

A world map showing the global distribution of RIPE Atlas measurement points. The points are represented by colored circles of varying sizes, primarily concentrated in North America, Europe, and Asia. The colors range from green to orange, and the sizes vary, likely representing different measurement types or frequencies. Major geographical features like the Atlantic, Indian, and Pacific Oceans are labeled.

# The RIPE Atlas Measurement Platform

## An Introduction for Operators

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I. What is RIPE Atlas?

II. Measurement Types

III. How to run measurements

IV. Measurement demo

V. Visualization showcase

I. RIPE Atlas とは

II. 計測の種類

III. 計測方法

IV. 計測のデモ

V. 視覚化の例

# The RIPE Atlas Measurement Platform

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- Global Internet measurement platform
- Operated by the RIPE NCC
- Active since late 2010
- Devices hosted by volunteers
  - Probes
  - Anchors
- Data publicly available



<https://atlas.ripe.net>

# Probes & Anchors

## Probe

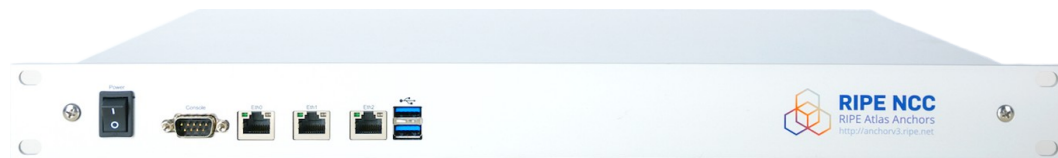
- Small device (or VM) for home use
- Participate in built-in measurements
- Can be selected for user-defined measurements (UDM)



[https://labs.ripe.net/author/alun\\_davies/new-ripe-atlas-version-4-probes/](https://labs.ripe.net/author/alun_davies/new-ripe-atlas-version-4-probes/)

## Anchor

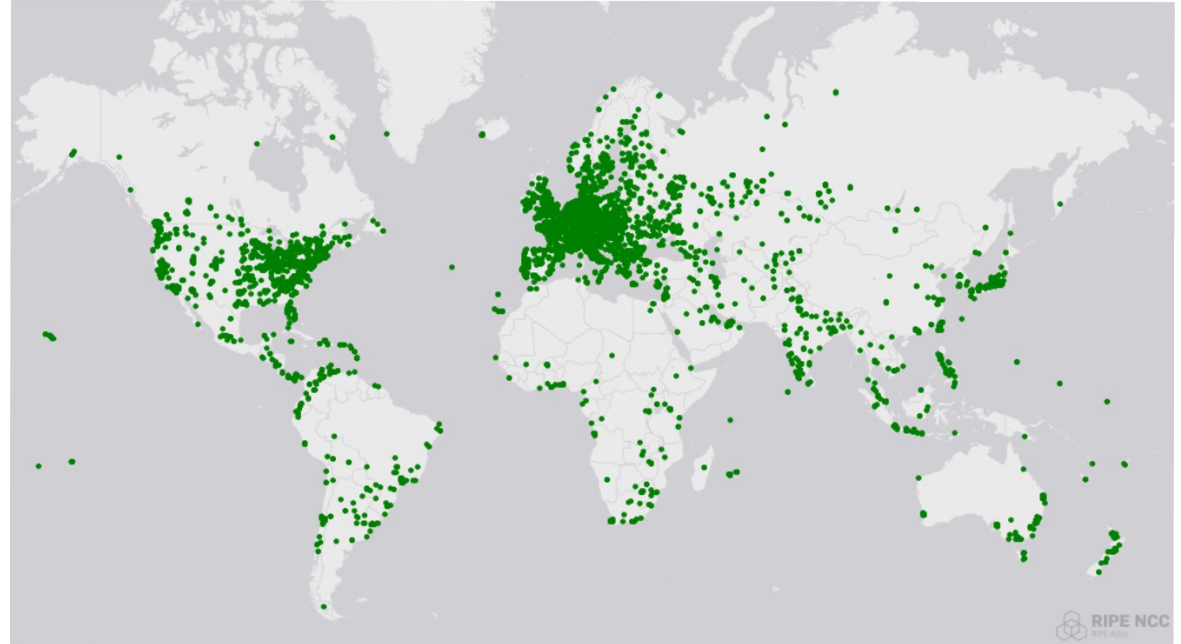
- Powerful device with connectivity requirements
- Participate in built-in and **anchor** measurements
- Available for UDM



<https://atlas.ripe.net/docs/anchor-v3/>

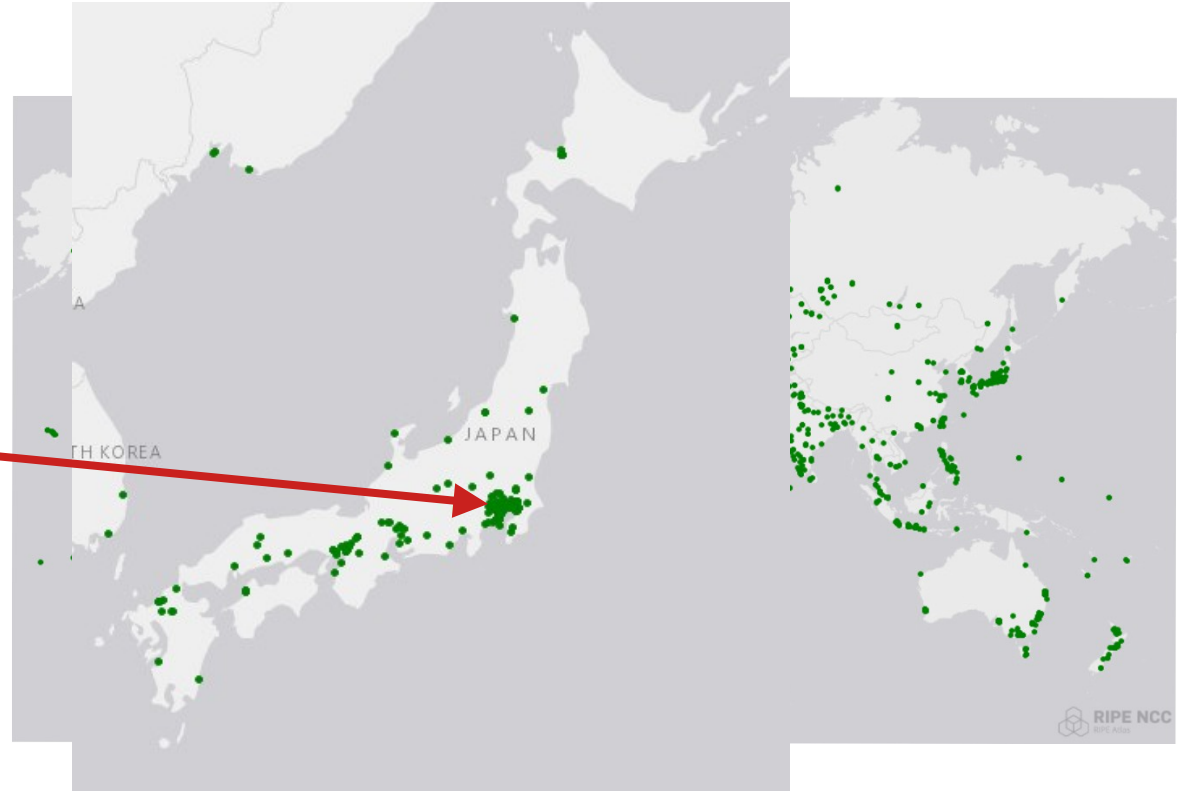
# Probes & Anchors — Distribution

- 11.6k connected probes
  - including 800 anchors
- 3,786 ASes
- 177 Countries



# Probes & Anchors — Distribution

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- **IIJ hosts an anchor!**
  - and six probes



## Six measurement types supported

1. Ping
2. Traceroute
3. DNS
4. TLS (SSL)
5. NTP
6. HTTP\*

\*only towards anchors

## Six measurement types supported

### 1. Ping

- It's... a ping

### 2. Traceroute

- Measure target reachability and latency

### 3. DNS

- Number of packets and packet size can be adjusted

### 4. TLS (SSL)

### 5. NTP

### 6. HTTP\*

Ping Specific

Packets 3	Size 48	<i>i</i> Packet Interval
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Include Probe ID *i*

\*only towards anchors



## Six measurement types supported

1. Ping
  - Trace the layer-3 path to a target
2. Traceroute
  - ICMP/UDP/TCP available
  - traceroute parameters adjustable
3. DNS
4. TLS (SSL)
5. NTP
6. HTTP\*

Traceroute Specific

Response Timeout 4000	Packets 3	Paris 16
Size 48	First Hop 1	Max Hops 32

Protocol:  ICMP  UDP  TCP

Don't Fragment

\*only towards anchors

## Six measurement types supported

1. Ping
  - DNS query to a target DNS server
2. Traceroute
  - 16 query types available
    - A, AAAA, CNAME, SOA, TXT, ...
3. DNS
4. TLS (SSL)
5. NTP
6. HTTP\*

DNS Specific

Target Server Server to query	Timeout 5000	UDP Payload Size 512
Retry Times 0	Query Class: IN CHAOS	Protocol: UDP TCP
<input checked="" type="checkbox"/> Use Probe's Resolver(s)	<input checked="" type="checkbox"/> Set NSID bit	<input type="checkbox"/> Include the Qbuf
<input checked="" type="checkbox"/> Include the Abuf	<input type="checkbox"/> Prepend the Probe's ID	<input checked="" type="checkbox"/> Set RD bit
<input type="checkbox"/> Set DO bit	<input type="checkbox"/> Set CD bit	<input type="checkbox"/> Use Macros

\*only towards anchors

## Six measurement types supported

1. Ping
  - Retrieve SSL certificates of a domain
2. Traceroute
  - Measures...
3. DNS
  - ...certificate validity
  - ...response time
  - TLS alerts
  - ...
4. **TLS (SSL)**
5. NTP
6. HTTP\*

\*only towards anchors

## Six measurement types supported

1. Ping
  - NTP & HTTP measurements are rarely used
2. Traceroute
  - HTTP measurements restricted towards anchors
    - GET measurements to arbitrary domains can have consequences for probe operators
3. DNS
4. TLS (SSL)
5. NTP
6. HTTP\*

\*only towards anchors

# Running Measurements

## Measurement parameters

- Type (ping, traceroute, etc.)
- Frequency (one-off / periodic)
- Participating probes
- Start time
  - End time (if periodic)

### Measurement Form

Use this form to create (and optionally schedule) a new measurement, or to configure an API call to do the same.

#### Step 1: Definitions

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

PING

TRACEROUTE

DNS

TLS

HTTP

NTP

#### 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

#### Step 4: Costs

{ } API Spec

CREATE THIS MEASUREMENT

# Let's try it out!

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

# Credits

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- Measurements are not “free”
- Probe hosts earn credits for uptime and measurements
  - Anchor hosts earn x10
- We have a lot of credits!
  - Contact [malte@iij.ad.jp](mailto:malte@iij.ad.jp) or [romain@iij.ad.jp](mailto:romain@iij.ad.jp) if you want some
- We are not the only one
  - Other hosts are happy to share credits if you ask nicely on the mailing list ([ripe-atlas@ripe.net](mailto:ripe-atlas@ripe.net))

# Back to the measurement

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# Using Existing Measurements

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- Atlas does not sleep
  - 35k measurements running
  - 15k results per second
- All results available via API
  - real-time streaming possible
  - details out of scope of this talk
- Focus on built-in and anchoring measurements

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## Built-in

- Ping + traceroute to DNS root servers and Atlas controllers
- Traceroute measurements to random targets to discover Internet topology
- And more

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## Anchoring

- Full mesh of ping + traceroute between anchors
  - High frequency: Ping every four minutes, traceroute every 15 minutes
- Additionally anchors are targeted by a large set of random probes

# Visualizations from Researchers

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- <https://atlas.ripe.net/probes/6425>
- <https://observablehq.com/@ripencc/atlas-latency-world-map>
- <https://jedi.ripe.net/latest/JP/>

## For Operators

- Global view of network  
広域ネットワークの全体像の把握
- Diagnosis of connectivity problems from specific networks or general regions  
特定のネットワーク、特定地域における疎通性の問題についての診断
- For anchor hosts: Continuous monitoring of network  
Anchor ホスト：継続的なネットワークの監視

## For Researchers

- Easy access to Internet measurements  
容易なインターネット計測
- Enormous dataset waiting to be analyzed  
膨大な量の、まだ分析がされていないデータセット
- Gather insights about the Internet  
インターネットについての情報・知見の収集

# Thanks!

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- Checkout [RIPE Atlas](#)
- Create an account and ask us for credits
  - [malte@iij.ad.jp](mailto:malte@iij.ad.jp) or [romain@iij.ad.jp](mailto:romain@iij.ad.jp)
  - 日本語 OK
- Look for the [IIJ anchor](#)