



**RIPE NCC**  
RIPE NETWORK COORDINATION CENTRE

# RIPE Atlas Tools for Operators and IXPs

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RIPE NCC

24 May 2017 | LACNIC 27 | Foz do Iguaçu

# Overview



- Introduction to RIPE Atlas
- Use cases
- IXP Country Jedi
- New: TraceMON
- How to take part in RIPE Atlas
- RIPE Atlas in LAC



# Introduction

# What is RIPE Atlas? (1)



- RIPE Atlas video



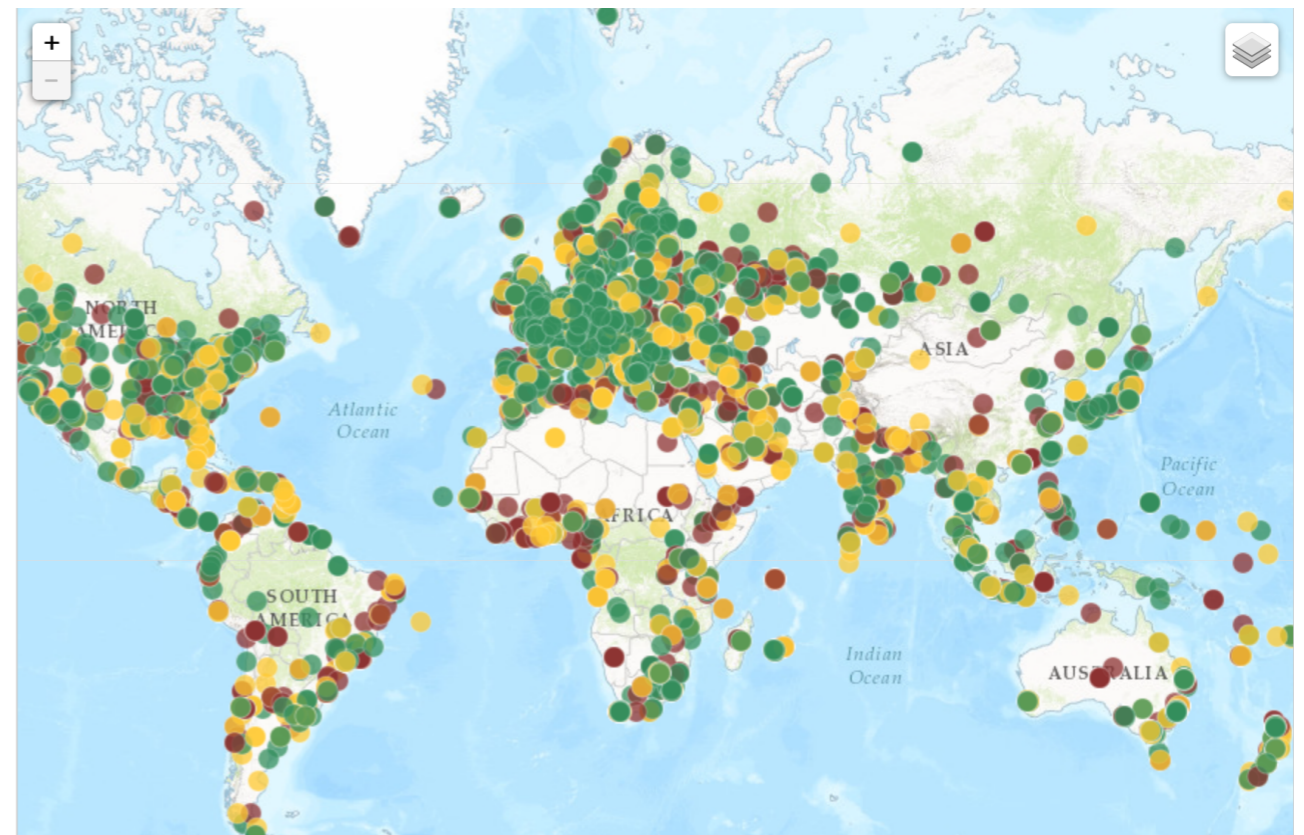
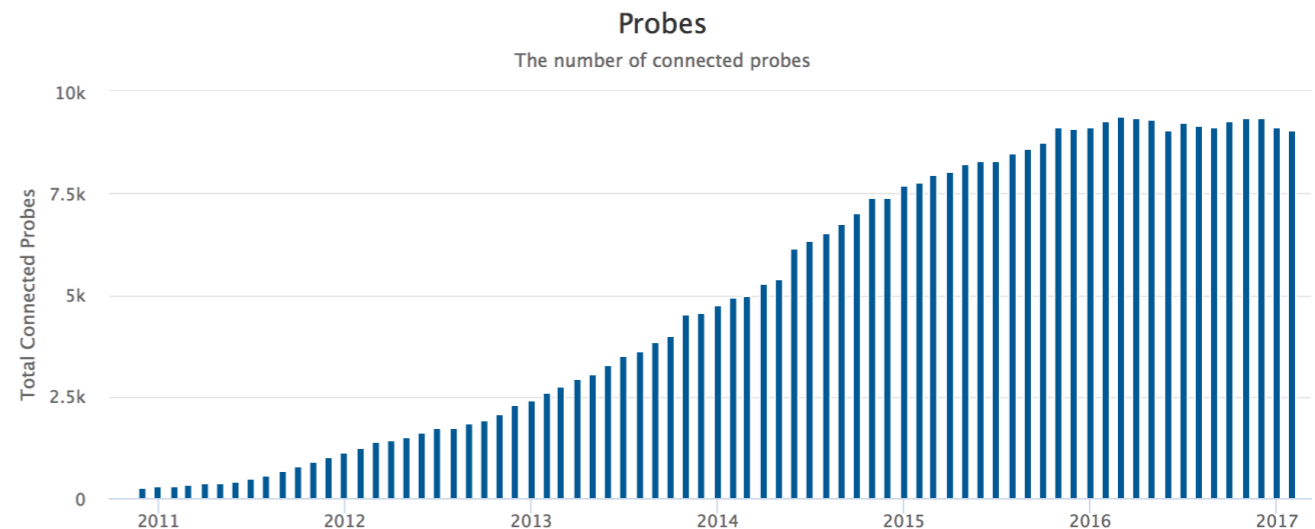
- 9700+ active probes

- 2,606 disconnected
- 6,692 abandoned

- Countries: 177

- Originating ASNs:

3,394 (IPv4) = 5,9%  
1,241 (IPv6) = 9,2%





# What is RIPE Atlas? (2)

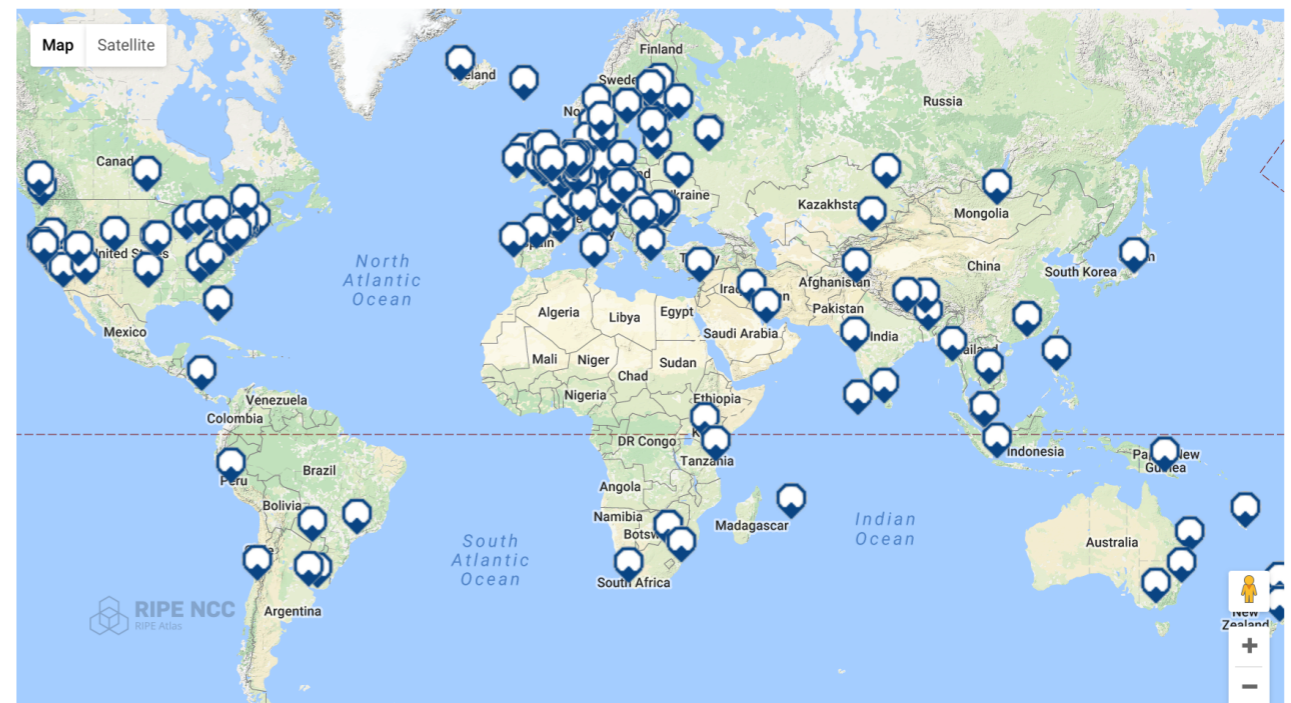
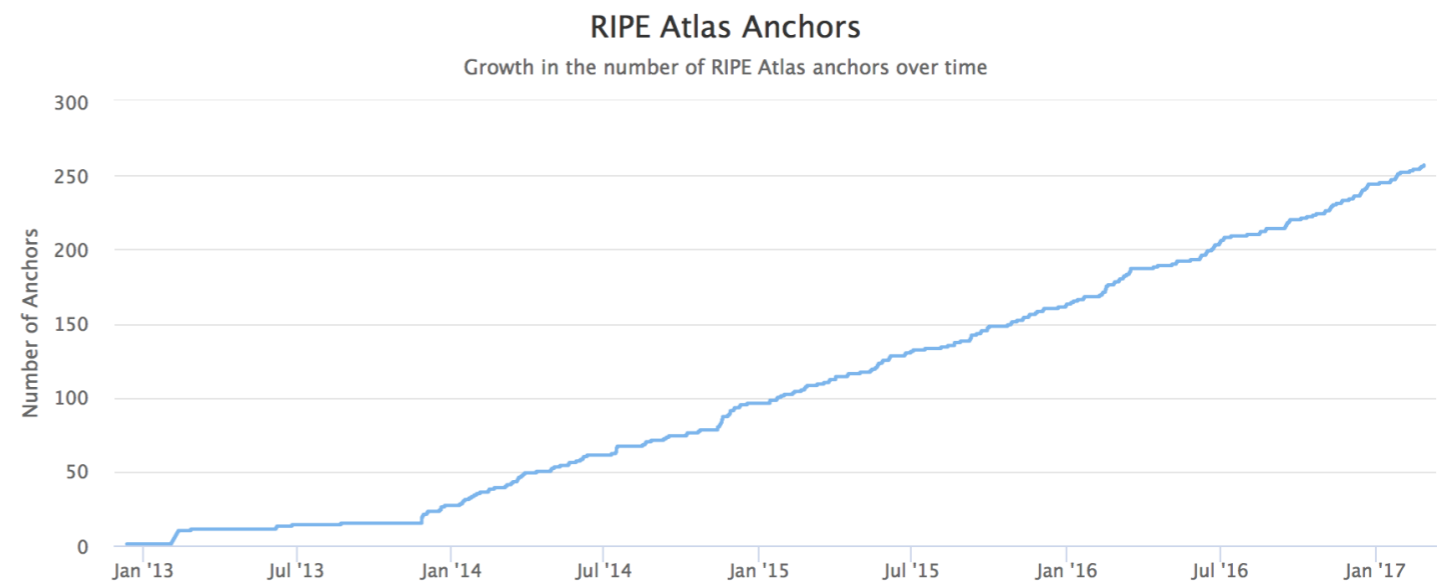


Composed by: Anchors



- 268
  - 7 in LAC

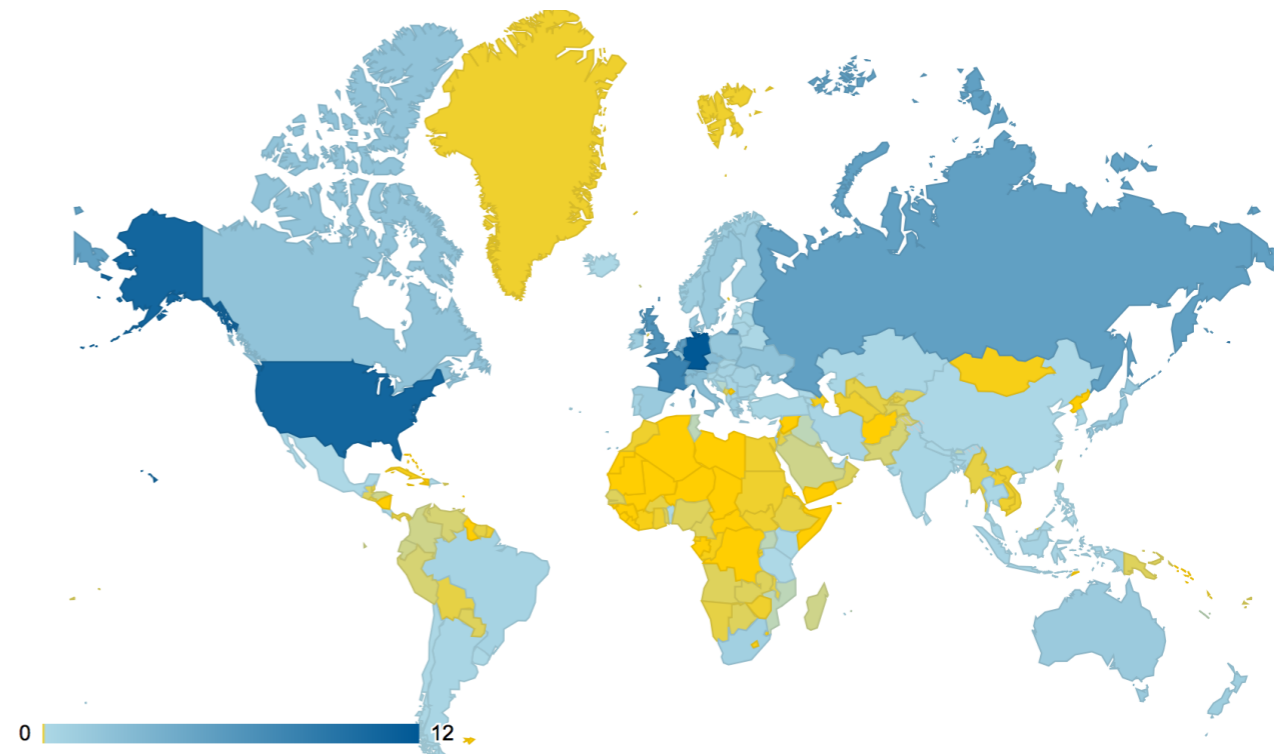
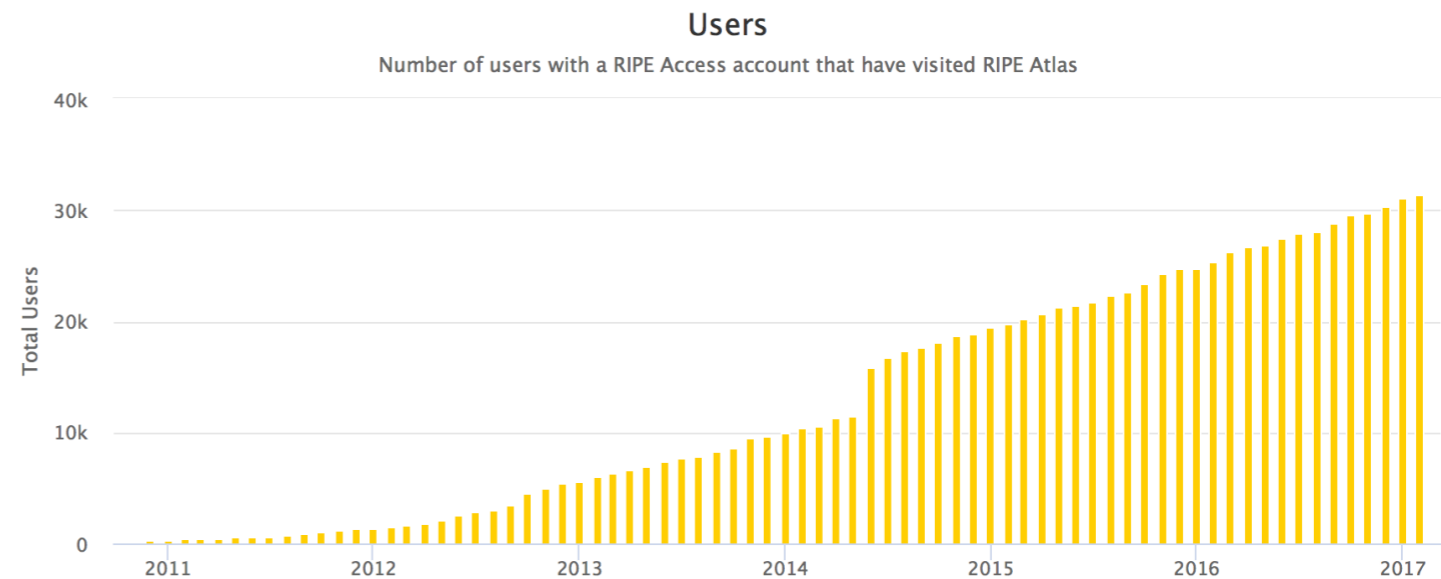
- Around the world coverage improving also thanks to the other RIRs and ISOC cooperation



# RIPE Atlas Community



- Users
- Hosts
  - Probes
  - Anchors
- Sponsors
  - 5 sponsors in 2016
  - 2 already for 2017
- 300 + Ambassadors at many conferences



# Highlights



- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- New: TraceMON
- APIs and CLI tools to start measurements and get results
- Streaming data for real-time results
- Status checks (Icinga & Nagios)
- “Time Travel”, LatencyMON, DomainMON



# Use cases

Examples of RIPE Atlas Use

# 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

# Use Cases (2)



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





# Use Cases (3)



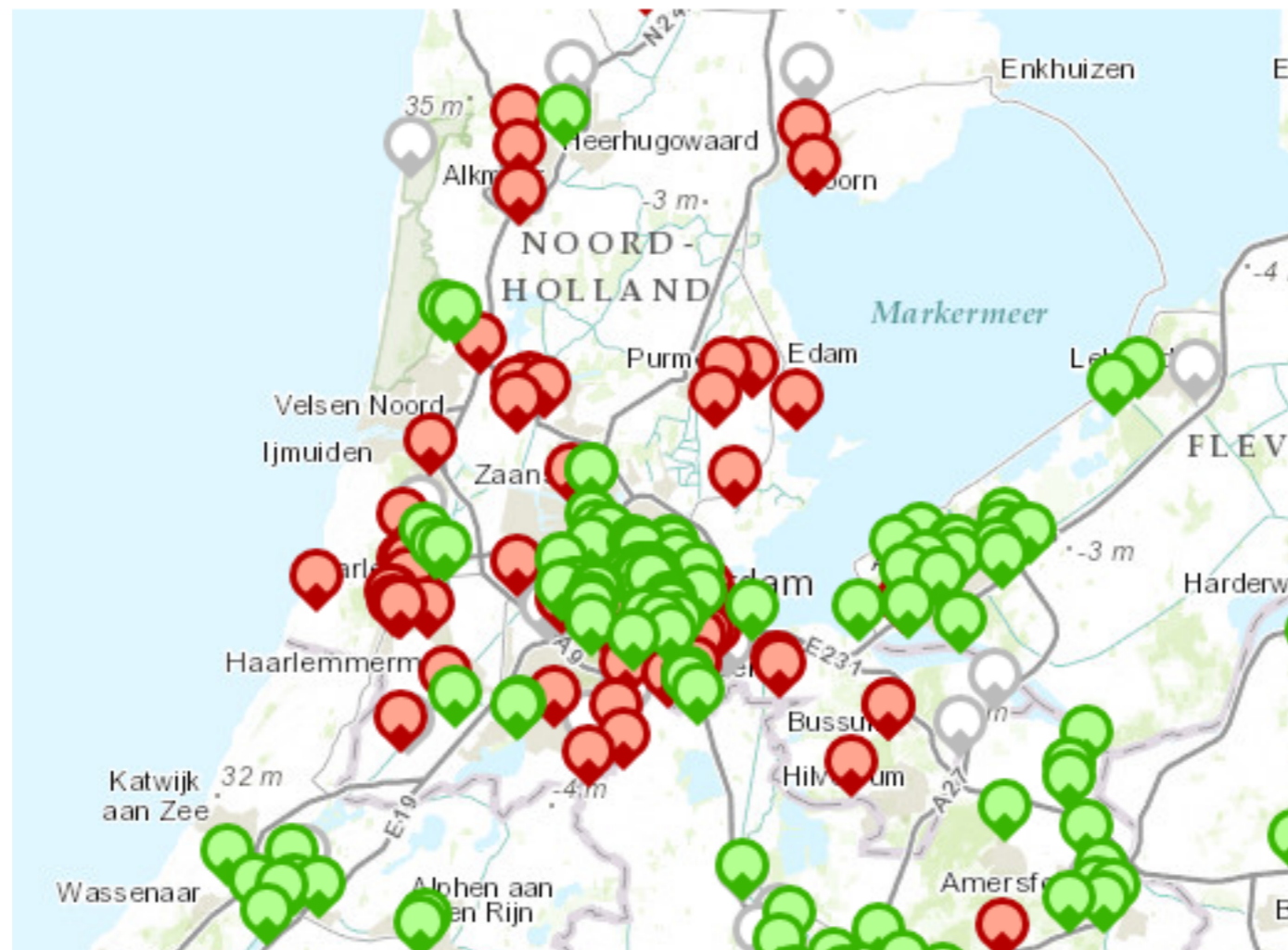
- Monitor Game Service Connectivity (Sept. 2016)
- Requirements:
  - Check General Reachability, Latency, Historical data
  - Supported by an active and helpful community
  - Integrate with their existing logging system
- Track down an outage in one upstream
- Became sponsors



# Use Cases (4)



- Amsterdam Power Outage (March 2015)
- When and where the outage was happening





# **IXP Country Jedi**

# IXP Country Jedi



- Tool and concept by Emile Aben
  - <https://github.com/emileaben/ixp-country-jedi>
  - <https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas>
- Method:
  - Traceroute mesh between RIPE Atlas probes
  - Detect whether they go via local IXP(s)' LAN IP
  - Hops geolocated using OpenIPMap database
- Data:
  - <http://sg-pub.ripe.net/emile/ixp-country-jedi/>

# IXP Country Jedi

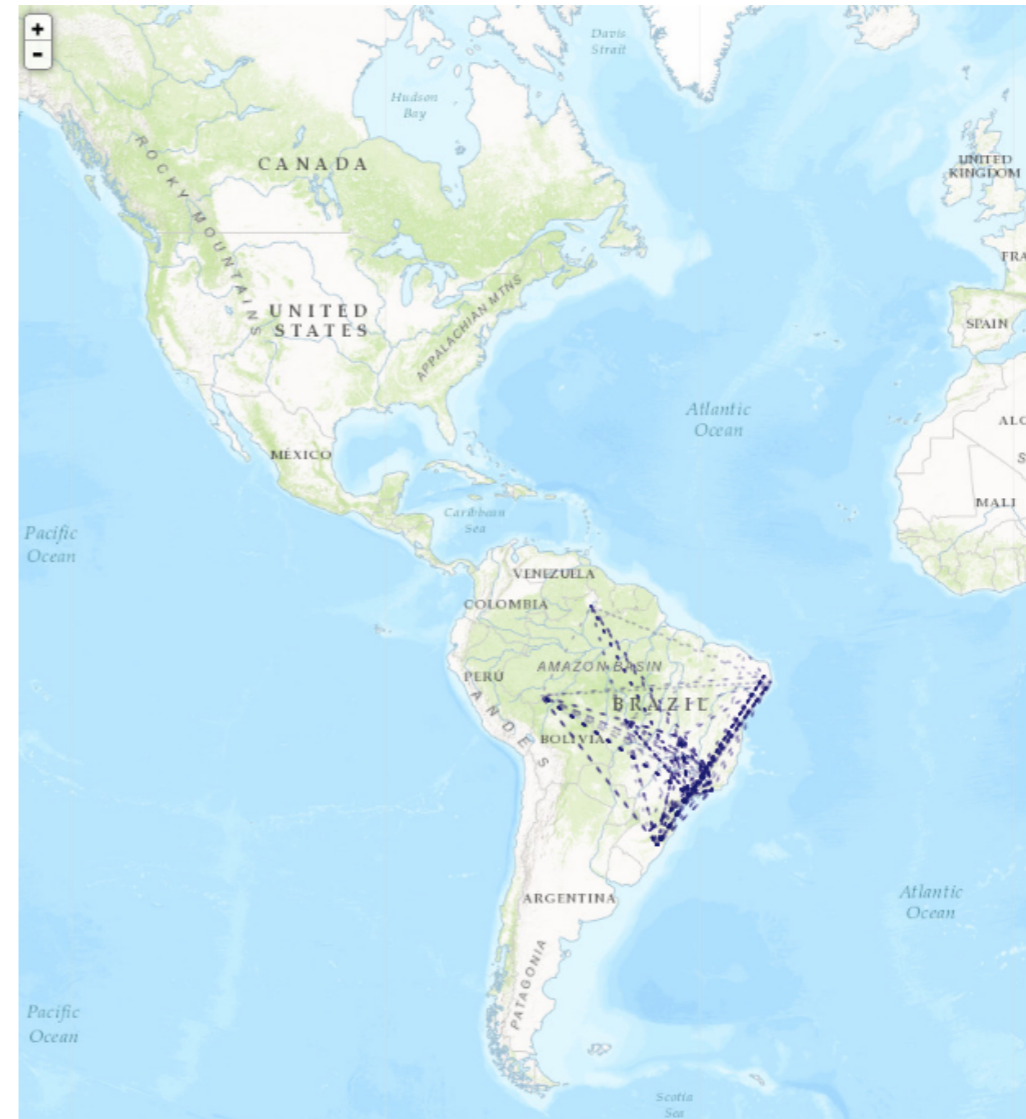
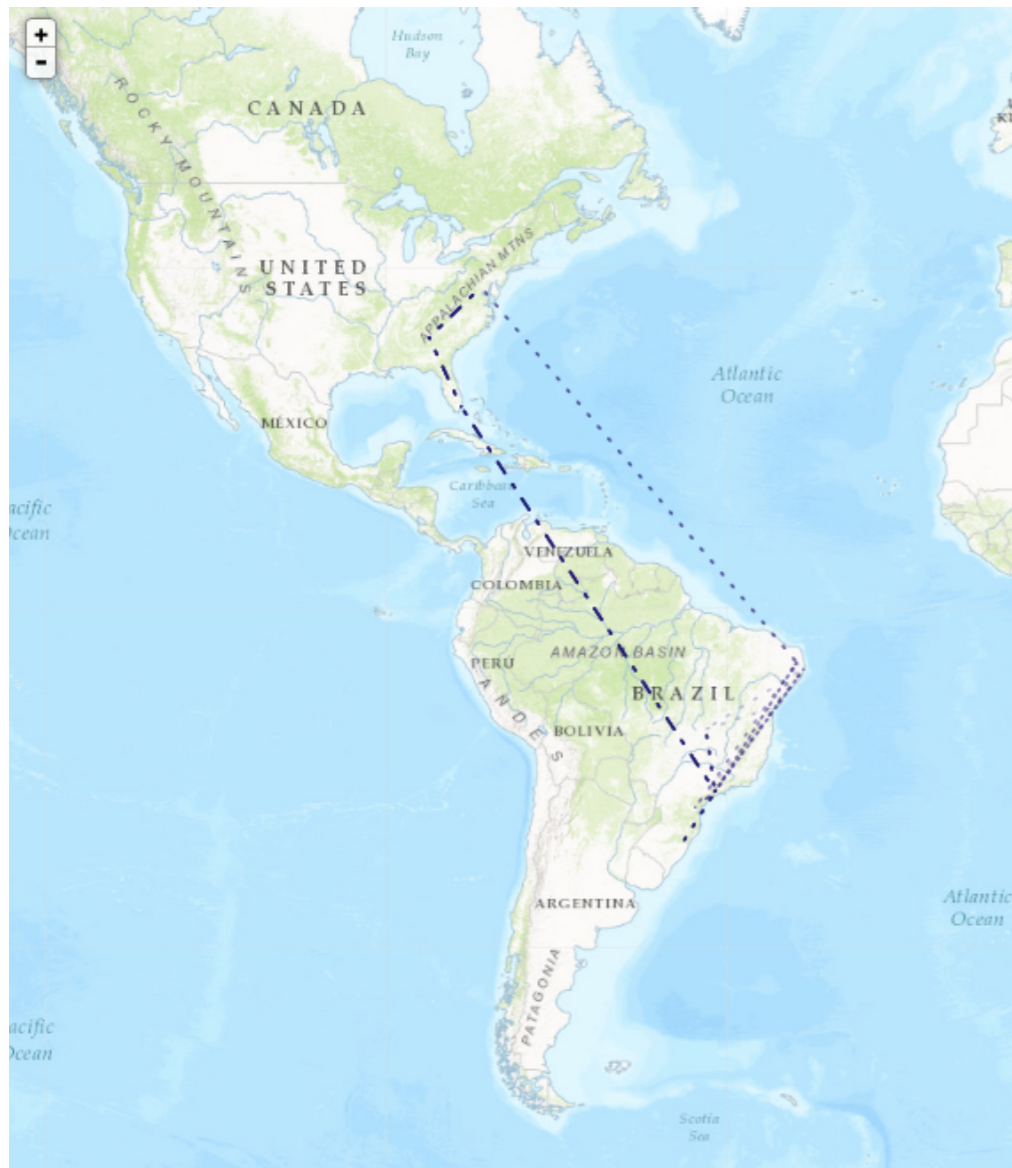


- Benefits:
  - Shows how IXPs help keep traffic local
  - Comparing countries' performances with each other
  - Routing and traffic optimisation
  - Comparing IPv6 and IPv4
- Brazil:
  - <http://sg-pub.ripe.net/emile/ixp-country-jedi/latest/BR/>

# Paths for Brazil



IPv4

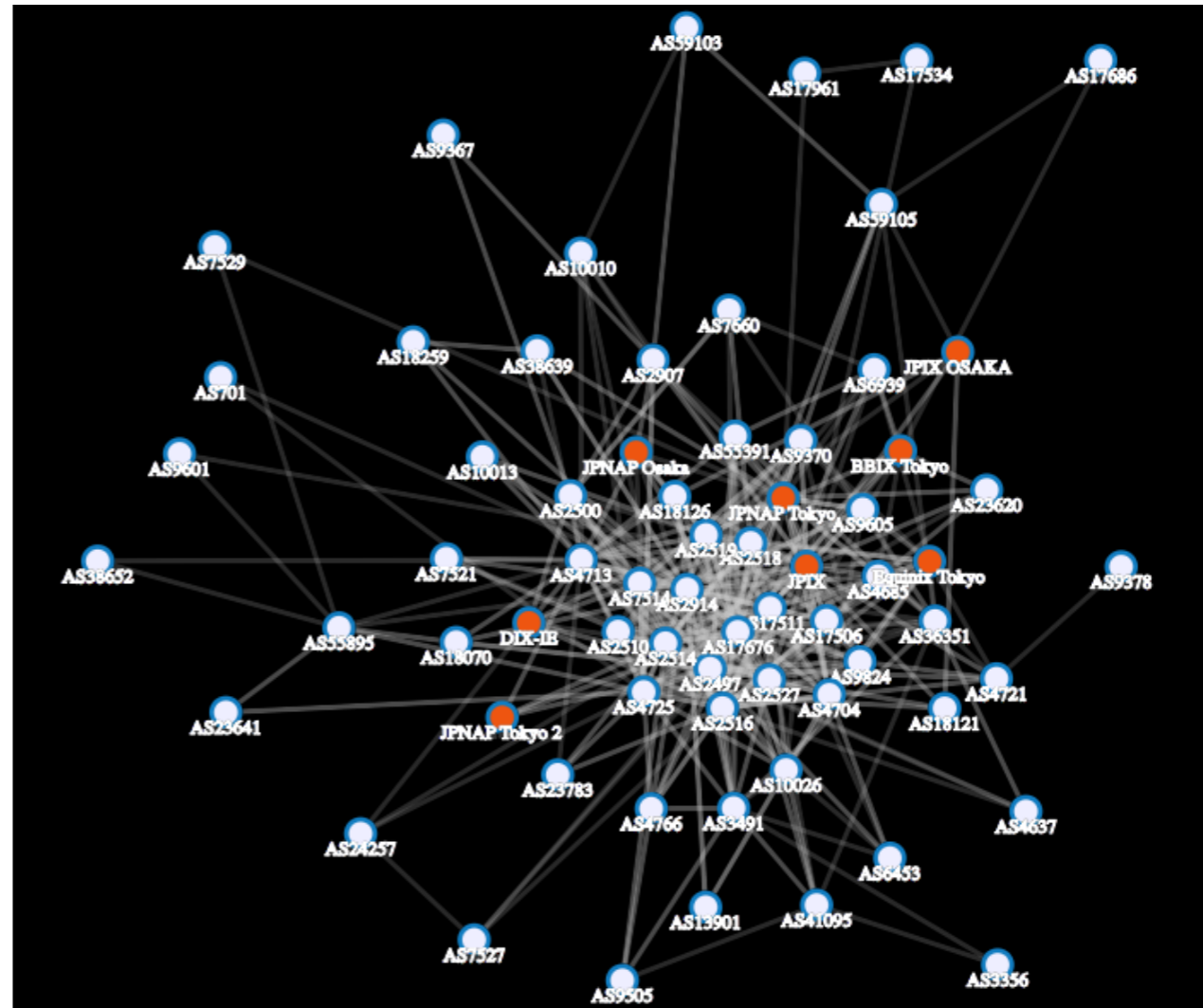
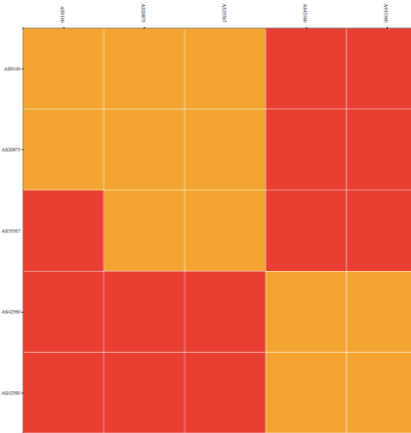
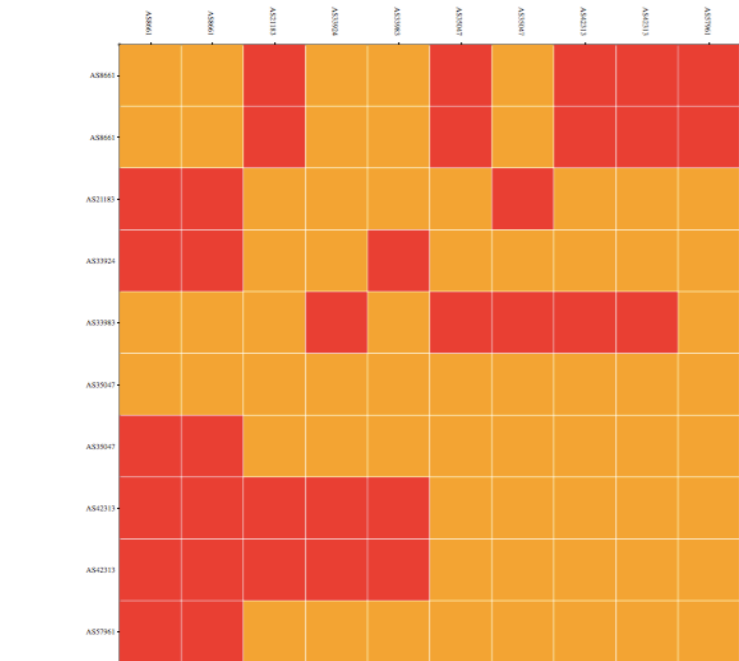
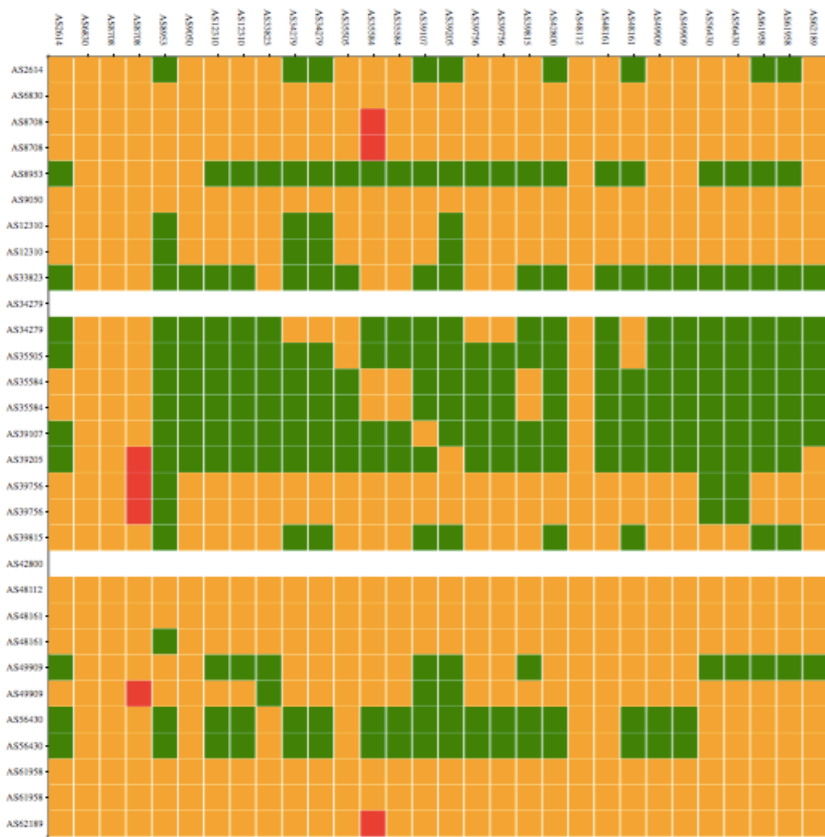


IPv6





# More Probes, Better Data Quality



# Optimise Routing



- Interactive tool! (hover over the cell...)
  - <http://sg-pub.ripe.net/emile/ixp-country-jedi/latest/IE/>

incc: no  
ixp: yes  
srcAS2128  
dstAS200174  
srcPrb6007  
dstPrb19770

```
## msm_id:3594219 prb_id:6007 dst:185.32.93.252 ts:2016-03-01 16:56:49 -00:00
1 (AS2128) gw2.v141.inex.ie [1.422, 1.479, 1.49] ||
2 (AS2128) te0-0-0-1-cr2-kp.hea.net [1.848, 1.919, 2.09] |Dublin,Leinster,IE|
3 (AS1213) be-600-cr2-cwt.hea.net [1.715, 1.772, 3.074] ||
4 (AS3257) xe-2-1-0.dub20.ip4.gtt.net [1.195, 1.213, 1.218] |Dublin,Leinster,IE|
5 (AS3257) xe-9-2-7.lon11.ip4.gtt.net [10.266, 10.315, 10.366] ||
6 (AS174) be3008.ccr21.lon01.atlas.cogentco.com [11.123, 11.164, 11.231] |London,England,GB|
7 (AS174) be2868.ccr41.lon13.atlas.cogentco.com [11.069, 11.073, 11.139] ||
8 (AS174) be2391.ccr21.lpl01.atlas.cogentco.com [18.534, 18.797, 22.348] |Liverpool,England,GB|
9 (AS174) be2590.rcr21.dub01.atlas.cogentco.com [24.562, 24.754, 24.756] |Dublin,Leinster,IE|
10 (AS174) be2530.rcr21.dub02.atlas.cogentco.com [25.249, 25.264, 25.506] |Dublin,Leinster,IE|
11 (AS174) be2041.nr11.b020478-0.dub02.atlas.cogentco.com [21.6, 21.653, 21.677] |Dublin,Leinster,IE|
12 (AS174) 149.11.37.114 [25.013, 25.054, 25.114] ||
13 (AS200174) 185.32.93.252 [32.185, 32.199, 32.268] ||
```

- Red or blue: the path is going out of country
  - If this is a surprise, talk to your upstream(s)
- Yellow: the path that is not going via local IXP
  - If this is undesired, make a new peering agreement

# New in IXP Country Jedi



- “Hackerspaces-Jedi”
  - <https://labs.ripe.net/Members/becha/the-next-42-ripe-atlas-probes-at-hackerspaces>
- It uses tags instead of countries for probe selection.
- An easy way to build community around probes and to be able to run your own customised measurements.



# TraceMON

Network Debugging Made Easy

# Daily Struggles: A reaches B



- How?
  - Optimised?
  - IXP?
  - Which Autonomous Systems?
  - Latency?
- Where?
  - Which local entity/node of the CDN?
  - From which source?
  - Is it going in another country?



# Daily Struggles: A doesn't reach B



- Where does it stop?
  - Which AS?
  - Which geographical location?
- Who is involved?
  - Which portion of the network?
  - Who is behind a private address or a \* in my traceroute?
  - Who can I contact?
- What happens at the BGP level?

# Let's use Traceroutes



- RIPE Atlas **multi**-source traceroutes
- What about a visualisation?
  - Complex model
    - *What is a node? (a single one!)*
    - *Filtering/simplification needed (difficult!)*
  - Complex view
    - *Precomputing from Traceroute to Graph (no operators are willing to do it... daily)*
    - *Static snapshot..still a lot of work and not so useful*



Static snapshot (only a portion at a time, no evolution, complex to follow)

# TraceMON



Traceroute Visualisation (BETA) ⏪ ⏩ speed:  Focus on

Traceroutes to 74.125.206.94 from 8 of 10 probes [\[select\]](#) at March 10th 2017, 18:47:31 UTC Nodes label:  Auto  Reverse lookup  Country code

RIPE NCC  
RIPE Atlas

● Source ● Target ● Host ● IXP ● Private IP ● No response — Connected - - - - Disconnected

51.5ms  
51ms  
50.5ms  
50ms  
49.5ms  
49ms  
48.5ms  
48ms

15:00 15:30 16:00 16:30 17:00 17:30 18:00 18:30

Latency ⋮ Some traceroutes don't reach the target ▨ All the traceroutes don't reach the target

16th August, 21:41 10th March, 14:57 — 10th March, 18:47 12th April, 15:21

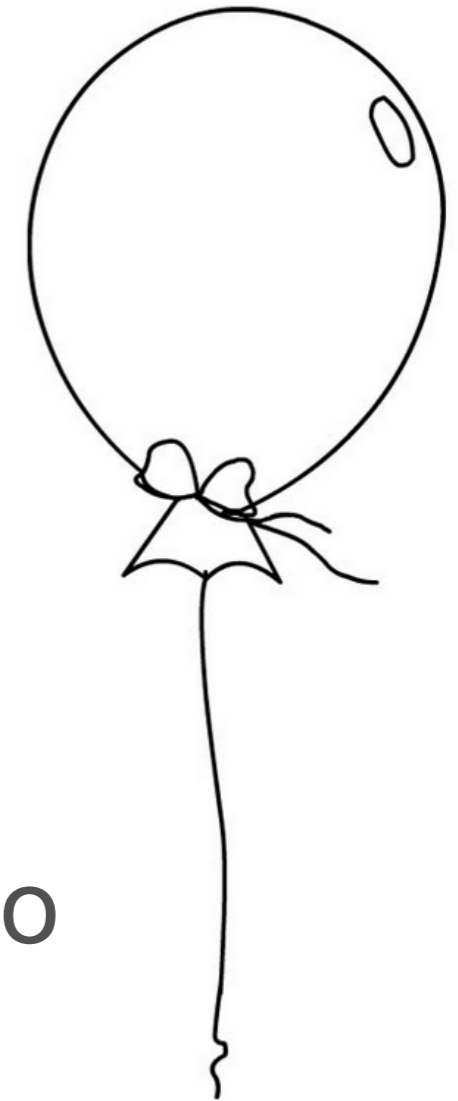
16th August, 21:41 15th October, 14:06 14th December, 06:31 11th February, 22:56 12th April, 15:21

[Documentation](#) [Embed in your page](#) [About TraceMON](#)

# What's new: TraceMON



- **TraceMON** is a web application for visualising (multi-source) traceroutes
- Infers network topology and characteristics of the various network component involved
- Aggregates data from many data sources, providing a one-click access to
  - Resource holder contacts, latency, whois, BGP visibility, IP geolocation, IXP detection, reverse DNS lookup ...

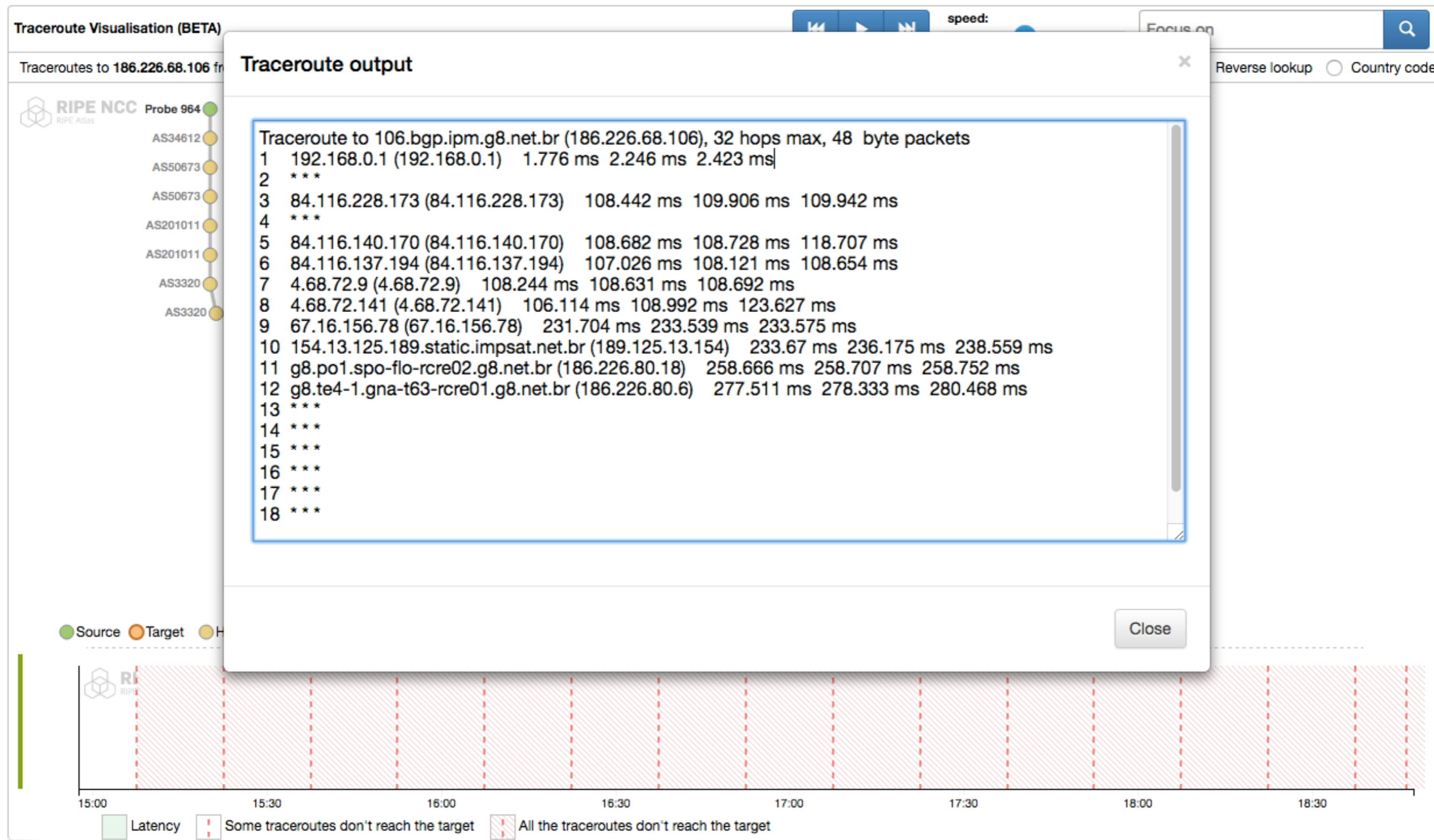


# Latency Chart and Time Navigation





# Traceroute Output





# Resource Info



AS34019 — France-IX — AS7477  
IX Australia NSW

### France-IX (AS57734)

IP: 37.49.236.2  
Located in: Paris, FR [Update](#)

**PeeringDB:**  
IXP: France-IX, Paris, FR  
Lan: 37.49.236.0/23  
[Update PeeringDB](#)

**Routing Info:**  
57734 - FRANCEIX , FR  
Announced: Yes

**Registry info:**  
Resource: 57344-58367  
Name: IANA 16-bit Autonomous System (AS)  
Numbers Registry  
Desc: Assigned by RIPE NCC

[Contact holder](#) [Whois](#) [See BGP events](#)

Probe 281  
10.7.4.1 (AS7922)  
\*

### \* (Guess AS7922)

Located in: Not available

**Best Guess :**  
7922 - COMCAST-7922 - Comcast Cable  
Communications, Inc., US  
Announced: Yes

**Registry info:**  
Resource: 7911-7926  
Name: IANA 16-bit Autonomous System (AS)  
Numbers Registry  
Desc: Assigned by ARIN

[Contact holder](#) [Whois](#)

RIPE NCC

TraceMON tries to guess private addresses and wildcards

# Resource Info



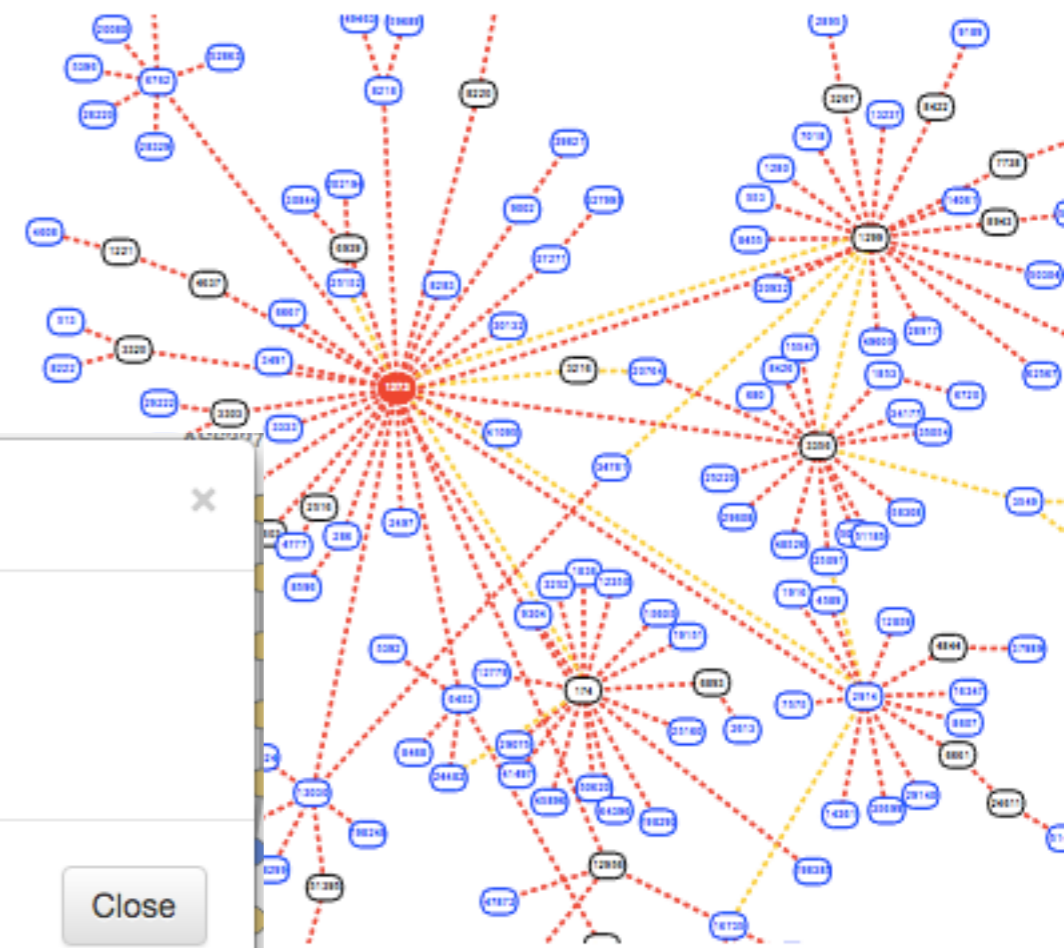
- IXP details (PeeringDB)
- Get/Update Location (OpenIPmap)
- Routing Information and BGPlay
- Whois / RIPE Database
- Technical contact emails

### Update location

**Resource:** 80.249.208.71  
Reverse DNS: gw.amsix.telrtr.ripe.net

Select location:

The changes cannot per persisted yet. This feature will be enabled soon.



Highlight RIPE NCC managed values

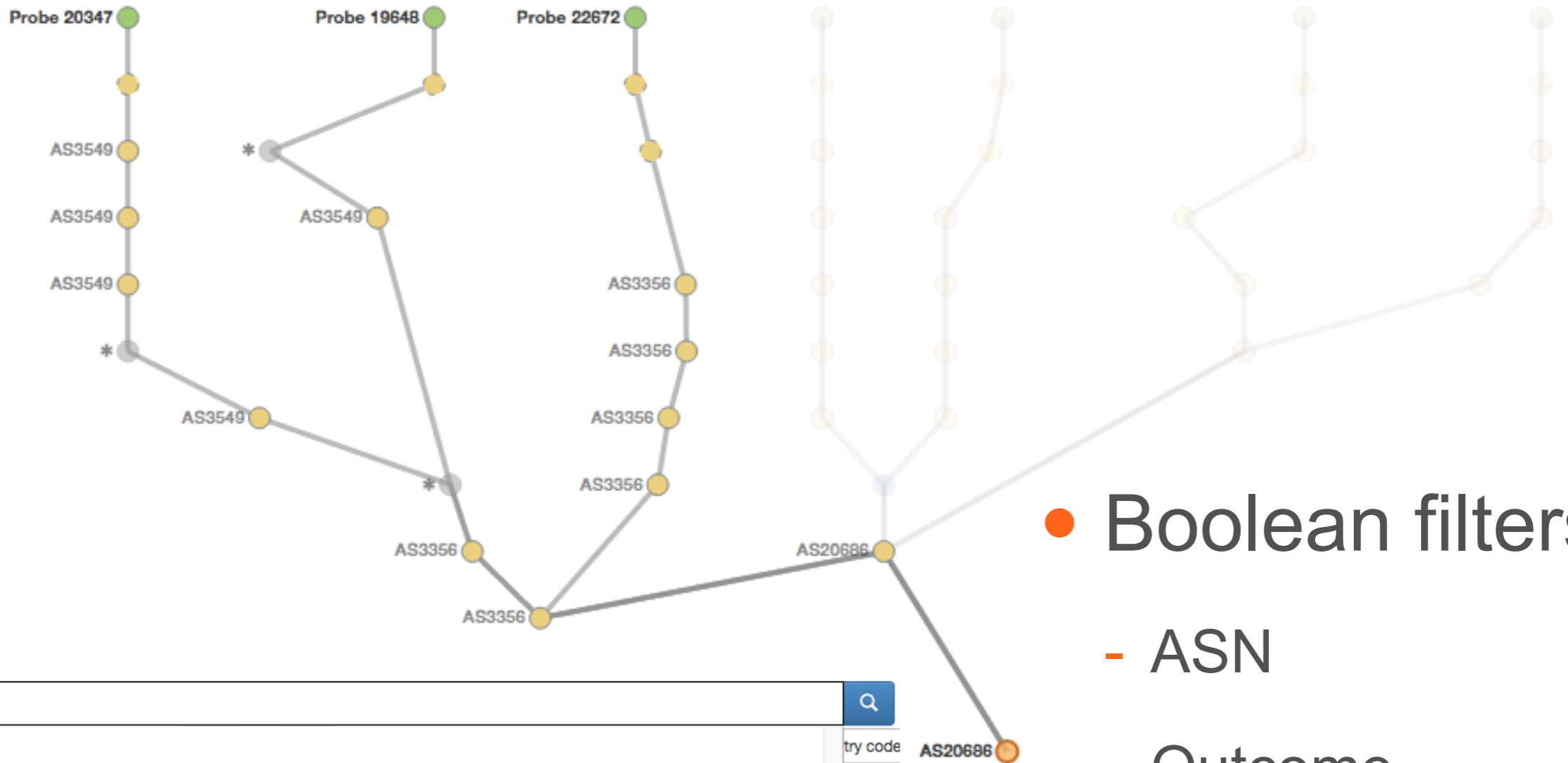
organisation: ORG-NCC1-RIPE  
org-name: RIPE Network Coordination Center  
org-type: LIR  
address: Singel 258  
address: 1016 AB  
address: Amsterdam  
address: NETHERLANDS  
phone: +31 20 535 4444  
fax-no: +31 20 535 4445  
admin-c: CREW-RIPE  
admin-c: AP110-RIPE  
tech-c: CREW-RIPE  
mnt-ref: RIPE-NCC-RIS-MNT  
mnt-ref: RIPE-NCC-HM-MNT  
mnt-by: RIPE-NCC-HM-MNT  
created: 2004-04-17T09:55  
last-modified: 2017-04-03T15:08  
source: RIPE # Filtered

person: Andrea Cima  
address: RIPE NCC  
address: Singel 258  
address: 1016 AB Amsterda  
address: The Netherlands  
phone: +31 20 5354444  
fax-no: +31 20 5354445  
nic-hdl: ACM2-RIPE  
mnt-by: RIPE-NCC-HM-MNT  
org: ORG-PAGE1-RIPE

### Contacts for: AS3333

**tech-c:** ops@ripe.net  
**abuse\_c:** abuse@ripe.net

# Filter & Search



- Boolean filters

- ASN
- Outcome
- Probe
- ...

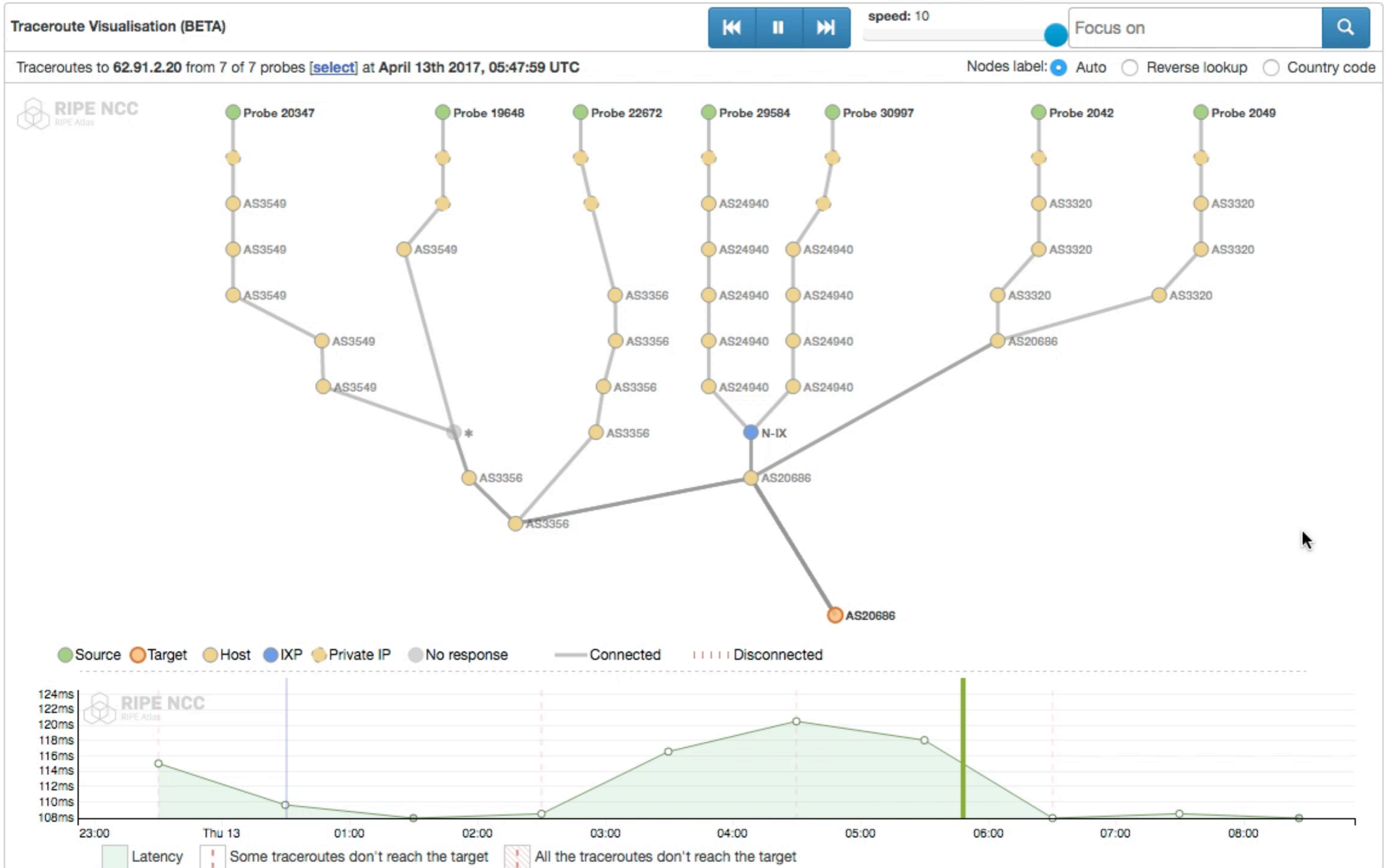
Focus on

ASN

- AS3320 - DTAG Internet service provider operations, DE
- AS3356 - LEVEL3 - Level 3 Communications, Inc., US**
- AS3549 - LVLT-3549 - Level 3 Communications, Inc., US
- AS20686 - BISPING ISP & Citycarrier, Germany, DE
- AS24940 - HETZNER-AS, DE

try code AS20686

# And of course.... Replay History



# TraceMON is Open



- Open Source
  - <https://github.com/RIPE-NCC/tracemon>
- Open research topics
  - Network simplification
  - Network characterisation
  - Visualisation
- Open to other datasets
  - Traceroute datasets (including private ones)
  - Enrichment datasets (also experimental)

# Upcoming Features



- Autonomous System grouping
  - And a more flexible grouping in general
- Real-time monitoring
- Alias resolution
  - To detect multiple interfaces of the same node
- Path coloring
  - More flexible path coloring e.g. which part of the graph is local network and which is the network of the target? user-defined coloring?
- Anomalies detection
- Auto filtering
  - To automatically highlight the traceroute variations that are considered "interesting" based on historic behaviours





# Questions



mcandela@ripe.net  
@webrobotics



# How to Take Part

# Get Involved!



- Use RIPE Atlas for your operations: monitoring, troubleshooting, measuring
  - Get 1 Million credits by entering this voucher: LACNIC27FOZ
  - <https://atlas.ripe.net/user/credits/#!/redeem>
- Do scientific research
- Add multi-lingual content. Thanks to LACNIC for translating in Spanish and Portuguese:
  - <http://www.lacnic.net/web/lacnic/ripe-atlas>
- Become an ambassador or a sponsor
- Host a RIPE Atlas probe or an Anchor

# Contribute to Tools and Code



- CLI tools
  - Write a patch: <https://github.com/RIPE-NCC/ripe-atlas-tools/blob/master/CONTRIBUTING.rst>
  - Use in your syllabus
- OpenIPMap
  - Add more data: <https://marmot.ripe.net/openipmap/>
  - Modify, reuse and improve the code:  
<https://github.com/RIPE-Atlas-Community/openipmap>
- Add a link to your software on GitHub:
  - <https://github.com/RIPE-Atlas-Community/ripe-atlas-community-contrib/blob/master/README.md>

# Hackathons



- Results of IXP Tools Hackathon in Madrid.
- RIPE NCC DNS Measurements Hackathon
- Next Hackathon in October/November: stay tuned!



Collection of stroopwafels as prizes for various categories of best projects

# Contact RIPE Atlas



- <https://atlas.ripe.net>
- Articles and updates: <https://labs.ripe.net/atlas>
- Mailing list for active users: [ripe-atlas@ripe.net](mailto:ripe-atlas@ripe.net)
- Questions: [atlas@ripe.net](mailto:atlas@ripe.net)
- Twitter: [@RIPE\\_Atlas](https://twitter.com/RIPE_Atlas) and [#RIPEAtlas](https://twitter.com/hashtag/RIPEAtlas)

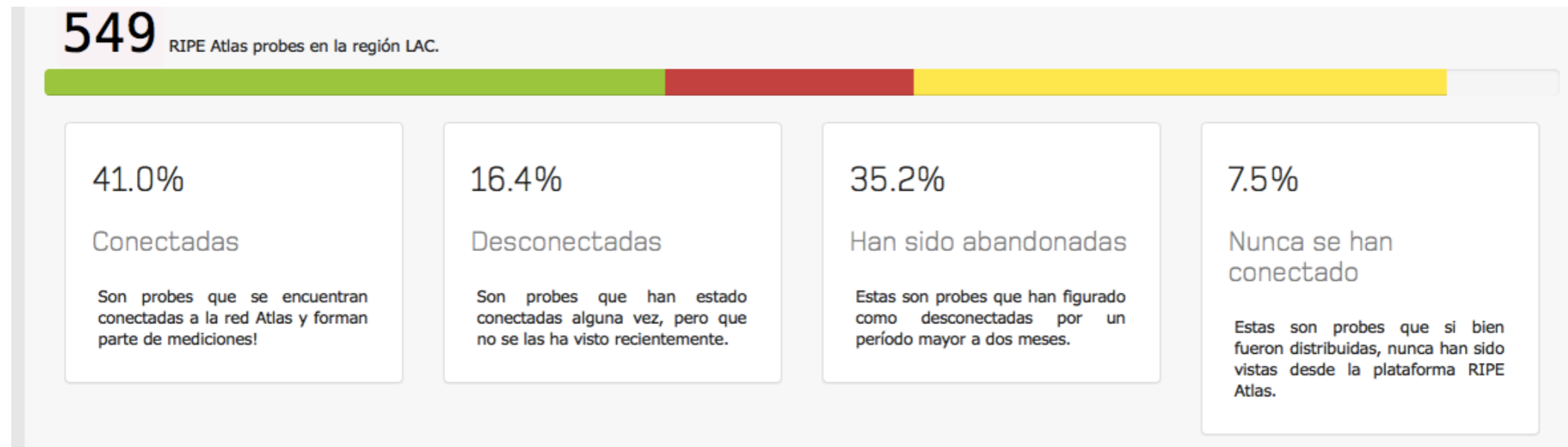




# LACNIC Region



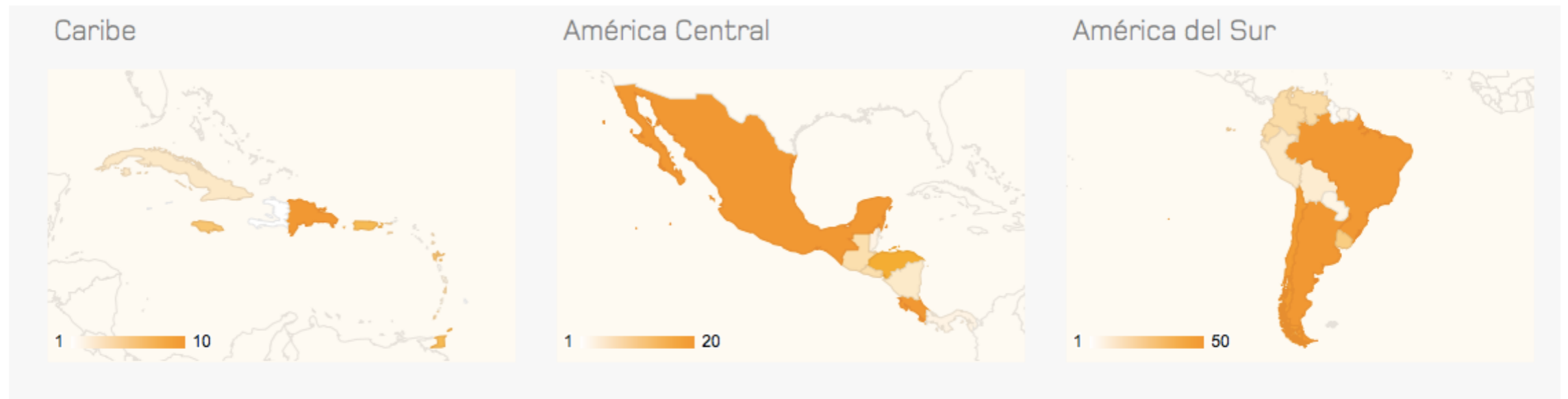
# Probes in LAC (1)



- Total amount of probes connected: 220  
Thanks to the ambassadors in LACNIC region!
- But ... Number of connected probes is less than in 2016 and number of abandoned 6 times more!
- Get your probe back online: [https://labs.ripe.net/Members/philip\\_homburg/troubleshooting-ripe-atlas-probes-usb-sticks](https://labs.ripe.net/Members/philip_homburg/troubleshooting-ripe-atlas-probes-usb-sticks)



# Probes in LAC (2)



- <https://simon.lacnic.net/atlas/>
- List of countries with no probes. Get one today!

- Dominica (DM)
- Aruba (AW)
- Bahamas (BS)
- Turks and Caicos Islands (TC)
- Virgin Islands, British (VG)
- Montserrat (MS)
- Anguilla (AI)
- Saint Kitts and Nevis (KN)
- Falkland Islands (Malvinas) (FK)

# Anchors in LAC



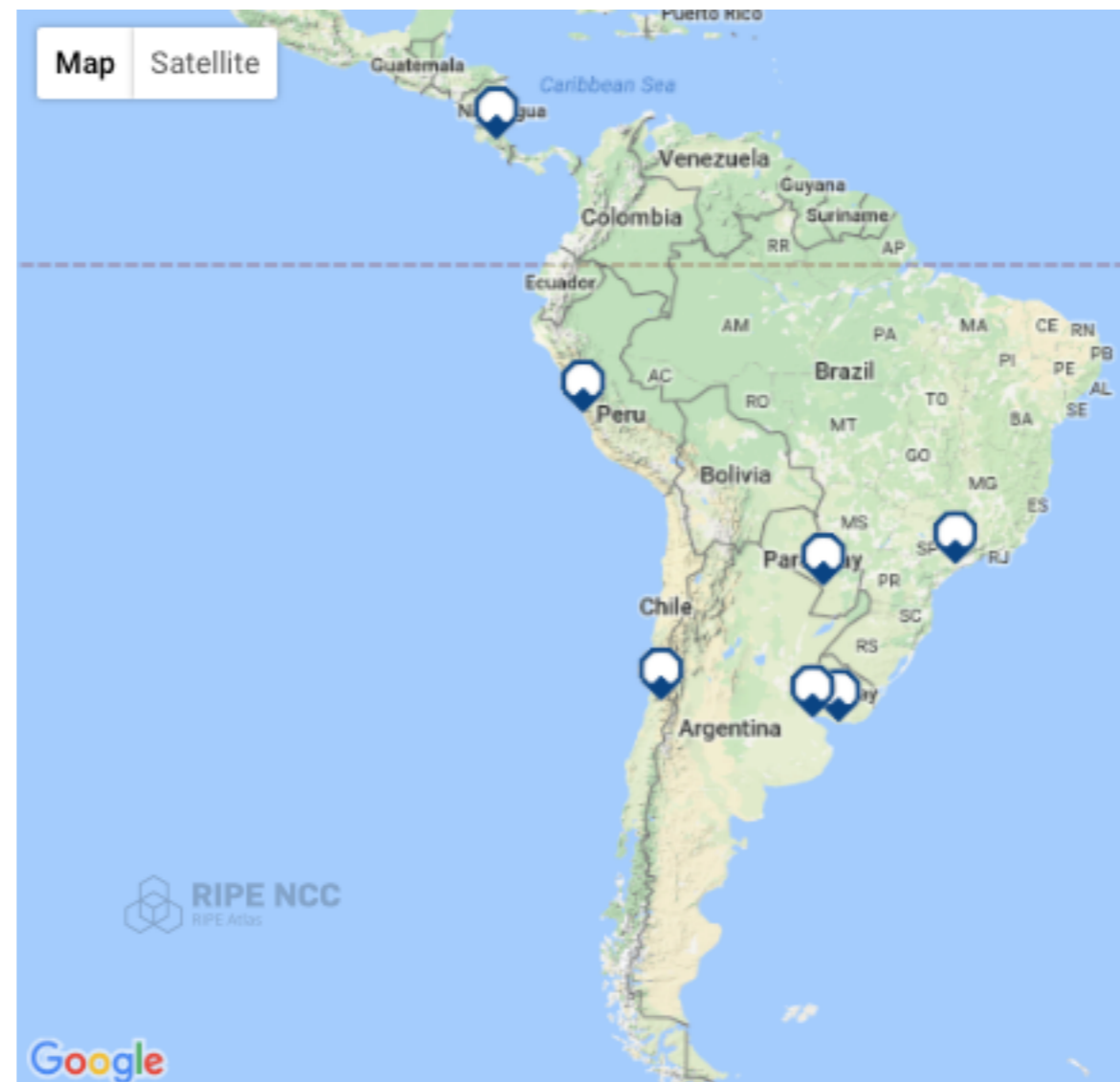
- 4 Anchors sponsored by LACNIC
- 1 hosted by LACNIC
- 1 in Sao Paulo, hosted by NIC.BR
- 1 in Lima, hosted by Optical Technologies

ar-bue-as4270	6170	ARIU <i>Sponsored by: LACNIC</i>	Buenos Aires	Argentina
cl-scl-as27678	6160	NIC Chile <i>Sponsored by: LACNIC</i>	Santiago	Chile
cr-sjo-as263779	6167	NIC COSTA RICA <i>Sponsored by: LACNIC</i>	San José	Costa Rica
py-slo-as27733	6240	IXpy, NIC.py <i>Sponsored by: LACNIC</i>	San Lorenzo	Paraguay
uy-mvd-as28000	6054	LACNIC <i>Sponsored by: RIPE NCC</i>	Montevideo	Uruguay
br-sao-as22548	6099	Núcleo de Informação e Coordenação do Ponto BR - NIC.br	Sao Paulo	Brazil
pe-lim-as27843	6161	Optical Technologies	Lima	Peru

# Hosting a RIPE Atlas anchor in LAC



- LACNIC is sponsoring more anchors.
- Interested? Get in touch with me and Guillermo Cicileo (LACNIC staff)







# Questions



[mgalante@ripe.net](mailto:mgalante@ripe.net)  
[atlas@ripe.net](mailto:atlas@ripe.net)