



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

minRTT

Latency Into Networks
As Seen From RIPE Atlas

Emile Aben

Agustin Formoso

Jasper den Hertog

emile.aben@ripe.net | 2021-10-17 | RIPE83

Problem(s)



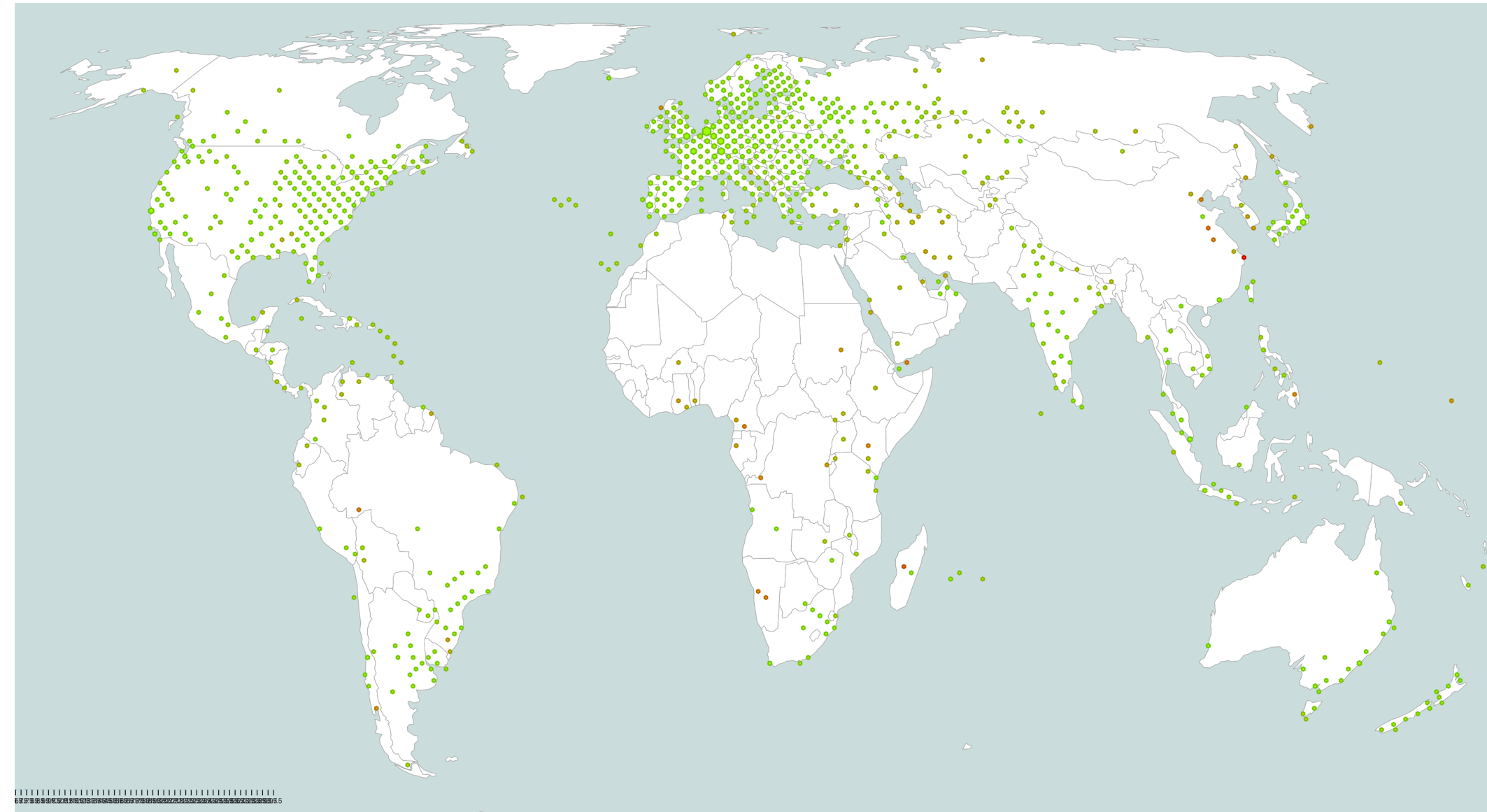
- Geolocation information about networks is spotty
 - Maxmind? Geolocates well where end-users are
 - RIR-stats: Geolocates country of head-quarters for a network
 - PeeringDB: Geolocates where people want to peer (for those who want to peer in the first place)

- What can we do to improve?
 - IPMap for IPs

Potential improvements



- How can we use RIPE Atlas to augment our understanding?
- RIPE Atlas is widely deployed across the globe

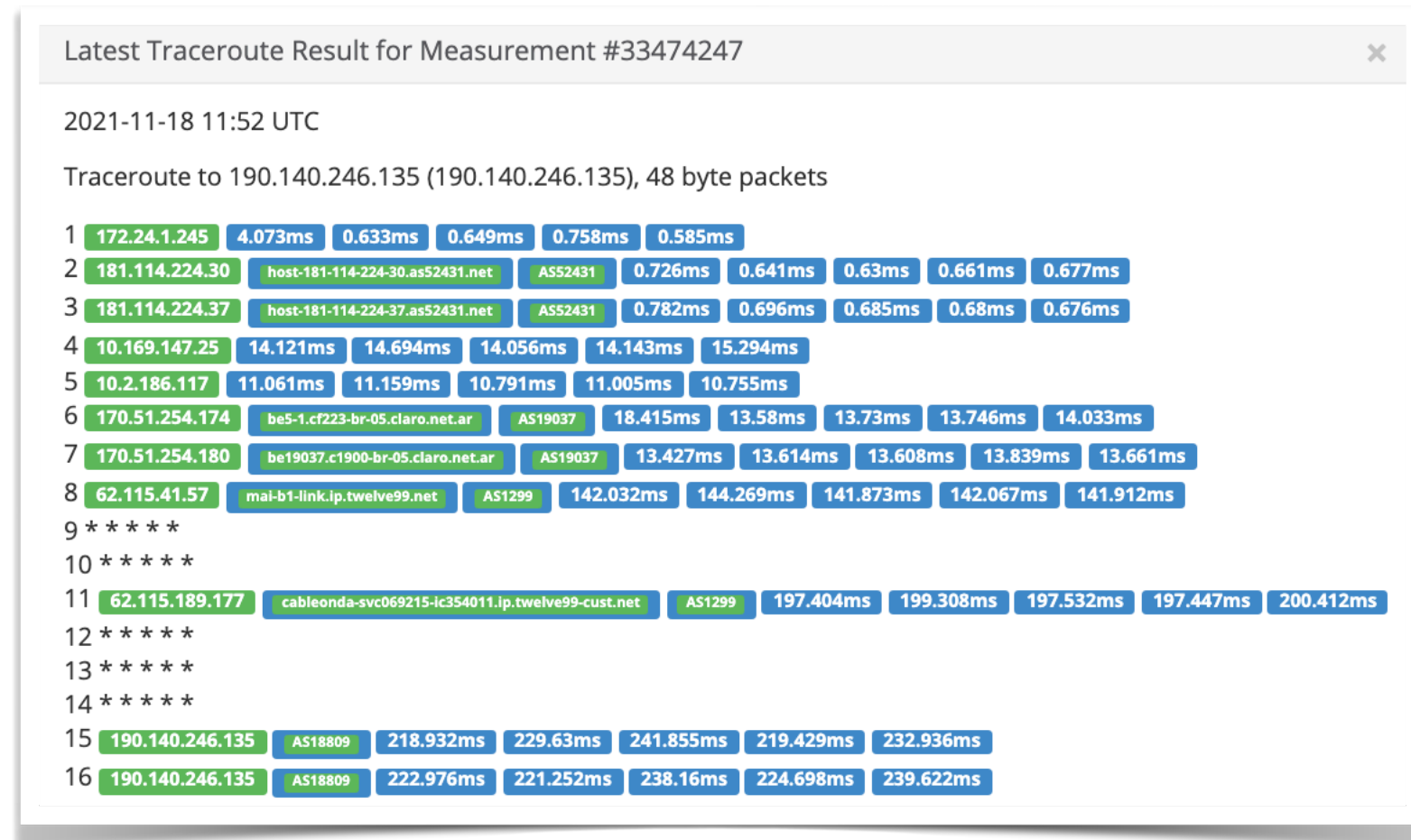


Dataset we Explore



- Daily minimum RTT for each probe/origin combination found in traceroutes
 - Hot potato routing should make you see first possible hand-off to next network
- Origin = ASN or IXP peering LAN
 - Mapping:
 - IXP peering LANs from peeringDB (can be looked up by peeringDB IXP ID
 - ie. AMS-IX is “ix-26” (see <https://www.peeringdb.com/ix/26>)
 - IP2ASN from BGP data in RIS (just looking at originator from this)

What Does This Look Like?



0:	
prb_id:	12538
origin:	"2603"
af:	4
day:	"2021-10-12"
min_rtt:	32.57
ip_count:	5
samples:	25

...

3.4GB/day

180M traces

Complex

...

36MB/day

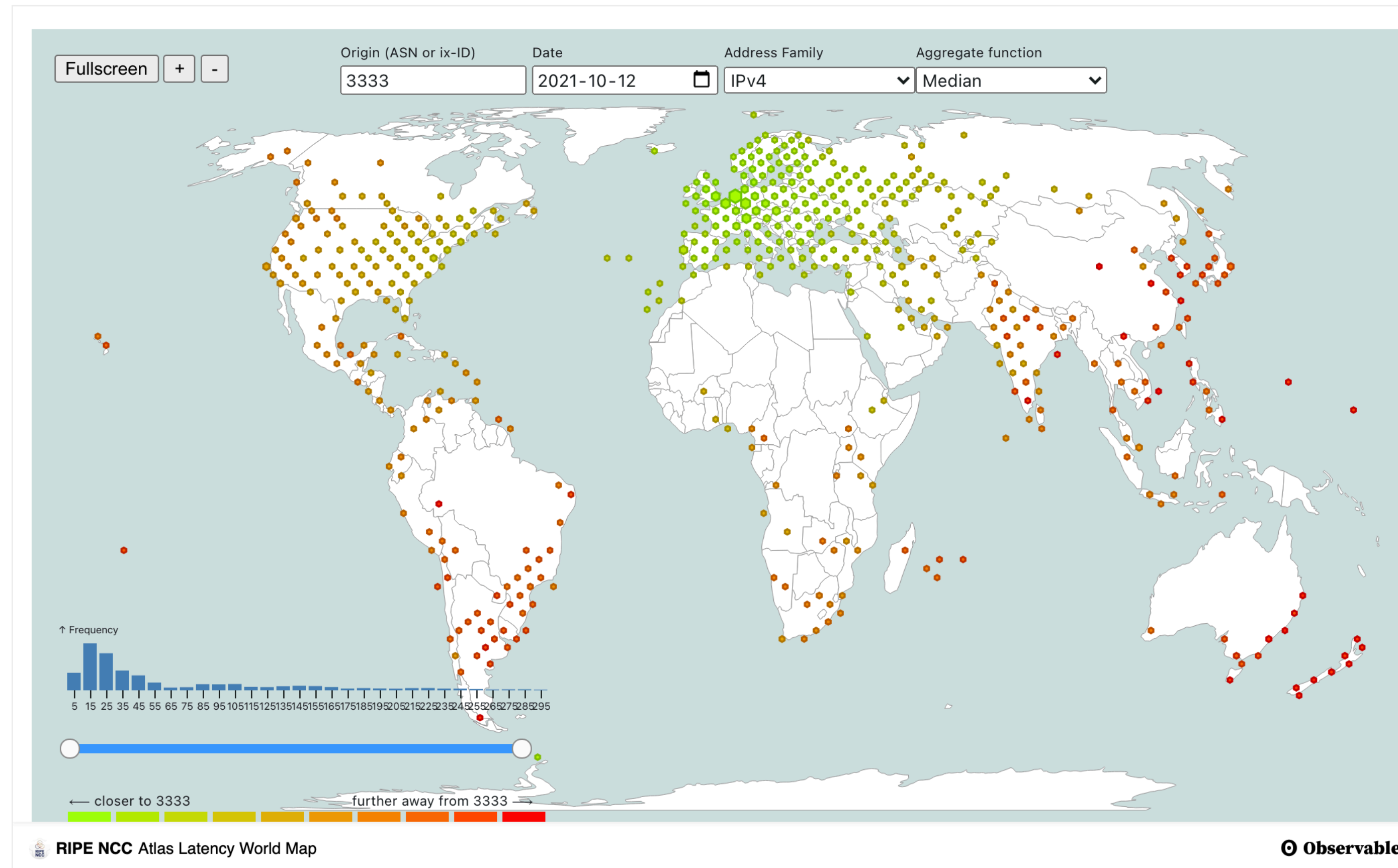
4.8M tuples

Simple

Example Viz: World Map



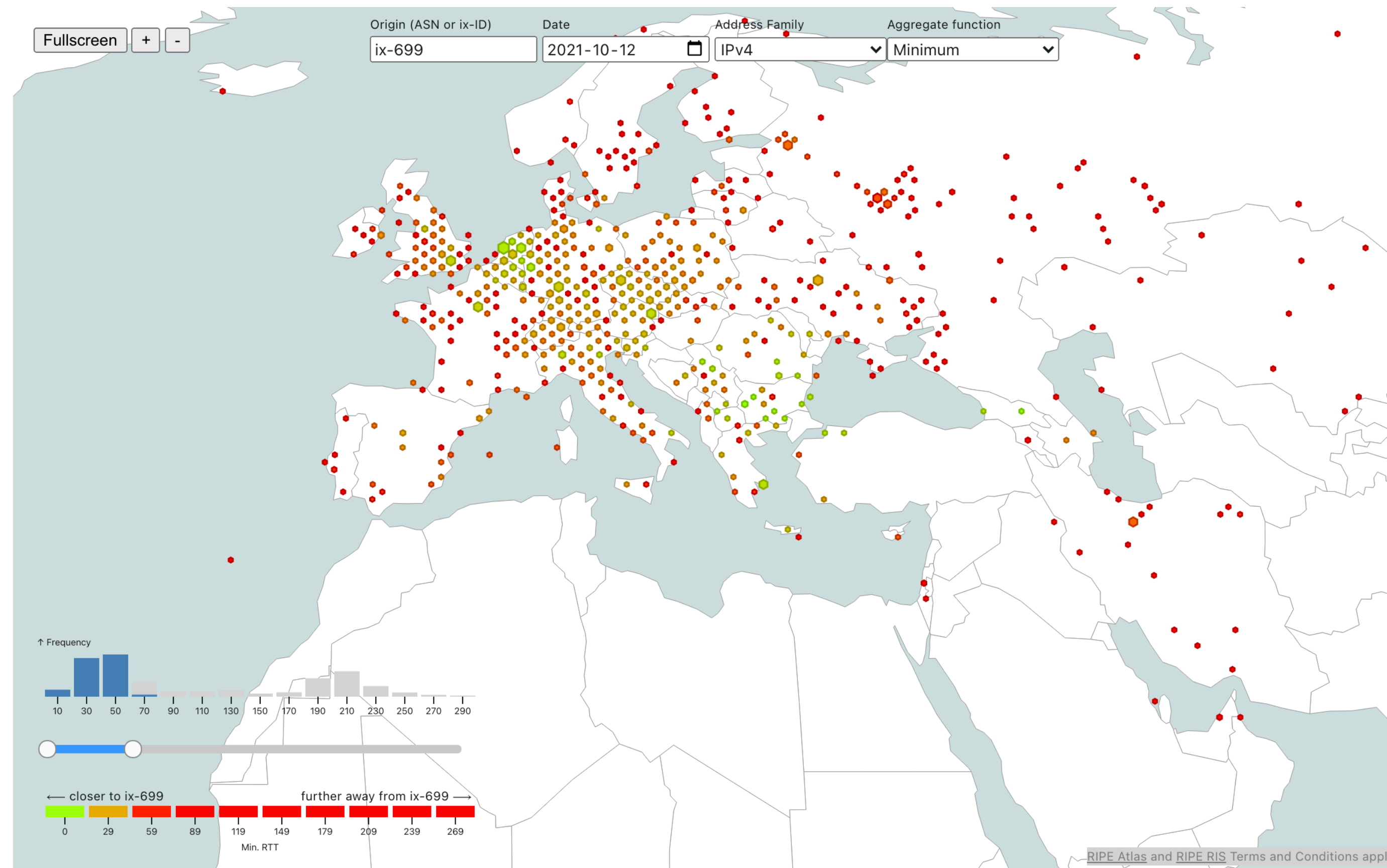
<https://observablehq.com/@ripencc/atlas-latency-worldmap>



Example Viz: Distributed IXP



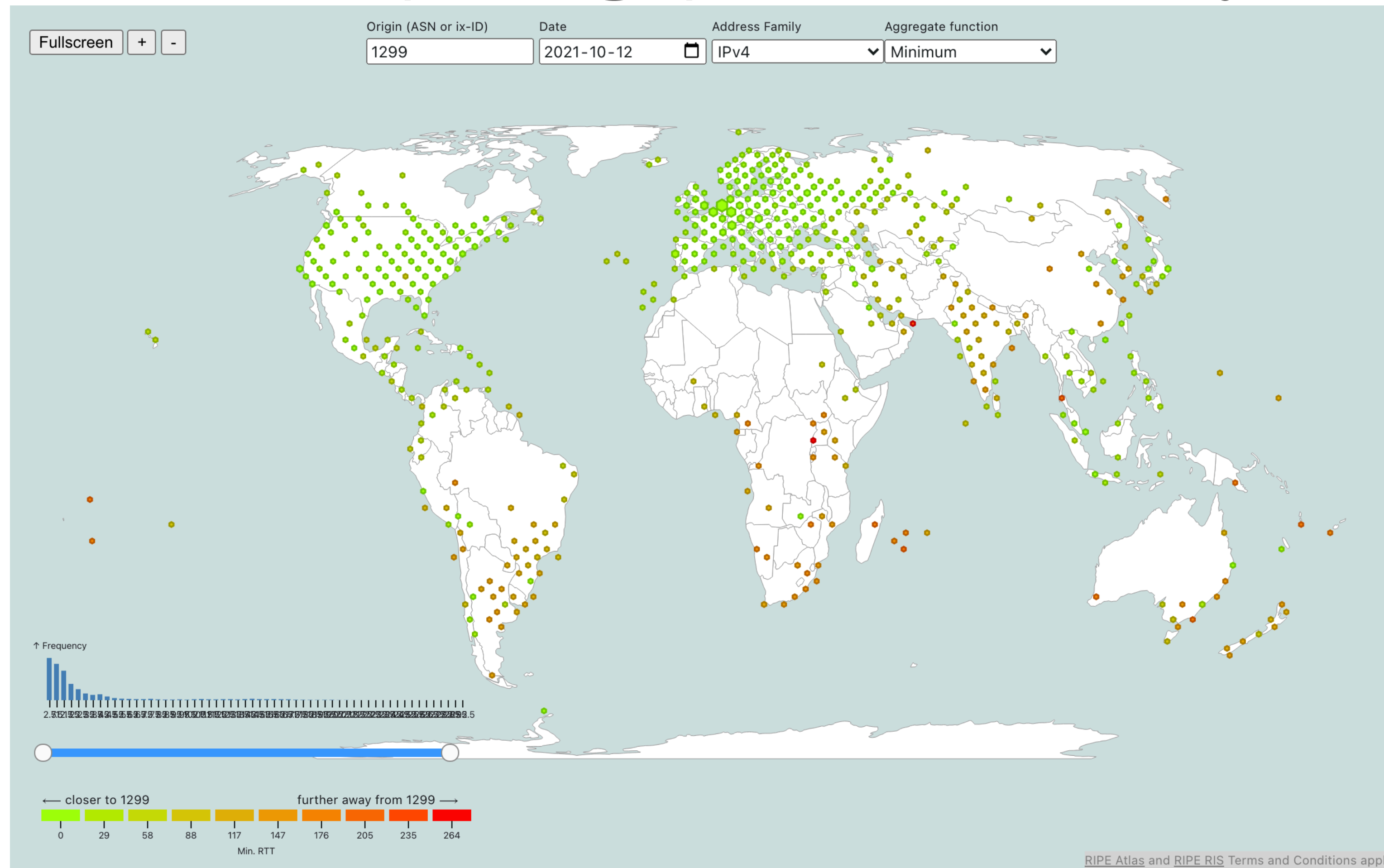
<https://observablehq.com/@ripencc/atlas-latency-worldmap>



Example Viz: Tier1



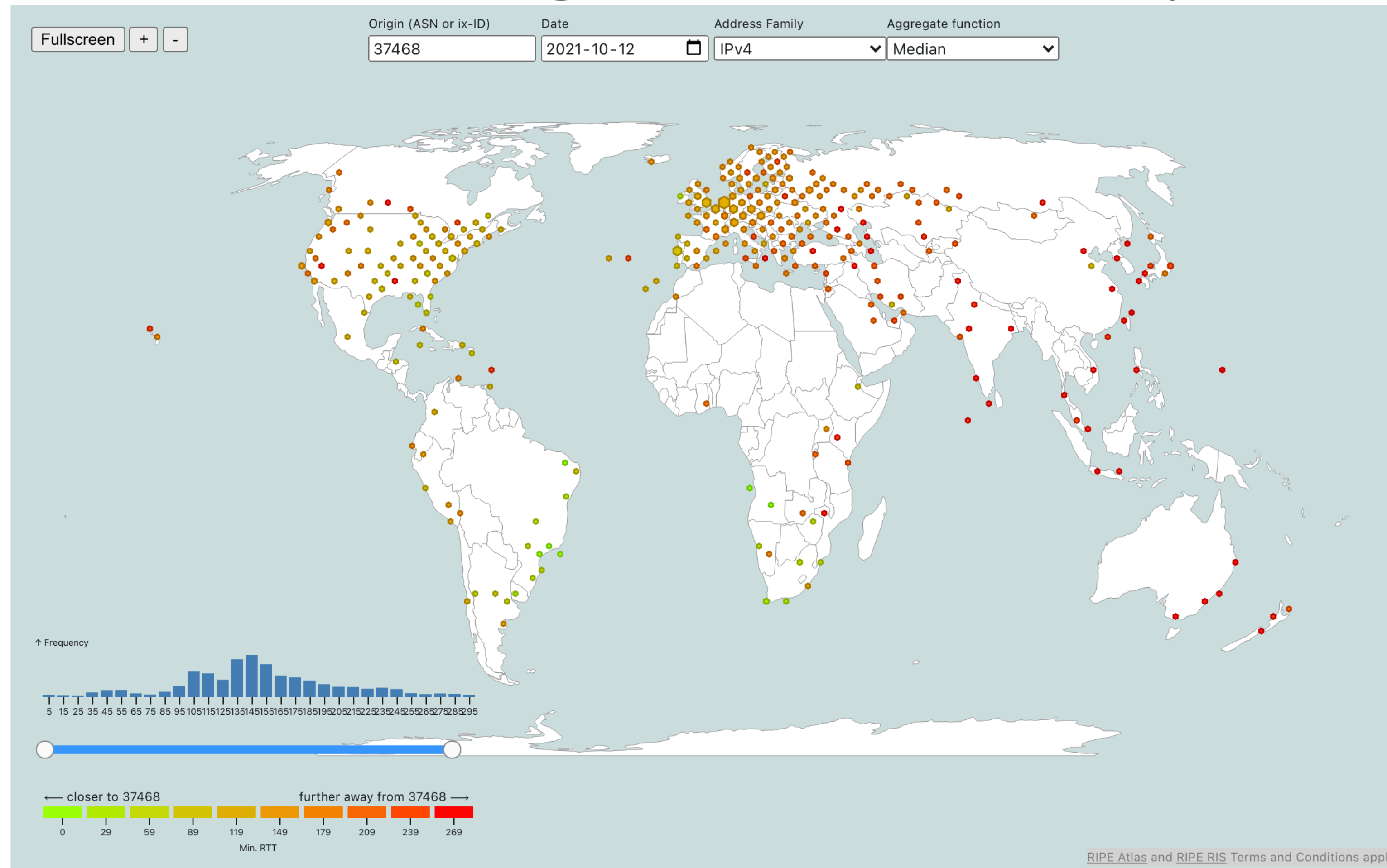
<https://observablehq.com/@ripencc/atlas-latency-worldmap>



Example Viz: Regional Deployment



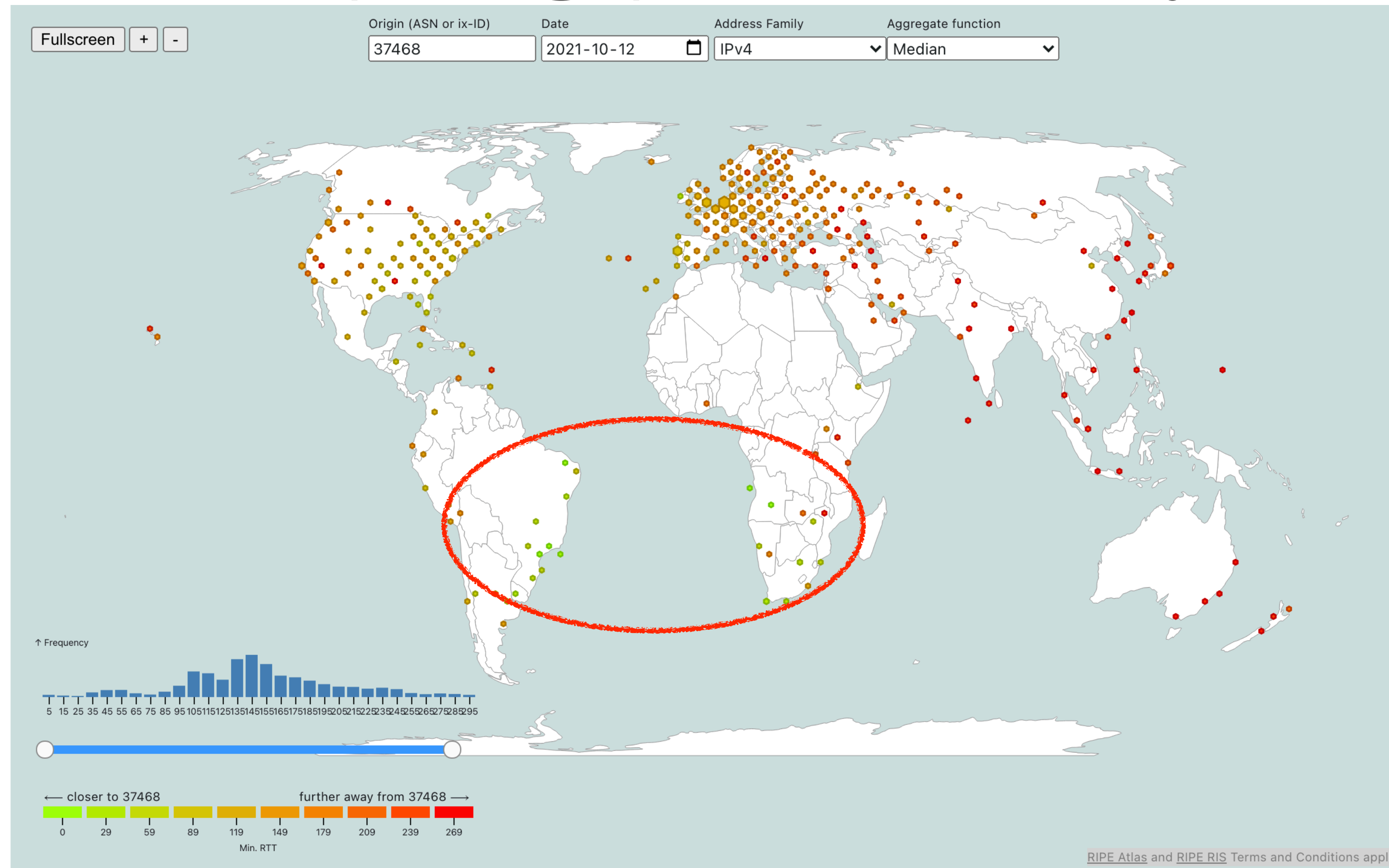
<https://observablehq.com/@ripencc/atlas-latency-worldmap>



Example Viz: Regional Deployment



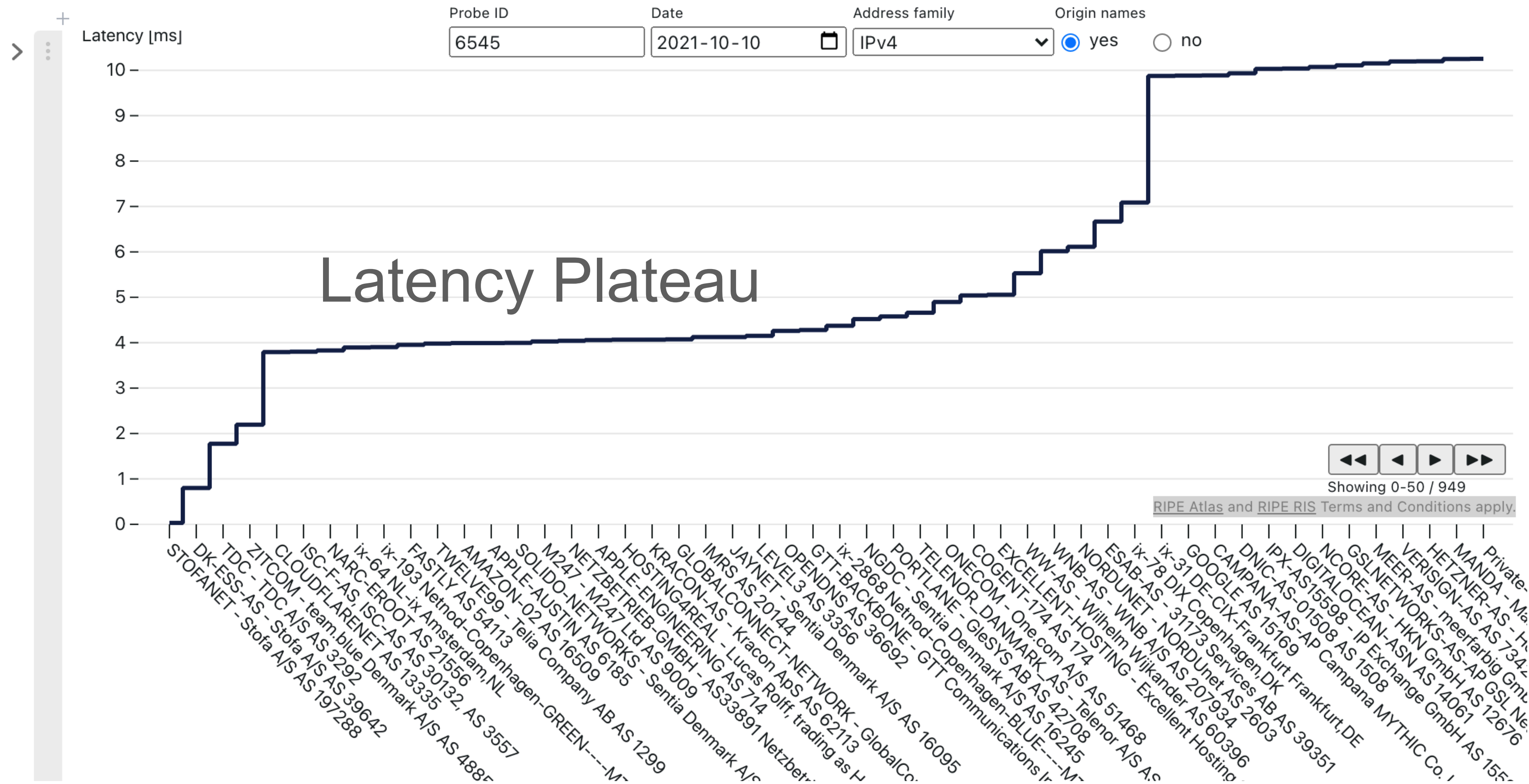
<https://observablehq.com/@ripencc/atlas-latency-worldmap>



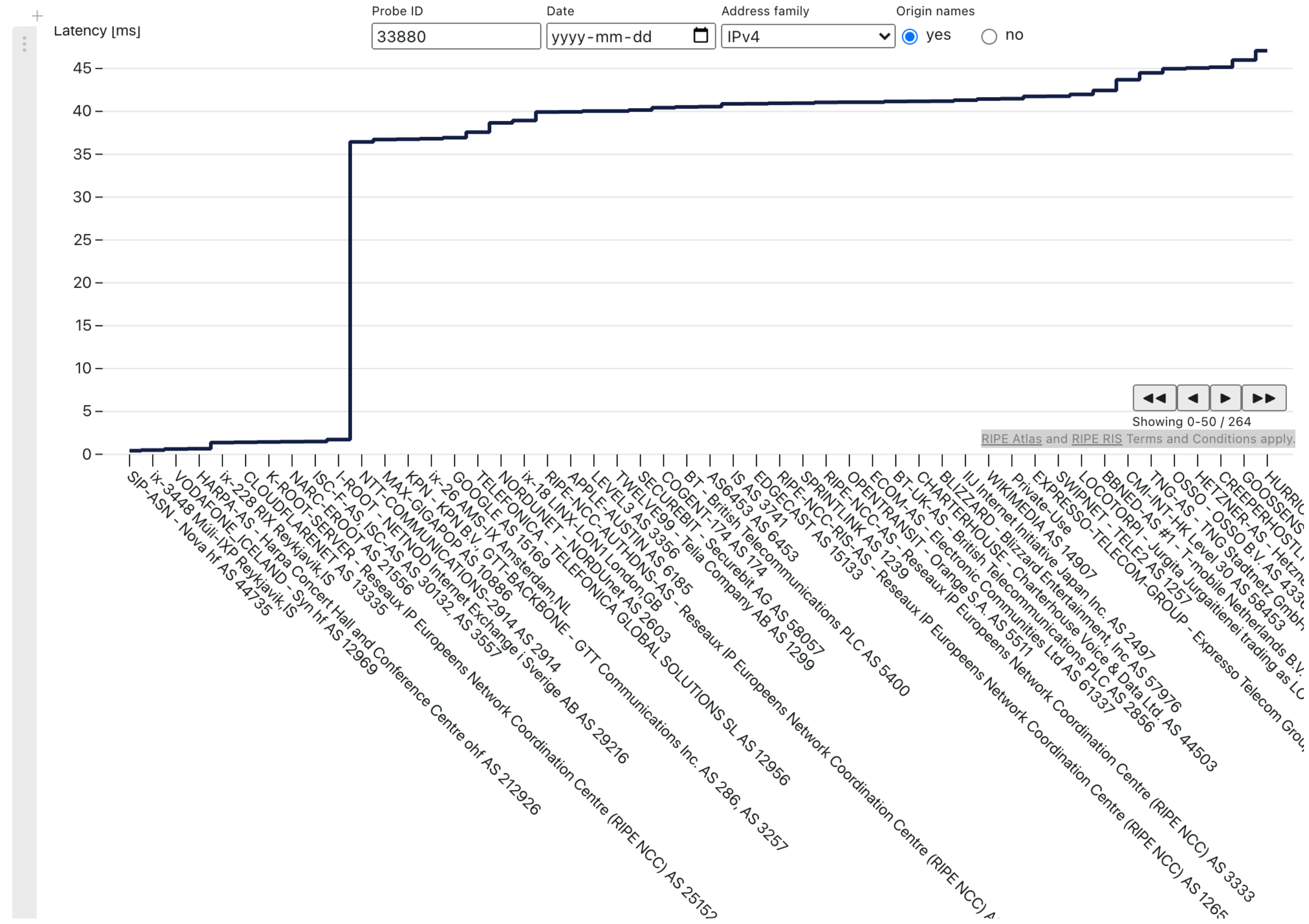
Example Viz: Probe Neighbourhood



<https://observablehq.com/@ripencc/atlas-probe-neighbourhood>



Latency Islands: Iceland!





Caveats

- Limited by where RIPE Atlas is deployed
 - And accuracy of probe geolocation
- Limited by where RIPE Atlas measures to
- Limited by ICMP blocking
- Limited by RTT lies
 - Some probes have a device close to them that responds with low latency and a fake src address (= destination of measurements)!

Measurement ID	Source IP	Destination IP	Country	Device	Time	RTT (ms)	Status
51703	701	701	USA	🌐	2021-10-12 01:14	1.615	🟢
51995	6855	6855	USA	🌐	2021-10-12 09:29	208.441	🟡
52064	20115	20115	USA	🌐	2021-10-12 09:44	122.918	🟡
52290	29014	29014	GER	🌐	2021-10-12 09:44	178.103	🟡

Latest Traceroute Result for Measurement #29091319x

2021-10-12 01:14 UTC

Traceroute to 45.183.45.23 (45.183.45.23), 48 byte packets

1	10.47.9.1	0.902ms	0.631ms	0.578ms	
2	45.183.45.23	AS64116	2.272ms	1.56ms	1.615ms

Future Work



- Mechanisms to select probes close to IXPs

- Can help in debugging problems around IXPs
- Which IXPs are well covered with RIPE Atlas probes?

<https://observablehq.com/d/13ba91347b0774c7>

- Country minRTT

- How do probes in a country see the latency into networks that are important to them?

- Compare IPv4 and IPv6

- <Your idea here>

- Or implement it yourself using ObservableHQ



Questions



emile.aben@ripe.net
[@meileaben](https://twitter.com/meileaben)

[https://labs.ripe.net/author/
emileaben/latency-into-your-network-
as-seen-from-ripe-atlas/](https://labs.ripe.net/author/emileaben/latency-into-your-network-as-seen-from-ripe-atlas/)