What is RIPEstat?

• Open data platform for RIPE NCC data
  - RIPE Database, RIS and RIPE Atlas

• Information service for Internet-related data

• Insight through statistics!
RIPEstat Data Sources Available

• More than 25 different datasets
  - RIPE Database (INR, IRR) and other RIRs
  - BGP routing data (RIS)
  - RIPE Atlas, M-Lab, Speedchecker etc.
  - Geolocation
  - Blacklist
  - More details at https://stat.ripe.net/data-sources

• New datasets are constantly added!
RIPEstat APIs

- https://stat.ripe.net

- RIPEstat widget API

- RIPEstat data API
  - https://stat.ripe.net/data/routing-status/data.json?resource=...
RIPEstat Data API

• JSON-RPC API
  - E.g. https://stat.ripe.net/data/prefix-overview/data.json?
    max_related=50&resource=193.0.20.0%2F23

• More than 50 data calls

• Documentation
  - https://stat.ripe.net/docs/data_api
RIPEstat Widget API

- HTML5/CSS/JS applications
- Standard Javascript
  - JQuery
  - Require.js
- More than 50 widgets
- Documentation
  - https://stat.ripe.net/docs/widget_api
RIPEstat Widget API

• Building blocks of RIPEstat web interface
  https://stat.ripe.net
Usage of RIPEstat

- RIPEstat is popular!
  - ~100 million requests per day
  - More than 1.5 million unique clients/IPs (daily)

“RIPEstat is the most used tool of the RIPE NCC tools and services…”
Usage of RIPEstat

- RIPEstat has a very diverse user base

![Graph showing usage statistics by country](image)
Usage of RIPEstat

• Despite this diverse user base, users from other RIR regions are underrepresented

• Possible reasons
  - Lack of knowledge about the service
  - Language barrier
  - Not addressing local topic

• We believe we can improve these points through cooperation with other RIRs
RIR Cooperation

● Phase 1
  - Customisation of the UI to LACNIC’s design
  - Localisation of textual content

● Phase 2
  - Cooperation on system operation and dataset provisioning
  - Example for dataset provisioning: collaboration on BGP route collectors between APNIC, LACNIC and RIPE NCC (already ongoing)
  - Phase 1 and 2 are independent for data set provisioning
Phase 1 Details

• Customisation of the UI to LACNIC’s design
  - The goal is to provide UI that reflects the affiliation to LACNIC. Users that go to stats.lacnic.net will see RIPEstat loaded with a LACNIC customised template e.g. LACNIC logo, header and footer. In the simplest case this requires a DNS entry for stat.lacnic.net pointing to RIPEstat and adaptations in the UI logic

• Localisation of textual content
  - The text that appears in RIPEstat widgets would be translated to Spanish and Portuguese. This would require language support in RIPEstat and the translation efforts
Benefits

- Improved usability for users in LACNIC region
  - Catering for regional information requirements
  - Removing language barrier
  - Access to regional datasets
  - Ability to show and share local events
  - Establishing feedback channel for regional matter to RIPEstat
lacnic infoRedes

Información acerca de recursos de numeración de Internet utilizando RIPEstat. Ingrese una dirección o prefijo IPv4, IPv6 o un ASN para obtener información sobre routing, conectividad, RPKI y otra información útil para operadores de red.

Prefijo, ASN o Nombre de Dominio

Tu red: AS3333 2001:67c:2e8::/48

Prueba alguno de estos ejemplos: Prefijo IPv4, Prefijo IPv6, Rango IPv4, ASN

CASA DE INTERNET DE LATINOAMÉRICA Y EL CARIBE
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InfoRedes

• LACNIC’s themed version of RIPEstat
• Localisations
  - Content
  - Decisions
  - Language
  - Feedback
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- LACNIC’s themed version of RIPEstat
- Localisations
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  - Decisions
  - Language
  - Feedback
- Powered by RIPEstat Data API
- Implementation took two weeks
InfoRedes

LACNIC Presents InfoRedes: the Single Window for Open Data from Internet Resources

InfoRedes

• https://inforedes.labs.lacnic.net

• Product manager: Guillermo Cicileo / guillermo@lacnic.net
NetOX - Network Operators Toolbox

- [https://netox.apnic.net](https://netox.apnic.net)

- Product manager: Sofia Silva Berenguer / sofia@apnic.net
Questions

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RIPE Atlas
Global Measurement Network

Christian Teuschel | October 2019 | ESNOG 24
RIPE Atlas

• ...is a global, open, distributed Internet measurement platform, consisting of thousands of measurement devices that measure Internet connectivity in real time
Global active measurements platform

- Goal: View Internet reachability
- Probes hosted by volunteers
- Measurements towards root name servers
  - Visualised as Internet traffic maps
- Users can also run customised measurements
  - ping, traceroute, DNS & SSL/TLS, NTP and HTTP*
- 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

- 10,000+ probes connected (almost 500 Anchors)
- 7,500+ results collected per second
- 21,000+ measurements currently running
RIPE Atlas Global Coverage
Most Popular Features

- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- APIs and CLI tools to start measurements and get results
- Streaming data for real-time results
- Status checks
Using RIPE Atlas As a Visitor
Internet Traffic Maps

**Internet Maps**

### DNS Root Instances

Shows, for each probe, which root DNS server instance the probe ends up querying, when they ask a particular root server. In other words, it shows the “gravitational radius” for root DNS server instances.

### Comparative DNS Root RTT

Shows a comparison of response time for DNS SOA queries to all the root DNS servers. For each probe, a marker shows the “best” root server with colour identifying the related minimum response time.

### Root Server Performance

This map shows the reply time to the SOA query of a particular root DNS server, over the selected transport protocol (UDP, TCP or comparison of the two) for each probe.

### RTT to Fixed Destinations

Shows the colour coding for the RTT value for the particular destination for each probe. The minimum / average / maximum values are based on standard “ping” measurements.

### Reachability of Fixed Destinations

Shows if the particular fixed destination is reachable or not from each probe. Red markers indicate that the specific destination for these probes are unreachable and green reachable.
Where is B-root?

We display measurement results from the last hour only.
Probes per country (in RIPEstat)

https://stat.ripe.net/es#tabId=activity
Probes per country (in RIPEstat)

https://stat.ripe.net/es#tabId=activity
Where we want to place probes
Looking Up Public Probes
Searching for Probes

Filter based on ASN, country, location...

[Image of RIPE NCC website with a screenshot of a table showing different probes with columns for ID, ASN v4, ASN v6, Country, Description, Connection Status, and a filter option for IP Address or ASN.]

https://atlas.ripe.net/probes/
Probe Page
Zoomable Ping Graph

• Replace multiple RRD graphs: zoom in/out in time, in the same graph
• Easier visualisation of an event’s details
• Selection of RTT class (max, min, average)
Searching probes with the API

- endpoint https://atlas.ripe.net/api/v2/probes/
- different formats, e.g. geojson

also works in a browser!
Finding Results of Public Measurements
Looking up Measurements Results

https://atlas.ripe.net/measurements/
Available visualisations: ping

- 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: traceroute

- List of probes, colour-coded number of hops
Available visualisations: DNS

- Map, colour-coded response time or diversity
- List of probes, sortable by response time
Downloading Measurements Results

- Click on “Results”, then “Download”
- Or URL
- Or API
- Results in JSON
- Libraries for parsing
Looking at the Result

```json
{"af":6,"avg":61.32,
"dst_addr":"2a00:1450:4004:802::1014","dst_name":"www.google.com",
"dup":0,
"from":"2001:8a0:7f00:b201:220:4aff:fec5:5b5b",
"fw":4660,"lts":411,
"max":62.148,"min":60.372,
"msm_id":1004005,"msm_name":"Ping",
"prb_id":722,"proto":"ICMP","rcvd":10,
"result":[{"rtt":62.148},{"rtt":61.437},{"rtt":61.444},{"rtt":61.448},{"rtt":61.794},{"rtt":61.533},{"rtt":60.372},{"rtt":60.373},{"rtt":61.384},{"rtt":61.267}],
"sent":10,"size":64,
"src_addr":"2001:8a0:7f00:b201:220:4aff:fec5:5b5b",
"step":240,"timestamp":1410220847,"ttl":54,"type":"ping"},
```

Destination (IP & name)

Source (probe public IP address)

Reference (msm ID)

Packet loss: difference between sent & received!
Search for Measurements by Target in RIPEstat

Go to “RIPEstat > “RIPE Atlas Activity”
Finding one specific measurement

• If you know the measurement ID:
  - https://atlas.ripe.net/measurements/ID
  - https://atlas.ripe.net/measurements/2340408/
Use Existing Measurements

• Many measurements already running!
• Search for existing public measurements first…
• Only then schedule your own measurement
Creating a Measurement
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 check where the problem is

• Measuring packet loss on suspected “bad” link

• Testing anycast deployment
Logging In

• Log in to atlas.ripe.net
  - Use your RIPE NCC Access account
  - Same account for LIR Portal, RIPE Atlas, RIPEstat, RIPE Labs...
  - Create an account if you don’t already have one
Credits system

• Measurements cost credits
  - ping = 10 credits, traceroute = 20, etc.

• Why? Fairness and to avoid overload

• Spending limit and max number of measurements
Credits overview

RIPE NCC

Credits overview page with a table showing credits usage.

My Atlas > Credits

Give credits to someone

Credits

Here you can see the history of your credit use and current consumption, transfer credits to someone else, and redeem a voucher for credits if you have one.

153,033,561
9,000.00 credits / hour

Christian Teuschel | ESNOG 24 | October 2019
Scheduling a measurement with the web interface

• Log in to atlas.ripe.net
• Navigate to Measurements, Maps and Tools -> Measurements in the left hand sidebar
• Click the green ‘Create a Measurement on the right side of the page
Scheduling a measurement (2)

1. Ping measurement to bbc.co.uk
2. Define the measurement details
3. Create the measurement
Scheduling a measurement (3)

- Recurring measurement: mostly used for a periodic, long-term measurement, or..
- One-off measurement: one run on all selected probes.
- Choose type, target, frequency, start/end time, # of probes, region…
- Each measurement will have unique ID
- “API Compatible Specification” is generated too
Selecting probes with new-set-wizard
Use Cases
Use cases (1)

Using RIPE Atlas to Validate International Routing Detours
Anant Shah — 30 Jan 2017

A Quick Look at the Attack on Dyn
Massimo Candela — 24 Oct 2016
Contributors: Emile Aben

Using RIPE Atlas to Monitor Game Service Connectivity
Annika Wickert — 14 Sep 2016

Using RIPE Atlas to Measure Cloud Connectivity
Jason Read — 06 Sep 2016

Using RIPE Atlas to Debug Network Connectivity Problems
Stéphane Bortzmeyer — 10 May 2016
RIPE Atlas IXP Country Jedi (1)

• Do paths between ASes stay in country?
• Any difference between IPv4 and IPv6?
• How many paths go via local IXP?
• Could adding peers improve reachability?

https://www.ripe.net/ixp-country-jedi

• Experimental tool
  - Feature requests welcome!
  - Depends on probe distribution in country
RIPE Atlas IXP Country Jedi (2)

- **Methodology**
  - Trace route mesh between RIPE Atlas probes
  - Identifying ASNs in country using RIPEstat
  - Identifying IXP and IXP LANs in PeeringDB
Use Cases (2)

• DDoS Attack on Dyn DNS Servers (Oct. 2016)
  - 10s millions devices - Mirai botnet
  - Legitimate requests
Use Cases (3)

• Monitor Game Service Connectivity (Sept. 2016)

• Requirements:
  - Check General Reachability, Latency, Historical data
  - Supported by an active and helpful community
  - Integrate with their existing logging system

• Track down an outage in one upstream

• Became sponsors
Use Cases (4)

- Amsterdam Power Outage (March 2015)
- When and where the outage was happening
Take Part in the RIPE Atlas Community
RIPE Atlas community (part 1)

- Volunteers host probes in homes or offices
- Organisations host RIPE Atlas anchors
- Sponsor organisations give financial support or host multiple probes in their own networks
RIPE Atlas community (part 2)

- Ambassadors help distribute probes at conferences, give presentations, etc.
- Developers contribute free and open software
- Network operators create measurements to monitor and troubleshoot
- Researchers and students write papers
Hosting a probe

- Create a RIPE NCC Access account
- Go to https://atlas.ripe.net/apply
- You will receive a probe by post
- Register your probe
- Plug in your probe
- If you receive a probe from an ambassador (trainer, sponsor, someone at a conference), just register it and plug it in!
Questions

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