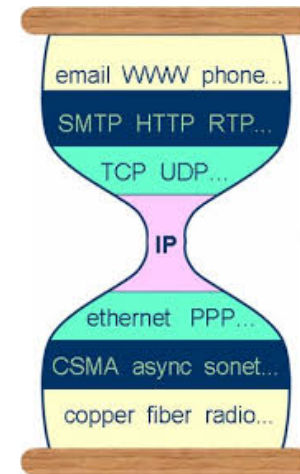
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SEE8 April 2019 | RIPE NCC

# The Most Wanted Feature...



- By design, RIPE Atlas does not measure “application layer”
  - Operators are happy with transport/network layer
  - ping, traceroute, DNS, TLS/SSL, NTP
- Users have been asking for **HTTP measurements**
- Due to ethical reasons, we decided:
  - not possible to target arbitrary web sites with probes
  - “standard” HTTP measurements are ONLY possible towards RIPE Atlas anchors



# Ethical Reason: Protecting Hosts



# Workaround: Using a “TCP Ping”



- traceroute (TCP) to the targeted **web server**
  - towards IP address : port 80
  - 3 packets; a packet size of **zero**
  - “maximum hops” = 64; initial time-to-live (TTL) = 64
  - long enough for the first traceroute attempt to immediately reach the destination address
- Mimics the behaviour of the TCP handshake
  - that takes place when setting up an HTTP connection
- This measures the same network delays!
  - RTT turns out to be equivalent to HTTP connect times

# How to: Web UI

- Go to “Measurements”
- Click on “New msm”
- “Advanced options”
- Add up to 1000 probes
- Choose “one off”
  - or continuous / repeated
- Done!
  - you need to have “credits”

## Create a New Measurement

Step 1 Definitions

Traceroute measurement to dk-blp-as39839.anchors.atlas.ripe.net

Target\*: dk-blp-as39839.anchors.atlas.ripe.net  
An IP address or hostname

Description: Traceroute measurement to dk-blp-as39839.

Address Family\*: IPv4

Protocol\*: TCP

Timeout (ms): 4000

Interval: 600  
How often this should be done (seconds between samples). Note that this value is ignored for one-off measurements.

Resolve on Probe: ☐  
Force the probe to do DNS resolution

Advanced Options

Packets: 3

Size: 0  
Size of the packet

First Hop: 64  
Start measuring the traceroute at this hop.

Maximum Hops: 64  
Stop measuring the traceroute at this hop.

Spread:   
Spread of uniformly distributed random probe start time phase

Port: 80

Paris: 16  
Number of different variations for paris traceroute. Set 0 for standard traceroute.

Destination Extension Header Size: 0  
The size of the destination extension header to include in the IPv6 packet.

Hop-by-Hop Extension Header Size: 0  
The size of the hop-by-hop extension header to include in the IPv6 packet.

Don't Fragment: ☐

Skip DNS check: ☐  
Disables target DNS check on measurement creation

# How to: Command Line (CLI)

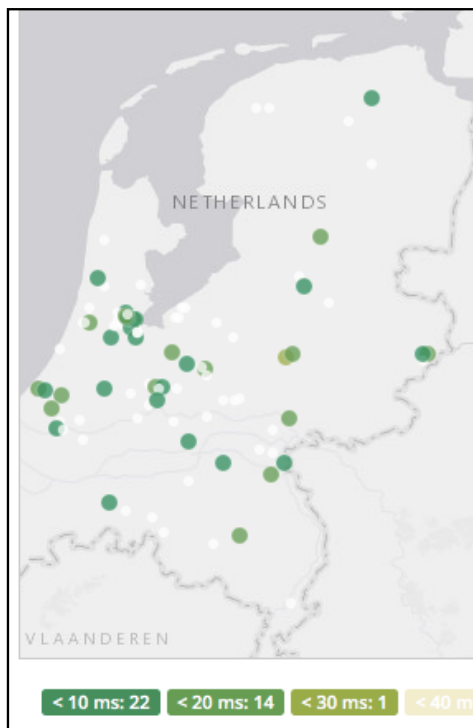


```
# ripe-atlas measure traceroute --target  
82.94.235.165 --protocol TCP --size 1  
--first-hop 64 --max-hops 64 --port 80
```

- "—size" should actually be **0**, will be fixed soon
  - *Please help us by fixing it yourself, make a pull request!*
- CLI tools:
  - Source: <https://github.com/RIPE-NCC/ripe-atlas-tools/>
  - Documentation: <https://ripe-atlas-tools.readthedocs.org/>
  - Included in many Linux / BSD distributions



# Results



- Reachability Map

- colour-coded for latency

- List of probes and latencies

⚡ 3rd TCP Ping measurement to 82.94.235.165 (unciv.nl)

General Information		Probes	Map	TraceMON (beta)	OpenIPMap Prototype	Results	Mod
Probe	↕ ASN (IPv4)	↕ ASN (IPv6)	↕	↕	↕ Time (UTC)	↕ RTT	↕ Hop
10150	6830	6830	🇳🇱	🌐	2017-10-03 11:51	23.829	1
10782	3265	3265	🇳🇱	🌐	2017-10-03 11:51	18.605	1
24605	3265	3265	🇳🇱	🌐	2017-10-03 11:51	18.090	1
13538	6830		🇳🇱	🌐	2017-10-03 11:51	17.560	1
31178	6830		🇳🇱	🌐	2017-10-03 11:51	16.069	1
16274	28685		🇳🇱	🌐	2017-10-03 11:51	14.752	1

- Download as JSON

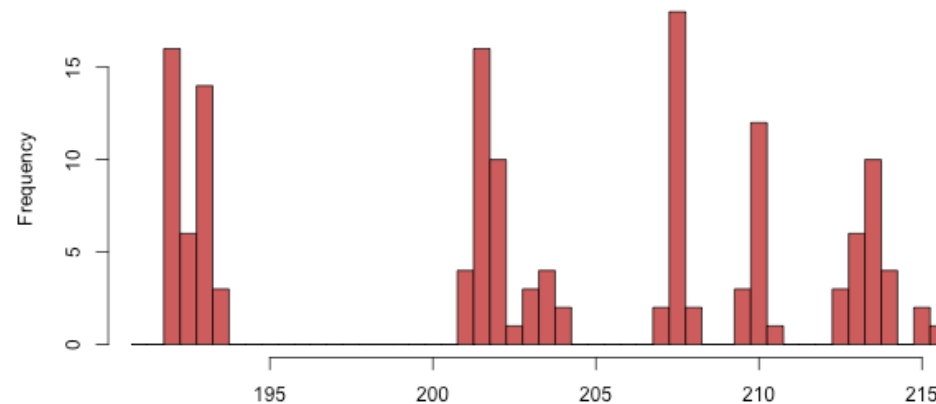
- <https://atlas.ripe.net/api/v2/measurements/9412863/results/?start=1506988800&stop=1507075199&format=json>

# Detailed Technical Information

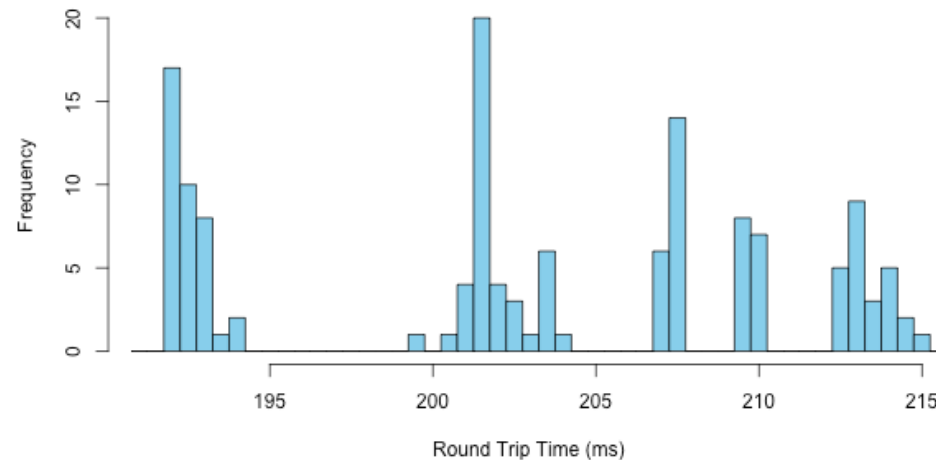


- Rene Wilhelm on RIPE Labs
- for 68% of the probe/destination pairs, median values differ by less than 1ms
- Interdecile ranges differ by less than 6ms
- When compared to RTT of 100 milliseconds, a difference in spread of 5-15ms may still be acceptable to assess network performance

HTTP Time to Connect to 210.4.72.46 from probe 25717



TCP RTTs to 210.4.72.46 from probe 25717





# Web Measurements: Feedback?



- This is the newest feature! October 2017
- We are looking for feedback:
  - is this useful?
  - what is your use case?
  - would you like to have a query tool, like DomainMon?
  - do you prefer CLI, for own scripting?
  - would you use it for monitoring?
- Thank you for using RIPE Atlas!
  - we invite you to write about it on RIPE Labs

# Contacting RIPE Atlas



- <https://atlas.ripe.net>
- Use cases and updates: <https://labs.ripe.net/atlas>
- Mailing list for active users:
  - [ripe-atlas@ripe.net](mailto:ripe-atlas@ripe.net)
  - <https://www.ripe.net/participate/mail/forum/ripe-atlas>
- Questions: [atlas@ripe.net](mailto:atlas@ripe.net)
- Twitter: [@RIPE\\_Atlas](#) and [#RIPEAtlas](#)



## **Additional Slides**



# **Introduction to RIPE Atlas Command-line Interface (CLI) Toolset**

# CLI Toolset: Benefits



- Access RIPE Atlas from the terminal / shell console
- Quick and dirty shortcuts for network troubleshooting
- FLOSS (open-source) tools
  - Written and maintained by RIPE NCC
  - Open to community contributions
- Before you can use the toolset:
  - Download the tools
  - Install
  - Configure

# CLI Toolset: Links



- Source:
  - <https://github.com/RIPE-NCC/ripe-atlas-tools/>
- Documentation:
  - <https://ripe-atlas-tools.readthedocs.org/>
- Included in the Linux / BSD distributions:
  - OpenBSD, FreeBSD, Gentoo, Arch, Debian & Ubuntu
  - (in progress: Fedora, Windows)

# Create a ping Measurement



- Simplest: one-off, using default values (50 probes to “target”)
- \$ `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,
```

```
48 bytes from probe #19368 188.75.141.6 to 91.198.174.192 (91.198.174.192): ttl=55 times:23.983, 23.833, 23.85,
48 bytes from probe #20236 94.112.19.136 to 91.198.174.192 (91.198.174.192): ttl=52 times:32.543, 32.069, 31.873,
48 bytes from probe #18830 46.42.38.244 to 91.198.174.192 (91.198.174.192): ttl=58 times:58.404, 58.075, 58.246,
48 bytes from probe #24056 176.156.201.171 to 91.198.174.192 (91.198.174.192): ttl=58 times:32.761, 32.819, 32.734,
48 bytes from probe #26946 67.233.176.217 to 91.198.174.192 (91.198.174.192): ttl=50 times:151.735, 118.041, 142.844,
48 bytes from probe #27414 170.210.70.251 to 91.198.174.192 (91.198.174.192): ttl=43 times:290.444, 285.019, 773.309,
48 bytes from probe #18607 185.75.138.141 to 91.198.174.192 (91.198.174.192): ttl=47 times:41.673, 33.16, 26.11,
48 bytes from probe #10246 194.33.189.126 to 91.198.174.192 (91.198.174.192): ttl=60 times:35.729, 35.558, 35.617,
48 bytes from probe #14724 194.231.22.155 to 91.198.174.192 (91.198.174.192): ttl=58 times:22.465, 22.181, 23.242,
48 bytes from probe #12092 93.189.153.142 to 91.198.174.192 (91.198.174.192): ttl=53 times:15.032, 13.846, 13.99,
48 bytes from probe #10506 63.130.83.21 to 91.198.174.192 (91.198.174.192): ttl=59 times:79.37, 78.971, 79.085,
```

```
Disconnecting from stream
```

```
You can find details about this measurement here:
```

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



## Other Examples of ping



- Geo-specific using 20 probes from Canada:
  - `$ ripe-atlas measure ping --target example.com --probes 20 --from-country ca`
- 20 Canadian probes that 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`

# traceroute



```
$ ripe-atlas measure  
traceroute --probes 2  
--target google.ca
```

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

<https://atlas.ripe.net/measurements/3499936/>

Connecting to stream...

## Probe #3837

1	192.168.8.254	2.748 ms	1.931 ms	1.982 ms
2	77.51.191.254	3.286 ms	3.051 ms	3.076 ms
3	172.27.8.174	4.421 ms	4.775 ms	4.694 ms
4	77.37.254.129	5.48 ms	5.363 ms	6.52 ms
5	72.14.209.81	4.37 ms	4.232 ms	4.183 ms
6	209.85.240.209	47.099 ms	46.705 ms	41.563 ms
7	209.85.240.102	23.207 ms	23.001 ms	22.993 ms
8	209.85.249.59	40.565 ms	40.454 ms	40.004 ms
9	209.85.254.198	62.337 ms	45.201 ms	44.595 ms
10	216.239.49.28	44.999 ms	44.887 ms	44.907 ms
11	*	*	*	*
12	173.194.65.94	77.313 ms	82.476 ms	83.303 ms

## Probe #16731

1	192.168.80.254	0.582 ms	0.483 ms	0.413 ms
2	188.134.205.225	0.79 ms	0.683 ms	0.684 ms
3	84.16.101.226	1.13 ms	1.169 ms	1.114 ms
4	86.61.255.241	5.503 ms	5.711 ms	5.629 ms
5	91.210.16.211	5.753 ms	5.307 ms	5.579 ms
6	216.239.56.169	13.419 ms	13.358 ms	13.243 ms
7	216.239.57.190	15.311 ms	15.26 ms	15.295 ms
8	209.85.253.216	17.012 ms	17.091 ms	16.925 ms
9	72.14.234.170	21.411 ms	21.472 ms	21.318 ms
10	216.239.51.19	25.035 ms	24.67 ms	24.773 ms
11	216.239.56.163	24.607 ms	24.554 ms	24.55 ms
12	*	*	*	*
13	173.194.65.94	25.36 ms	25.894 ms	24.296 ms

Disconnecting from stream

You can find details about this measurement here:

<https://atlas.ripe.net/measurements/3499936/>

# Search for Existing Measurements



```
$ ripe-atlas measurements --af 6 --status ongoing --limit 15  
--search google
```

```
Filters:  
  Search: google  
  Af: 6  
  Status in: (2,)
```

Id	Type	Description	Status
1004005	ping	google - v6	Ongoing
1004732	traceroute	google v6 traceroute	Ongoing
1007128	dns	Google.fi AAAA reply	Ongoing
1012449	sslcert	www.google.com	Ongoing
1024911	ping	IPv6 Google DNS	Ongoing
1404300	ping	IPv6 Ping to Google	Ongoing
1665737	ping	google.com - 2404:6800:4003:c00::71	Ongoing
1796260	ping	Ping measurement to www.google.com	Ongoing
1889086	traceroute	Traceroute measurement to ipv6.google.com	Ongoing
2062542	traceroute	Traceroute measurement to ipv6.google.com	Ongoing
2062543	ping	Ping measurement to ipv6.google.com	Ongoing
2143865	ping	Ping measurement to ipv6.google.com	Ongoing
2486602	traceroute	IPv6 Traceroute measurement to snapchat.com	Ongoing
2486820	ping	Google IPv6	Ongoing
2929651	ping	campaign:th-mon-run2 type:ping host:plus.goog	Ongoing

Showing 15 of 18 total measurements

# Search for Very Specific Probes



```
$ ripe-atlas probes --asn 3333 --field id --field asn_v6 --field country --field is_public --field description --field status
```

Filters:  
ASN: 3333

ID	Asn_v6	Country	Public	Description	Status
9	3333	nl	✓	SG office 1	Connected
14	3333	nl	✓	vty probe	Connected
15	3333	nl	✓	SG office 2	Connected
111	3333	br	✗	NIC.br	Abandoned
237	3333	nl	✓	The Traveling Probe	Connected
1108	3333	us	✓	probe 1	Abandoned
2009	3333	nl	✓	NCC Office 2009	Connected
3497	3333	nl	✗		Abandoned
4840	3333	nl	✗		Abandoned
6001	3333	nl	✓	AA nl-ams-as3333	Connected
6012	3333	nl	✗	AA pre-production	Connected
6018	3333	nl	✗		Abandoned
6019	3333	nl	✓	RIPE NCC Anchor v2	Connected
6137	3333	nl	✓	nl-ams-as3333-preprod	Connected
10004	3333	nl	✓	RIPE NCC R&D Office	Abandoned
10105	3333	nl	✗		Abandoned
10106	3333	nl	✗		Abandoned
10888	3333	nl	✓	Ridderkerk - UPC 120/10Mbits	Abandoned
11187	3333	nl	✗		Disconnected
11283	3333	gb	✗	DUFFPROBE	Disconnected
12989		de	✓	TeraStream Test Lab	Abandoned
13343	3333	ch	✓	FSIT AG - CH-DIE001 - out of 0	Abandoned
14004	3333	nl	✗		Abandoned
14013	3333	nl	✗		Abandoned
14020	3333	nl	✗		Abandoned

Showing 25 of 39 total probes



# **RIPE NCC Hackathons**

# What is a Hackathon?



- Hack-a-thon = hacking marathon
  - intensive coding on FLOSS (free and open source software)

**hacker:** n.

[originally, someone who makes furniture with an axe]

1. A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary. RFC1392, the *Internet Users' Glossary*, usefully amplifies this as: A person who delights in having an intimate understanding of the internal workings of a system, computers and computer networks in particular.

- Cooperative, collaborative, non-competitive
- Non-commercial: no monetary rewards

# Powered by Stroopwafels!





# Goals of the Hackathons



- Bring together operators, researchers, designers, coders
- Combine creative skills
- Get feedback for RIPE NCC
- Contribute useful tools for operators
- Make new connections
- Have fun!



# Previous RIPE NCC Hackathons



- [labs.ripe.net/hackathons](https://labs.ripe.net/hackathons)
  - RIPE Atlas [DataViz](#) (March 2015)
  - RIPE Atlas [Tools for Operators](#) (October 2015)
  - RIPE Atlas [Interfaces](#) (April 2016)
  - [IXP Tools](#) (October 2016)
  
  - IXP Tools [Code-Sprint](#) (April 2017)
  - [DNS Measurements](#) (April 2017)
- All [code on GitHub](#)

# Take Part in Our Hackathons



- Use the software and tools
  - Share your use cases and success stories
- Modify the code, contribute improvements
  - All the code is on [GitHub](#)
- Watch this page: <https://labs.ripe.net/hackathons>

## More Info & Contacting RIPE Atlas



- <https://atlas.ripe.net>
- Use cases and updates: <https://labs.ripe.net/atlas>
- Mailing list for active users:
  - [ripe-atlas@ripe.net](mailto:ripe-atlas@ripe.net)
  - <https://www.ripe.net/participate/mail/forum/ripe-atlas>
- Questions: [atlas@ripe.net](mailto:atlas@ripe.net)
- Twitter: [@RIPE\\_Atlas](#) and [#RIPEAtlas](#)