

A faint, light gray map of Asia and Oceania serves as the background for the slide. The map shows the outlines of the continents and major islands, with a slightly darker shade of gray for the landmasses.

Using RIPE Atlas for network diagnostics

Swapneel Patnekar

APNIC Community Trainer

Housekeeping

- If you wish to ask a question:
 - Type your question in the Zoom Q&A
 - Unmute and ask!
- Webinar is being recorded

RIPE Atlas

What is RIPE Atlas?

- A large scale distributed measurement project consisting of probes, anchors and backend servers
- Probes - Hardware probe - Small low powered device, designed to be placed with end users (eyeballs) and triggers measurements (pre-defined & user defined)
Software probe - Can be installed on a Raspberry Pi, NUC, VPS etc
- Anchors: Bigger version of probes, designed to be running in datacenters & act as one of the target for the probes
- Backend system: Enables mechanism of triggering measurements from probes via web UI as well as API, collect measurement data

Global Coverage - RIPE Atlas probes



Connected: 11700 Disconnected: 1638 Abandoned: 16324

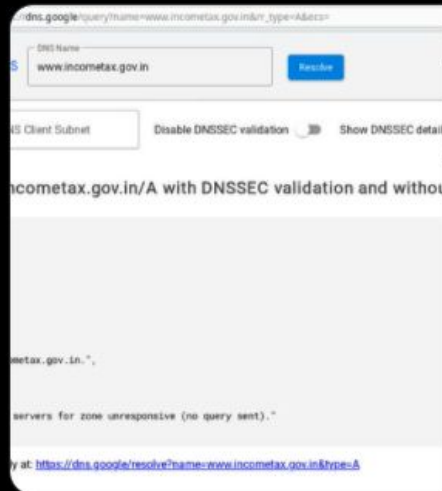
Why RIPE Atlas ?



@HopboxNet

@NICMeity @GoogleIndia @IncomeTaxIndia Google's public DNS is not resolving "www.incometax.gov.in" causing outages. Quad9, Cloudflare, OpenDNS, Level3 DNS servers OK. Please get it looked.

Also, no A record for "incometax gov in" (without WWW).



icometax.gov.in @4.2.2.2

```
, id: 64460
RITY: 1, ADDITIONAL: 1
```

ns01.incometax.gov.in. ns-admin.income

10:18 AM · Aug 26, 2021 · Twitter Web App




hopbox @HopboxNet · Aug 26

Replying to @HopboxNet

@NICMeity @GoogleIndia @Google @IncomeTaxIndia @Infosys Thanks to @pswapneel for running RIPE Atlas measurement on 8.8.8.8 and 8.8.4.4 for "www.incometax.gov.in" all of which give SERVFAIL.

JSON reports downloadable at

[illegible]

 **Swapneel Patnekar** @pswapneel · Aug 26

Replying to @HopboxNet @abhasabhinav and 3 others

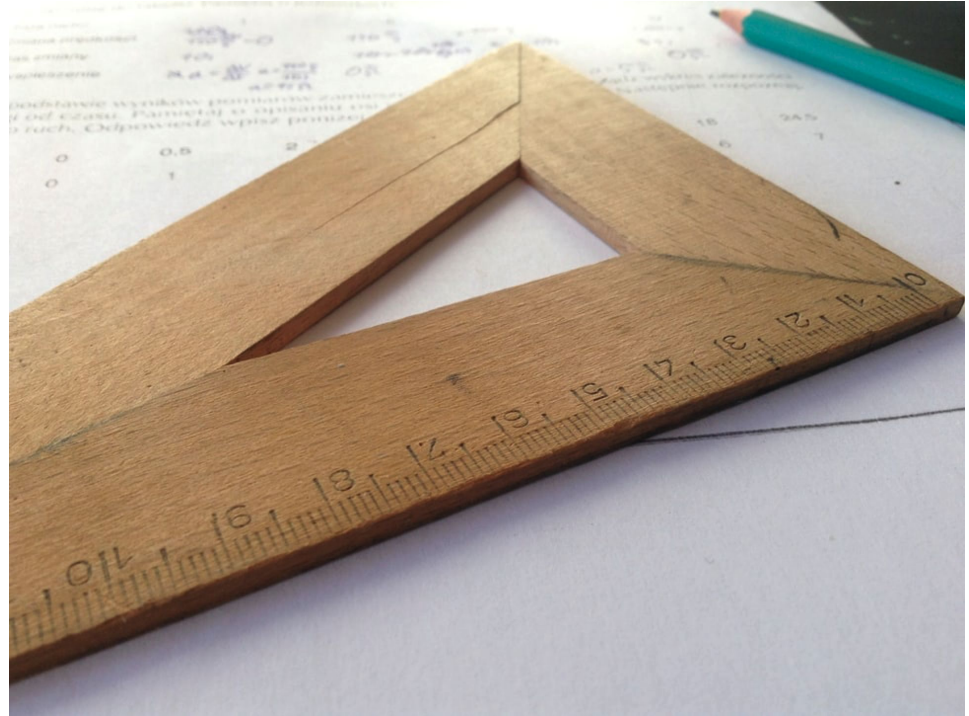
1.atlas.ripe.net/measurements/3...

This measurement ran on 106 probes within India with 8.8.8.8 as the target resolver DNS A inetmetax.gov.in

2.atlas.ripe.net/measurements/3.....

What can be measured ?

- Ping
- Traceroute
- DNS
- SSL/TLS
- NTP
- HTTP



Value of RIPE Atlas to a network operator

- Probes in a big eyeball AS cannot reach my AS an alert can be triggered
- Routing perspective - packets transiting outside the country when they should remain local

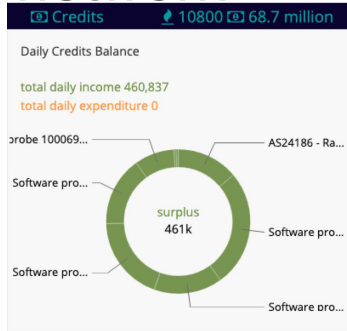
RIPE Atlas Measurements

RIPE Atlas Measurements

- Built-in global measurements towards root servers & anchors
- Users can run customised measurements - ping, traceroute, DNS, SSL/TLS, NTP and HTTP
- Public Measurements - <https://atlas.ripe.net/measurements/>
- All RIPE Atlas dumps - <https://data-store.ripe.net/datasets/atlas-daily-dumps/>

User defined measurements (UDM)

- Create a free account at <https://access.ripe.net/registration>
- Credits is 👑 ! :-) Run a probe in your network and earn credits !
15 credits for each minute the probe is connected to the RIPE network



- <https://atlas.ripe.net/user/credits/#!/redeem> - Voucher code - APNIC 2021 (1M, valid until 31 Dec 2021)

How to trigger measurements ?

1. Web UI on atlas.ripe.net
2. Using API via command line

Create a New Measurement

Step 1 Definitions

Please select the type of measurement you want to create

[+ Ping](#) [+ Traceroute](#) [+ DNS](#) [+ SSL](#) [+ HTTP](#) [+ NTP](#)

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 (UTC): ⋮

Stop time (UTC): ⋮

[> Measurement API Compatible Specification](#)

Create My Measurement(s)

Let's run a measurement

- Traceroute to apnic.net from all probes in AU
- RTT to apnic.net from Autonomous systems in AU



Traceroute to apnic.net from all probes in AU

Create a New Measurement

Step 1 Definitions

Traceroute measurement to apnic.net

Target*:
apnic.net
An IP address or hostname

Description:
Traceroute measuremen

Address Family*:
IPv4

Protocol*:
ICMP

Timeout (ms):
4000

Interval:
900
How often this should be done (seconds between samples). Note that this value is ignored for one-off measurements.

Tags
A list of comma separated tags

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

Advanced Options

Step 2 Probe Selection

AU 215

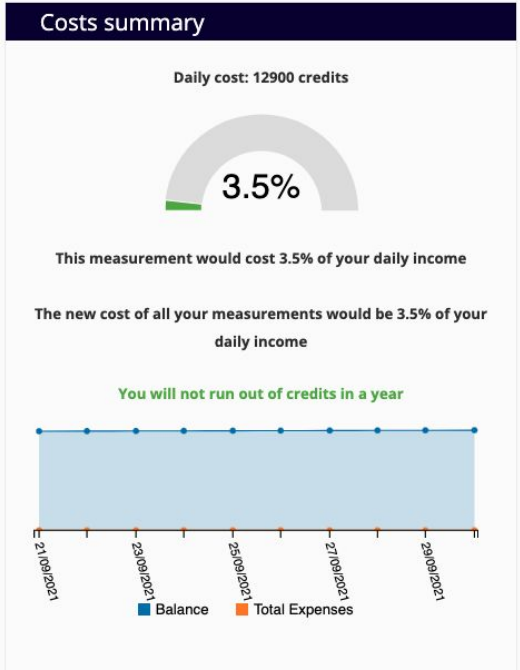
+ New Set - wizard + New Set - manual + IDs List

+ Reuse a set from a measurement















































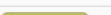















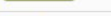











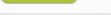



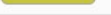











Step 3 Timing

This is a One-off: ☒

Start time (UTC):
Now



Measurement results

Probe	ASN (IPv4)	ASN (IPv6)			Time (UTC)	RTT		Hops	Success	
1000	1221				2021-09-21 06:28	183.779		19	✓	
1002	7545	4739			2021-09-21 06:28	175.359		12	✓	
1035	4739				2021-09-21 06:28	95.283		11	✓	
1051	4764				2021-09-21 06:28	134.514		19	✓	
1060	4764	4764			2021-09-21 06:28	124.967		14	✓	
1079	4764	4764			2021-09-21 06:28	127.147		13	✓	
1082	4739	4739			2021-09-21 06:28	310.137		12	✓	
1192	4764	4764			2021-09-21 06:28	160.551		16	✓	
1318	4804				2021-09-21 06:28	171.252		13	✓	
2293	135887				2021-09-21 06:28	145.285		18	✓	
2546	10143	10143			2021-09-21 06:28	147.417		15	✓	
2841	4764				2021-09-21 06:28	252.760		14	✓	
4449	7545				2021-09-21 06:28	166.677		13	✓	
6386	4764	4764			2021-09-21 06:28	121.061		13	✓	
6427	9268	9268			2021-09-21 06:28	243.803		8	✓	
6460	16509	16509			2021-09-21 06:28	133.190		7	✓	
6503	20473	20473			2021-09-21 06:28	132.525		13	✓	
6660	202422	199524			2021-09-21 06:28	253.017		16	✓	
6688	15169				2021-09-21 06:28	132.532		7	✓	
6764	138466	138466			2021-09-21 06:28	149.913		13	✓	
6849	4608	4608			2021-09-21 06:28	144.827		8	✓	
10266	38195								No recent report available	

Traceroute to i.root-servers.net from IN

- i.root-servers.net -
IPv4 : 192.36.148.17
IPv6: 2001:7fe::53
- Measurement -
<https://atlas.ripe.net/measurements/25563060>

Latest Traceroute Result for Measurement #25563060



2020-05-31 10:01 UTC

Traceroute to 192.36.148.17 (192.36.148.17), 48 byte packets

1	117.247.236.129	AS9829	32.117ms	3.665ms	3.152ms
2	218.248.173.65	AS9829	1.956ms	1.422ms	1.911ms
3	218.248.169.158	AS9829	2.204ms	1.174ms	1.215ms
4	218.248.235.233	AS9829	8.048ms	* *	
5	* * *				
6	115.110.78.165	AS4755	9.067ms	7.541ms	7.577ms
7	172.23.183.134	30.262ms 30.303ms 30.816ms			
8	180.87.38.5	ix-ae-0-100.tcore1.mhy-mumbai.as6453.net	AS6453	135.977ms	121.636ms
	119.501ms				
9	80.231.217.29	if-ae-5-2.tcore1.wyn-marseille.as6453.net	AS6453	273.484ms	278.712ms
	270.919ms				
10	80.231.217.2	if-ae-2-2.tcore2.wyn-marseille.as6453.net	AS6453	266.235ms	237.505ms
	249.767ms				
11	80.231.200.78	if-ae-7-2.tcore2.fnm-frankfurt.as6453.net	AS6453	245.715ms	259.468ms
	244.881ms				
12	195.219.156.135	if-ae-12-80.tcore1.fnm-frankfurt.as6453.net	AS6453	243.291ms	
	242.813ms	242.3ms			
13	80.231.18.10	AS6453	266.711ms	251.251ms	252.886ms
14	195.219.131.130	if-et-40-2.tcore1.stk-stockholm.as6453.net	AS6453	258.885ms	
	235.163ms	228.551ms			
15	195.219.36.14	AS6453	221.391ms	227.129ms	220.19ms
16	194.68.123.73	v215.ro1-stk.sth.netnod.se	206.847ms	207.001ms	207.098ms
17	77.72.228.65	et50-1.ro1-stk.sth.netnod.se	AS8674	206.355ms	211.641ms
	206.235ms				
18	194.146.105.187	peering.r1.sth.dnsnode.net	AS8674	216.569ms	222.191ms
	216.545ms				
19	192.36.148.17	lroot-servers.net	AS29216	219.555ms	223.53ms
				222.634ms	

Triggering through RIPE Atlas CLI Tools

- Makes it quick and easy to trigger measurement
- Output can be seen in CLI as well as Web UI
- Can be used for searching for probes as based on country, ASN etc

RIPE Atlas Tools

- <https://github.com/RIPE-NCC/ripe-atlas-tools>
- Use Python 3!
- <https://ripe-atlas-tools.readthedocs.io/en/latest/quickstart.html>



```
pip install ripe.atlas.tools
```



```
ripe-atlas configure -init  
ripe-atlas configure -editor  
ripe-atlas configure --set authorisation.create=YOUR_API_KEY
```

DNS Measurement

- AS55836 - vowifi.jio.com
- Source:<https://forums.oneplus.com/threads/jio-vowifi-not-working-in-india.1168433/>

I faced the same issue on not only my OnePlus 7 device but also iPhone with Jio as well as Airtel VoWifi, not working properly. I have a You Broadband connection, and since from time to time the DNS servers provided by this ISP donot respond, I had long back switched to 1.1.1.1, 1.0.0.1 DNS service by cloudflare. By my analysis, Cloudflare as well as OpenDNS alongwith DNS servers provided by You Broadband do-not enable VoWifi on either of devices.

I switched to Google DNS which is 8.8.8.8, 8.8.4.4 and viola, after restarting router and phone, the VoWifi worked. Give it a shot, and change the DNS in your router...it may help.

Detailed post - <https://brainattic.in/blog/2020/11/18/jio-vowifi-issue-its-always-dns/>

Parsing DNS results - Custom tooling

- Measurement - <https://atlas.ripe.net/measurements/25445357>
- abuf -- answer payload buffer from the server, UU encoded (string)
- Decode the abuf value using Python and parse the results
- Python modules that can be used for parsing - ripe.atlas.sagan , ripe.atlas.cousteau , cymru.ip2asn.dns

RIPE Atlas Software probes

- Open Source (GPL 3.0) -
<https://github.com/RIPE-NCC/ripe-atlas-software-probe>
- CentOS 7 and CentOS 8 - Binary packages
- CentOS 7 and CentOS 8 - Install from source
- Ubuntu / Debian / Raspberry Pi OS (previously called Raspbian) -
Install from source
- Docker - Not provided and maintained by RIPE NCC
<https://github.com/Jamesits/docker-ripe-atlas> - Actively maintained
https://github.com/Knight1/ripe-atlas_dockerized - Hasn't been updated for a few months
- OpenWrt
- Mikrotik

RIPE Atlas results in Prometheus

- RIPE Atlas Measurement
- Prometheus
- Grafana
- atlas_exporter - https://github.com/czerwoni/atlas_exporter
- Blog - https://labs.ripe.net/author/daniel_czerwoni/using-ripe-atlas-measurement-results-in-prometheus/

References

- RIPE Atlas Credits
<https://atlas.ripe.net/docs/credits/>
- RIPE Atlas Tools (Magellan) - <https://github.com/RIPE-NCC/ripe-atlas-tools>
- Windows Subsystem for Linux(WSL) - <https://docs.microsoft.com/en-us/windows/wsl/install-win10>
- Frequently Asked Questions (FAQ) - <https://atlas.ripe.net/about/faq/>
- Research Papers - https://en.wikipedia.org/wiki/RIPE_Atlas#Research_papers
- Eyeball Network Coverage -
http://sg-pub.ripe.net/petros/population_coverage/country.html?name=IN
- RIPE Atlas - Raw data structure documentation - https://atlas.ripe.net/docs/data_struct/
- Install the RIPE Atlas Software Probe in Debian/Raspbian/Ubuntu in 15 minutes
<https://www.youtube.com/watch?v=8uvzE6bhks4>
- Install the RIPE Atlas Software Probe in CentOS 7/8 Binary (RPM) in 5 minutes
<https://www.youtube.com/watch?v=SNecvbNYi20>
- Install the RIPE Atlas Software Probe using Docker in 10 minutes
<https://www.youtube.com/watch?v=8GK36ljGwbq>
- RIPE Atlas software probe on Mikrotik
<https://forum.mikrotik.com/viewtopic.php?f=2&t=178437>



QUESTIONS?

Thank You!





User



Switch



Switch



Router



3d router



Flat router



Host



Server



RFC



LAN



ISP



IXP



Skull



Info



Cloud



Cloud



Database



Tower



Wifi

NOTE: The icons are all SVGs so if you need to change the color, right click and “convert to shape”.
If you need any icons that are not here, let us know pls.