



RIPE NCC
RIPE NETWORK COORDINATION CENTER

RIPE Atlas 101

PIMF - APRICOT - FEB 2025

Introduction



- RIPE Atlas is an active Internet measurement network
- Built and operated by the RIPE NCC
- Based on the community to deploy and host vantage points (“probes”)
- Operating since 2010 - almost 14 years now!
- World-wide presence, though the focus is our service region
- Primary objective: support network operations
- Secondary objectives:
 - Understanding the state of the Internet
 - Support research



- To measure a network “target” from virtually anywhere in the world
- Can use ping, traceroute, DNS, NTP, SSL/TLS, and limited HTTP
- Continuous monitoring, anomaly detection
 - When you want to establish a baseline
 - Or monitor planned or unplanned changes, improvements, anomalies, etc.
 - These measurements run periodically
- Ad hoc, immediate tests
 - When there’s a problem to be discovered or understood
 - Support pinpointing where a current problem is, thereby helping recovery

Concepts: Probes



- **Variations: hardware (~8200), software (~3500), anchors (~800)**
- **Hardware**
 - Limited supply, one needs to apply to get one
 - We aim to distribute new hardware probes to increase diversity
 - Plug-and-play: auto-configured, automatically updated, no maintenance needed
- **Software**
 - Same functionality but without the hardware
 - Installable on almost any Linux machine
 - Needs more expertise: run the underlying OS plus upgrade the probe every now and then





Concepts: Anchors

- An anchor is a probe and a willing measurement target
- Meant to be installed in the core network with stable connectivity
- Can be hardware or VM
- The OS, the services and the probe firmware is managed by the RIPE NCC
- Automatically measured by every other anchor in a full mesh
 - Ping, traceroute, HTTP
 - Therefore there's a constant data flow about connectivity to the anchor's network



Concepts: Hosts



- Each probe/anchor has a “host” who owns it
- The host is responsible to keep the probe connected
- The host role can be shared within the LIR/ISP
- Hosts earn credits proportionally to the uptime of the probe
- Anyone can host multiple probes
 - Including hardware, software and anchor

Concepts: Measurements



- All measurements have a single target and multiple vantage points
- Periodic measurements:
 - They have a predefined interval
 - The set of probes to use is set at the beginning, can be changed later
 - They can have a predefined start and stop time
 - Relevant use case: monitoring, determining a baseline, tracking changes
- One-off measurements
 - The only run once - most likely “immediately”
 - Response time is measured in seconds
 - Relevant use case: issue resolution, debugging, ad-hoc questions

Concepts: Credits



- Measurements cost credits
 - Proportional to the number of results and measurements
- Credits can be earned:
 - By hosting a probe or anchor
 - By being a RIPE NCC member
 - By being a sponsor
 - By getting a transfer from another user
- Credits can be pooled, given access to, ...



Concepts: Data

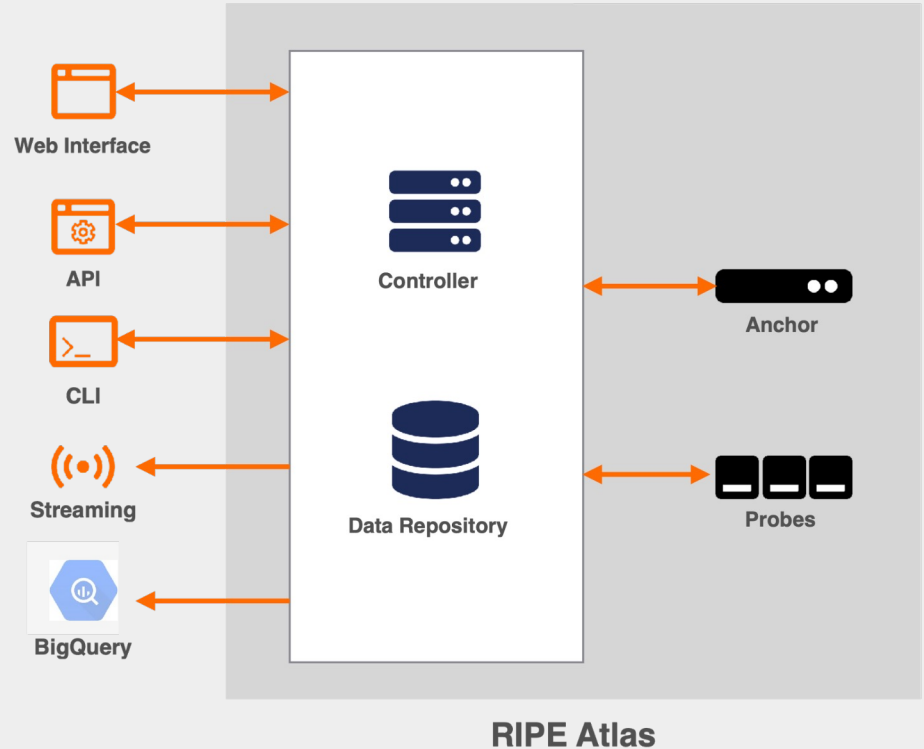


- **User Access**

- Users interact through a Web Interface, API, CLI, Streaming, and BigQuery.

- **Data Flow**

- The Controller connects to Anchors and Probes to collect and store data.



Concepts: Ambassadors & Sponsors

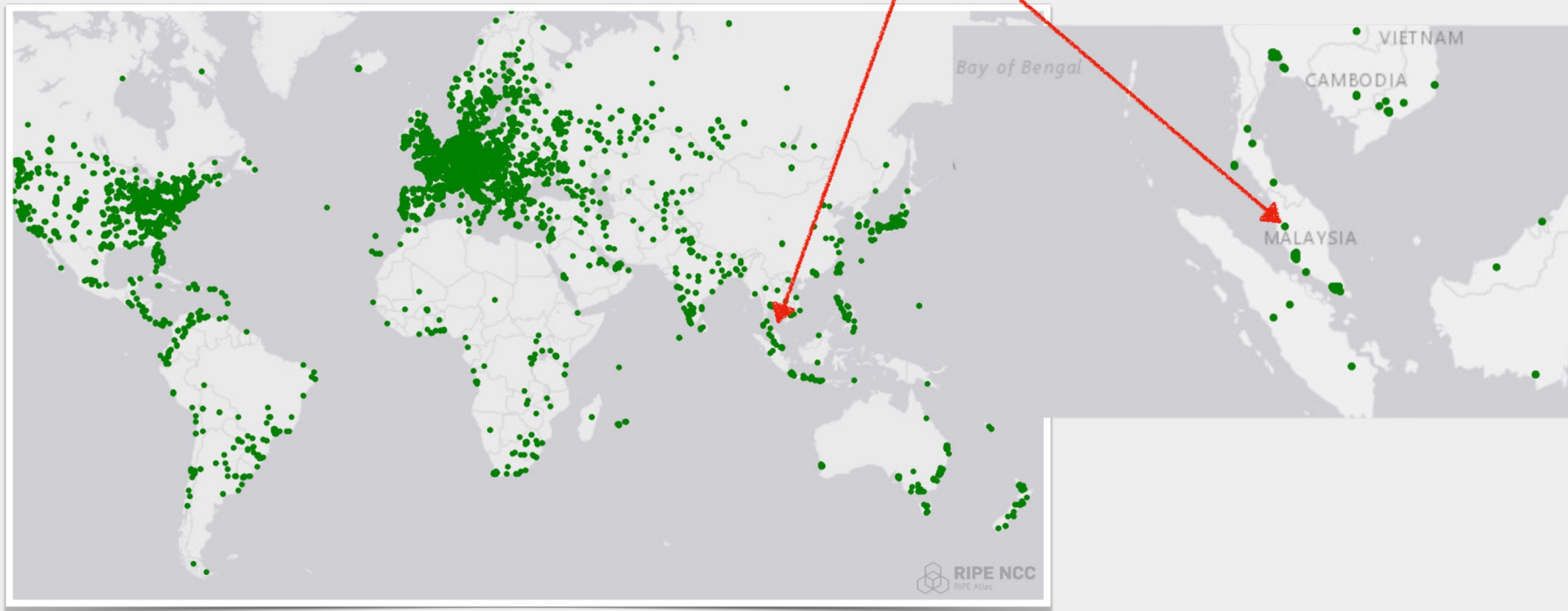


- **Ambassadors: individuals or institutions**
 - Help with the distribution of hardware probes
 - Help spreading the word and supporting (local) users
- **Sponsors**
 - They provide monetary support for RIPE Atlas. In return they get:
 - Recognition and visibility in the system
 - A number of hardware probes
 - Becoming time-limited sponsors for other probes - and credits income from that
 - One-off credits
 - Ability to run many anchors

Current Status



you are here



Measurements: Quick Look



QuickLook Measurement

Last QL: ping to nos.nl on 2024-05-30 10:34

Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ

<10ms: 39 **<20ms: 26** **<30ms: 8** **<40ms: 2** **<50ms: 1** **<100ms: 4** **<200ms: 16**
>300ms: 1 **>300ms: 0** **No Data: 0** **No Reply: 0** **Total: 97**

[See Measurement Details](#)

New QuickLook Measurement

Target (IP/Domain)

Cost: 600 credits

My Measurements

Search Measurements
quicklook

ID	Target	Description	Interval
72649614	nos.nl	QuickLook ping to nos.nl	one-off
72648650	klarna.com	QuickLook ping to klarna.com	one-off
72130821	mango.com	QuickLook ping to mango.com	one-off
72091589	york.ac.uk	QuickLook ping to york.ac.uk	one-off
71841729	klarna.com	QuickLook ping to klarna.com	one-off

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Measurement 72649614

QuickLook ping to nos.nl

ONE-OFF PING measurement to nos.nl via IPv4 initiated by YOU

OVERVIEW RESULTS DETAILS

Search Results

Probs	ASN	Country	Time (UTC)	Min RTT	Packet Loss
1006184	47692	SE	No report available		
1000364	39182	SE	No report available		
53825	8251	SE	2024-05-30 08:34	1184 ms	0.00%
1007542	24940	SE	2024-05-30 08:34	1254 ms	0.00%
62645	1888	SE	2024-05-30 08:34	1546 ms	0.00%
51868	701	SE	2024-05-30 08:34	1583 ms	0.00%
1008964	3543	SE	2024-05-30 08:34	2004 ms	0.00%
62748	1241	SE	2024-05-30 08:34	2104 ms	0.00%
33200	51681	SE	2024-05-30 08:34	237 ms	0.00%
62764	1103	SE	2024-05-30 08:34	2654 ms	0.00%
90237	56478	SE	2024-05-30 08:34	3489 ms	0.00%
1006454	3269	IT	2024-05-30 08:34	3746 ms	0.00%
51053	7018	US	2024-05-30 08:34	3813 ms	0.00%
62732	3320	DE	2024-05-30 08:34	3982 ms	0.00%

Measurements: Specification



☰ **Step 1: Definitions** ▾

Please select the type of measurement you want to create (you can add multiple).

PING TRACEROUTE DNS TLS HTTP NTP

✕ **PING Configuration** ▾

IPv4 IPv6 PING to

Description
Ping measurement to

+ MORE OPTIONS

Common Fields

Tags ▾ Frequency 240

Spread Skip DNS Check Resolve on Probe

Ping Specific

Packets 3 Size 48 Packet Interval

Include Probe ID

Measurements: Specification



Step 2: Probe Selection



SEARCH

RANDOM BY...

IDS LIST

REUSE FROM EXISTING MEASUREMENT

Probe Selection

50 Random Probes AREA: Worldwide



Step 3: Timing



Please select if this is a one-off (vs. periodic) measurement and start and end times (if needed). All times are displayed in your local time (but submitted in UTC).

This is a One-off:

Start Time:



ASAP

Measurements: Results



Measurement 21972436

PERIODIC PING measurement to nl-ams-as286.anchors.atlas.ripe.net via IPv4 initiated by YOU.

LATEST GO

Probe	ASN	Country	Time (UTC)	Min RTT	Packet Loss
13907	60288	🇮🇩	2024-05-10 12:46:30	13.453 ms	0.00%
22109	553	🇩🇪	2024-05-10 12:46:26	11.774 ms	0.00%
22706	31148	🇧🇪	No report available		
29658	51207	🇫🇷	No report available		
34397	42003	🇮🇩	No report available		
50144	1136	🇮🇩	2024-05-10 12:46:32	19.925 ms	
50543	8881	🇩🇪	2024-05-10 12:46:38	20.200 ms	
50926	12083	🇺🇸	2024-05-10 12:46:29	108.172 ms	
51215	39083	🇩🇪	2024-05-10 12:46:37	21.086 ms	

Measurement 21972436

PERIODIC PING measurement to nl-ams-as286.anchors.atlas.ripe.net via IPv4 initiated by YOU.

LATEST GO

OVERVIEW RESULTS DETAILS MANAGE

Result summary (latest, as of 2024-05-10 12:46 UTC):
 6 probes reached their target.
 4 probes did not.
 Min RTT: 11.774
 Mean RTT: 32.102

LatencyMON

Measurement 21972436

PERIODIC PING measurement to nl-ams-as286.anchors.atlas.ripe.net via IPv4 initiated by YOU.

LATEST GO

OVERVIEW RESULTS DETAILS MANAGE

OVERVIEW

- Description: Ping measurement to nl-ams-as286.anchors.atlas.ripe.net
- Family and Type: IPv4 ping
- Target: nl-ams-as286.anchors.atlas.ripe.net
- Resolved on Probe?: No
- Periodic: Yes
- Public or Non-Public: Public

PING SETTINGS

- INCLUDE PROBE ID: false (default)
- PACKET INTERVAL: 1000
- Packets: 3
- Size: 48

STATUS & TIMING

- Requested Start Time: 2019-06-11 00:34
- Current Status: Ongoing
- System Creation Time: 2019-06-11 09:34
- Interval: 240 seconds

OWNERSHIP

- User That Gets Billed: robert@ripe.net
- Measurement Owner: robert@ripe.net
- Editable: true

Measurement 21972436

PERIODIC PING measurement to nl-ams-as286.anchors.atlas.ripe.net via IPv4 initiated by YOU.

LATEST GO

OVERVIEW RESULTS DETAILS MANAGE

STOP MEASUREMENT REMOVE PROBES ADD PROBES

Remove all abandoned
Select probes

Participation Requests ID	Created	Type	Value
35031032	4 years ago	add	area WW

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LatencyMON



- **RIPE NCC's Python based tools have been available for some time now**
 - RIPE Atlas Sagan: raw result parser
 - RIPE Atlas Cousteau: API wrapper
 - RIPE Atlas Magellan: command line tools
- **New**
 - goat, a Go implementation of an API wrapper / result parser / CLI
 - CLI binaries are available if you don't want to compile
- **All these are open source**

But Wait, There's More!



- APIs
- LatencyMON, TraceMON
- Data analysis
 - Daily dumps
 - BigQuery
- Related services
 - DNSMON / DomainMON
 - IPmap



Who Knows What The Future Brings?



- **Current activities:**

- Renewing the UI and the infrastructure
- Easier use (packaging) of the probe software package

- **This year...**

- Improve support and simpler access to known use cases
- Increasing RIPE NCC members' benefits



Questions & Comments ?



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