



RIPE
NCC

RIPE Atlas and RIS at France-IX

Emile Aben
emile.aben@ripe.net



RIPE RIS

Control plane data

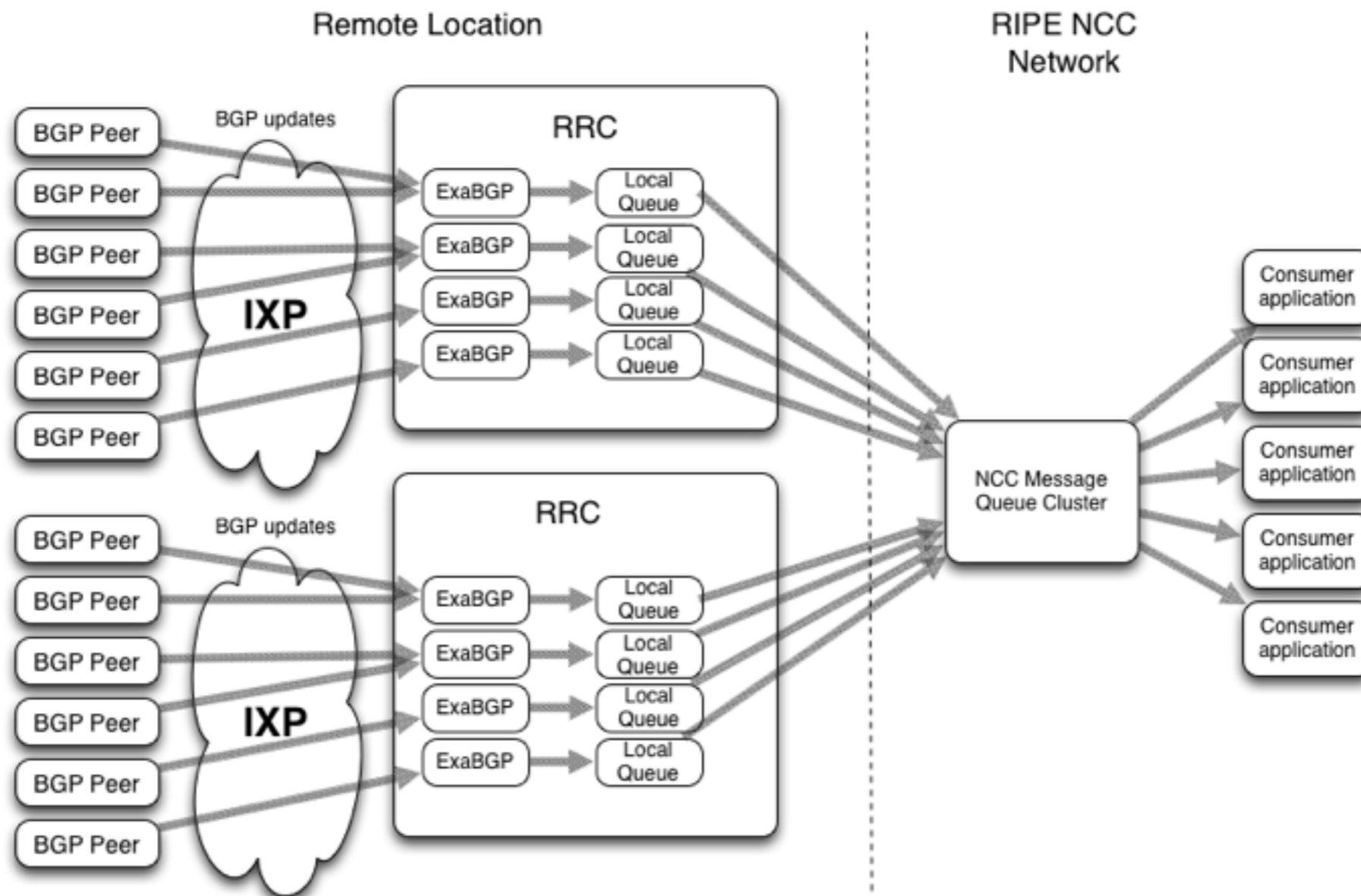


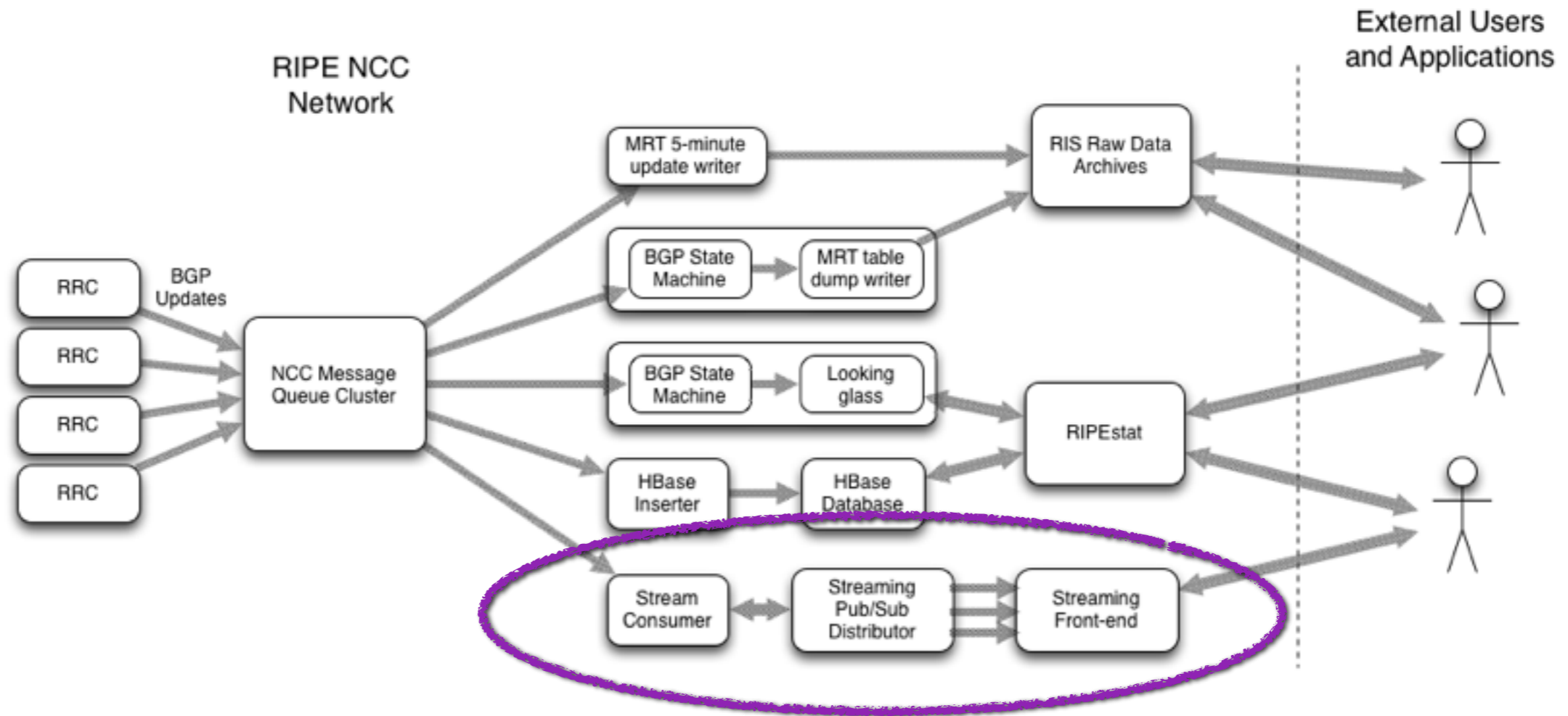
RIPE
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- Route Collector system
 - Control plane info **for** the community, **by** the community
 - Data for RIPEstat: <https://stat.ripe.net/>
- We're doing an overhaul
 - <https://ripe70.ripe.net/archives/video/112/>

OLD	NEW
Quagga based	ExaBGP based
11 route collectors (RRCs)	3 route collectors
MRT files	JSON (+ MRT for backward compat)
Hardly room for growth	Plenty of room for growth!
Production	Beta

- Current status: beta





- RRC21 at FrancelIX is part of the new system
 - IPv4: 11 peers up (out of 16 configured)
 - IPv6: 11 peers up (out of 15 configured)
- Able to collect at FrancelIX Paris and Marseille (and potentially at partner IXPs in the future)

- Is your prefix/AS consistently visible?
- Example: Identified a peer at FranceIX where AS3333 IPv6 prefix was not visible

Visibility Location Details of AS3333

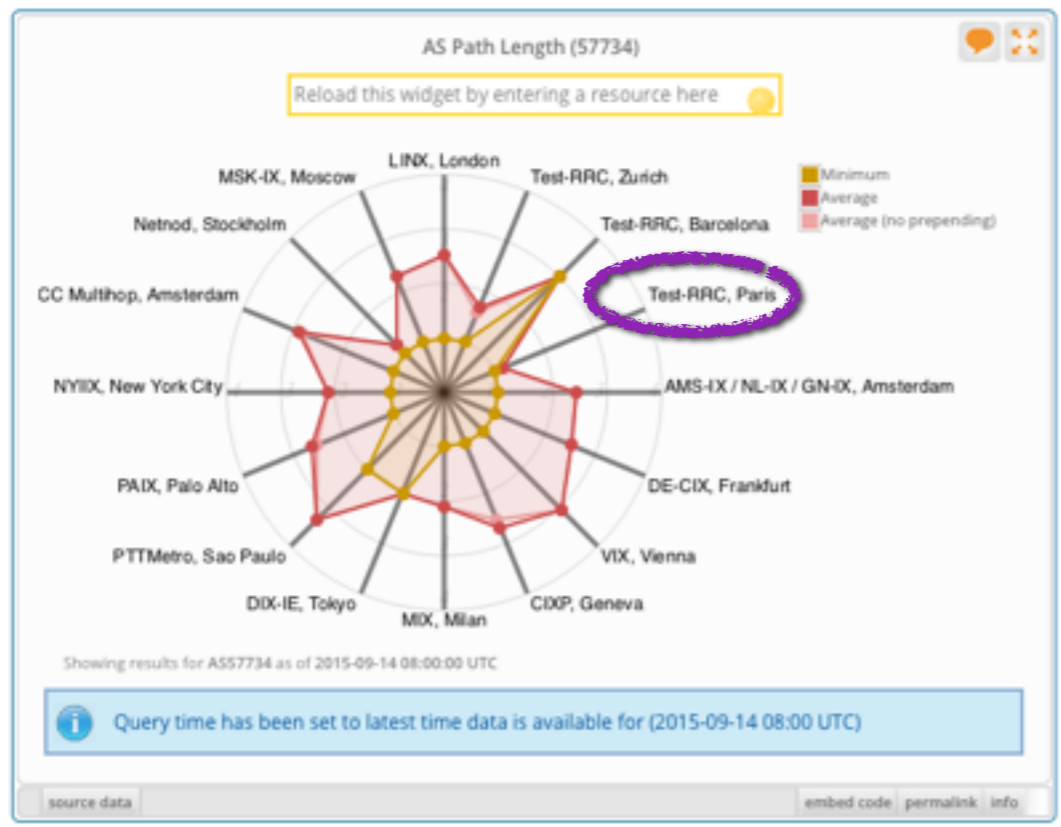
RRC	IXP Location	Location	IPv4 peers seeing	IPv6 peers seeing	IPv4 Visibility	IPv6 Visibility
RRC00	RIPE-NCC Multihop	Amsterdam, Netherlands	15 of 15	10 of 10	100%	100%
RRC01	LINX	London, United Kingdom	10 of 10	9 of 9	100%	100%
RRC03	AMS-IX / NL-IX / GN-IX	Amsterdam, Netherlands	8 of 8	12 of 12	100%	100%
RRC04	CIXP	Geneva, Switzerland	7 of 7	4 of 4	100%	100%
RRC05	VIX	Vienna, Austria	6 of 6	7 of 7	100%	100%
RRC06	DIX-IE	Tokyo, Japan	1 of 1	1 of 1	100%	100%
RRC07	Netnod	Stockholm, Sweden	2 of 2	4 of 4	100%	100%
RRC10	MIX	Milan, Italy	10 of 10	7 of 7	100%	100%
RRC11	NYIIX	New York City, US	8 of 8	8 of 8	100%	100%
RRC12	DE-CIX	Frankfurt, Germany	15 of 15	20 of 20	100%	100%
RRC13	MSK-IX	Moscow, Russian Federation	12 of 12	5 of 5	100%	100%
RRC14	PAIX	Palo Alto, US	6 of 6	6 of 6	100%	100%
RRC15	PTTMetro	Sao Paulo, Brazil	11 of 11	8 of 8	100%	100%
RRC18	Test-RRC	Barcelona, Spain	2 of 2	1 of 1	100%	100%
RRC20	Test-RRC	Zurich, Switzerland	8 of 8	7 of 7	100%	100%
RRC21	Test-RRC	Paris, France	11 of 11	10 of 11	100%	91%

▼ List of RIS peers not seeing AS3333

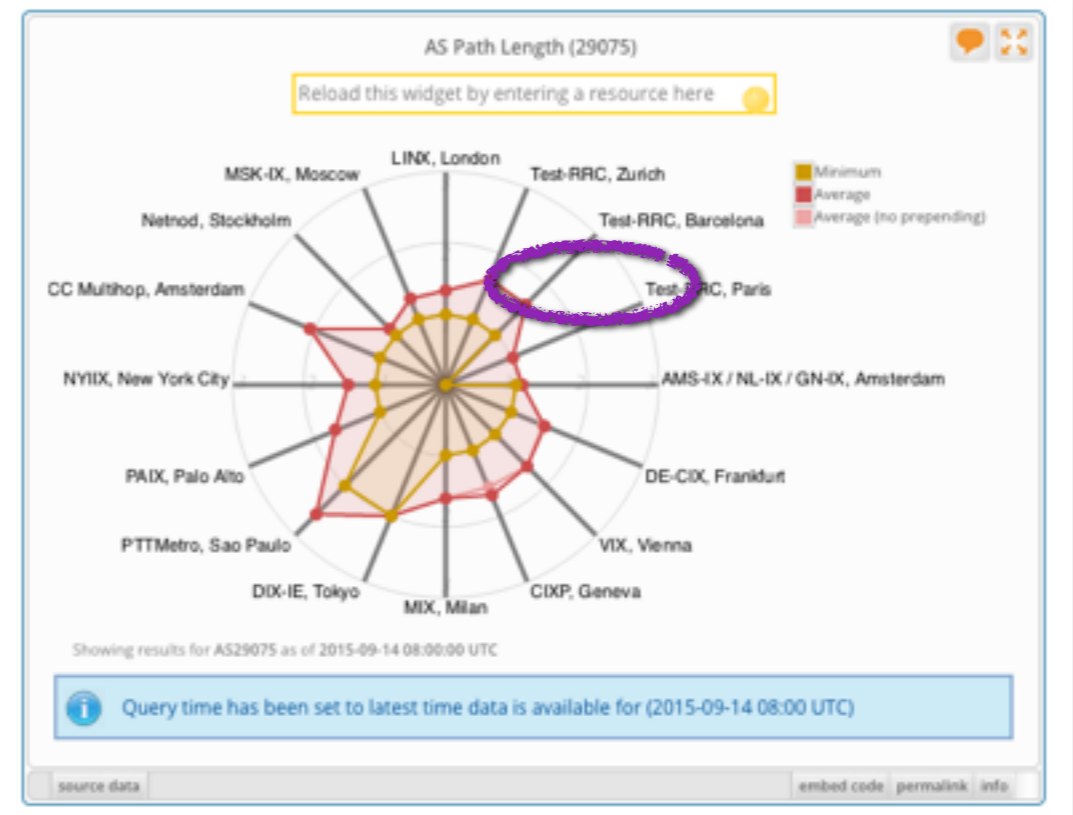
Show 10 entries Search:

RRC	City	Peer AS	Peer IP	BGP Table	Prefix Count
RRC21	Paris, France	49463	2001:7f8:54::145	IPv6	23901

<https://stat.ripe.net/widget/visibility>



FrancelIX

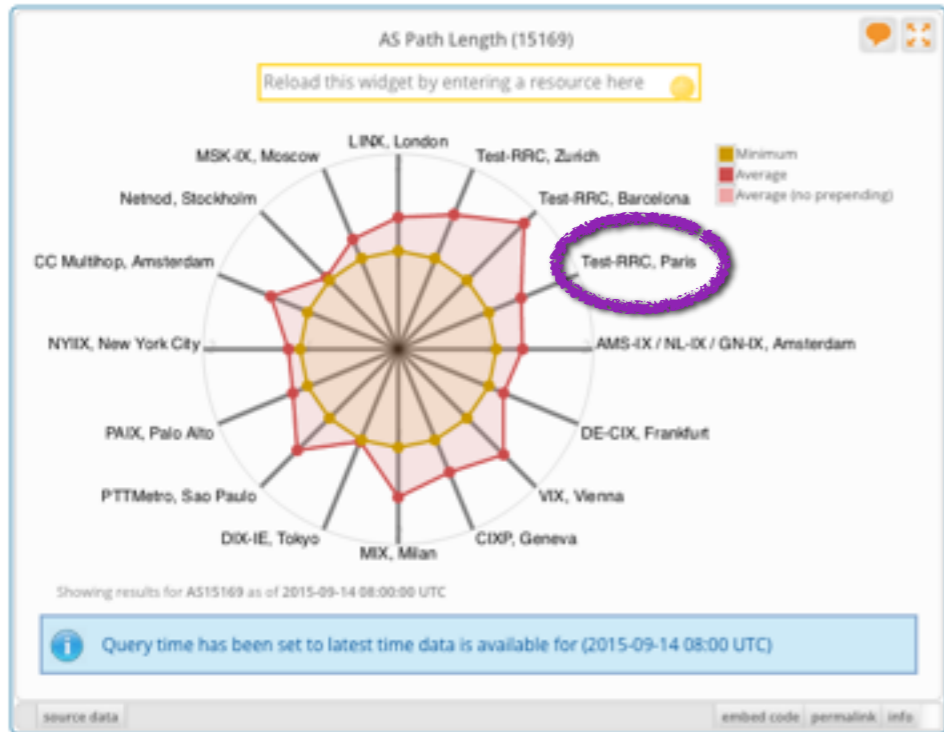


IELO

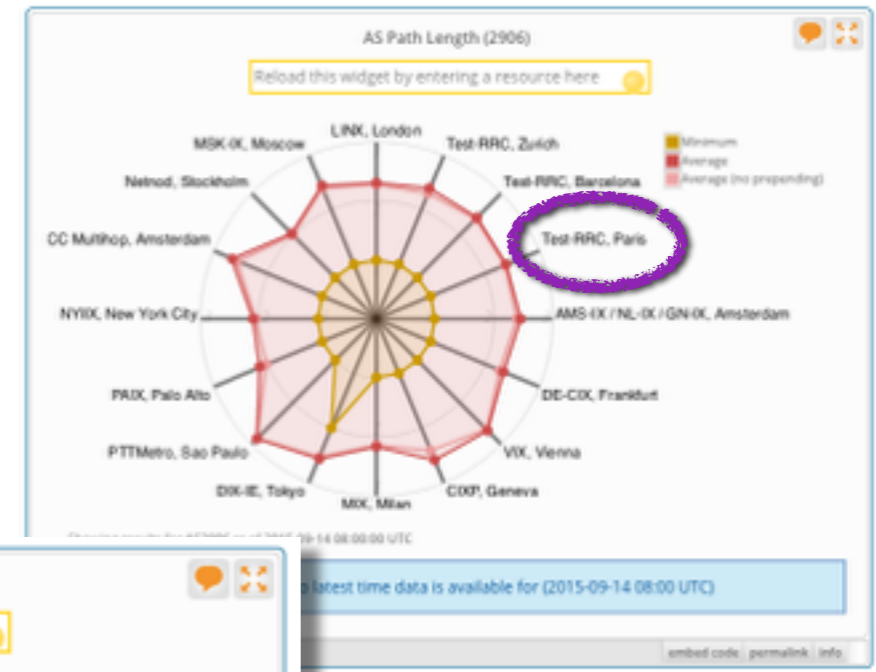
- Which location has short AS paths for a particular AS?

<https://stat.ripe.net/widget/as-path-length>

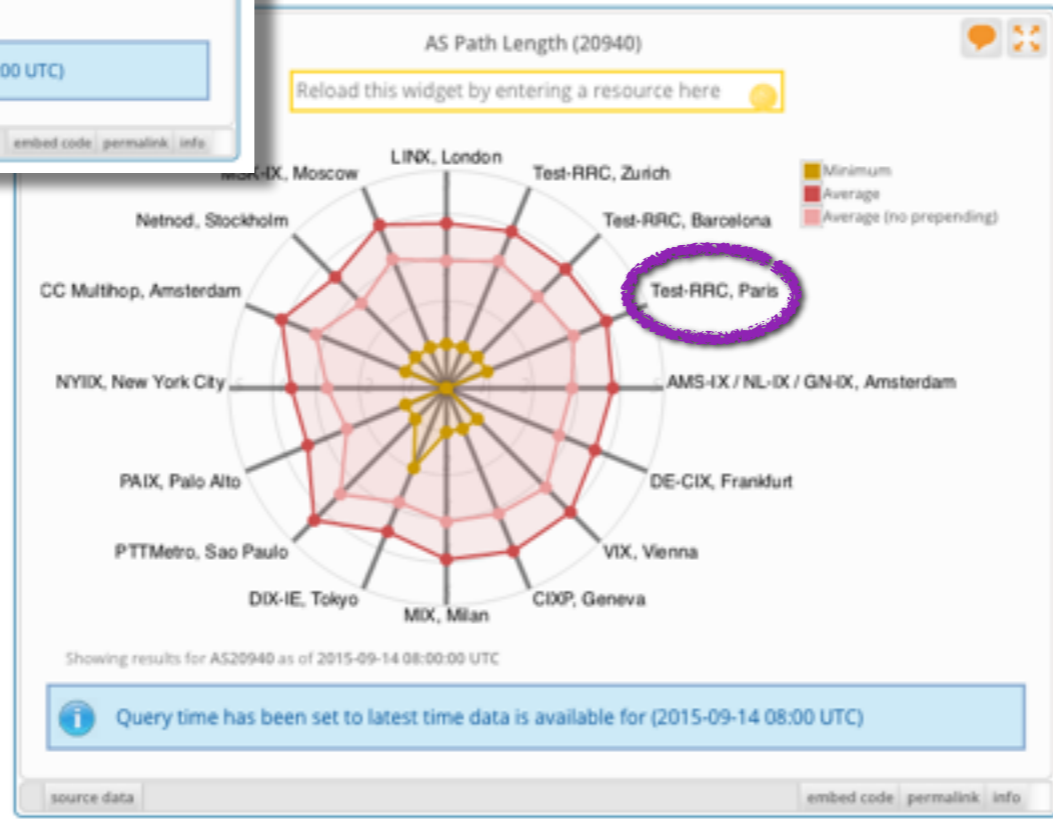
AS Path Length for Content



Google



Netflix



Akamai

- <http://www.ris.ripe.net/cgi-bin/peerreg.cgi>

RIS Peering Request Form

We are soliciting dual-stack peerings at: rrc04 rrc06 rrc07 rrc10 rrc11 rrc13 rrc14 rrc15 rrc18 rrc20 rrc21

Please supply us with your full, default-free feed, exactly as you would announce it to your customers

Organisation name	
Contact name	
Contact e-mail*	
Contact phone	
NOC e-mail*	
NOC phone	
AS Number*	
Peering IPv4 Address	
Peering IPv6 Address	
RIS Route Collector*	<input checked="" type="checkbox"/> FrancelX Paris/Marseille (RRC21)
AS Macros	
Router vendor	
OS version	

Reset Send

* = required

- In the past we've asked for "Full Table" (i.e. as if you were giving RIS transit)
- Lots of RIS peers provide other feeds
 - Typically "peering"
- Result: Many different types of RIS peers
 - Harder to understand in data consumption/analysis
 - Potential fix for that in the works:
 - draft-ymbk-grow-bgp-collector-communities
 - differentiate "customer cone", "external", and "internal" routes, using additional BGP communities



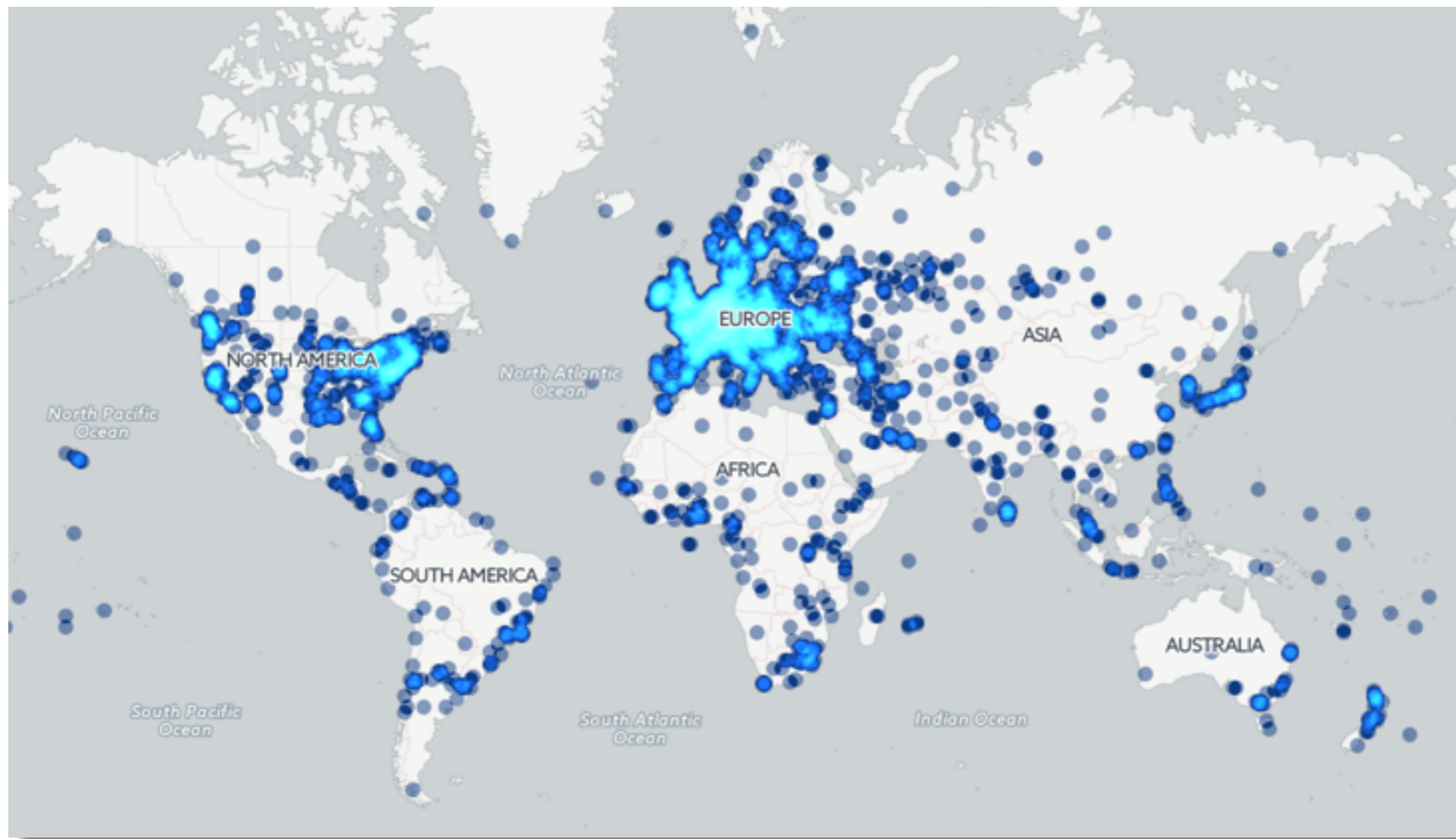
RIPE Atlas

Data plane data



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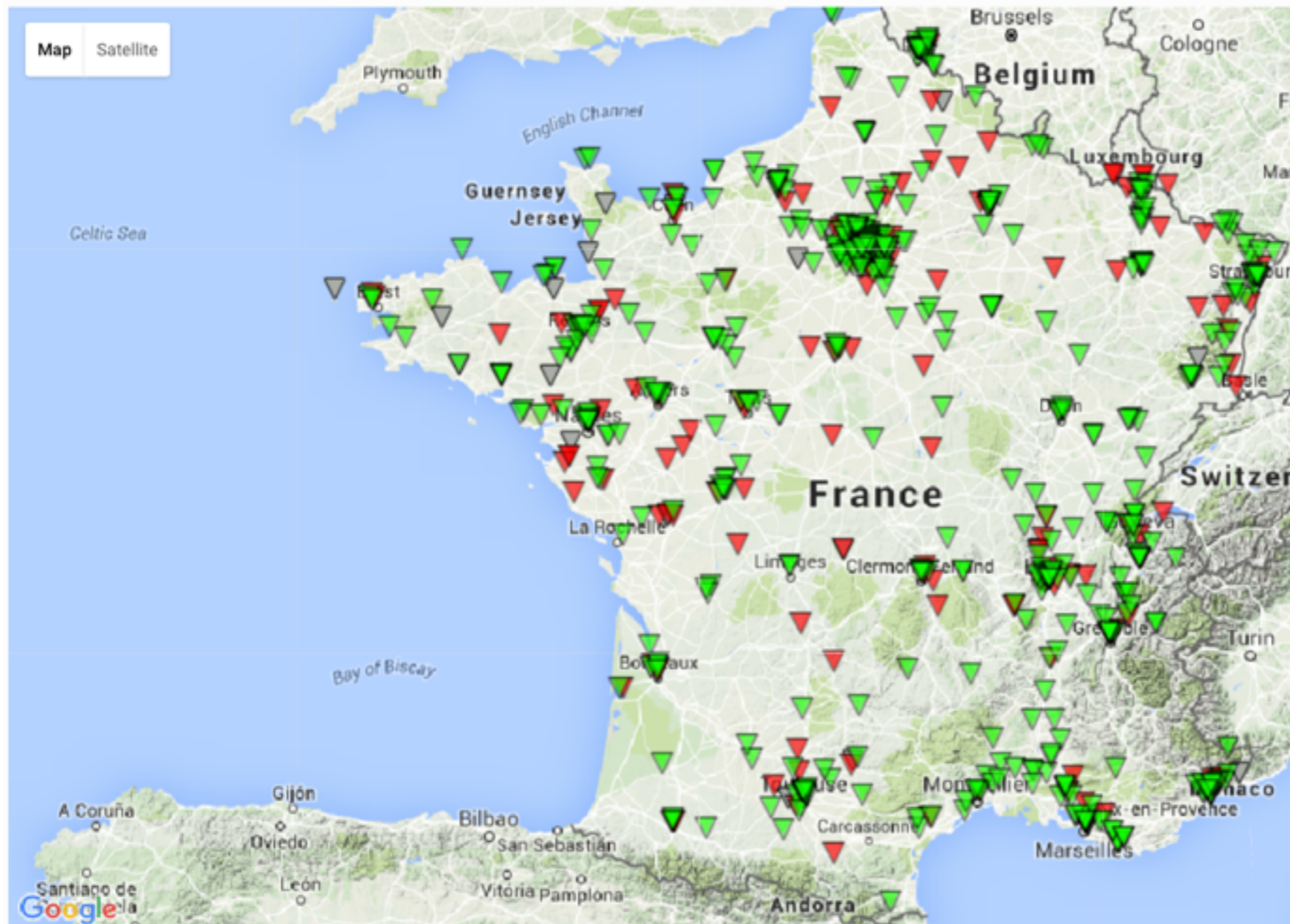
- Internet data plane monitoring **for** the community,
by the community



https://astrikos.cartodb.com/viz/d9cdef7c-465a-11e5-83b0-0e4fddd5de28/public_map

Found 1050 RIPE Atlas probes in this network:

▲ Connected (755) ▼ Abandoned (59) ▼ Disconnected (236)



- 755 active probes
- 9 anchors
- 123 ASNs



- RIPE Atlas anchor:
 - <https://atlas.ripe.net/probes/6118/>
- Monitors network inside-out and **outside-in**
- Automatically scheduled measurements from other RIPE Atlas anchors (144 and rising)
 - <https://atlas.ripe.net/anchors/map/>
- Earns measurement credits at 10x rate of normal probes
 - Ask Arnaud Fenioux if you have a good cause for these!



Using RIPE Atlas

IXP-Country-Jedi



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- RIPE Atlas doesn't know **traffic**, but can measure **paths** with traceroute
- Full probe-probe mesh for France:
 - ~~755 x 754 = 569,270~~ traceroutes
- Select max. 2 probes per ASN
 - 155 x 154 = 23,870 traceroutes (manageable)
- Do we see IXPs in these paths?
- Do we see out-of-country paths?
 - Do they need to be fixed?

Results IPv4

=====

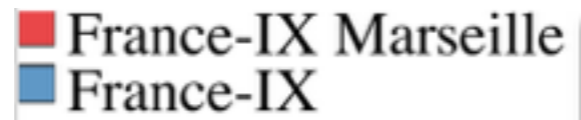
23354	100.0%	_total
16743	71.7%	_none
6387	27.3%	France-IX
229	1.0%	France-IX Marseille

Results IPv6

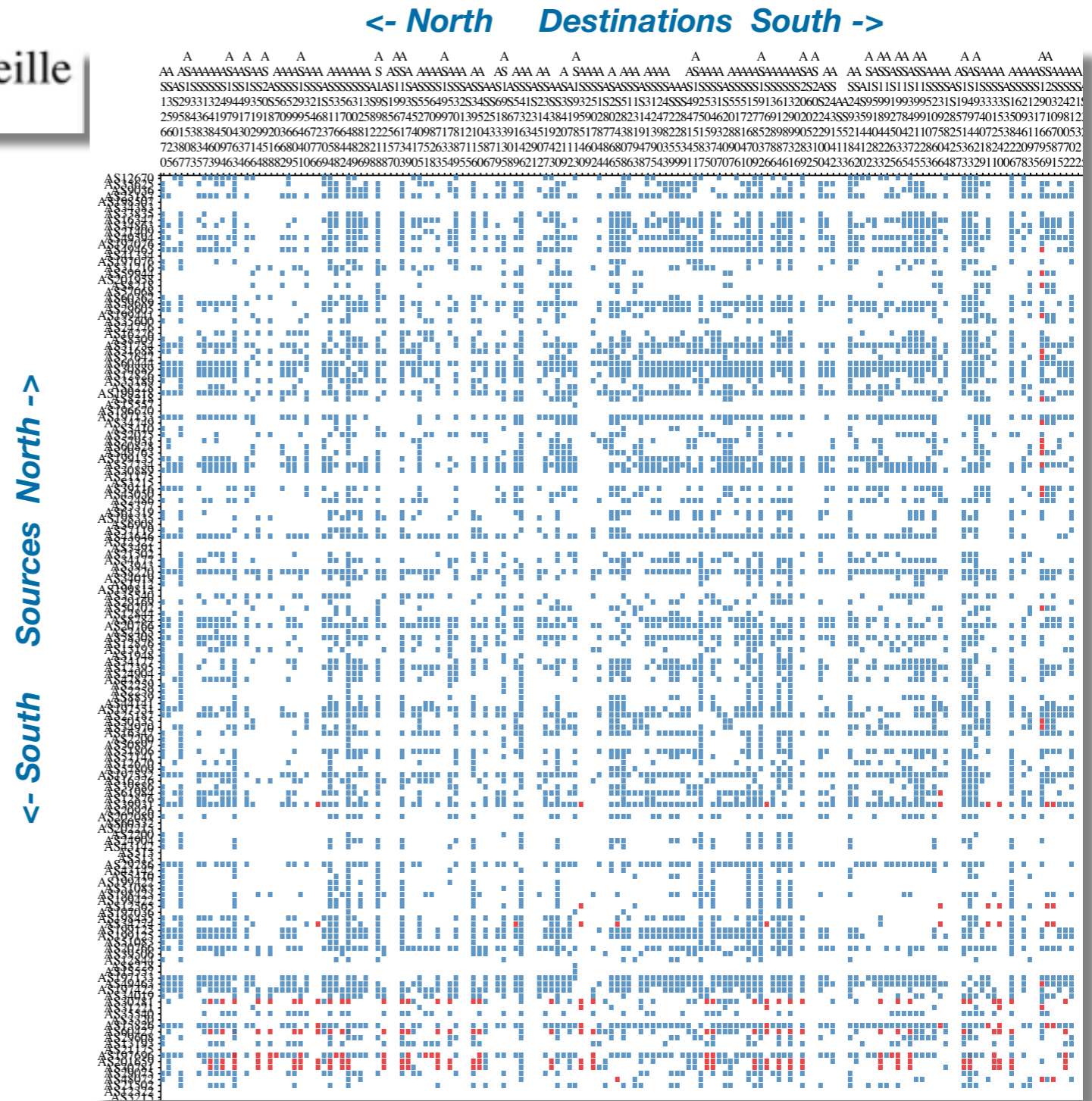
=====

3828	100.0%	_total
2546	66.5%	_none
1264	33.0%	France-IX
18	0.5%	France-IX Marseille

What PeeringLAN is Traversed?



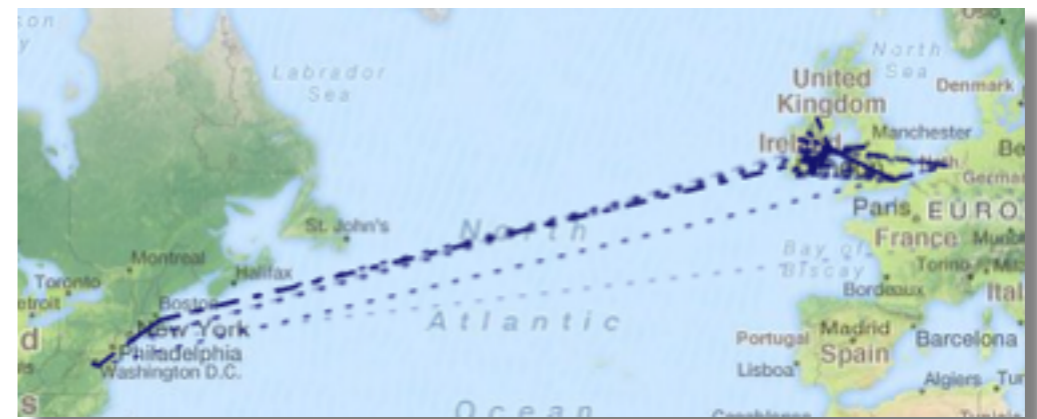
- FranceIX peeringLANs only
- IPv4
- South-south sometimes “bypasses” Marseille



- Crowdsourcing the geolocation of Internet infrastructure
- Database where experts (**you!**) report where they think an infrastructure IP or hostname is
- Integrated with RIPE Atlas traceroute results pages

<https://marmot.ripe.net/openipmap/>

- Performs better than other geolocation solutions for infrastructure IPs [1]



[1] On the Diversity of Interdomain Routing in Africa, PAM 2015, Fanou et al.

Paths with Out-of-Country IP Addresses

IPv4 : 9.75%

DE : 3.70% (864)

CH : 2.66% (621)

GB : 2.12% (496)

NL : 2.04% (477)

IT : 0.83% (195)

US : 0.43% (100)

BE : 0.06% (13)

ES : 0.03% (7)

DK : 0.02% (4)

JP : 0.00% (1)

LU : 0.00% (1)

IPv6 : 18.10%

DE : 7.31% (280)

NL : 5.98% (229)

CH : 4.47% (171)

GB : 3.50% (134)

IT : 0.71% (27)

SE : 0.31% (12)

US : 0.21% (8)

LU : 0.16% (6)

HK : 0.05% (2)

SG : 0.05% (2)

- Two probes at CERN (less than 100m from border!)
- Probe in Danish company in Paris TH2
- LISP

```
## msm_id:2407452 prb_id:22071 dst:153.16.38.64 ts:2015-09-12 18:48:29 -00:00
5 (AS2200) vl807-pc1-brest1-rtr-021.noc.renater.fr [1.167, 1.389] |Brest,FR|
6 (AS2200) te1-4-lannion-rtr-021.noc.renater.fr [11.442, 11.506] |Lannion,FR|
7 (AS2200) te1-4-stbrieuc-rtr-021.noc.renater.fr [11.508, 11.678] |Saint-Brieuc,FR|
8 (AS2200) te2-1-rennes-rtr-021.noc.renater.fr [4.97, 5.078, 11.499]
9 (AS2200) 193.51.177.234 [13.016, 13.626, 13.74]
10 (AS20965) renater-lb1.mx1.par.fr.geant.net [11.399, 11.478, 11.623] |Paris,FR|
11 (AS20965) ae1.mx1.lon.uk.geant.net [17.121, 17.207, 17.326] |London,GB|
12 (AS20965) internet2-gw.mx1.lon.uk.geant.net [112.956, 113.047, 113.076]
13 (AS11537) et-5-0-0.104.rtr.atla.net.internet2.edu [119.339, 119.547, 120.69] |
Atlanta,GA,US|
14 (AS11537) et-10-2-0.105.rtr.hous.net.internet2.edu [141.481, 141.518, 141.524] |
Houston,TX,US|
15 (AS11537) et-5-0-0.111.rtr.losa.net.internet2.edu [174.024, 174.042, 174.23] |Los
Angeles,CA,US|
17 (AS22388) 192.203.116.154 [281.07, 281.121, 292.992]
18 (AS7660) apan-pxtr-vlan7.jp.apan.net [282.323, 285.43, 297.019]
19 (AS7660) tyo-t1600-xe4-0-2-17.jp.apan.net [291.106, 301.732, 308.542]
```

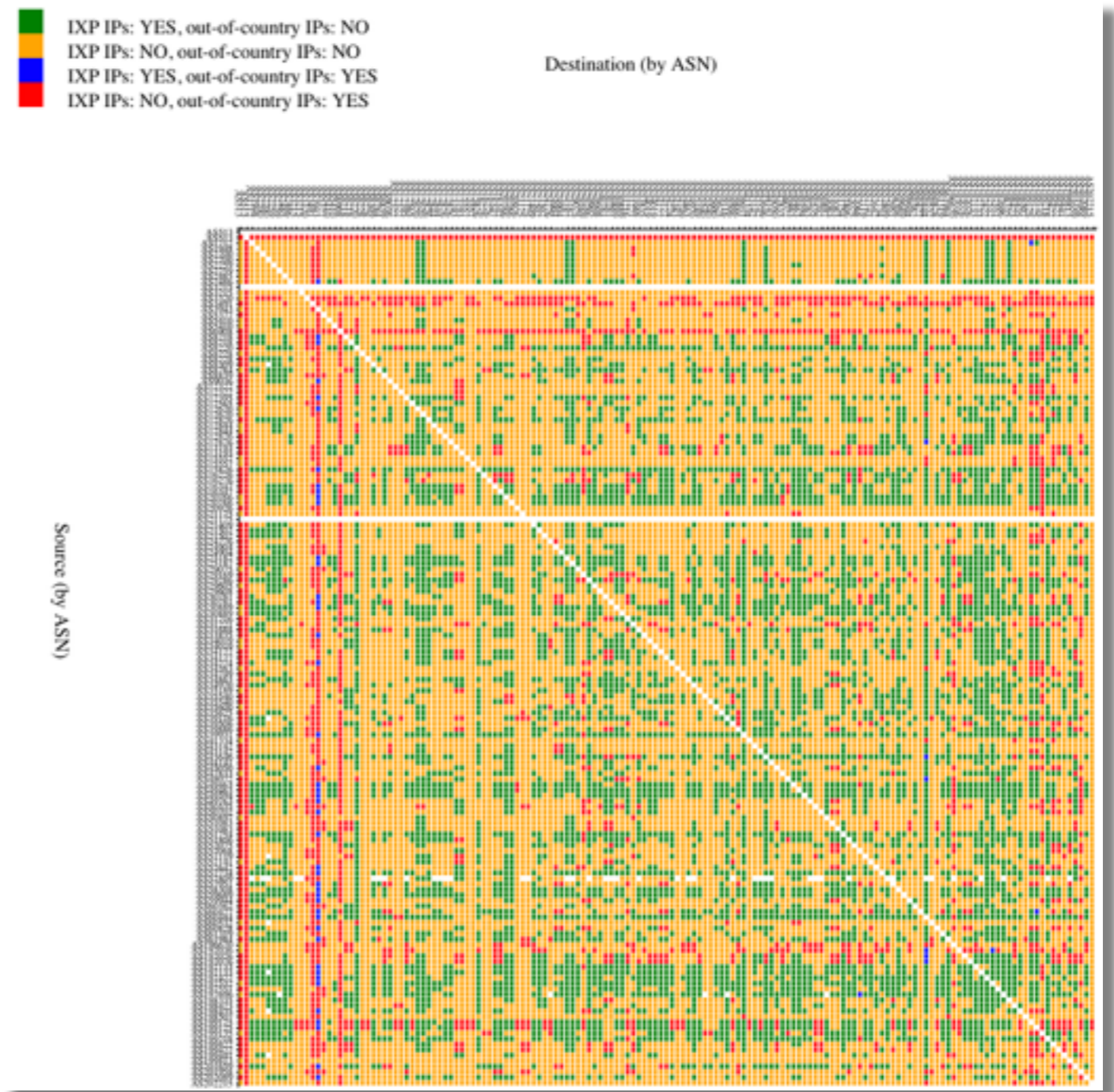
- Paris-LA-Tokyo is 18844 km (188ms round-trip)

- “Spiderweb”
 - Due to probe selection
- Some close-by cities where FR-FR paths go:
 - London
 - Amsterdam
 - Frankfurt



EXPERIMENTAL: <http://sg-pub.ripe.net/emile/ixp-country-jedi/specials/france-ix-2015-08-19/geopath/>

- Interactive version shows traceroute when hovering over cell
- (help/input wanted!)

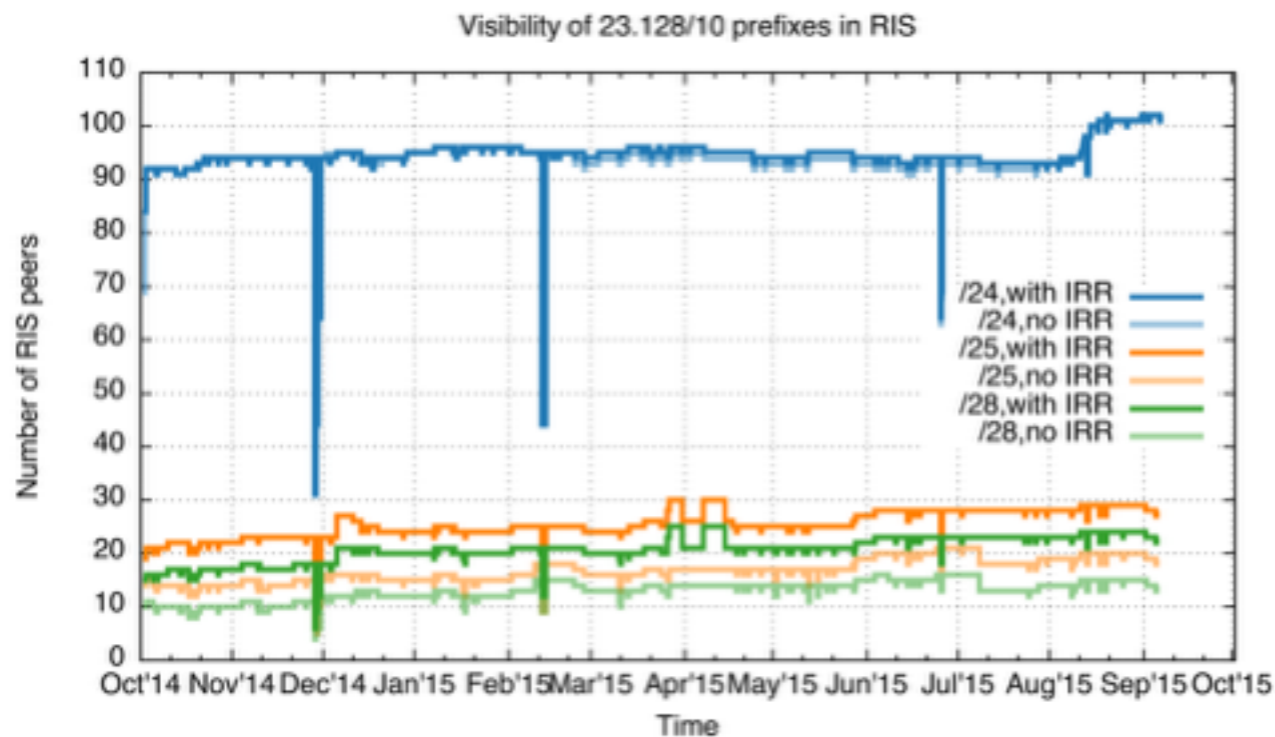


<http://sg-pub.ripe.net/emile/ixp-country-jedi/specials/france-ix-2015-08-19/ixpcountry/>

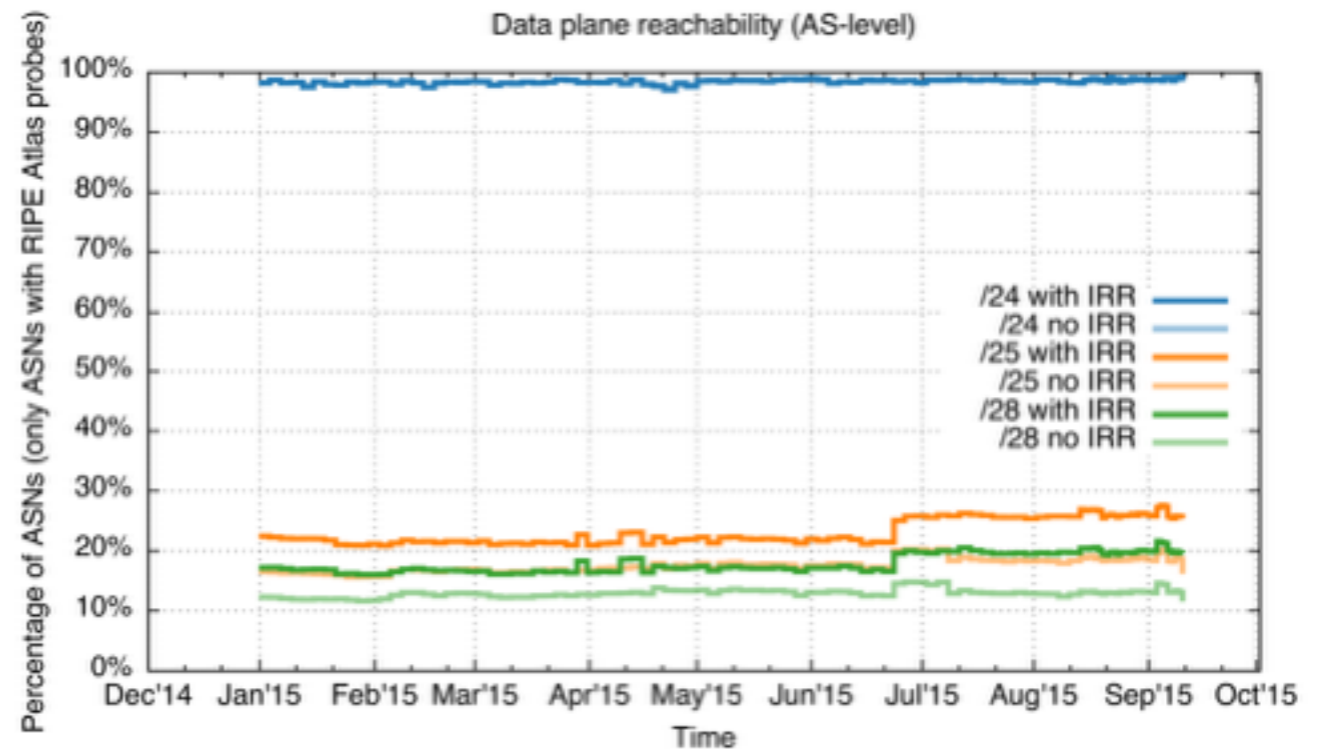
- Network operators:
 - Explore, see if you can find where you can improve
- IXPs:
 - Find network ops that you can bring together and peer with locally
- Programmers:
 - Check out the code that does all this, and improve it:
 - <https://github.com/emileaben/ixp-country-jedi/>
- Everybody:
 - Feature requests welcome - contact me



- <https://labs.ripe.net/Members/emileaben/has-the-routability-of-longer-than-24-prefixes-changed>
- /25-/28 not really usable for global Internet connectivity



RIS / Control Plane



RIPE Atlas / Data Plane

- Idea: What if I could do a **traceroute** from all of the major **“eyeball” networks in a country?**
- Workflow:
 - Extract list of ASNs with $> 1\%$ market share (external API)
 - Find usable RIPE Atlas probes in these ASNs (probe API)
 - Create measurements from these probes (measurement API)
 - Fetch results (streaming API)
 - Provide text-based, annotated output (host, ASN for hops)
(RIPEstat / OpenIPMap)

- <https://github.com/emileaben/eyeballtrace>
- command-line: `eyeballtrace -c FR cloudflare.com`

```
## AS3215/AS3215 - Orange S.A. (35.3% of market in FR)
#prb:16015 dst:www.cloudflare.com
1 () 192.168.1.1 [0.58, 0.66, 0.759]
2 () 80.10.126.18 [8.422, 8.461, 8.472]
3 () 10.125.220.202 [8.468, 9.108, 9.119]
4 () ae42-0.nistr102.strasbourg.francetelecom.net [13.265, 13.542, 13.936] |Strasbourg,Alsace,FR|
5 () 81.253.184.190 [29.967, 29.984, 30.132]
6 (AS2914) ae-11.r04.parsfr01.fr.bb.gin.ntt.net [23.121, 23.432, 24.494] |Paris,?le-de-France,FR|
7 (AS2914) ae-5.r02.parsfr02.fr.bb.gin.ntt.net [22.667, 22.851, 23.069] |Paris,?le-de-France,FR|
8 (AS2914) 82.112.96.190 [24.576, 24.761, 24.933]
9 (AS13335) 198.41.215.163 [25.206, 25.341, 26.009]
```

AS12322/PROXAD - Free SAS (15.3% of market in FR)

#prb:11729 dst:www.cloudflare.com

1 () 10.10.16.1 [0.381, 0.477, 0.542]

2 (AS12322) 78.234.84.254 [5.001, 5.045, 5.245]

3 (AS12322) colmar-3k-1.routers.proxad.net [5.497, 5.555, 5.768] |Colmar,Alsace,FR|

4 (AS12322) mulhouse-6k-1-v808.intf.routers.proxad.net [5.496, 5.785, 5.806] |Mulhouse,Alsace,FR|

5 (AS12322) strasbourg-6k-1-v804.intf.routers.proxad.net [8.999, 9.779, 9.802] |Strasbourg,Alsace,FR|

6 () p11-crs16-1-be1111.intf.routers.proxad.net [13.271, 13.749, 13.825]

7 () th2-9k-2-be2000.intf.routers.proxad.net [13.273, 13.49, 13.501]

8 (AS174) be4204.ccr21.par04.atlas.cogentco.com [13.47, 13.533, 13.533] |Paris,?le-de-France,FR|

9 (AS174) be2308.ccr41.par01.atlas.cogentco.com [13.792, 14.068, 21.968] |Paris,?le-de-France,FR|

10 (AS174) be2097.agr22.par01.atlas.cogentco.com [14.075, 14.278, 14.484] |Paris,?le-de-France,FR|

11 (AS174) te0-0-2-0.rcr11.b019498-0.par01.atlas.cogentco.com [14.013, 14.276, 14.439] |Paris,?le-de-France,FR|

12 (AS174) 149.11.0.126 [14.226, 15.509, 17.039]

13 (AS13335) 198.41.215.163 [14.072, 14.22, 14.271]

```
## AS15557/LDCOMNET - Societe Francaise du Radiotelephone S.A (14.8% of market in FR)
#prb:16089 dst:www.cloudflare.com
1 () 10.34.128.1 [5.775, 5.779, 6.542]
2 (AS21502) pal1rj-ge-2-1-0.200.numericable.net [6.294, 7.774, 7.821]
3 () 172.19.132.146 [11.945, 13.941, 21.208]
4 (AS57734) cloudflare.franceix.net [8.745, 9.515, 10.55] |Paris,?le-de-France,FR|
5 (AS13335) 198.41.215.163 [8.182, 9.374, 9.759]
```

```
## AS21351/MEDIASERV - Mediaserv (1.5% of market in FR)
```

```
NO RIPE Atlas coverage!!
```

```
If you are in a position to put a probe in this network: https://atlas.ripe.net/get-involved/become-a-host/
```

```
## AS51207/FREEM - Free Mobile SAS (1.1% of market in FR)
```

```
NO RIPE Atlas coverage!!
```

```
If you are in a position to put a probe in this network: https://atlas.ripe.net/get-involved/become-a-host/
```

Full output at: <http://sg-pub.ripe.net/emile/FR.www.cloudflare.com.txt>