RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Using RIPE Atlas

Webinar

RIPE NCC Learning & Development

Take the Poll!

How much experience do you have with **RIPE Atlas**?

2 min.

P1

Take Another Poll!

What is an “**active measurement**”?

2 min.

P1

Prerequisites

- We assume you have already used RIPE Atlas
- Do you have a **RIPE NCC Access** account?
  - If not - quickly create one: ***access.ripe.net***
- Do you have credits to spend?

Overview

Introduction to RIPE Atlas

Creating a Measurement

Demo A: Creating a Measurement

Command Line Interface (CLI) Toolset

DEMO B: Using RIPE Atlas CLI

Monitoring

Exercise A: Kahoot

Introduction to RIPE Atlas

Section 1

An Introduction

- RIPE Atlas is a **global active measurements platform**
- Goal: view Internet reachability
- Probes hosted by volunteers
- Data **publicly available**

RIPE Atlas Measurements

- **Built-in** global measurements towards root nameservers
  - Visualised as Internet traffic maps
- **Built-in** regional measurements towards “anchors”
- **Users** can run customised measurements
  - ping, traceroute, DNS, SSL/TLS, NTP and HTTP*

Probes and Anchors

- **11,000+** probes connected (**600+** RIPE Atlas Anchors)
- **10,000+** results collected per second
- **23,000+** measurements currently running

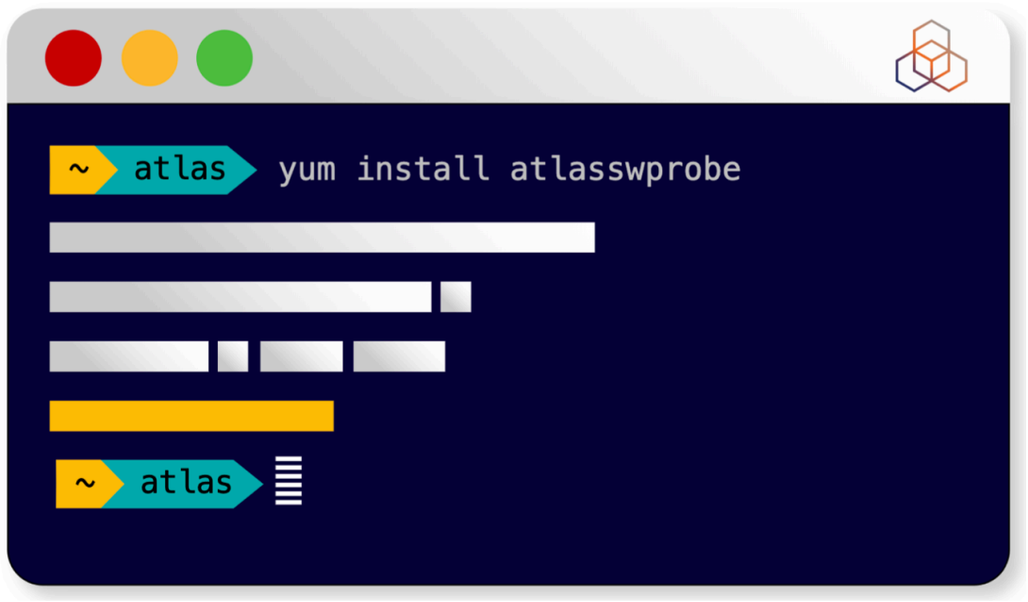
RIPE Atlas probe

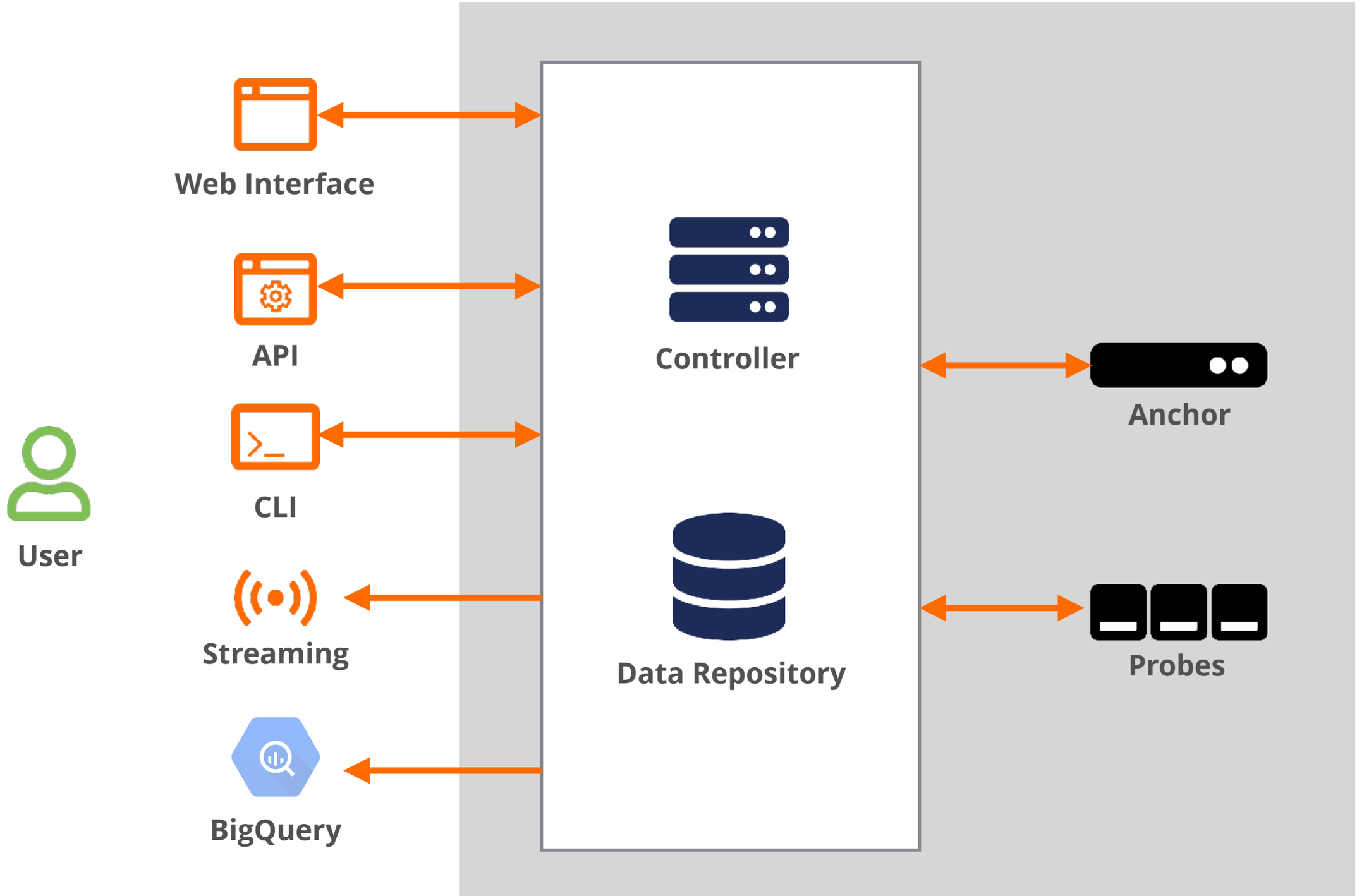
RIPE Atlas anchor

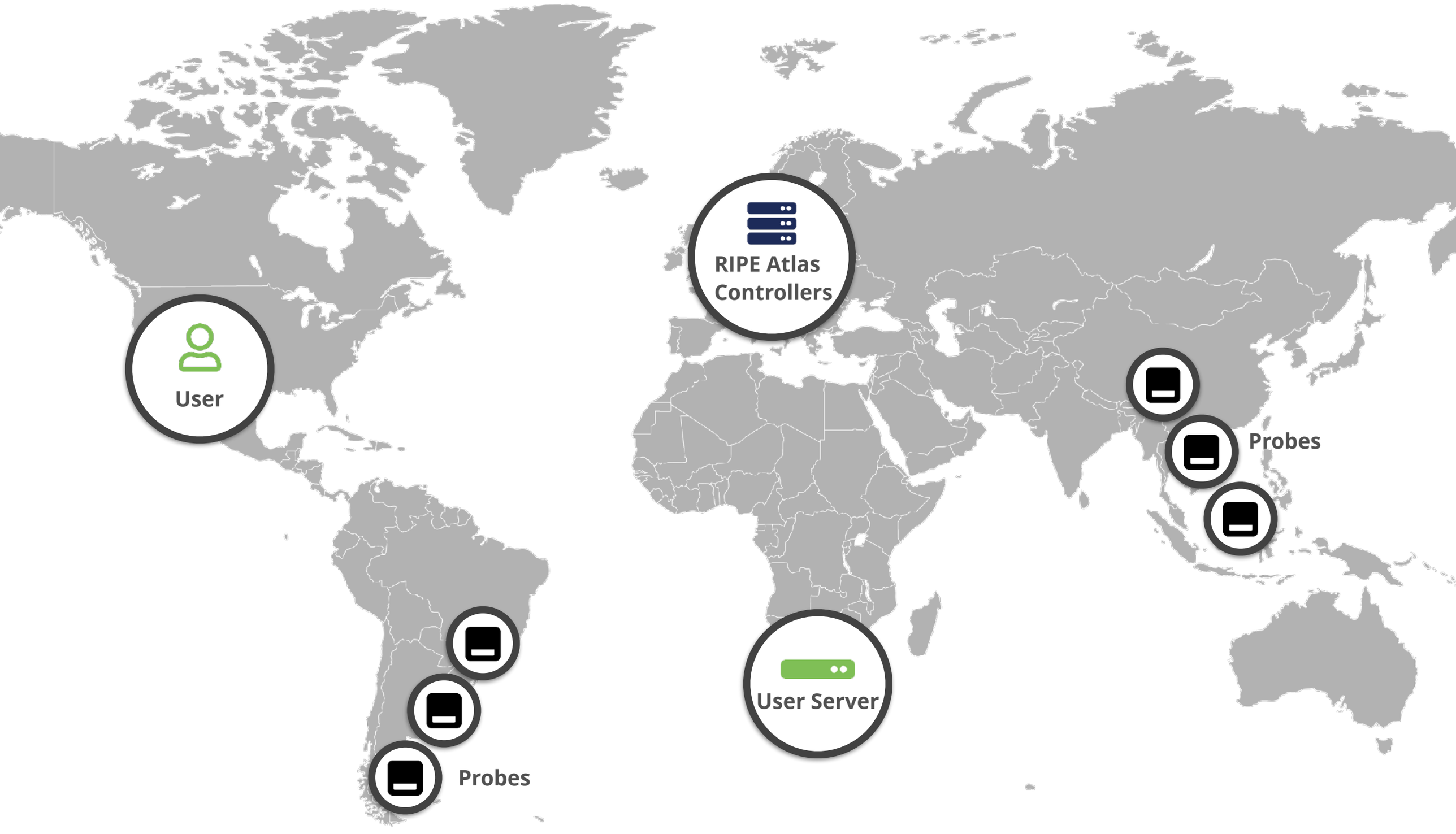
New: RIPE Atlas Software Probes

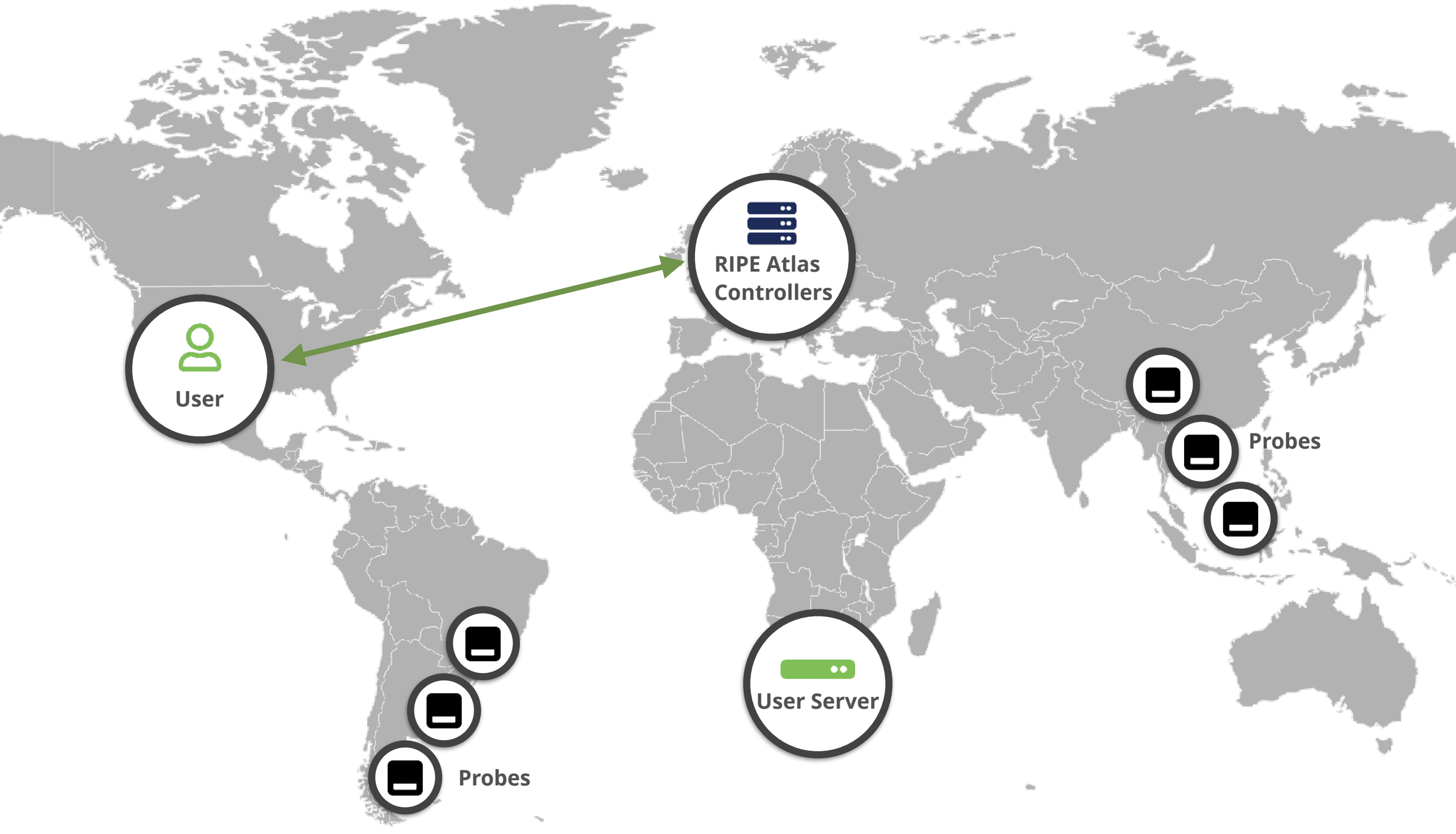
- Software packages that work like regular probes
- Install and run on your (virtual), machines, routers, servers etc
- Currently supporting:
  - CentOS 7 and 8; Debian (9 and 10) and Raspbian; Docker; Turris Routers
- Further information: atlas.ripe.net/docs/software-probe/

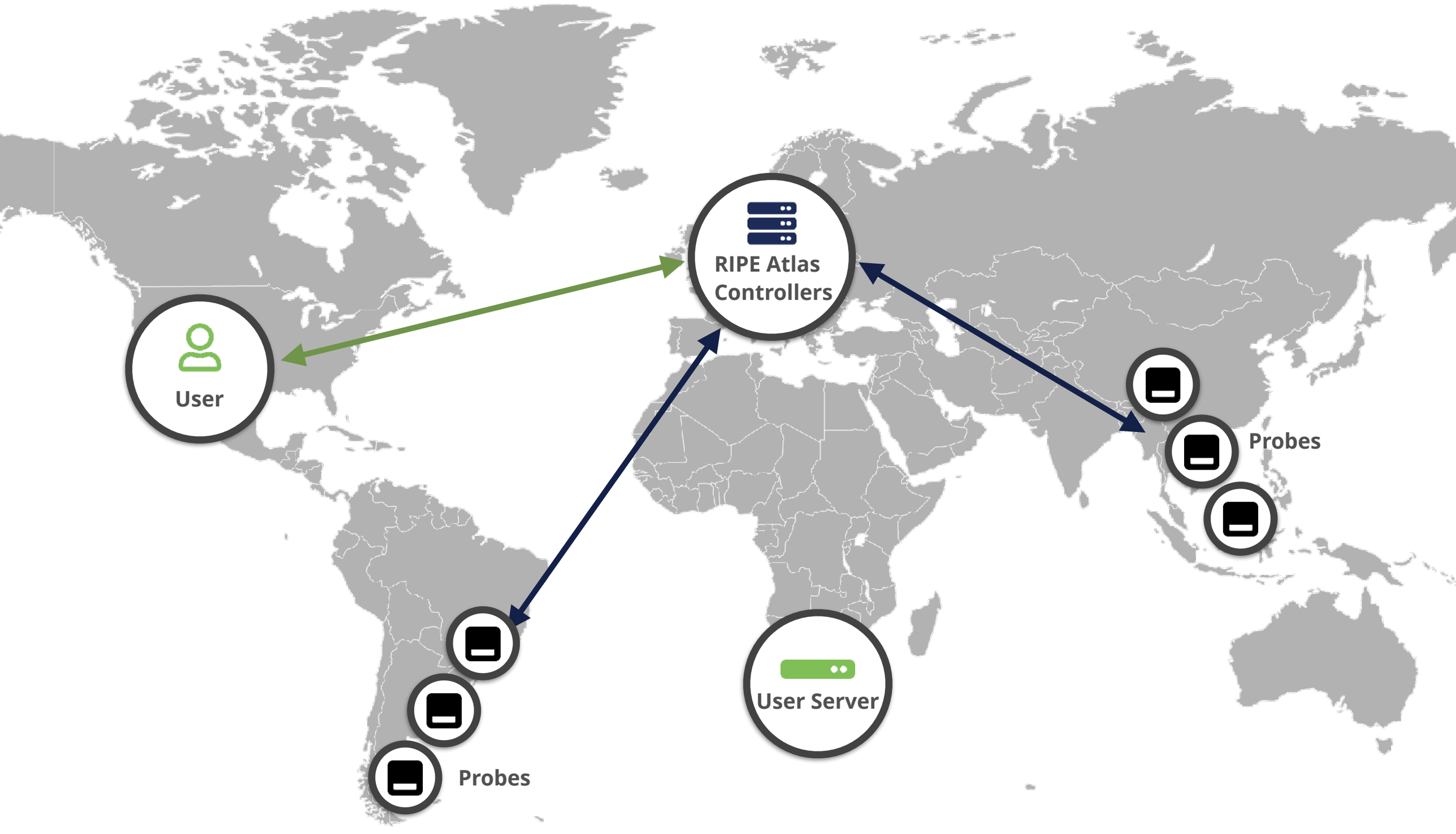
Apply to host a software probe:
https://atlas.ripe.net/apply/

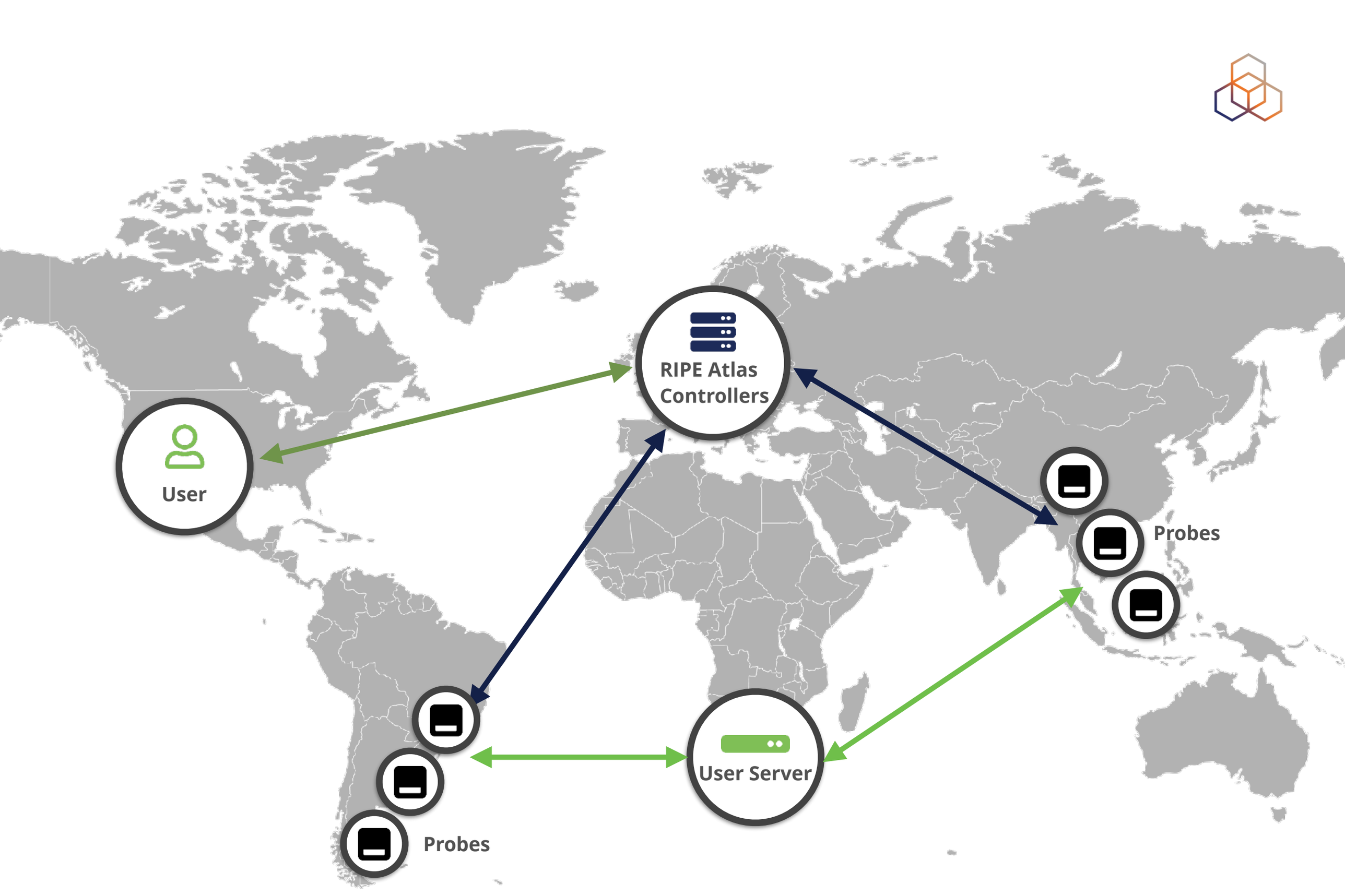



Web Interface
API
CLI
Streaming
BigQuery
User
Controller
Data Repository
Anchor
Probes
RIPE Atlas


RIPE Atlas
Controllers
User
Probes
Probes
User Server


RIPE Atlas
Controllers
User
Probes
Probes
User Server


RIPE Atlas
Controllers
User
Probes
User Server
Probes


RIPE Atlas
Controllers
User
Probes
Probes
User Server

Steps to Take

1. Get a probe (optional)
2. Get a **RIPE NCC Access** account
3. Register the probe (if you received one)
4. Get credits
5. **Create measurements** as needed
6. **Troubleshoot and monitor** your network

Take the Poll!

Can you get a

RIPE Atlas probe for free?

2 min.

P3

Why?

- Why get a free RIPE Atlas probe?
  - to help the community effort in building the largest Internet measurement network: RIPE Atlas
  - to help everyone and yourself to create better measurements

- Why get credits and create a RIPE NCC Access Account?
  - to be able to create measurements and troubleshoot

Questions

Creating a Measurement

Section 2

Benefits of Your Own Measurements

- *Customer problem:* cannot reach your server
  - Schedule measurements (**pings** or **traceroutes**) from up to **1,000** RIPE Atlas probes **worldwide** to verify where the problem is;
- **Measuring** packet loss on suspected “bad” link;
- **Testing** anycast deployment.

Credits System

- Measurements cost credits
  - ping = **10 credits**, traceroute = **20**, etc.
- Why? Fairness and to avoid overload
- Spending limit
- Max number of measurements

How Can you Earn Credits?

- Hosting a RIPE Atlas probe
- Being a RIPE NCC member
- Hosting an anchor
- Sponsoring probes

Credits Overview

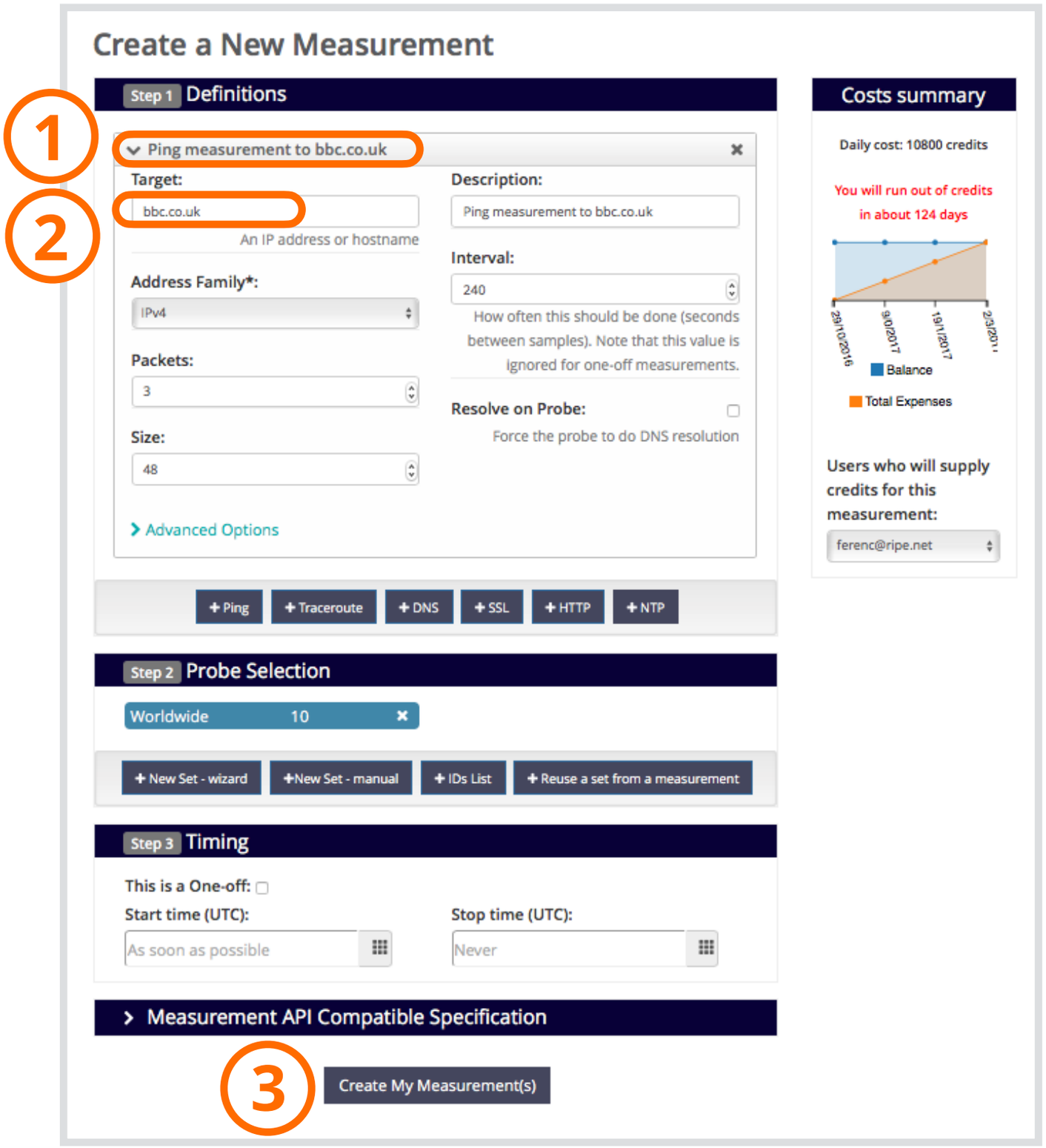
My Atlas > Credits

Scheduling a Measurement

- Log in to **atlas.ripe.net**
- Four methods:

1. Quick and easy
2. Advanced GUI usage
3. API (curl and JSON code)
4. CLI

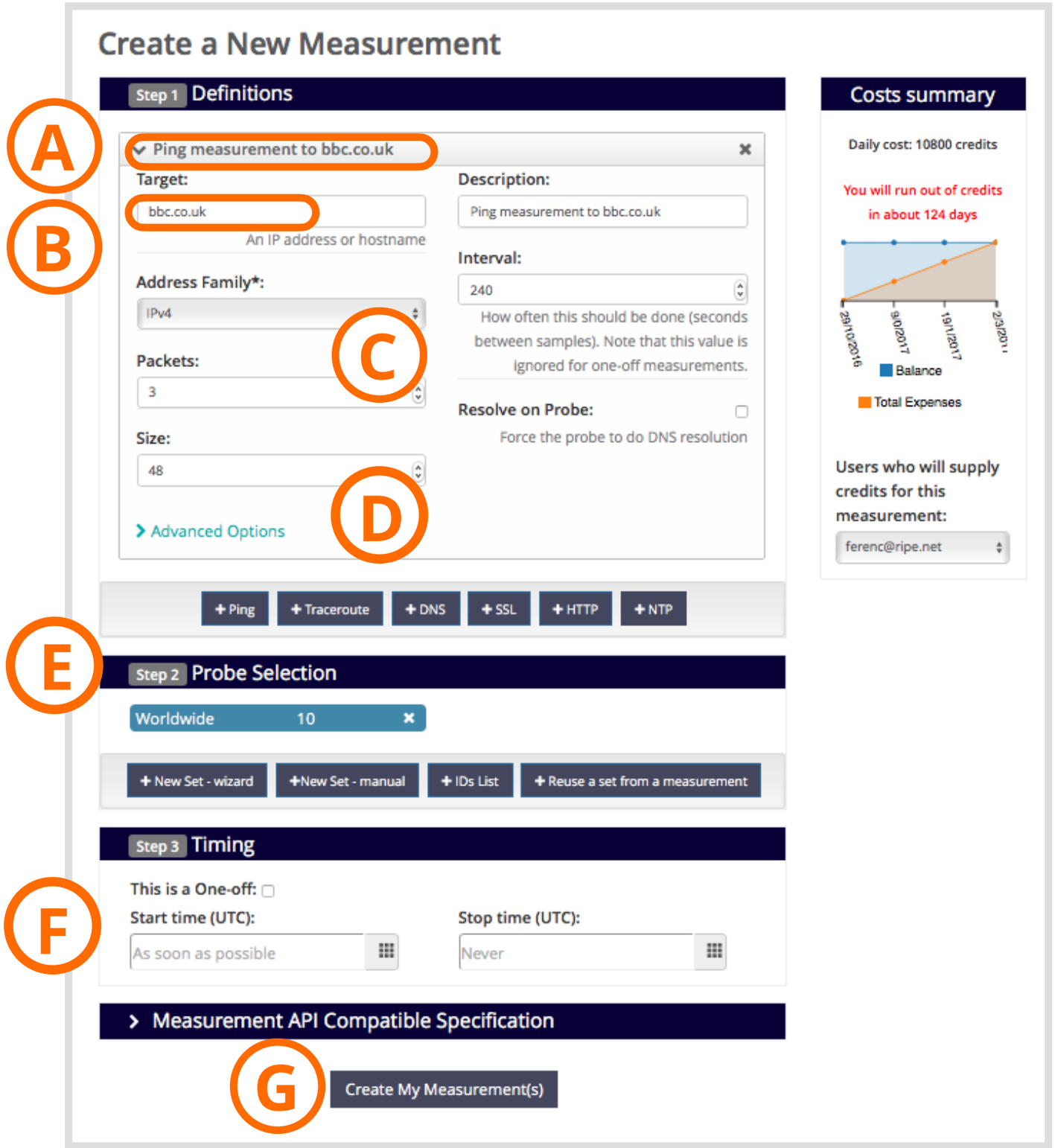
1. Quick and Easy



2. Use GUI

- Mostly used for a periodic, long-term measurement
  - Or “One-off”
- Choose type, target, frequency, start/end time, # of probes, region…
- Each measurement will have **unique ID**
- “**API Compatible Specification**” is generated too

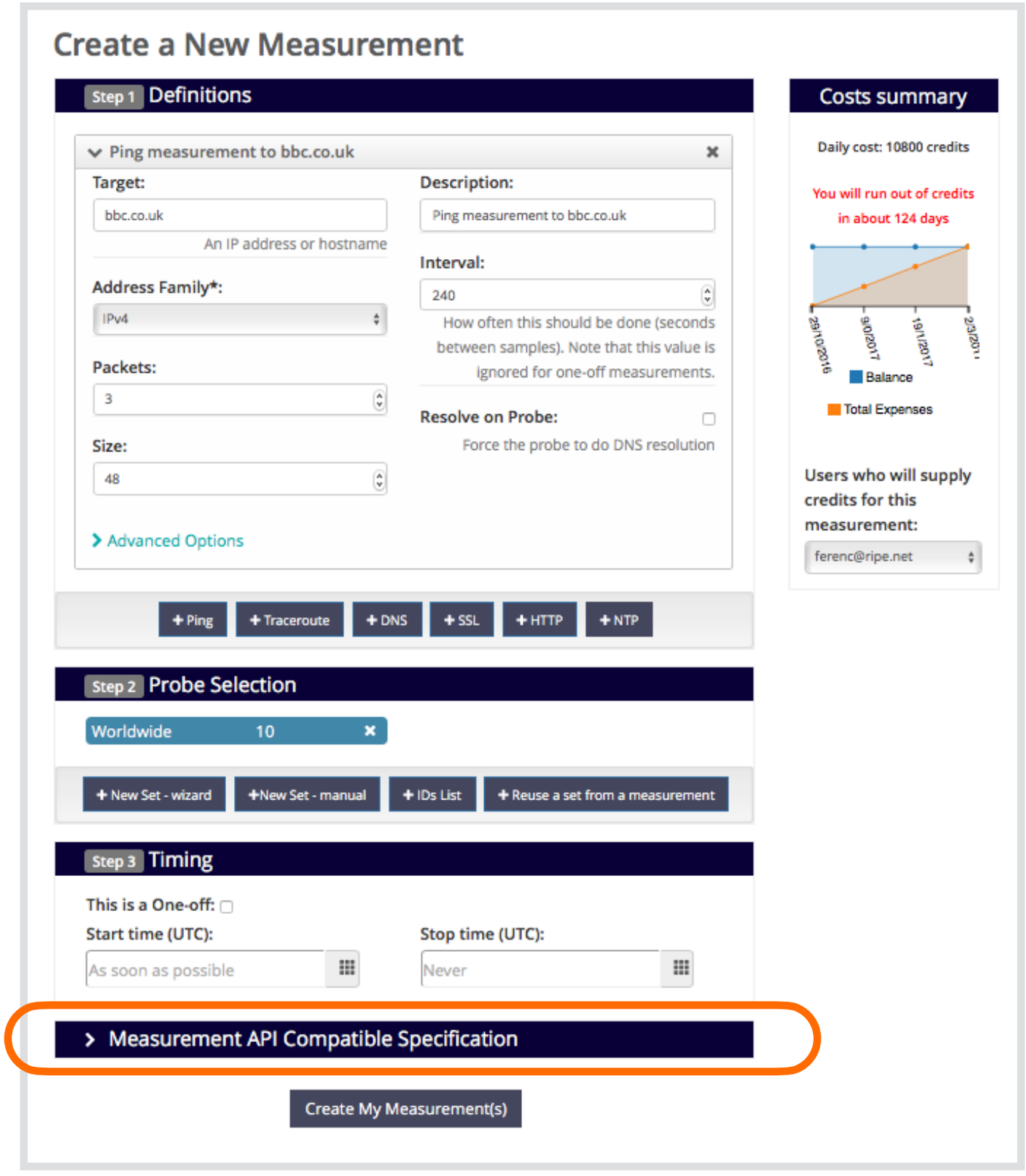
2. Advanced GUI



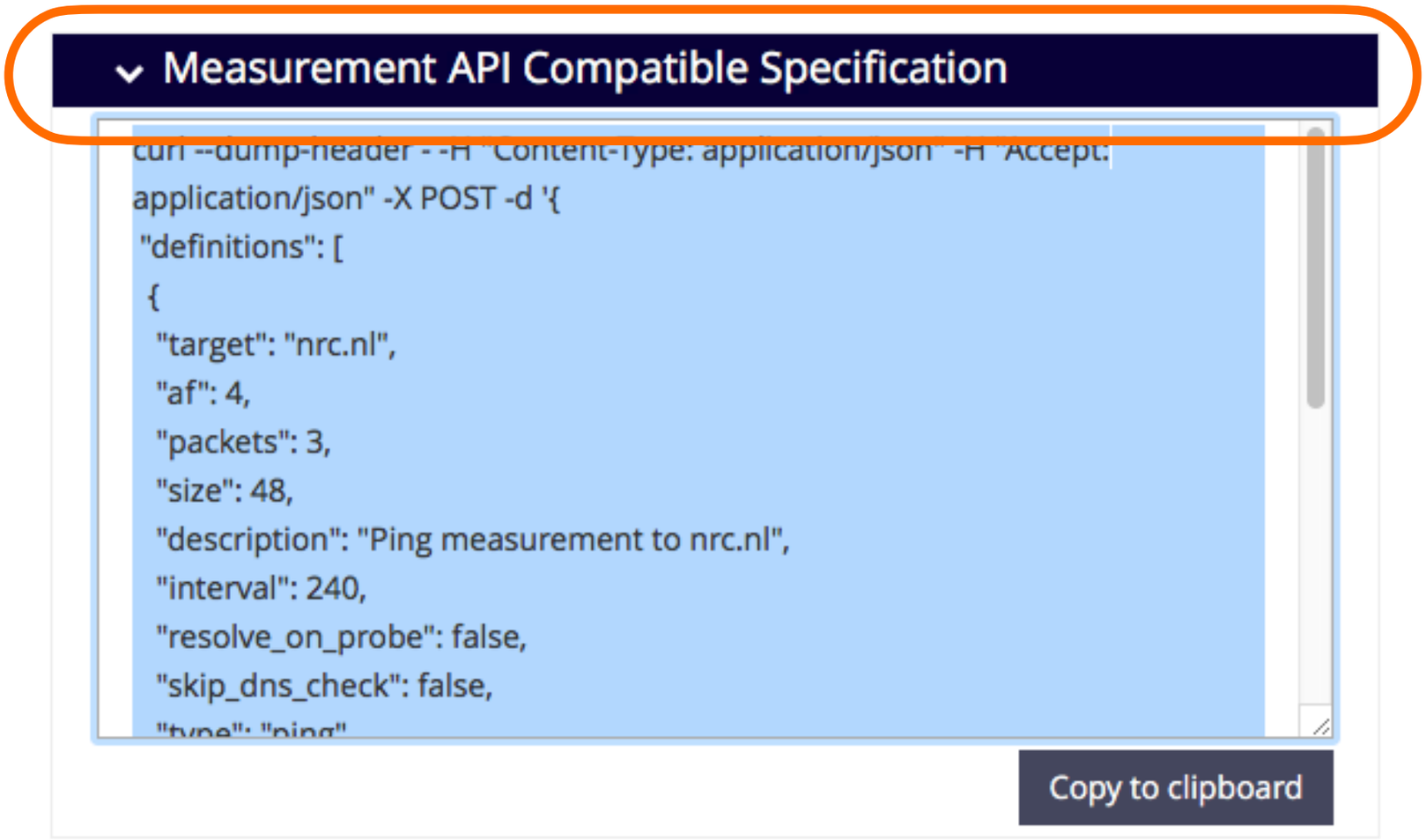
3. Use API

- **Using command-line and scripting:**
  - Application Programming Interface (API)
  - https://atlas.ripe.net/docs/api/v2/manual/measurements/types/
  - https://atlas.ripe.net/keys/
- **You will need API keys**
  - To create measurements without logging in
  - To securely share your measurement data

3. API Compatible



[cont...] 3. API Compatible

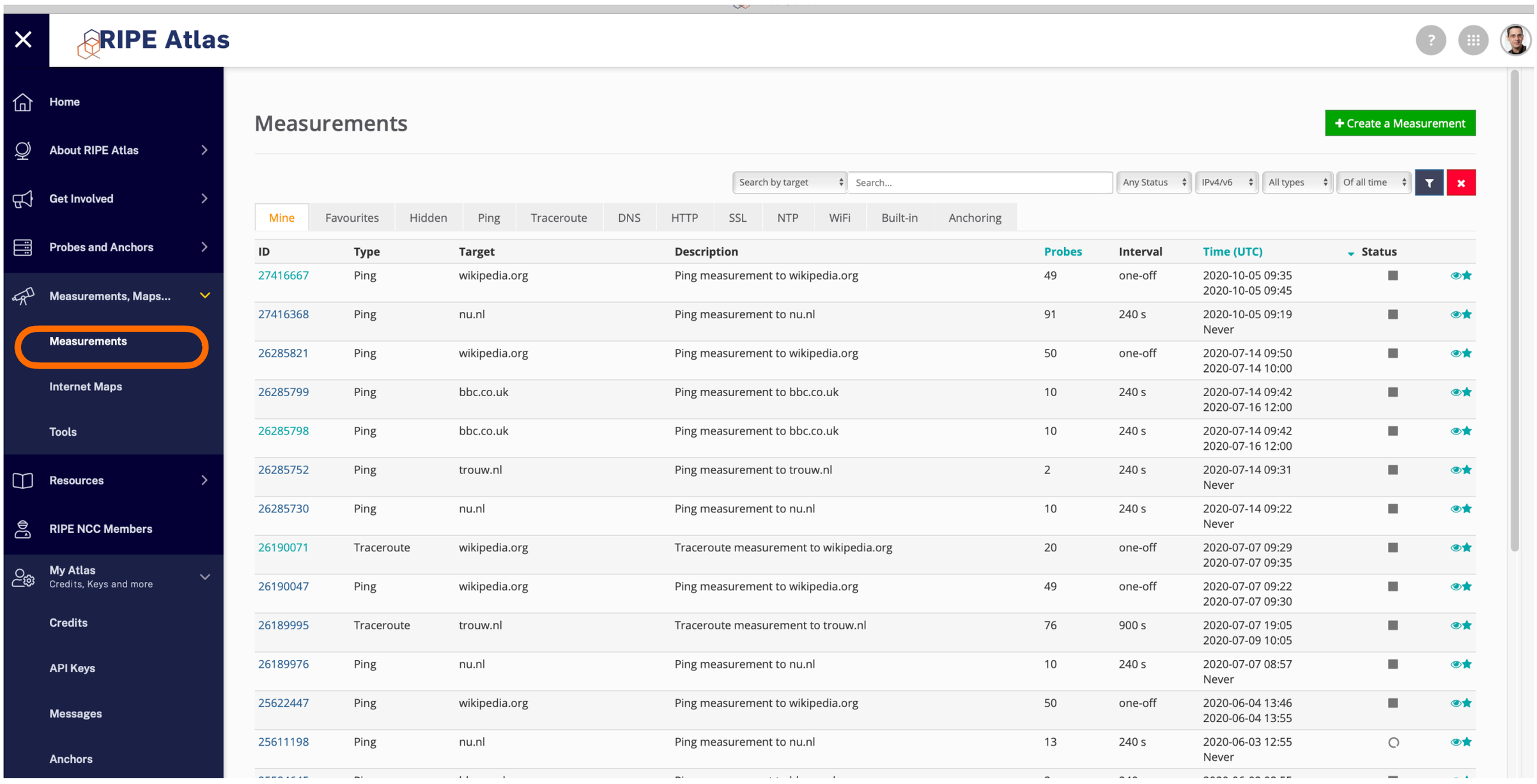


Create API Key

1. Go to MyAtlas
2. Click on “Create an API Key”
3. Choose type: “create a new user-defined measurement”
4. “Object” is not applicable (N/A) for this type
5. Give it a label

Looking Up Measurements Results

Go to “Measurements, Maps and Tools” > “Measurements”



ID	Type	Target	Description	Probes	Interval	Time (UTC)	Status
27416667	Ping	wikipedia.org	Ping measurement to wikipedia.org	49	one-off	2020-10-05 09:35 2020-10-05 09:45	
27416368	Ping	nu.nl	Ping measurement to nu.nl	91	240 s	2020-10-05 09:19 Never	
26285821	Ping	wikipedia.org	Ping measurement to wikipedia.org	50	one-off	2020-07-14 09:50 2020-07-14 10:00	
26285799	Ping	bbc.co.uk	Ping measurement to bbc.co.uk	10	240 s	2020-07-14 09:42 2020-07-16 12:00	
26285798	Ping	bbc.co.uk	Ping measurement to bbc.co.uk	10	240 s	2020-07-14 09:42 2020-07-16 12:00	
26285752	Ping	trouw.nl	Ping measurement to trouw.nl	2	240 s	2020-07-14 09:31 Never	
26285730	Ping	nu.nl	Ping measurement to nu.nl	10	240 s	2020-07-14 09:22 Never	
26190071	Traceroute	wikipedia.org	Traceroute measurement to wikipedia.org	20	one-off	2020-07-07 09:29 2020-07-07 09:35	
26190047	Ping	wikipedia.org	Ping measurement to wikipedia.org	49	one-off	2020-07-07 09:22 2020-07-07 09:30	
26189995	Traceroute	trouw.nl	Traceroute measurement to trouw.nl	76	900 s	2020-07-07 19:05 2020-07-09 10:05	
26189976	Ping	nu.nl	Ping measurement to nu.nl	10	240 s	2020-07-07 08:57 Never	
25622447	Ping	wikipedia.org	Ping measurement to wikipedia.org	50	one-off	2020-06-04 13:46 2020-06-04 13:55	
25611198	Ping	nu.nl	Ping measurement to nu.nl	13	240 s	2020-06-03 12:55 Never	

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Available Visualisations: Ping

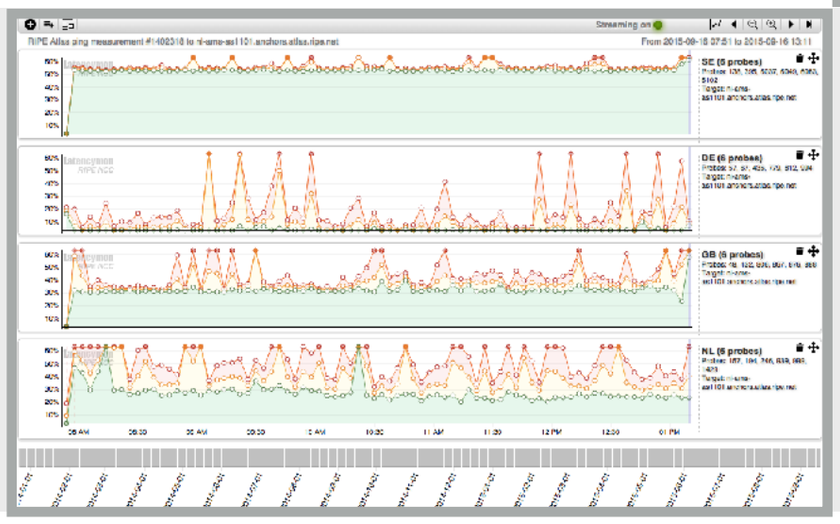
Probe	ASN (v4)	ASN (v6)		Time	RTT
6019	3333	3333		2015-05-19 09:23	1.157
6069	59469	59469		2015-05-19 09:23	15.253
6111	198068	198068		2015-05-19 09:23	37.760
6112	197216	197216		2015-05-19 09:23	35.494
10008	3851			2015-05-19 09:23	24.664
10218	6876			2015-05-19 09:23	37.952
10246	39608			2015-05-19 09:23	36.313
10252	50288			2015-05-19 09:23	62.441
10267	12322			2015-05-19 09:23	31.498
10296	51214			2015-05-19 09:23	✖ Unreachable

List of probes

sortable by RTT

Map

colour-coded by RTT



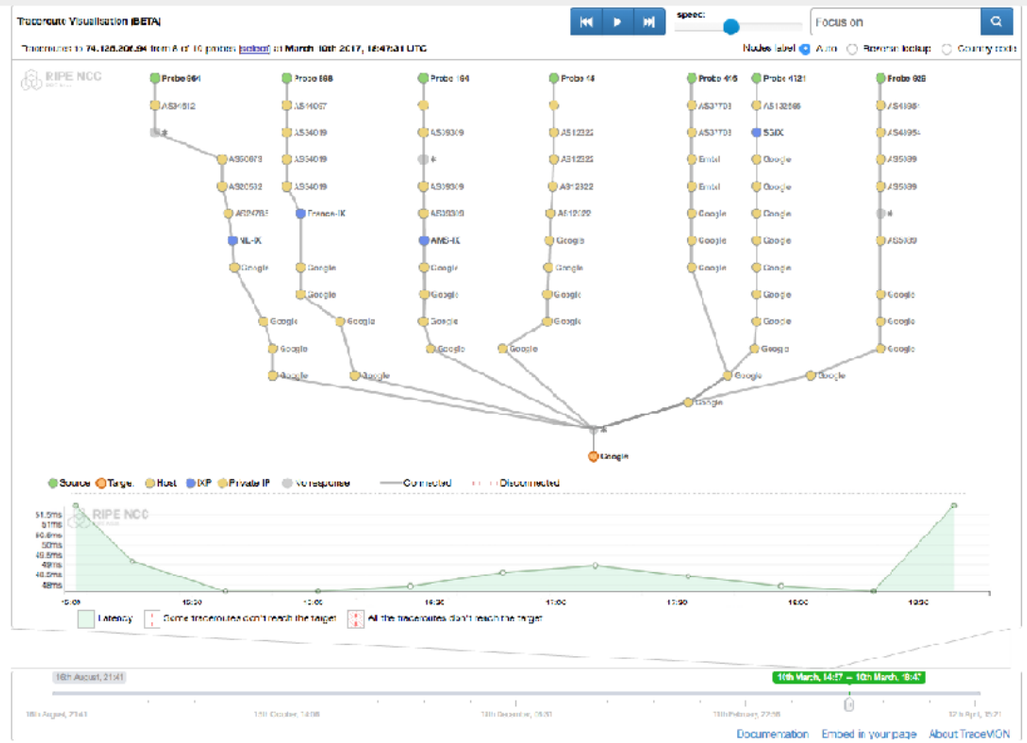
LatencyMON

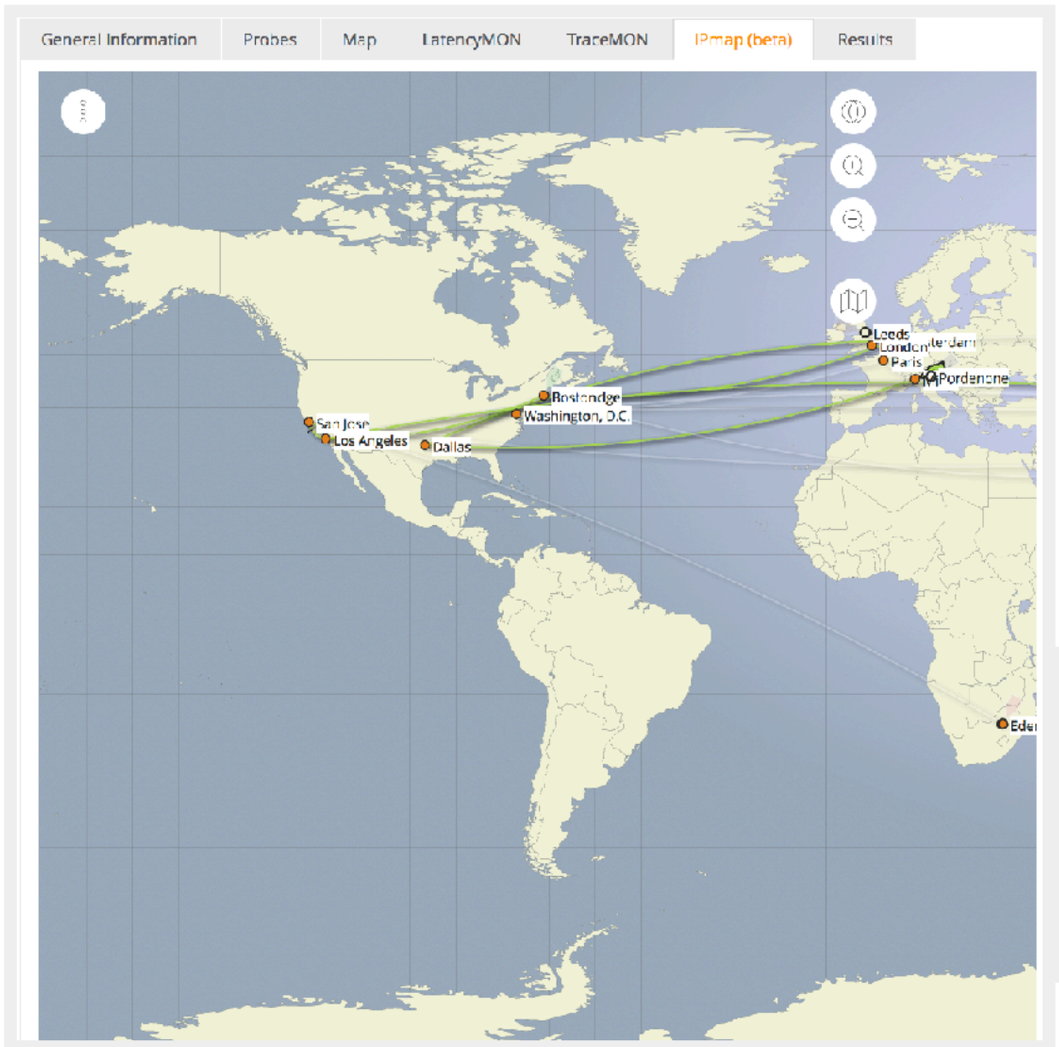
compare multiple latency trends

Available visualisations: traceroute

TraceMON:

network topology, latency and nodes information





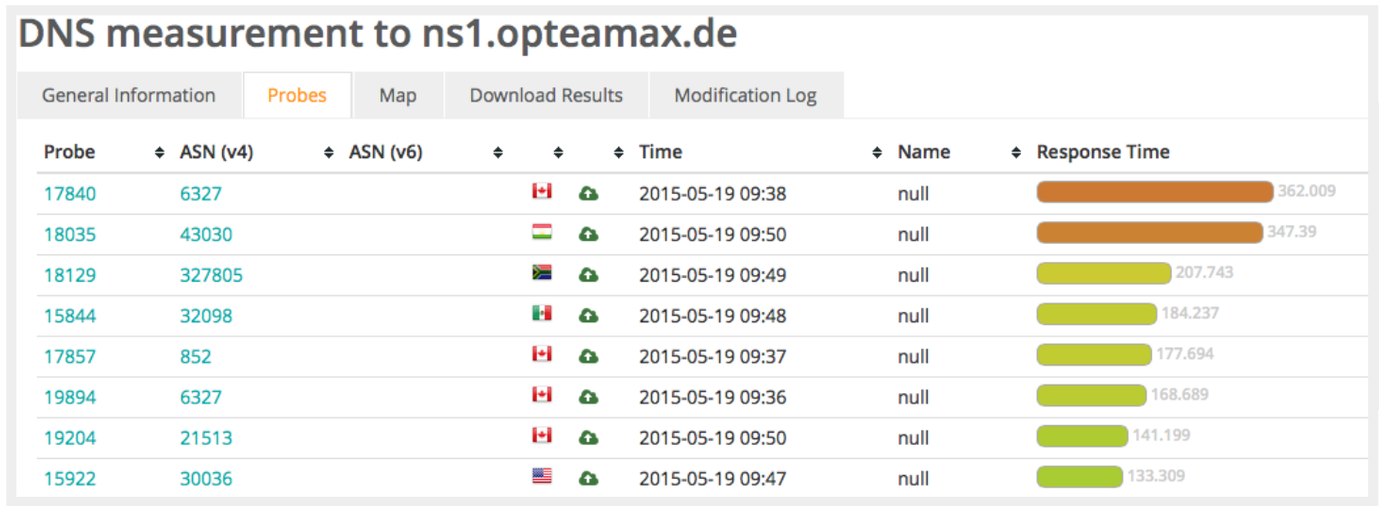
IPMap(beta):

hops geolocation on map (prototype)

Available visualisations: DNS

Map:

colour-coded response time or diversity



DNS measurement to ns1.opteamax.de

General Information | Probes | Map | Download Results | Modification Log

Probe	ASN (v4)	ASN (v6)		Time	Name	Response Time
17840	6327			2015-05-19 09:38	null	362.009
18035	43030			2015-05-19 09:50	null	347.39
18129	327805			2015-05-19 09:49	null	207.743
15844	32098			2015-05-19 09:48	null	184.237
17857	852			2015-05-19 09:37	null	177.694
19894	6327			2015-05-19 09:36	null	168.689
19204	21513			2015-05-19 09:50	null	141.199
15922	30036			2015-05-19 09:47	null	133.309

List of probes:

sortable by response time

Raw Measurement Data download

You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements > Measurement #13027

RIPE Atlas

- About RIPE Atlas
- Get Involved
- Probes and Anchors
- Measurements, Maps and Tools
- Resources
- RIPE NCC Members

Settings & Status | Map | Latencymon | Downloads

Download the raw measurement result data here.

You can use this form to download the data through your browser, or use the preview on the right to help you query the REST API directly.

Select Your Timeframe

Start Date*:

2038-01-14 UTC

All dates are start-of-day

Stop Date*:

2038-01-14 UTC

All dates are end-of-day

Format:

json

Download

URL Preview

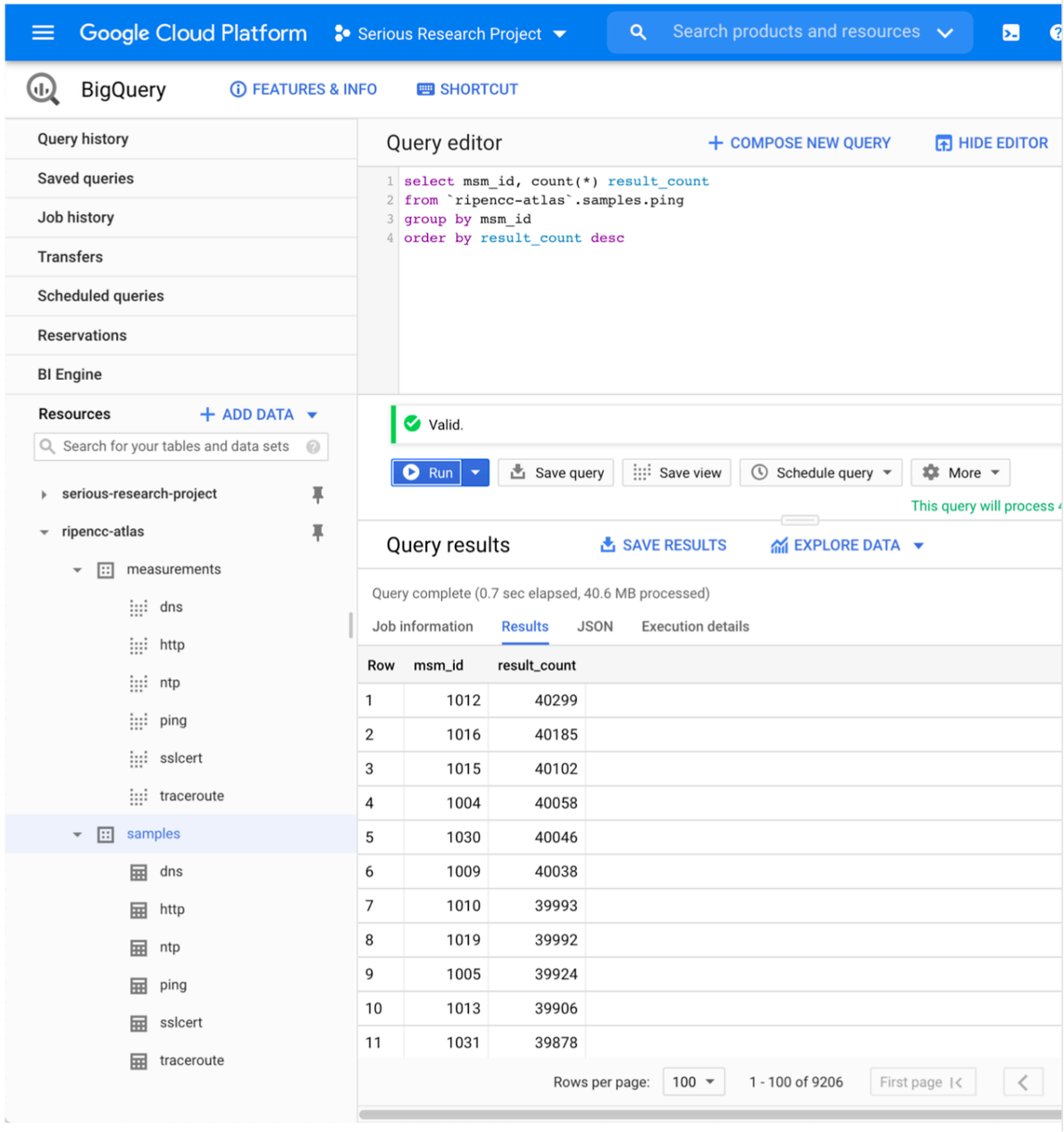
```
/api/v2/measurements/13027/results/?start=2147040000&stop=2147126399&format=json
```

RIPE Atlas Data on BigQuery

- RIPE Atlas measurement results available via Google BigQuery
- General purpose data warehouse
- SQL query language on top
- Great for rapid investigation
- Build complex analyses, or just heavy filtering prior to local analysis

https://github.com/RIPE-NCC/ripe-atlas-bigquery/

https://labs.ripe.net/tools/



Take the Poll!

Can you create as many measurements as you want?

2 min.

P4

P4

Questions

Demo A

Create a Measurement

Exercise

We will create a **ping** measurement:

- Involving **ten probes**
- To a target of your choice
- Source is **your country**
- Duration of **two days**

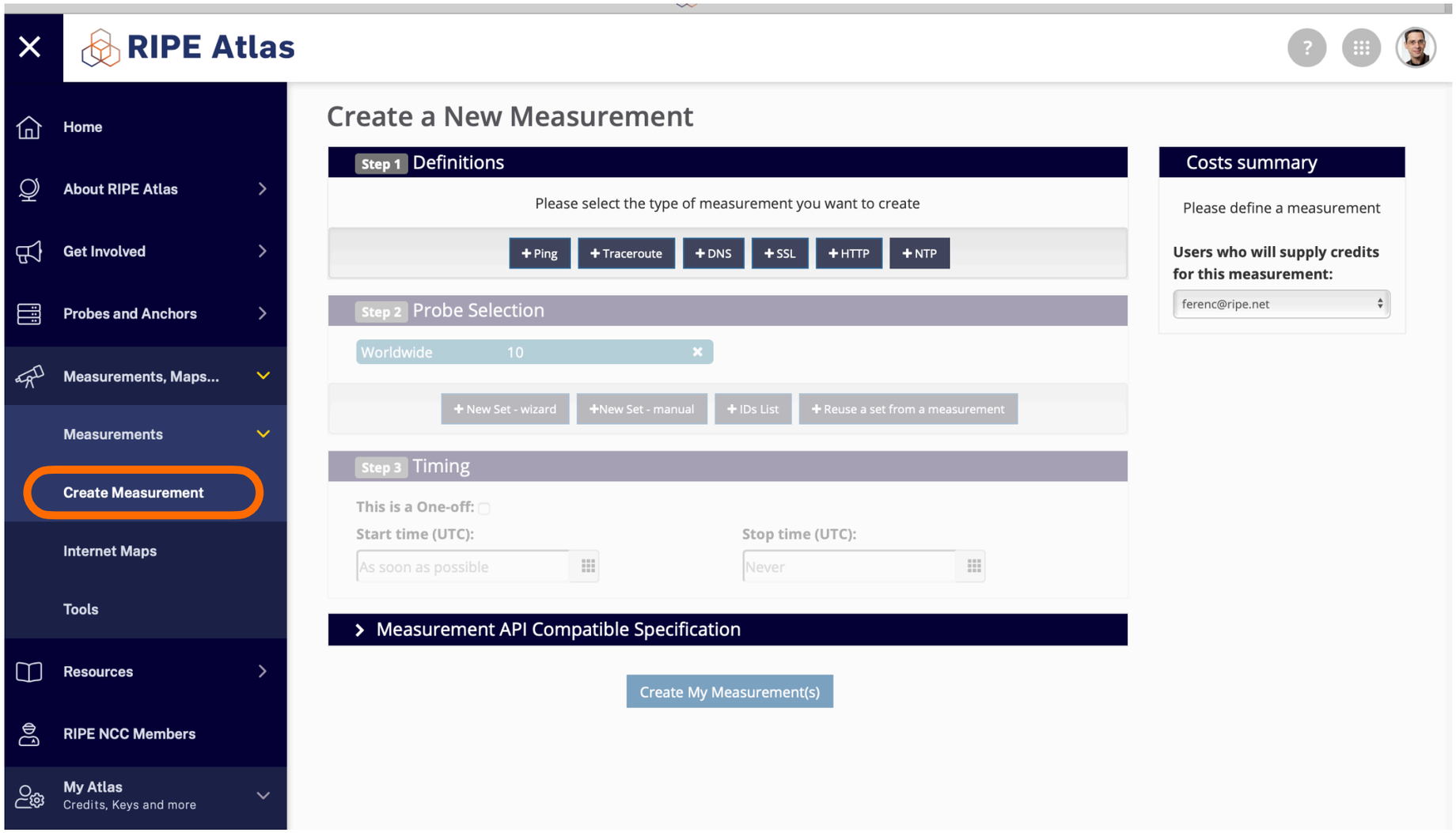
Tasks

1. *Warm-up:* Create a measurement using the GUI
2. Create API Key
3. Schedule a measurement using the API

Task 1: Use Web Interface

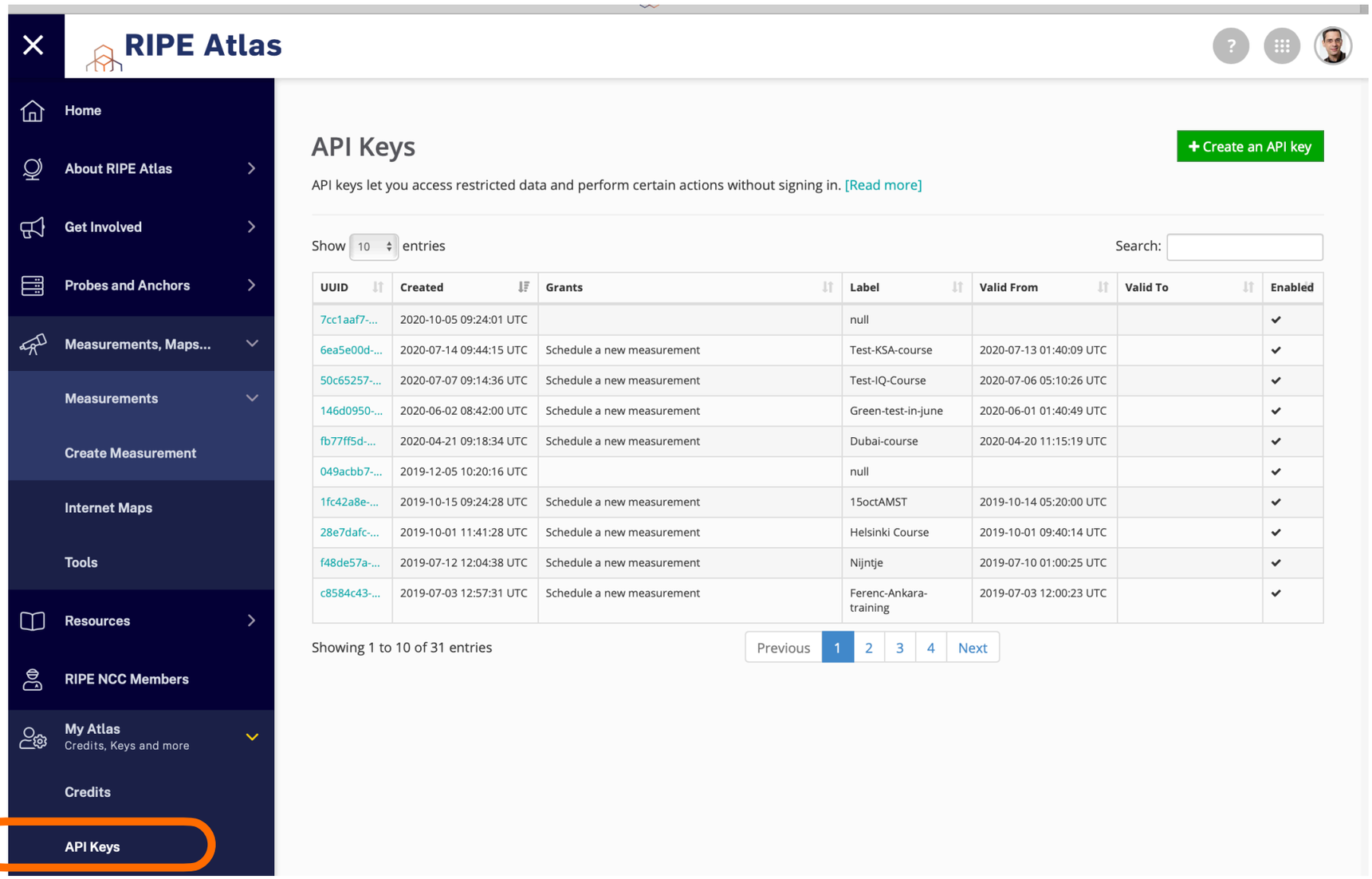
- Once you generate a measurement, copy **“API Compatible Specification**” to text file
- Take note of the **measurement ID**!

create measurement



Task 2: Create API key

1. Click on “Create an API Key”
2. Permission: “schedule a new measurement”
3. “Target” is not applicable (N/A) for this type



API key

[cont...] Task 2: Create API key

4. Give it a label

5. Give it a duration of validity (leave empty for defaults)

6. “Key” value to be passed on to the API call (next step)

Task 3: Use API

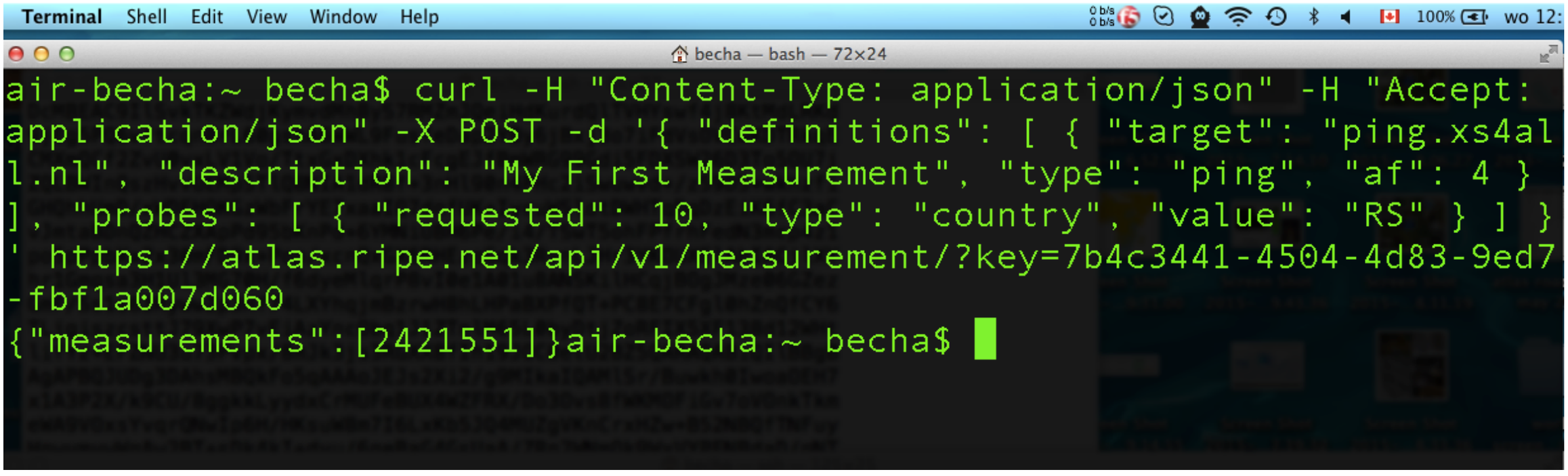
Schedule a measurement using API

- Use the “key” you just generated
- Hint: copy and past API call syntax from the measurement generated by the GUI

An example:

```
curl -H "Content-Type: application/json" -H "Accept: application/json" -X
POST -d '{ "definitions": [ { "target": "ping.xs4all.nl", "description":
"My First API Measurement", "type": "ping", "af": 4 } ], "probes":
[ { "requested": 10, "type": "country", "value": "RS" } ] }' https://
atlas.ripe.net/api/v1/measurement/?key=YOUR_API_KEY
```

Task 3: Use API



D

Questions

Let’s take a **5 minute** break!


WELCOME
WE ARE
OPEN
PLEASE COME IN

Command-line Interface (CLI) Toolset

Section 3

RIPE Atlas CLI

- Familiar output (ping, dig, traceroute)
- **Linux/OSX**
  - http://ripe-atlas-tools.readthedocs.org/en/latest/installation.html#requirements-and-installation
- **Windows** [experimental]
  - https://github.com/chrisamin/ripe-atlas-tools-win32

Installing the CLI tool

RIPE Atlas CLI

- Open source
  - RIPE NCC led community contribution
- Documentation
  - https://ripe-atlas-tools.readthedocs.org/
- Source, if you want to contribute:
  - https://github.com/RIPE-NCC/ripe-atlas-tools/

Installing the CLI tool

Install RIPE Atlas Tools

- **OSX:**
  - sudo easy_install pip
  - sudo pip install ripe-atlas-tools
- **Linux:**
  - Available from many package repositories
  - ...or same as in OSX

Installing the CLI tool

Configure RIPE Atlas CLI

- Reuse the API key of the previous exercise
  - Or create a new one at https://atlas.ripe.net/keys/
- Configure your CLI
  - ripe-atlas configure --set authorisation.create=MY_API_KEY

Fetch an Existing Measurement

Fetch the ping measurement **2340408**

- ripe-atlas report 2340408

Search probes

- **Search all probes in AS 3333**
  - ripe-atlas probe-search --asn 3333
- **Show specific fields**
  - ripe-atlas probe-search --asn 3333 --field asn_v6 --field country --field description --field status

D

Create a Measurement

Create a ping measurement to wikipedia.org

- One-off, default parameters
- 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,
```

D

Other Examples of Ping

Geo-specific from 20 probes from Canada:

- ripe-atlas measure ping --target example.com --probes 20 --from-country ca

20 Canadian probes that definitely 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

Take a Poll!

How do you identify yourself (for credit accounting) when using CLI?

2 min.

P5

Questions

Demo B

Using RIPE Atlas CLI

Search Probes

Use the **traceroute** command to test the reachability of

- **wikipedia.org**
- on TCP port **443**
- from **20 probes**
- in **France**.

Search Probes

Use the **traceroute** command to test the reachability of

- **wikipedia.org**
- on TCP port **443**
- from **20 probes**
- in **France**.

```
ripe-atlas measure
traceroute  --protocol TCP
--target wikipedia.org --
port 443 --probes 20 --
from-country fr
```

Questions

Take a Poll!

Which method gives you greater **flexibility** in creating measurements and in looking up results?

2 min.

P6

Demo C

Installing a RIPE Atlas software Probe

Installing the RIPE Atlas SW Probe

- All info over installing SW probes:
  - https://atlas.ripe.net/docs/software-probe/
  - instructions, videos
- Many different platforms
- We will now demo one of them

- https://atlas.ripe.net/docs/software-probe/

Good to Know

The (future) host of a RIPE Atlas software probe is expected to:

- Understand what it means to operate a probe for the RIPE Atlas network, including what benefits they themselves gain from this and what services they thereby provide to the RIPE network and its users. You can read more on the RIPE Atlas about page.
- Install the software package that is applicable for their intended target hardware and OS. This software package can come from a variety of sources such as an official repository on GitHub. At the moment the RIPE NCC maintains a binary RPM package.
- Register their probe following the software probe application procedure.
- Keep the version of their software up-to-date by upgrading to newer versions as they become available.
- Should the access credentials for their probe change (for example after having to reinstall a server that runs the software probe), they need to re-register the new access credentials.

Platform Specific Installation Instructions

- https://atlas.ripe.net/docs/software-probe/

Platform-specific Installation Instructions

Below you can find help with installing the RIPE Atlas software probes.

Platform	Support	Installation Manuals	Installation Videos
CentOS 7 (binary)	RIPE NCC	English Indonesian	English
CentOS 8 (binary).	RIPE NCC	English Indonesian Arabic	Russian
CentOS 7 & 8 (source)	RIPE NCC	English Indonesian Arabic	Your video here?
Debian 9 (source)		English Indonesian Arabic	Your video here?
Debian 10 (source)		English Indonesian Arabic	English
Raspbian (source)		English Indonesian Arabic	Your video here?
Docker	Community	English (Jamesit) English (Knight1)	English
OpenWRT			
Turris	Vendor (NIC.CZ)	English	English

We are maintaining a Github repo for manuals in different languages. Please let us know (open an issue, or even a PR) if you'd like to contribute.

DEMO

- We will demo the RIPE Atlas Probe installation on CentOS 7
- https://atlas.ripe.net/docs/software-probe/
- Instructions: https://github.com/RIPE-NCC/ripe-atlas-probe-doc/blob/master/manuals/CentOS-7-binary.en.md
- Instruction video: https://youtu.be/SNecvbNYi20

Monitoring

Section 4

Question!

- Do you use **network monitoring**?
- If yes, what kind?

Type your answer in the chat window.

2 min.

Network Monitoring

- Integrate “**status checks**” with existing monitoring tools (Icinga, Nagios)
- Using **real-time data streaming**
  - Server monitoring
  - Detecting and visualising outages

Steps for Integration

1. Create a RIPE Atlas ping measurement
2. Go to “status checks” URL (RESTful API call)
   - https://atlas.ripe.net/api/v2/measurements/2340408/status-check?max_packet_loss=20
3. Documentation:
   - https://atlas.ripe.net/docs/api/v2/manual/measurements/status-checks.html
4. Add your alerts in Nagios or Icinga

Security Aspects

- Probes:
  - Hardware trust material (regular server address, keys)
  - No open ports; initiate connection; NAT is okay
  - Don’t listen to local traffic
  - No passive measurements
- Measurements triggered by “command servers”
  - SSH connections from probe to server
  - initiated by probe
- Measurement code published

Contact Us

- https://atlas.ripe.net
- Users' mailing list: ripe-atlas@ripe.net
- Articles and updates: https://labs.ripe.net/atlas
- In the works: https://atlas.ripe.net/docs/in-the-works/
- Questions and bugs: atlas@ripe.net
- Twitter: @ripencc and #RIPEAtlas

Questions

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