Measuring Reachability of your Web Server using RIPE Atlas

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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 <u>ethical reasons</u>, we decided:

  - not possible to target arbitrary web sites with probes

  - "standard" HTTP measurements are ONLY possible towards <u>RIPE Atlas anchors</u>
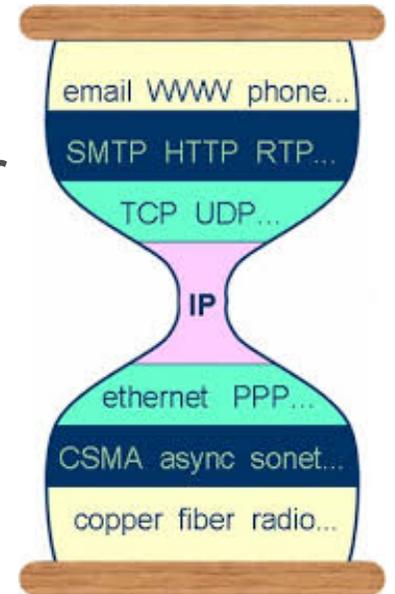
Ethical Reason: Protecting Hosts

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!

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

Address Family*:
IPv4

Timeout (ms):
4000

Description:
Traceroute measurement to dk-blp-as39839.

Protocol*:
TCP

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**
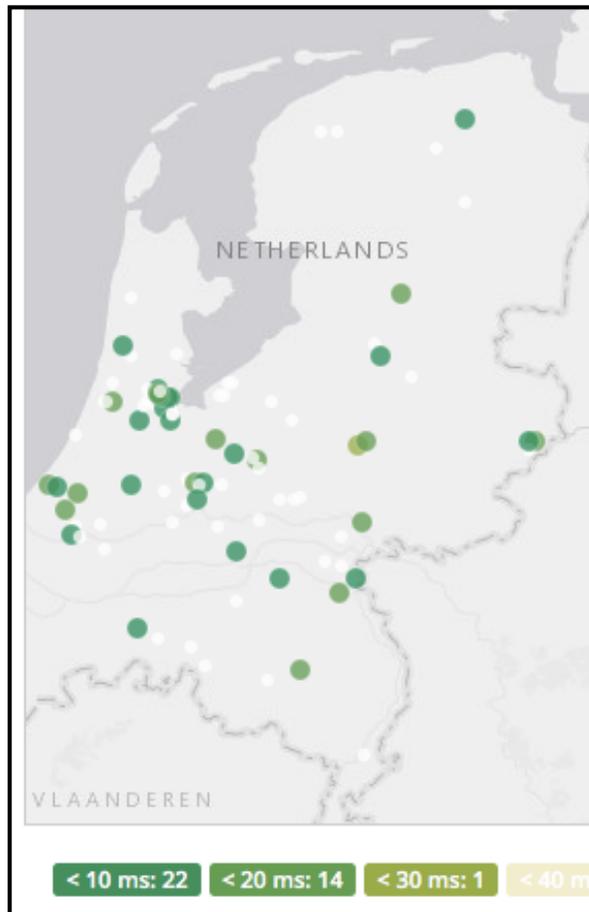
⚡⁴ **3rd TCP Ping measurement to 82.94.235.165 (unciv.nl)**

| 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
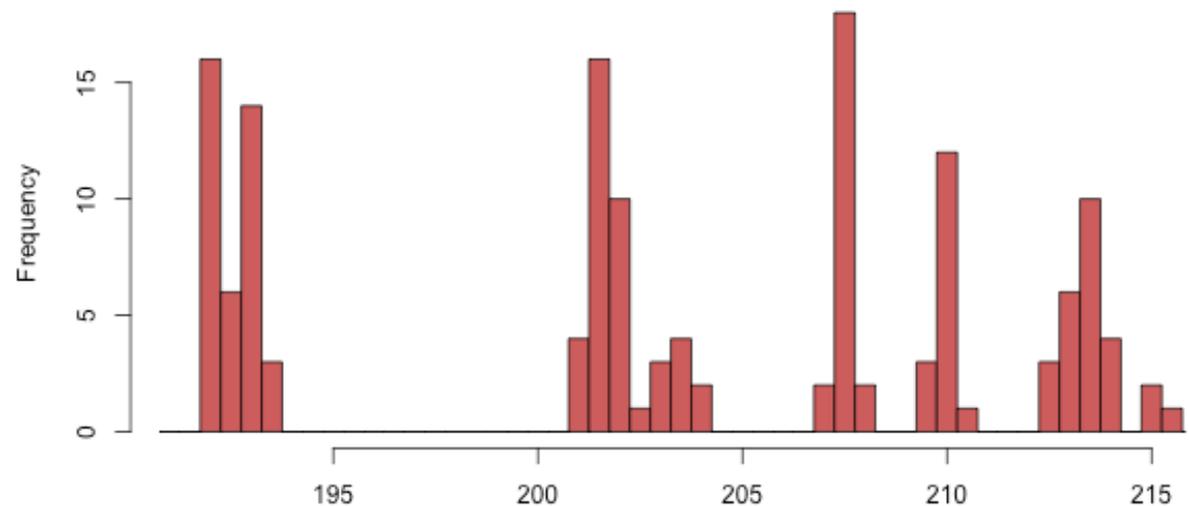
TCP RTTs to 210.4.72.46 from probe 25717

Round Trip Time (ms)
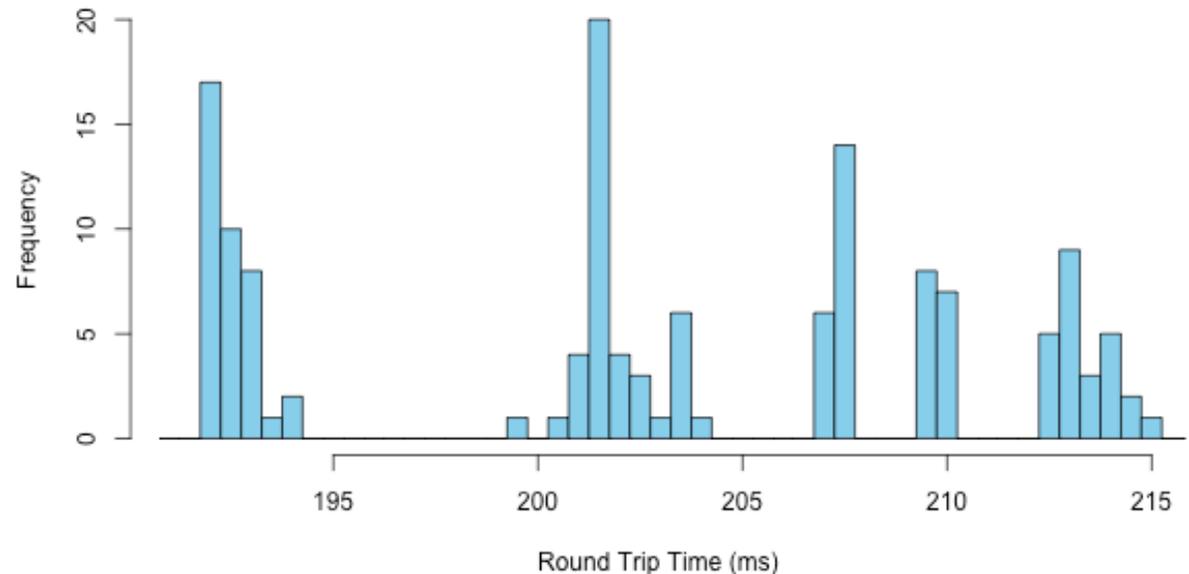
Web Measurements: Feedback?

- 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

  - https://www.ripe.net/participate/mail/forum/ripe-atlas

- Questions: 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 O 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?

- <u>Hack-a-thon</u> = 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!

RIPE ATLAS HACKATHON:

MOST FUN I HAD AT RIPE SINCE CANALS FROZE

memes.com

Previous RIPE NCC Hackathons

- 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

Next: Hackathon Version 6

- https://labs.ripe.net/Members/becha/save-the-date-ripe-ncc-hackathon-version-6

- Topic: IPv6

- Date: 4 and 5 November 2017

  - Saturday & Sunday

- Location: Copenhagen, Denmark

- Sponsor: Comcast

- Local support: DKNOG

- Looking for: more sponsors, experts, participants

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

- Early call for 2018

  - Two events planned: Spring and Autumn 2018

  - Be a host / local partner / juror

  - Be a sponsor

- 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
  - https://www.ripe.net/participate/mail/forum/ripe-atlas

- Questions: atlas@ripe.net

- Twitter: @RIPE_Atlas and #RIPEAtlas