



RIPE NCC

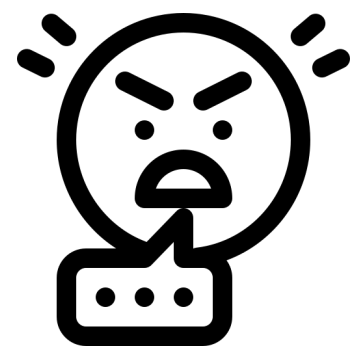
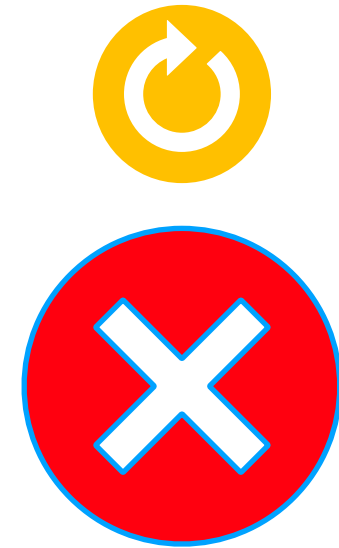
RIPE NETWORK COORDINATION CENTRE

Know Your Network

Utilising RIS and RIPE Atlas to your advantage

Lia Hestina | ThaiNOG 6 | Bangkok

Imagine YouTube Prefix Hijack Incident

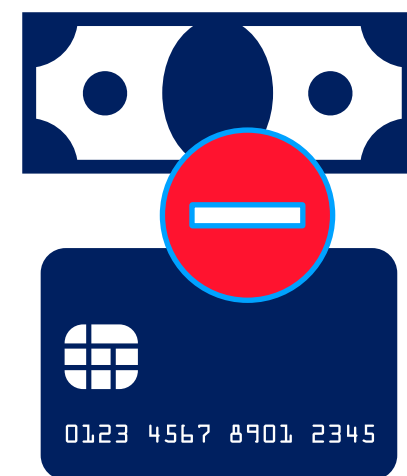


Angry customer



Panic

No Transactions



Lawsuits

Bad for
your Brand



Routing Information Service (RIS)

Data & Tools

What is RIS?

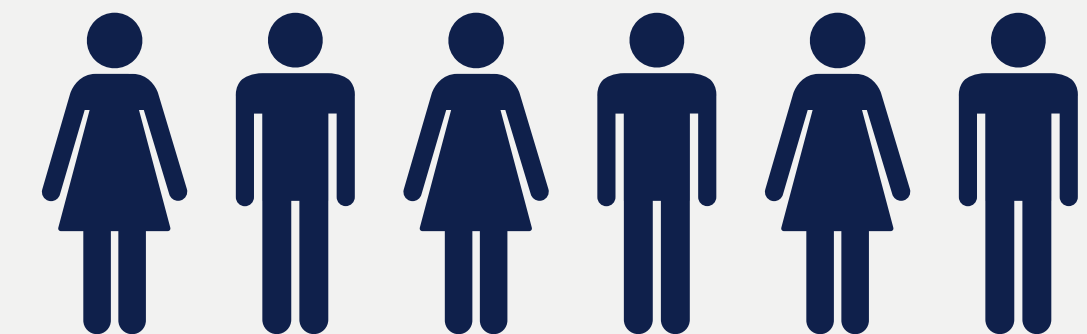


- RIS is a routing data collection platform
- Collecting BGP data since 1999
- Up-to-date routing information, as opposed to information in databases and routing registries
- Information includes:
 - What is being announced
 - Which prefixes are seen and where
 - Which prefixes are not seen

THANK YOU TO OUR COMMUNITY



23 collectors



1,377 global peers

How Can RIS Help Network Operators?

- Is your prefix getting announced?
 - RIS Live (<https://ris-live.ripe.net/>)
 - APNIC NetOX (<https://netox.apnic.net/>)
- Tools developed by others allow you to set an alert
 - Try out **BGP Alerter** (powered by RIS Live) <https://github.com/nttgin/BGPalerter>
 - PacketVis <https://packetvis.com/>

Optimise Your Internet Traffic with RIS LIVE



- Provides **real-time** routing information
- Enhances network stability
- Enables proactive management of internet traffic

Demo

Subscriptions to the stream are sent as a JSON object containing various filter parameters. You can adjust the parameters below and see the messages that are streamed on the right.

```
{
  "prefix": "182.232.0.0/22",
  "path": null,
  "type": "UPDATE",
  "require": "ANY",
  "moreSpecific": true,
  "lessSpecific": false,
  "host": "null (all)",
  "peer": null,
  "socketOptions": {
    "includeRaw": false,
    "acknowledge": true
  }
}
```

Live RIS BGP messages



Paused

1 matching messages ~0 kbit/s ⓘ

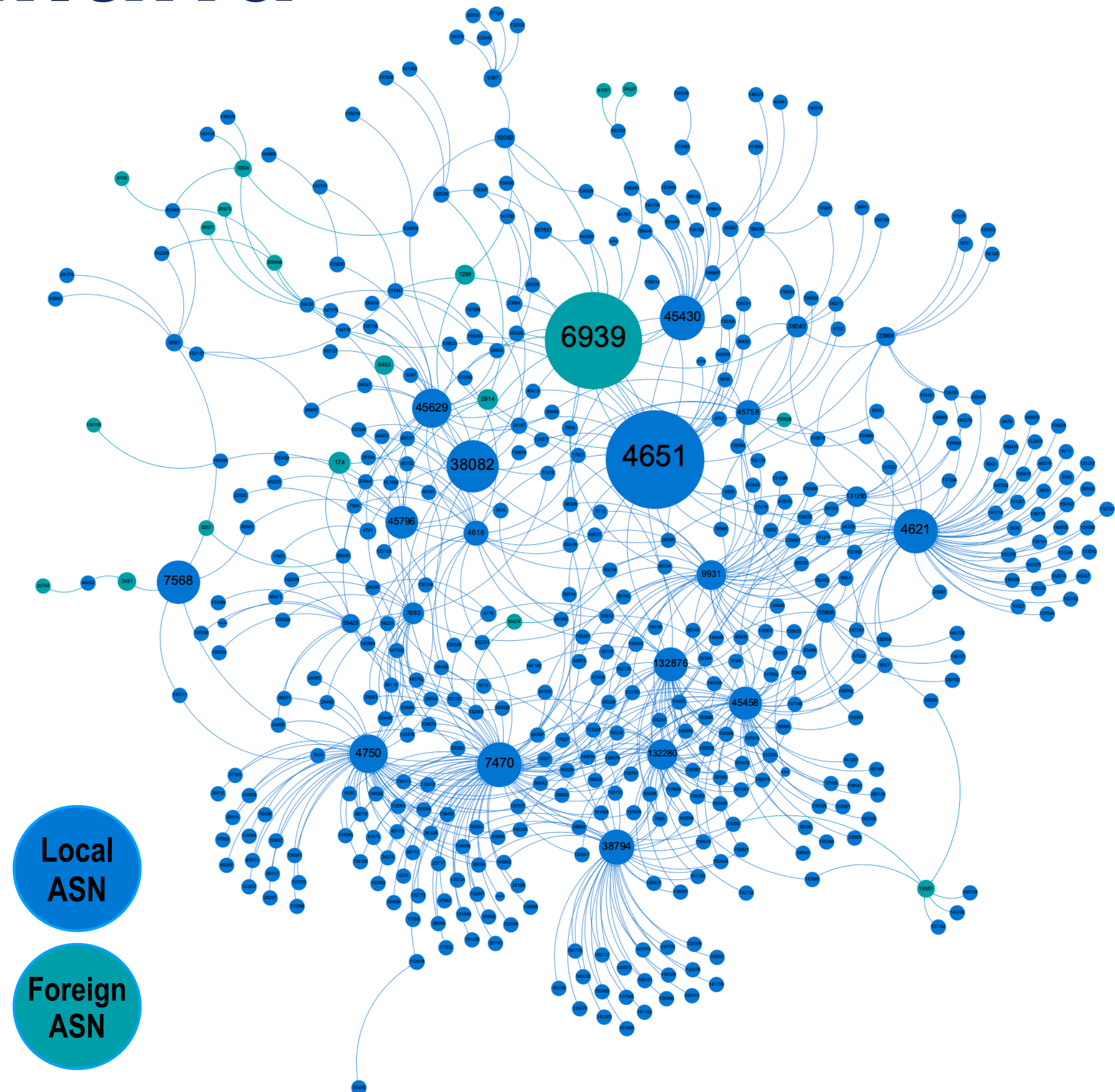
```
// Received at 16:58:08 (4.43 second delay)
{
  "timestamp": 1716476283.84,
  "peer": "190.112.55.254",
  "peer_asn": "264845",
  "id": "190.112.55.254-018fa5f58bc00014",
  "host": "rrc24.ripe.net",
  "type": "UPDATE",
  "path": [264845, 6057, 6939, 45430, 131445],
  "community": [],
  "origin": "EGP",
  "announcements": [
    {
      "next_hop": "190.112.55.254",
      "prefixes": [
        "49.229.160.0/22",
        "49.229.164.0/22"
      ]
    }
  ]
}
```

RIS LIVE



AS Hegemony in Thailand

- As seen by BGP data
- Size shows the importance of the network
- Many networks in Thailand are dependent on AS4651 and AS6939



Come *Peer* With Us



Top improvers (IPv4), countrycode TH

asn	pct improve	abs improve
7470	9.168530947054437	2459
4651	8.575689783743474	2300
23969	7.643549589858314	2050
45430	5.678598061148397	1523
38082	4.489187173750932	1204
45458	4.474272930648770	1200
131090	4.295302013422819	1152
4750	4.258016405667412	1142
133481	3.161819537658464	848



Top Improvers (IPv6), countrycode TH

asn	pct improve	abs improve
17552	31.4615191777387828	1255
7470	24.6678365505139148	984
38082	12.4341940335923784	496
45430	7.5708197543243925	302
131445	5.9162697417899226	236
133481	5.0137879167711210	200
4651	4.1614439709200299	166
9931	4.0862371521684633	163
132061	2.5570318375532715	102





RIPE Atlas

Monitor your network and
Keep your customers' **latency low**

RIPE Atlas



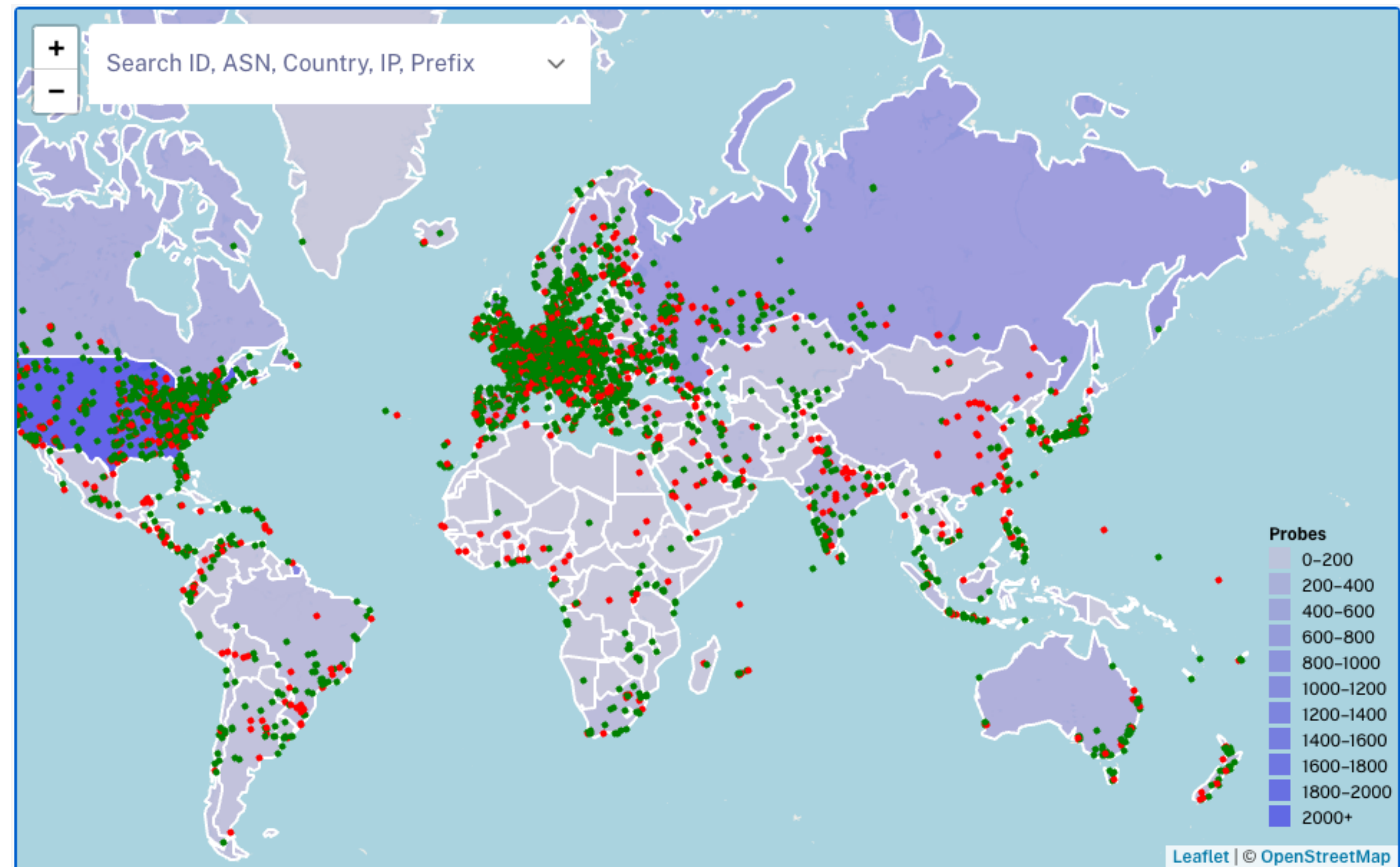
- RIPE Atlas is a global active measurements platform, funded by RIPE NCC members and sponsors
- Goal: view Internet reachability
- Probes hosted by volunteers, using a credit system
- Data is publicly available
- atlas.ripe.net



Run RIPE Atlas Tests



- More than 12,000 probes connected
- More than 3,000 ASNs globally
- 346 in South East Asia





Accessible via

GUI

API

CLI TOOL

Measurement types

PING

TRACEROUTE

DNS

NTP

SSL/TLS

HTTP (anchors)



Security and Privacy

Probes

- ☒ Trust material (regular server address, keys)
- ☒ No open Ports; initiate connection; NAT is OK
- ☒ Doesn't listen to local traffic/ No snooping

Measurements

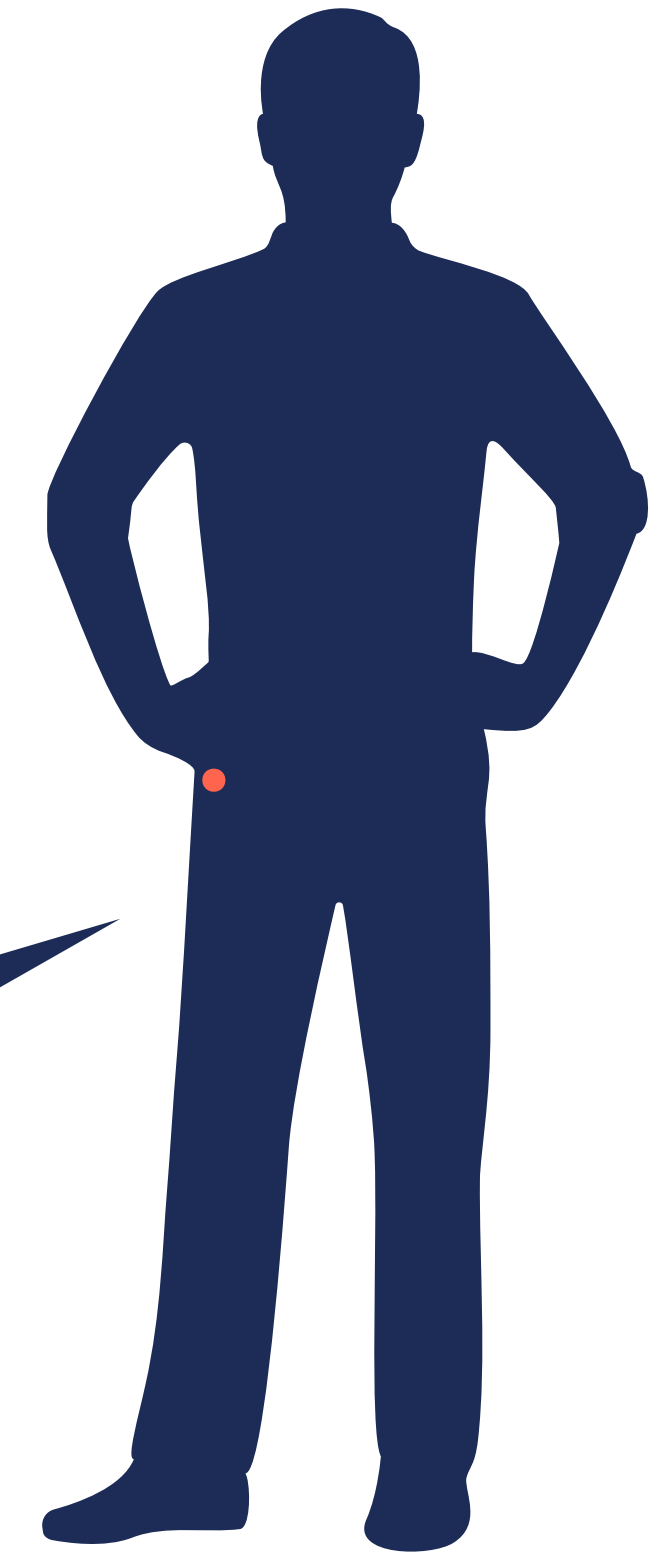
- ☒ No passive measurements
- ☒ Initiated by probes via SSH connections from probe to server
- ☒ Code of measurements publicly available





Some Problems

- High latency - impatient gamers
- Gamers from different networks
- Realtime application, unpredictable



Mbappe

- Online gaming company
Runs own LAN
Users from around the world

Issues Spotted!

High latency
identified



Probe	ASN (IPv4)	ASN (IPv6)		Time (UTC)	RTT		Hops	Success	
4429	55430			2020-05-13 19:02	270.039		17	✗	
14042	55430			2020-05-13 19:02	267.779		17	✗	
22798	55430	55430		2020-05-13 19:02	268.372		17	✗	
24422	55430			2020-05-13 19:02	268.974		17	✗	
25828	4788			2020-05-13 19:02	364.127		15	✗	
28850	4844			2020-05-13 19:02	265.993		17	✗	
54623	4773	4773		2020-05-13 19:02	268.964		16	✗	
55415	55430	55430		2020-05-13 19:02	367.158		13	✗	

Talk to your peers, ISP or any that can help improve RTT

Settings & Status		Latest Results		Map	Tracemon	IPMap	Downloads						
Probe	↕ ASN (IPv4)	↕ ASN (IPv6)	↕	↕	↕ Time (UTC)	↕ RTT	↕		↕ Hops	↕ Success	↕	↕	
4429	55430			 	2020-05-13 20:17	4.394			14	✓			
14042	55430			 	2020-05-13 20:17	3.042			14	✓			
22798	55430	55430		 	2020-05-13 20:17	3.336			14	✓			
24422	55430			 	2020-05-13 20:17	3.993			15	✓			
25828	4788			 	2020-05-13 20:17	3.158			14	✓			
28850	4844			 	2020-05-13 20:17	3.127			14	✓			
31918	55430			 	2020-05-13 20:17	5.194			15	✓			
54623	4773	4773		 	2020-05-13 20:17	4.505			14	✓			
55415	55430	55430		 	2020-05-13 20:17	3.508			14	✓			

Latest Traceroute Result for Measurement #59170999

2023-09-01 16:17 UTC

Traceroute to tiktok.com (3.160.5.56), 48 byte packets

1	192.168.0.1	0.457ms	0.368ms	0.346ms
2	100.91.127.254	5.424ms	4.347ms	4.594ms
3	10.233.97.55	4.777ms	4.537ms	4.473ms
4	10.55.192.63	193.346ms	194.974ms	194.312ms
5	213.248.79.106	lax-b3-link.ip.twelve99.net	AS1299	182.594ms 182.382ms 182.325ms
6	62.115.126.250	lax-b23-link.ip.twelve99.net	AS1299	202.572ms 203.672ms 203.016ms
7 *	62.115.123.136	dls-bb2-link.ip.twelve99.net	AS1299	232.324ms *
8	62.115.116.213	atl-b24-link.ip.twelve99.net	AS1299	255.674ms 250.639ms 250.838ms
9	62.115.119.201	ipls-b2-link.ip.twelve99.net	AS1299	255.624ms 255.207ms 255.525ms
10	62.115.139.235	clb-b1-link.ip.twelve99.net	AS1299	260.81ms 260.133ms 259.797ms
11	***			
12	***			
13	***			
14	***			
15	***			
255	3.160.5.56	server-3-160-5-56.cmh68.r.cloudfront.net	AS16509	243.323ms 242.473ms 243.412ms

Lower latency after debugging



Hooray Moments!

Improve Performance

Shorter path is selected, better latency, reliability & security

Control & Flexibility

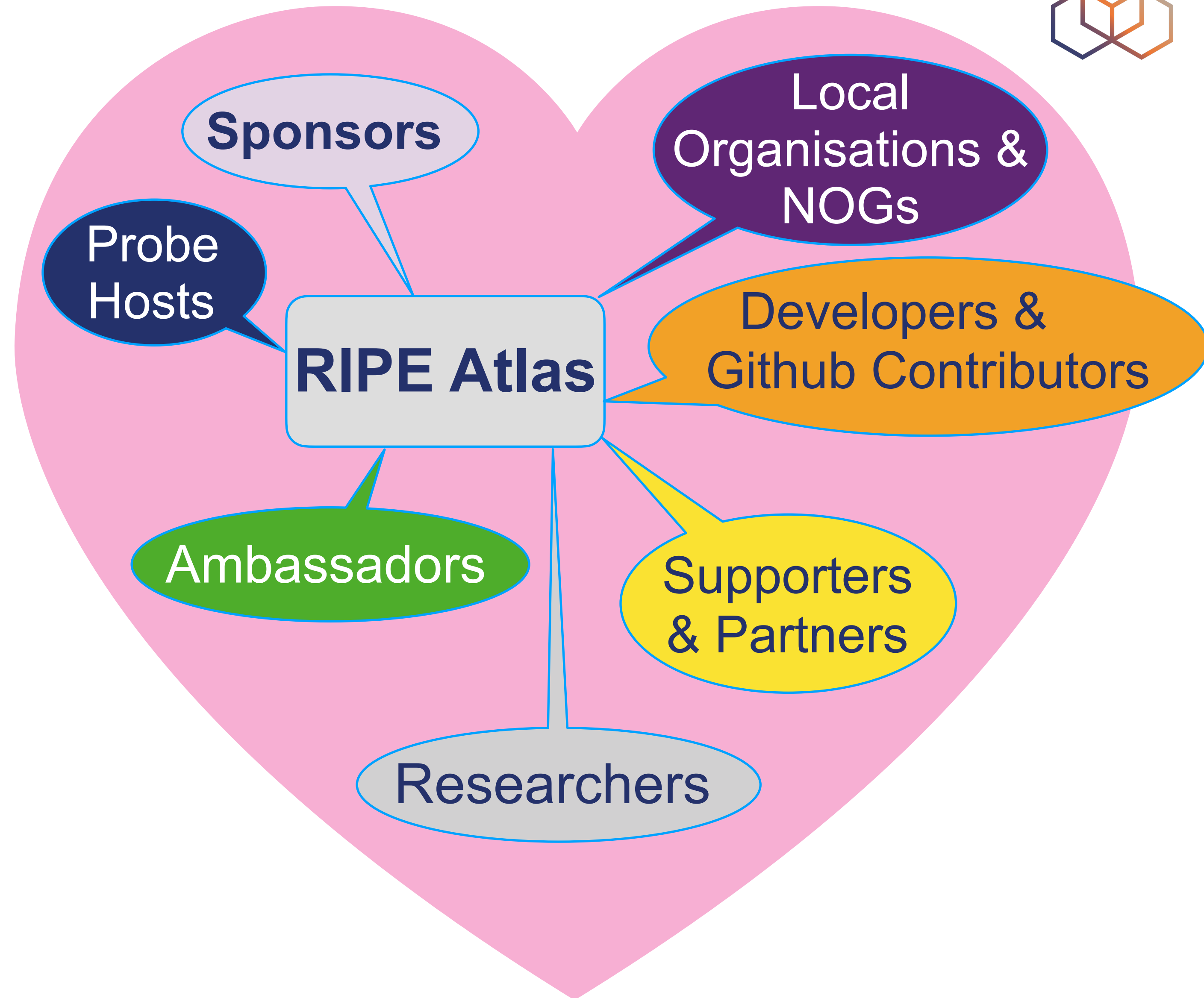
Repeat tests as much as you need!

Service desks RIPE Atlas ❤️ GUI

To validate findings

Thank you!

- Within Asia Pacific (APAC) region we work closely with APNIC, ISOC, NSRC and many local ambassadors
- Interested in a workshop? Contact: <https://academy.apnic.net/en/contact>





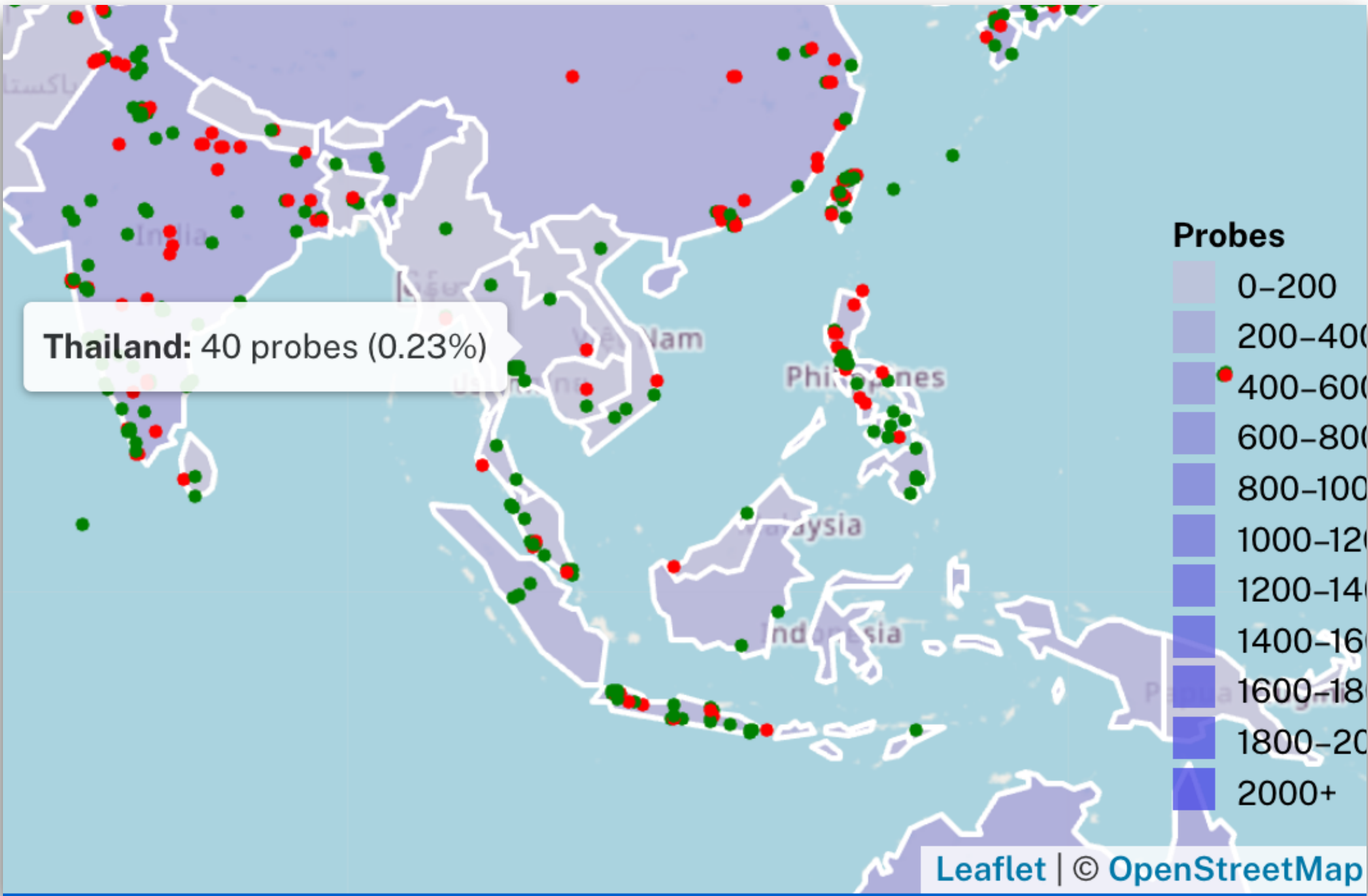
A view into Thailand and South East Asia

RIPE Atlas in South East Asia



Country	RIPE Atlas
Vietnam	7
Timor Leste	1
Thailand	27
Singapore	117
Philippines	60
Myanmar	2
Malaysia	28
Laos	1
Indonesia	99
Cambodia	2
Brunei	3

• Data from 20 May 2024



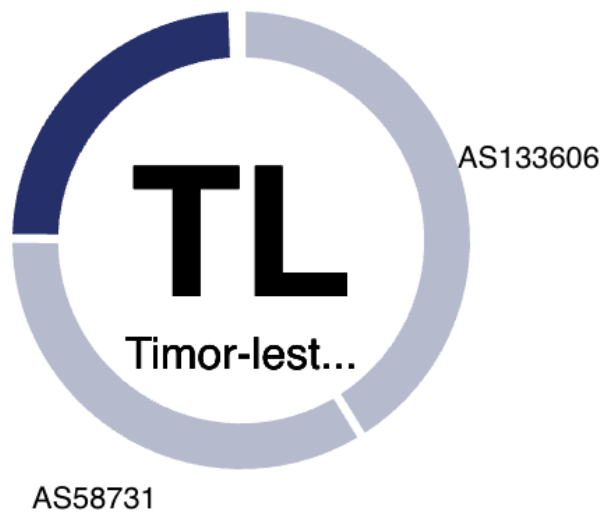
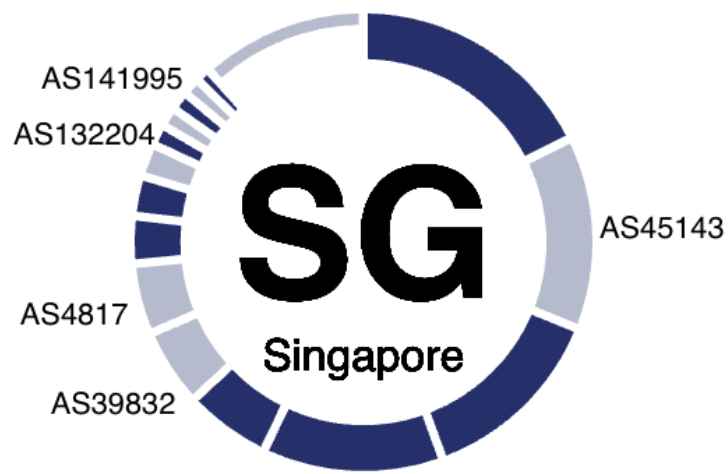
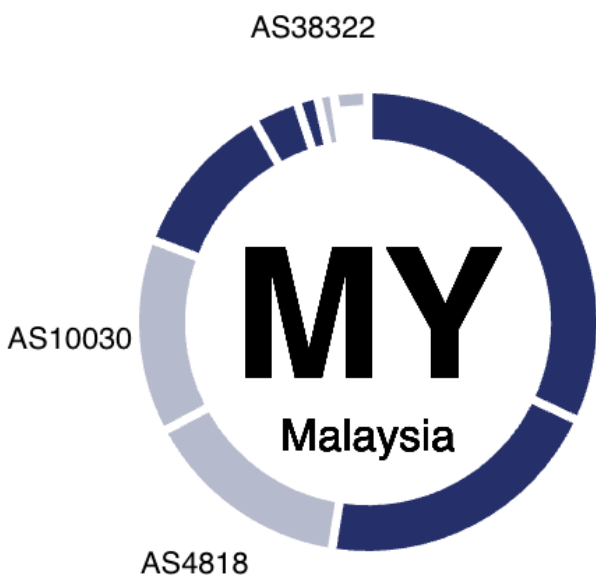
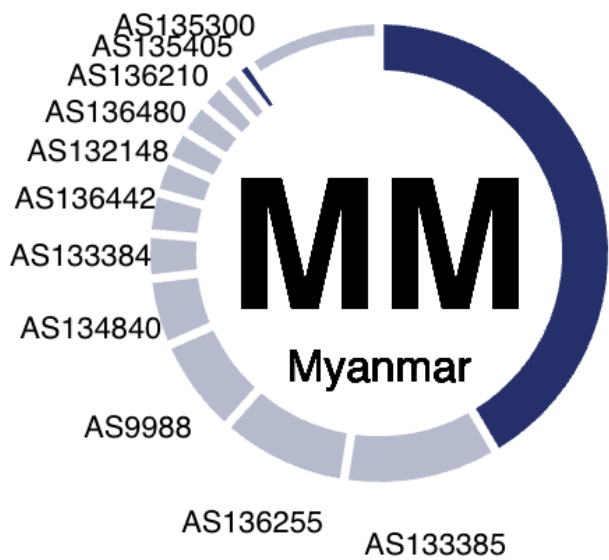
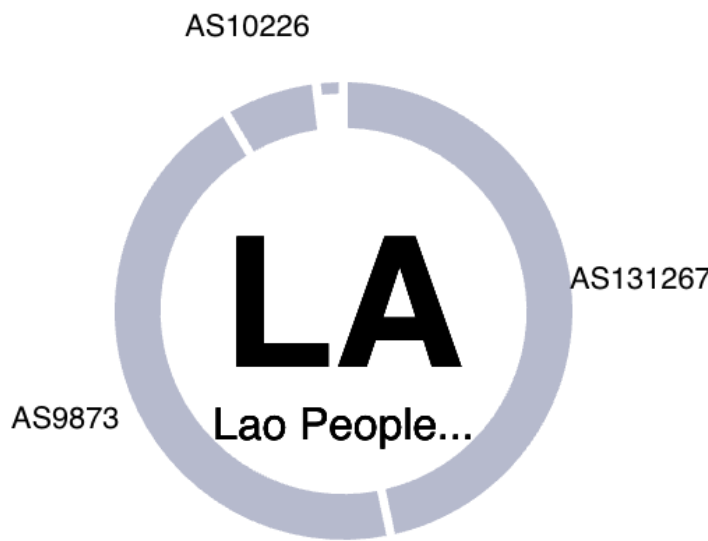
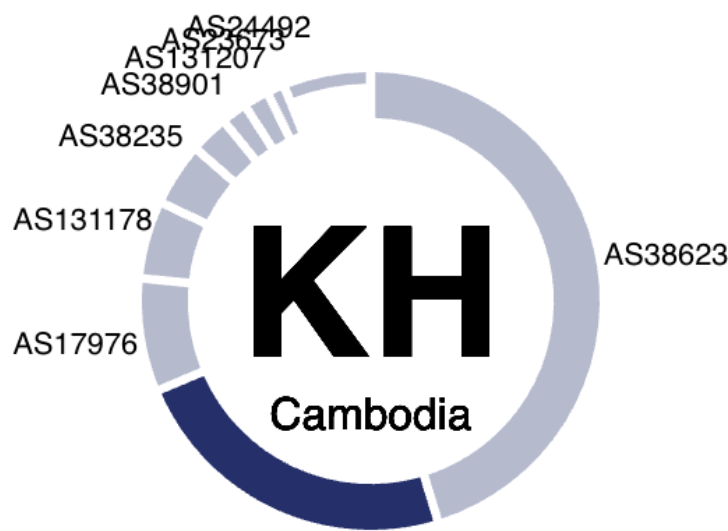


Let's Cover These (Eyeball) Networks in South East Asia

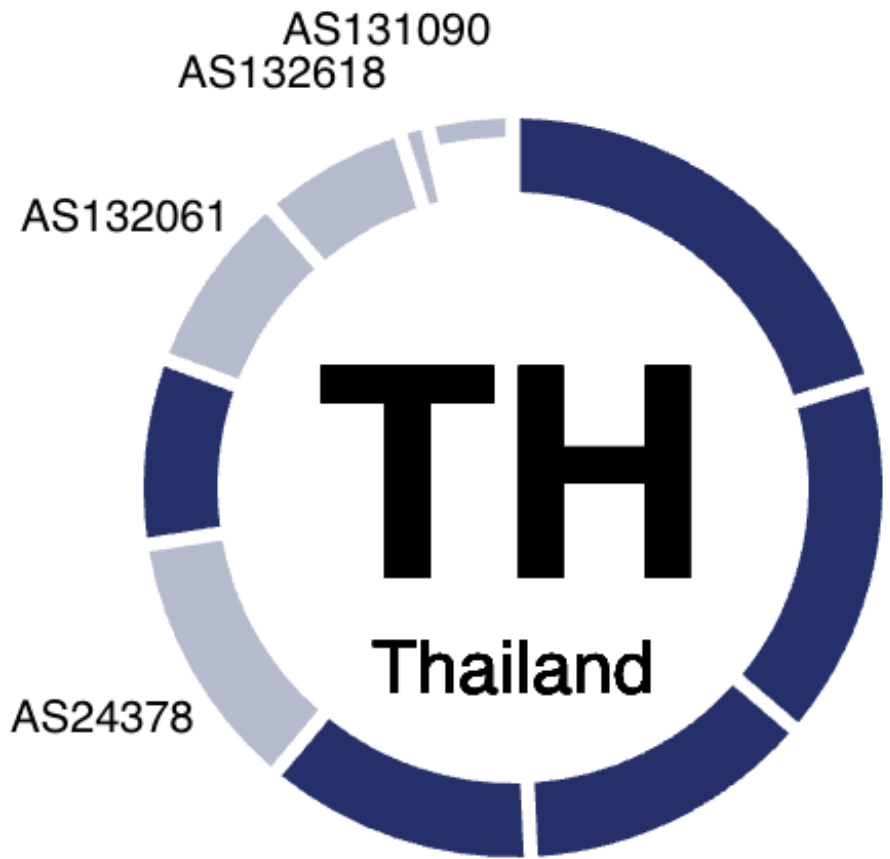
RIPE Atlas probe coverage

Showing ASNs covering at least 1% of the country's population (2024-05-24)

- ASN has at least 1 probe
- ASN is not covered



131445	AIS3G-2100-AS-AP	Thailand
24378	ENG TAC-AS-TH-AP	Thailand
132061	Realmove-as-ap	Thailand
132618	REALFUTURE-AS-AP	Thailand
131090	CAT-IDC-4bytenet-AS-AP	Thailand
9931	CAT-AP	Thailand
7470	IRNET-AS-AP TRUE INTE	Thailand
4651	re Communications Autho	Thailand

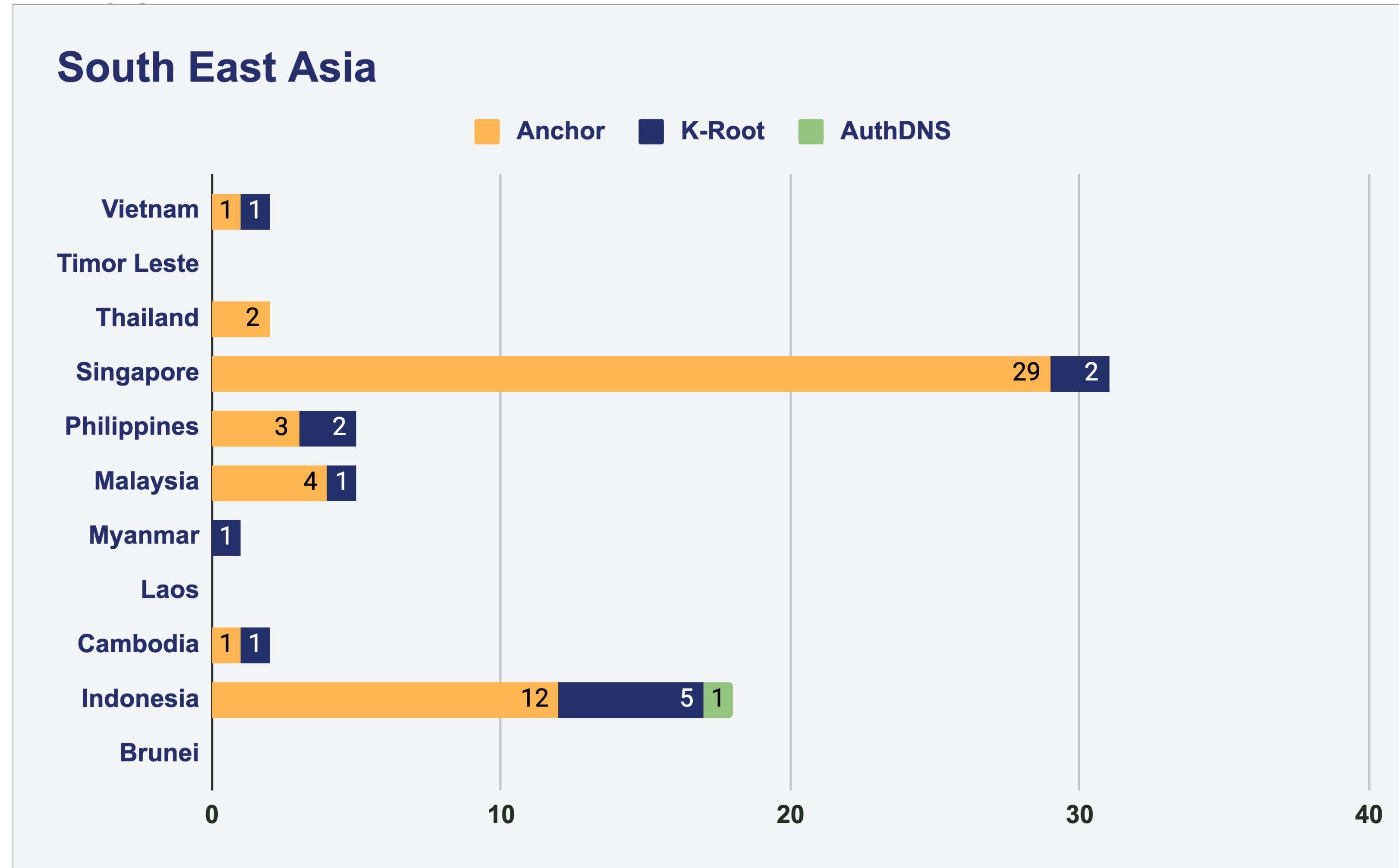


[https://observablehq.com/
@ripenc/ripe-atlas-
network-coverage](https://observablehq.com/@ripenc/ripe-atlas-network-coverage)

Prototype Tool

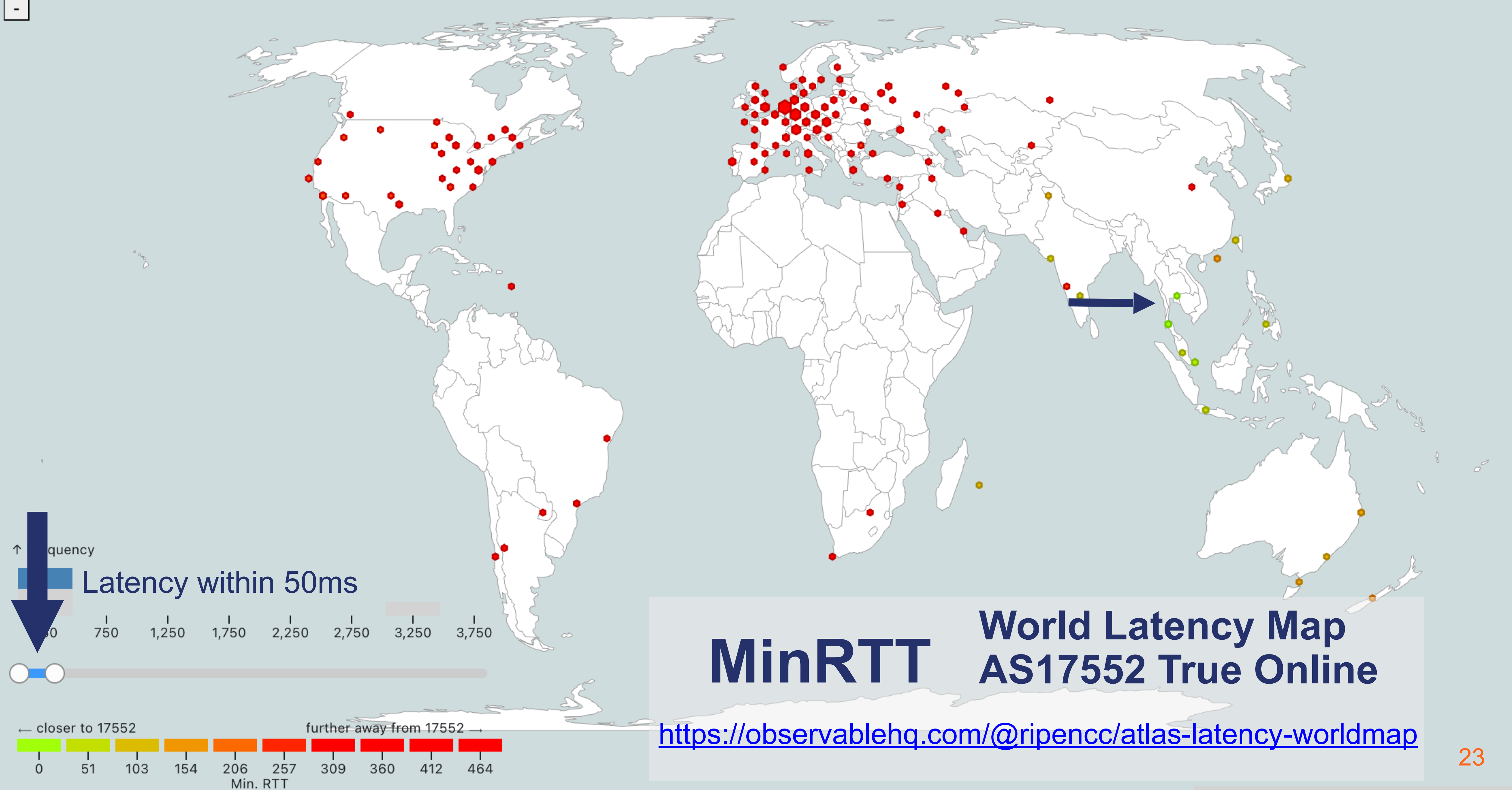


RIPE NCC Tools and Services



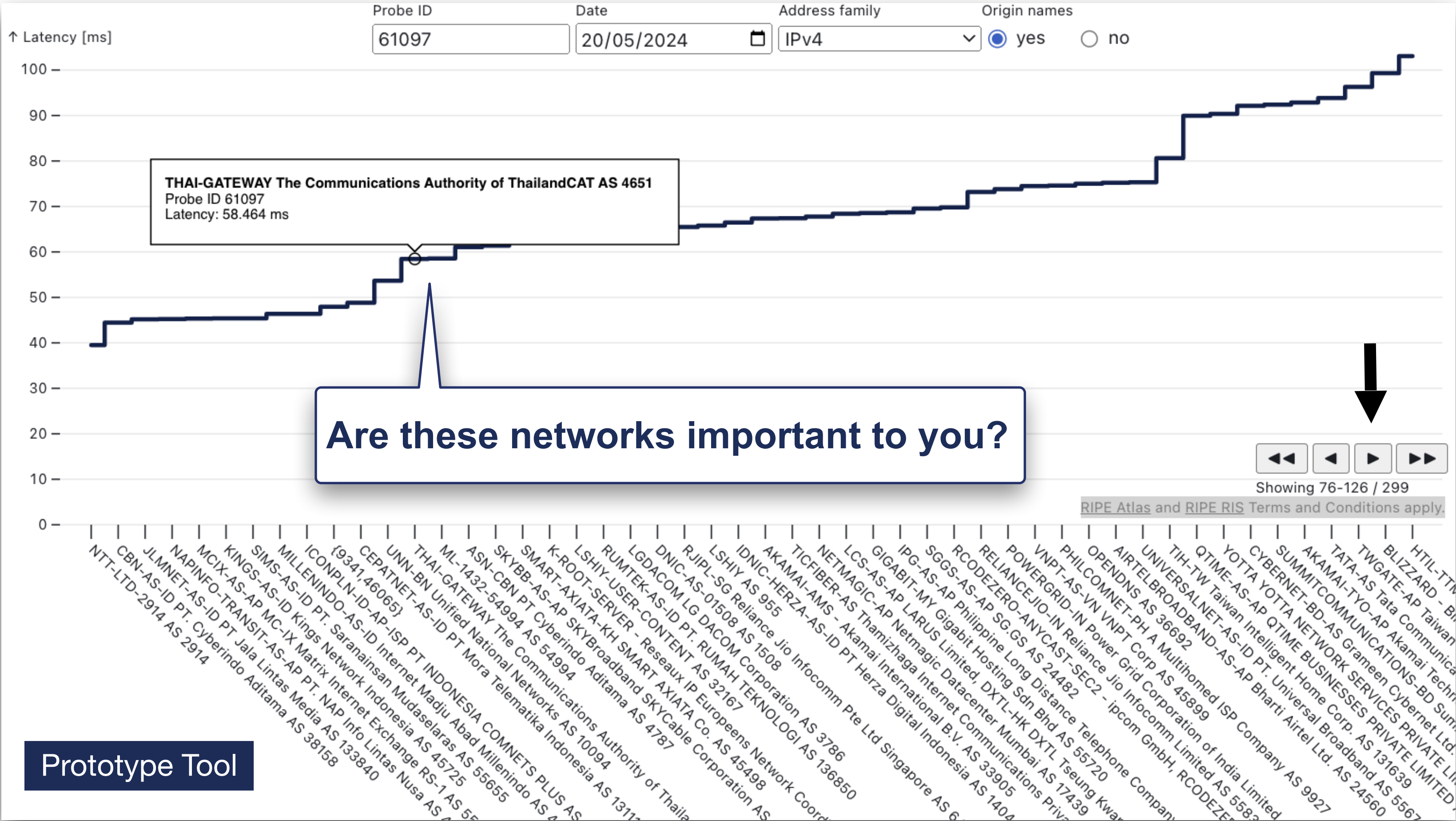
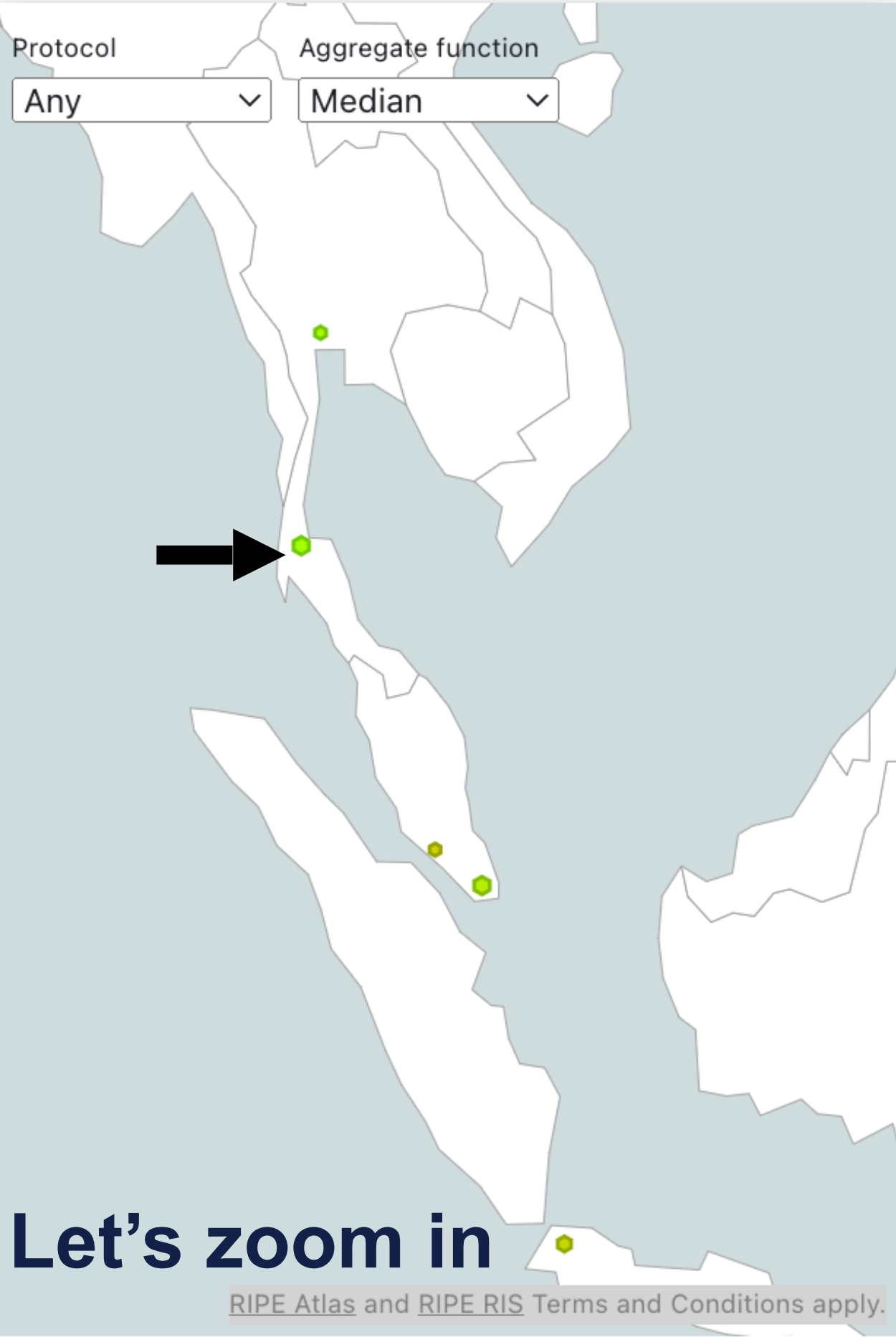
- Data from 1 March 2024

```
0: () 192.168.3.1 (0.567 0.609 0.881) ||
1: (AS4434) 202.154.42.225 (0.727 0.735 0.85) ||
2: (AS4434) 202.154.26.217 (0.745 0.841 1.148) ||
3: (AS4434) 202.154.0.21 (4.318 4.381 4.468) ||
4: (AS58552) cache.google.com (5.323 5.395 7.213) ||
5: (AS58552) 103.11.29.2 (17.588 17.621 17.701) ||
6: () 7713.sgw.equinix.com (18.576 18.633 18.711) [Singapore,SG]
7: (AS7713) 180.240.204.9 (20.129 20.517 21.426) ||
8: (AS7713) 180.240.204.9 (19.817 19.875 20.348) ||
9: (AS*) Unknown (*) (* * *) |*|
10: (AS7713) 36.93.255.41 (38.925 39.267 39.784) ||
11: (AS7713) 36.93.255.42 (38.131 34.162 34.266) ||
12: (AS46044) 111-223-255-25.ip.unpad.ac.id (33.488 33.708 33.772) ||
```

Networks in your Neighbourhood

as seen through RIPE Atlas probe



MinRTT

Your network **neighbourhood** as seen through RIPE Atlas



Try your probe here



[https://observablehq.com/
@ripenc/atlas-probe-
neighbourhood?](https://observablehq.com/@ripenc/atlas-probe-neighbourhood?)

NOTE: MinRTT is a prototype tool, with its limitation.
Be sure to install RIPE Atlas (SW) probes in different locations to have
a representative data visualisation and see the difference

Some Reasons to Love RIPE Atlas



12,000 Probes

Global Coverage

Trusted Source

Non-profit organisation
Volunteers: End Users

Safe & Secure

Regular third-party security review

Open Data

Measurement results open to all

Community Driven

By the community for the
community

Fair Use/
Non Monetary

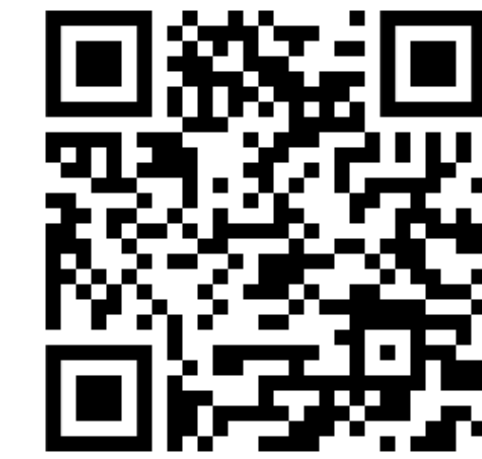


What's Next?



- Create a RIPE Access **ACCOUNT** ✓
- INSTALL** RIPE Atlas (SW) strategically ✓
- Network in Thailand? **PEER** with RIS* ✓
- Start testing, **MONITOR** your network performance ✓
- Did your probe disconnect? **Reconnect it!** ✓

Redeem 500K
Voucher
THAINOG6



Install SW Probes Now in these Platforms



- Software packages that work like regular probes
- Most installation instructions are available in **8** languages

Platform	Support	Installation Videos	Installation Manuals
CentOS 7 (binary)	RIPE NCC	✓	✓
CentOS 8 (binary).	RIPE NCC	✓	✓
CentOS 7 & 8 (source)	RIPE NCC		✓
Debian 9 (source)	Community		✓
Debian 10 (source)	Community	✓	✓
Raspbian (source)	Community	✓	✓
Docker	Community	✓	✓
OpenWRT	Community		✓
Turris	Vendor (NIC.CZ)	✓	✓

RIPE Atlas Software probe

- 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 - Looks like it's coming soon !

0:18 / 11:47 · Intro >

<https://www.youtube.com/watch?v=8uvzE6bhks4&t=52s>

<https://atlas.ripe.net/docs/howtos/software-probes.html>



Live Demo

Install SW Probes in CentOS 7/8 Binary (RPM) in 5 minutes



```
Term2 Shell Edit View Session Scripts Profiles Toolbar Window Help
vagrant@localhost:~
Mac OS X 3x1 Debian 3x2 CentOS 7 3x3 ..binar/centos8 (zsh) 3x4 ..atlas-webinar (zsh)
vagrant@localhost ~]$ cat /etc/redhat-release
CentOS Linux release 7.8.2003 (Core)
vagrant@localhost ~]$ curl -O 'https://ftp.ripe.net/ripe/atlas/software-probe/centos7/noarch/ripe-atlas-repo-1-2.el7.noarch.rpm'
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left   Speed
0  3672  100  3672    0     0  2645      0  0:00:01  0:00:01 --:--:-- 2647
vagrant@localhost ~]$ ls -al
total 16
wx-----. 4 vagrant vagrant 128 Aug 19 09:34 .
wxr-xr-x. 3 root root 21 Apr 30 22:08 ..
w-r--r--. 1 vagrant vagrant 18 Apr 1 02:17 .bash_logout
w-r--r--. 1 vagrant vagrant 193 Apr 1 02:17 .bash_profile
w-r--r--. 1 vagrant vagrant 231 Apr 1 02:17 .bashrc
wxrw----. 3 vagrant vagrant 19 Aug 19 09:34 .pki
w-rw-r--. 1 vagrant vagrant 3672 Aug 19 09:34 ripe-atlas-repo-1-2.el7.noarch.rpm
wx-----. 2 vagrant vagrant 29 Aug 19 06:23 .ssh
vagrant@localhost ~]$ sha256sum ripe-atlas-repo-1-2.el7.noarch.rpm
a256sum: ripe-atlas-repo-1-2.el7.noarch.rpm : No such file or directory
vagrant@localhost ~]$ sha256sum ripe-atlas-repo-1-2.el7.noarch.rpm
2b6fb7004e86765257c93912403636f67ba59250f8f0904288f60eaa816c3 ripe-atlas-repo-1-2.el7.noarch.rpm
vagrant@localhost ~]$
```



2020-08-19 11:35:38

CentOS 7 - Binary (RPM) Installation

- Download the REPO package
`curl -O 'https://ftp.ripe.net/ripe/atlas/software-probe/centos7/noarch/ripe-atlas-repo-1-2.el7.noarch.rpm'`
- Verify the integrity of the downloaded RPM file
`sha256sum ripe-atlas-repo-1-2.el7.noarch.rpm`
HASH - c02b6fb7004e86765257c93912403636f67ba59250f8f0904288f60eaa816c3
- Install the REPO package
`yum install ripe-atlas-repo-1-2.el7.noarch.rpm`
- Install the software probe
`yum install atlasswprobe`
- Package is signed. Verify GPG key : afbe 52eb 213a 90ef c72a 39dd 1b48 2af7 830d 38d5
- Copy the SSH public key
`cat /var/atlas-probe/etc/probe_key.pub`
- Register the software probe
`https://atlas.ripe.net/apply/swprobe/`



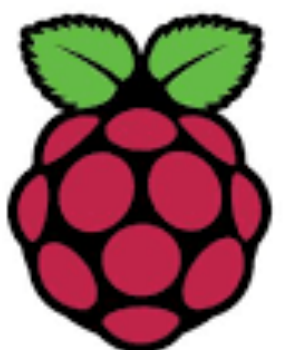
CentOS

Don't have machine/VM/server that run CentOS?

Install SW probe in a Raspberry Pi in 15 minutes



Step	Script for Debian/Raspbian/Ubuntu	Description
1	<code>sudo apt update</code>	Update the package repositories
2	<code>sudo apt install git tar fakeroot libssl-dev libcap2-bin autoconf automake libtool build-essential</code>	Install packages required in order to install the probe
3	<code>git clone --recursive</code> https://github.com/RIPE-NCC/ripe-atlas-software-probe.git	Download the source code in github repository
4	<code>Ls -al</code>	Check the repository, it should show as: ripe-atlas-software-probes
5	<code>./ripe-atlas-software-probe/build-config/debian/bin/make-deb</code>	Build and compile the source code. It will create a file, make sure to copy this for the next step
6	<code>sudo dpkg -i atlasswprobe-5080-1.deb</code>	Install the probe. Make sure the file is the correct one.
7	<code>/var/atlas-probe/etc/probe_key.pub</code>	Get the public key here
8	register your probe atlas.ripe.net/apply/swprobe	Register your probe, make sure you are logged in



RaspberryPi



Getting started!

Live Demo Using the New UI

- Welcome Lia

Ambassador

Probe Host

Current Status

News Flash

Welcome to the new RIPE Atlas!

For a list of everything that has changed, check out the [release notes](#).

Mandatory 2FA on RIPE NCC Access Accounts

Two-factor authentication (2FA) is now mandatory on RIPE NCC Access accounts. If you have not already done so, please [enable 2FA on your account](#).

Credits

81,328,799

Credit Balance

8608.7083 credits /hour

Manage Credits

Ambassador Probe Management

Search probes

Probe ID	Host	Probe Status	Event	State	Country	Note
65986	Ipnet	Never	Montenegro	Handed Out		
65953	Elvis Salkovic	Never	Montenegro	Handed Out		
65729	Samir Secerovic	Offline	various Jele...		BA	
65687	Milan Adhikari		Mumbai		NP	
65658		Never	Mumbai	New		

Records per page: 5 1-5 of 290

My Measurements

Search Measurements

ID	Target	Description	Interval
72307824	apnic.net	QuickLook traceroute to apnic.net	one-off
72137308	www.bangkokpost.com	Traceroute measurement to www.bangkokpost.com	900
72133406	www.bangkokpost.com	Traceroute measurement to www.bangkokpost.com	one-off
72133405	www.bangkokpost.com	Ping measurement to www.bangkokpost.com	one-off
72133071	www.rd.go.th	Ping measurement to www.rd.go.th	one-off

Records per page: 5 1-5 of 92

Messages

Search messages

QuickLook Measurement

Last QL: traceroute to apnic.net on 2024-05-24 13:38

<10ms: 0

<20ms: 0

<30ms: 0

<40ms: 0

<50ms: 0

<100ms: 0

<200ms: 1

<300ms: 3

>300ms: 5

No Data: 0

No Reply: 1

Total: 10

See Measurement Details

New QuickLook Measurement

Target (IP/Domain)

IPv4IPv6

PingTraceroute

Cost: 600 credits

CREATE QUICKLOOK

My Probes

Search Probes

ID	Country	Description	Status
60058	Indonesia	Kalibaru	11 hours
60050	Netherlands	Valentine probe	1 month, 1 week

Page 1 of 1 | 1-2 of 2

Community Events

Search events

Event	Date	Location
RIPE 88	20-24 May - Ongoing	Krakow

I'll be there



1) Search for a Measurement

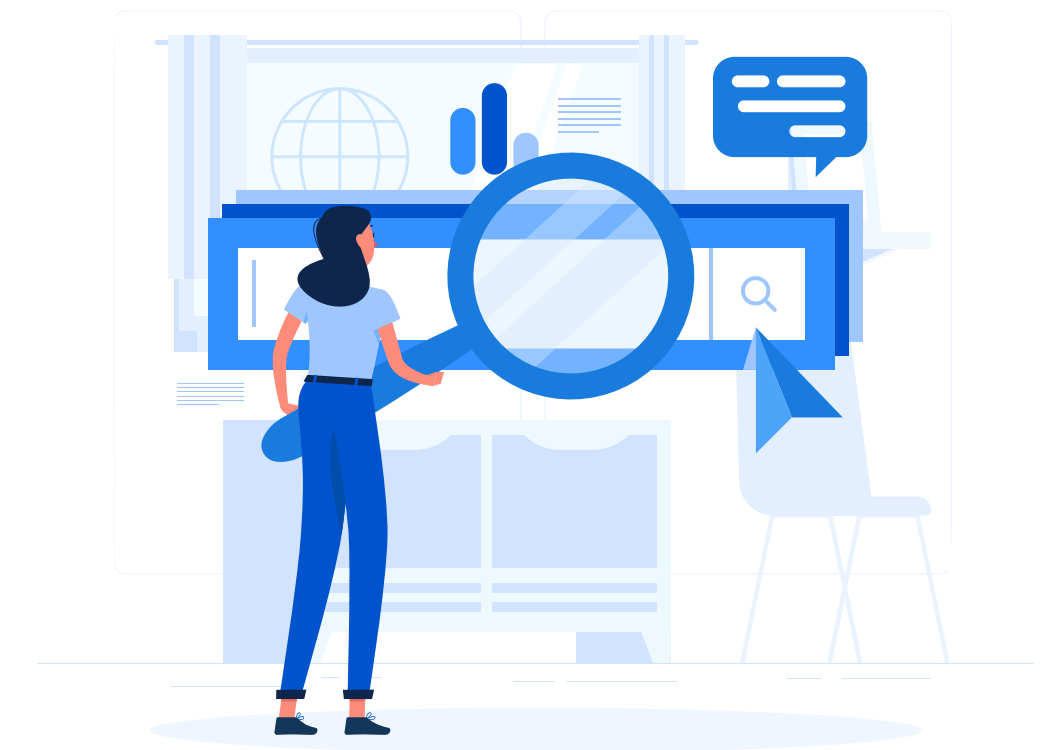
Before you create a measurement of your own, search an existing one!

Go to the RIPE Atlas Measurements page and search for a measurement to an IP or prefix you know.

Once you have found the measurement, click on it to view more information.

Here are some things you can do:

- Analyse the results of the measurement to identify trends or patterns
- Compare the results of the measurement to other measurements
- Troubleshoot network problems
- Track the performance of a network over time



https://atlas.ripe.net/measurements/public?id__gt=1000000&is_public=true&sort=-



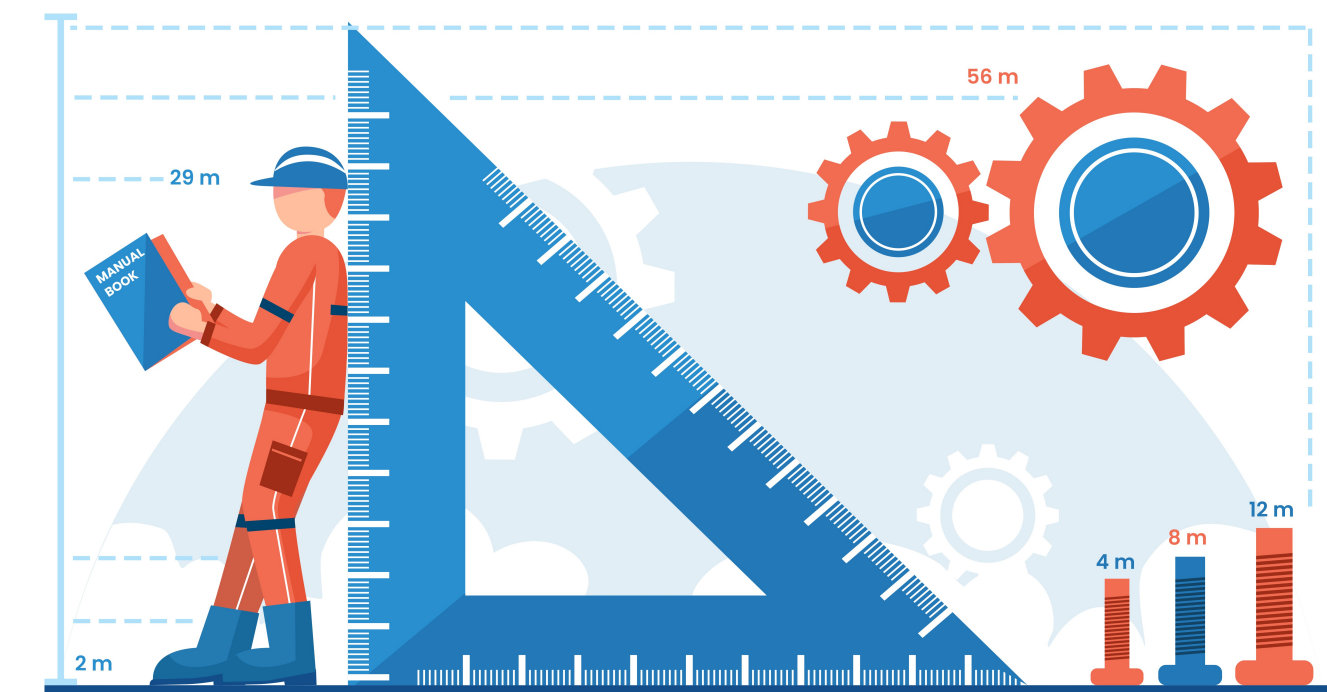
2) Create a measurement

You now know enough to create your own measurement!

Get started by doing the following:

- Choose a target and define your goal: what do you want to find out?
- Choose the probes from locations of interest for you
- Create the measurement and wait for the results
- Analyse the results and see what you discover!

- <https://atlas.ripe.net/measurements/form/>

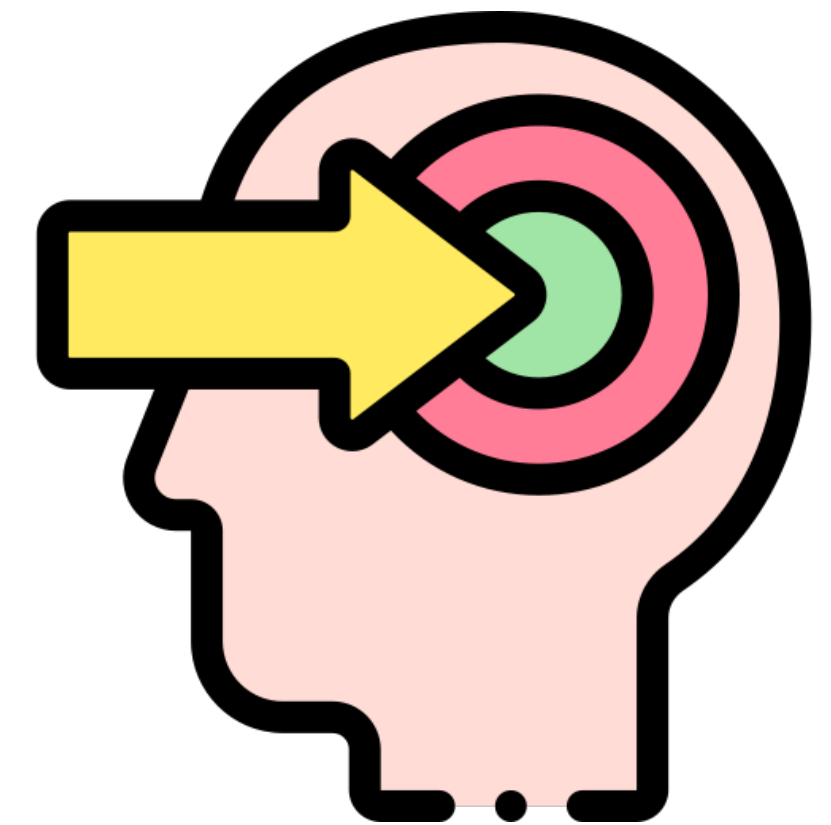




Remember...

Here are some questions to help you analyse the results:

- Are the results what you expected?
- Do any patterns or anomalies appear in the data?
- How do the results compare over time or from different vantage points?
- What conclusions can you draw and how might this data be useful?





Questions



lhestina@ripe.net

atlas@ripe.net



Other Resources

- **RIPE NCC Internet Measurements**
<https://www.ripe.net/analyse/internet-measurements/>
- **APNIC Labs**
<https://labs.apnic.net/measurements/>
- **Internet Society**
<https://www.internetsociety.org/action-plan/measuring-the-internet/>
- **Center for Applied Internet Data Analysis (CAIDA)**
<https://www.caida.org/>
- **M-LAB**
<https://www.measurementlab.net/>

Use Cases



A distributed view of the Internet

- https://labs.ripe.net/author/alun_davies/ripe-atlas-a-distributed-view-of-the-internet/

The Kazakhstan outage as seen from RIPE Atlas

- <https://labs.ripe.net/author/emileaben/the-kazakhstan-outage-as-seen-from-ripe-atlas/>

Detecting DNS root manipulation

- <https://labs.ripe.net/author/qasim-lone/detecting-dns-root-manipulation/>

DNS vulnerability, configuration errors that can cause DDoS

- https://labs.ripe.net/author/giovane_moura/dns-vulnerability-configuration-errors-that-can-cause-ddos/