LYNKSTATE

For Those About To Anycast

Or “Dazed And Confused”, Depending on your viewpoint

Remco van Mook, RIPE84, May 2022

Measure at Internet Scale

There are 10+ billion devices used by almost 5 billion people on the Internet

To get statistically relevant data, you need ‘Internet Scale’ viewpoints

Not hundreds, or thousands, **but hundreds of millions.**

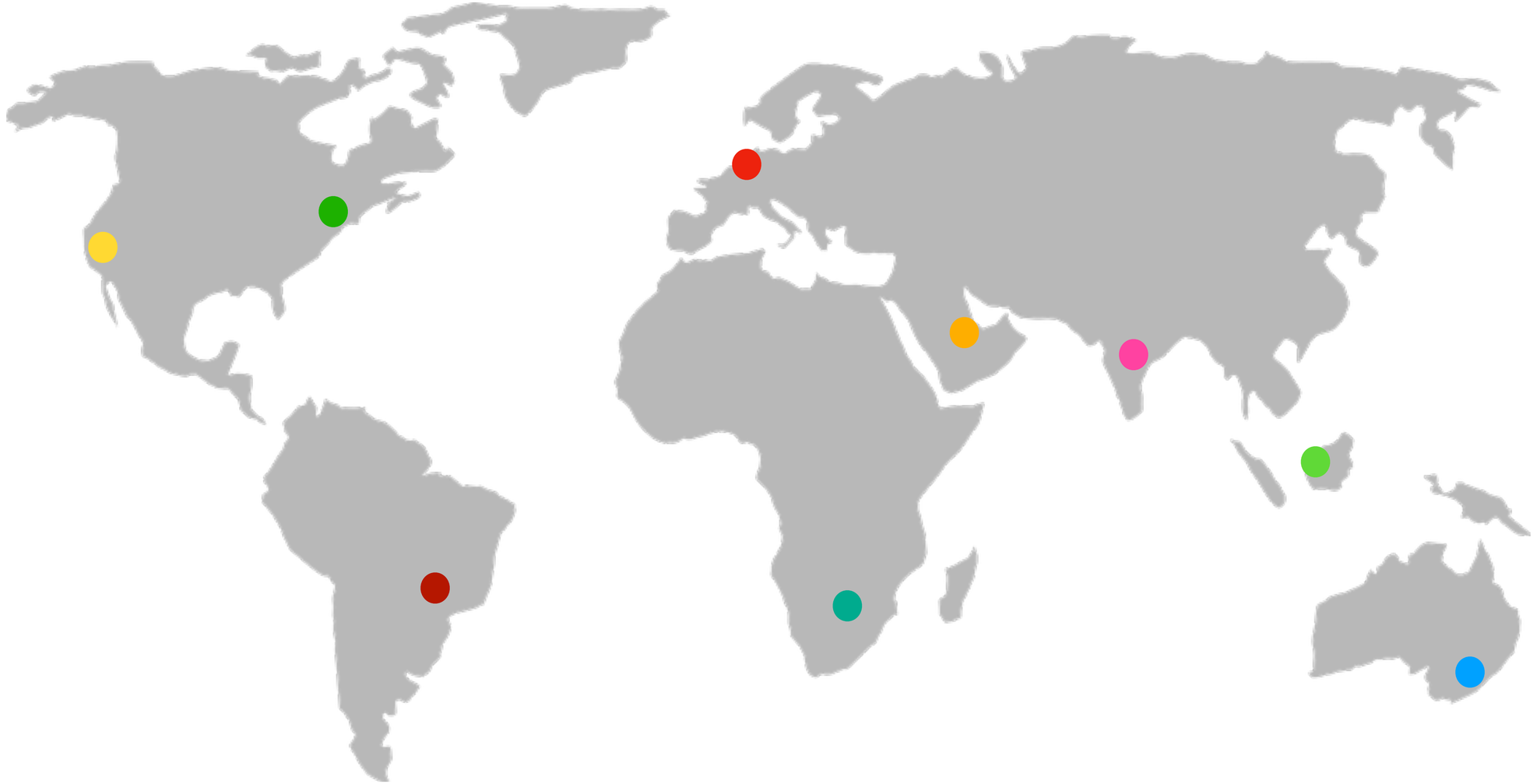
Lynkstate built a platform where we can continuously measure network performance from a pool of hundreds of millions of end user connections.

As it so happens, one of our internal test cases is.. **a global anycast network**.

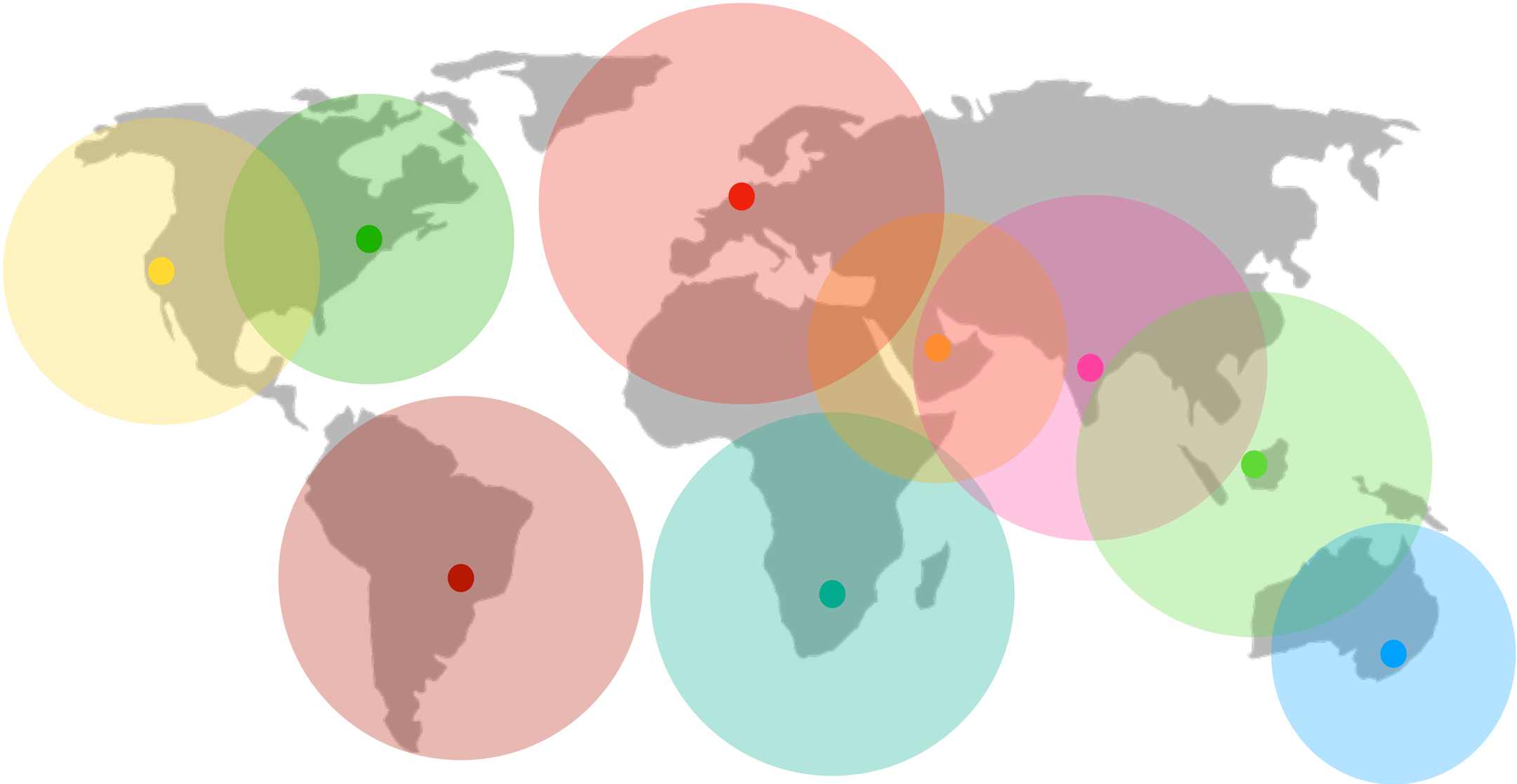
The Key Challenges

1. Make sure inbound anycast traffic shows up - at all
   - No black holes, no loops
   - Unlike unicast, you can’t ‘just’ test from your side
2. Make sure inbound traffic ends up in the ‘right’ place
   - You need to have a defined ‘intent’ to engineer against
   - Determined by geography, service level objectives (speed, latency)
   - You are effectively traffic engineering the reverse path

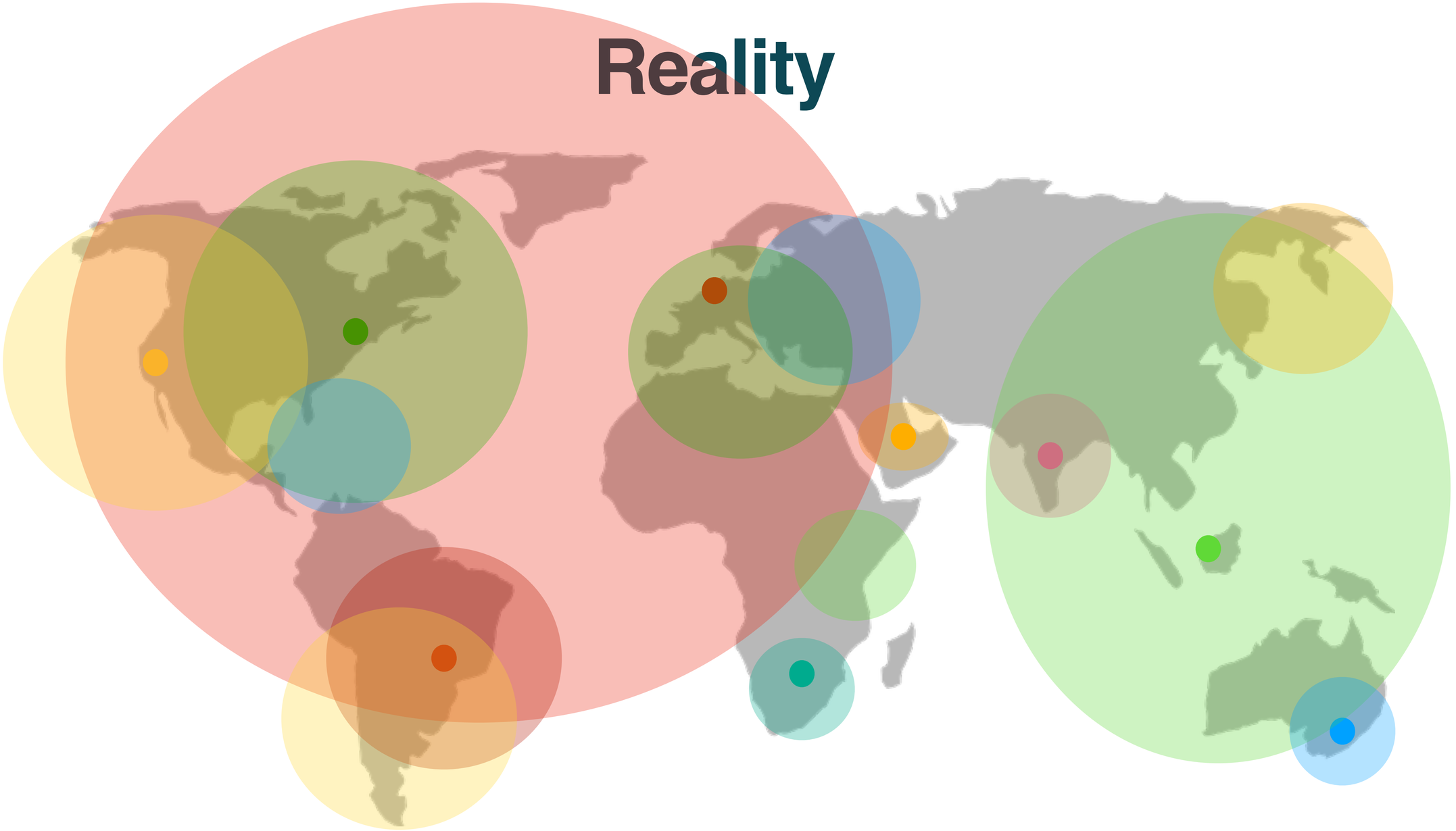
The Dream



The Dream



Reality

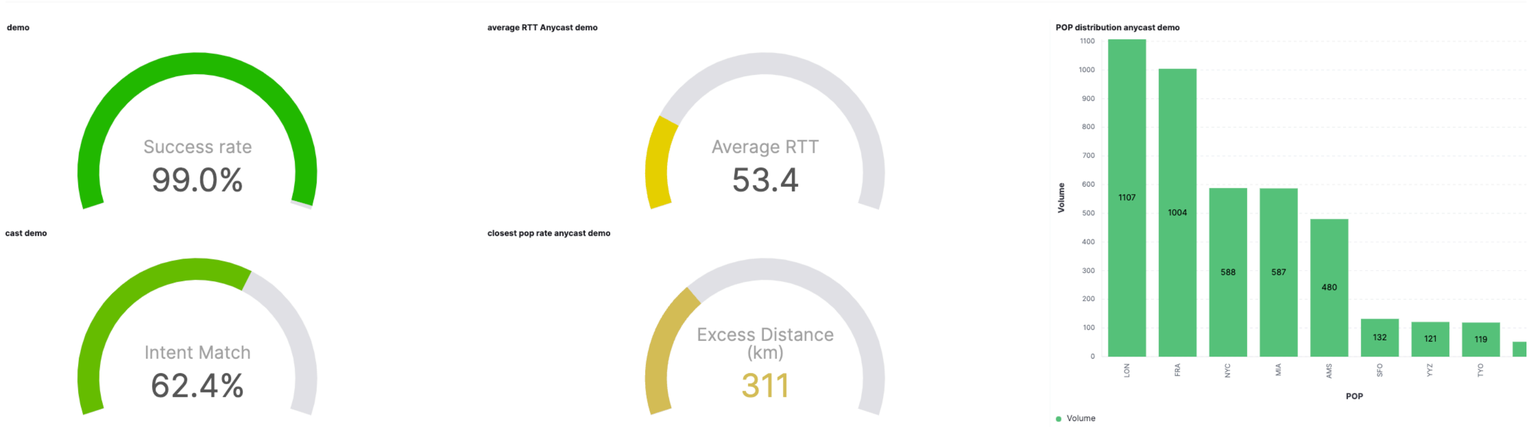


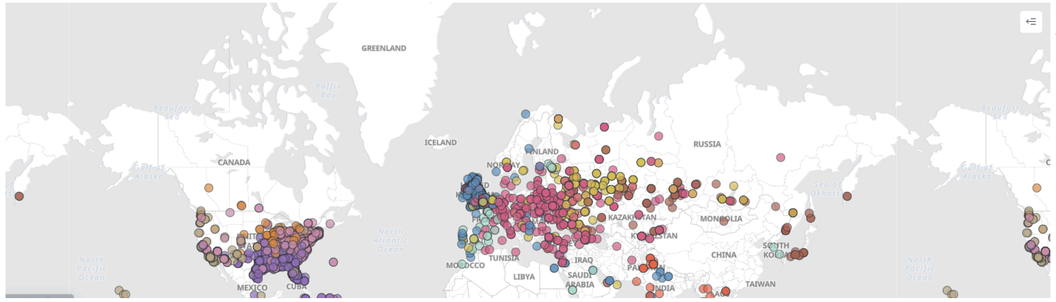
What you can See

Or, what your monitoring tells you:

So Jan and Sander came over..

“Oh, you mean something like this?”



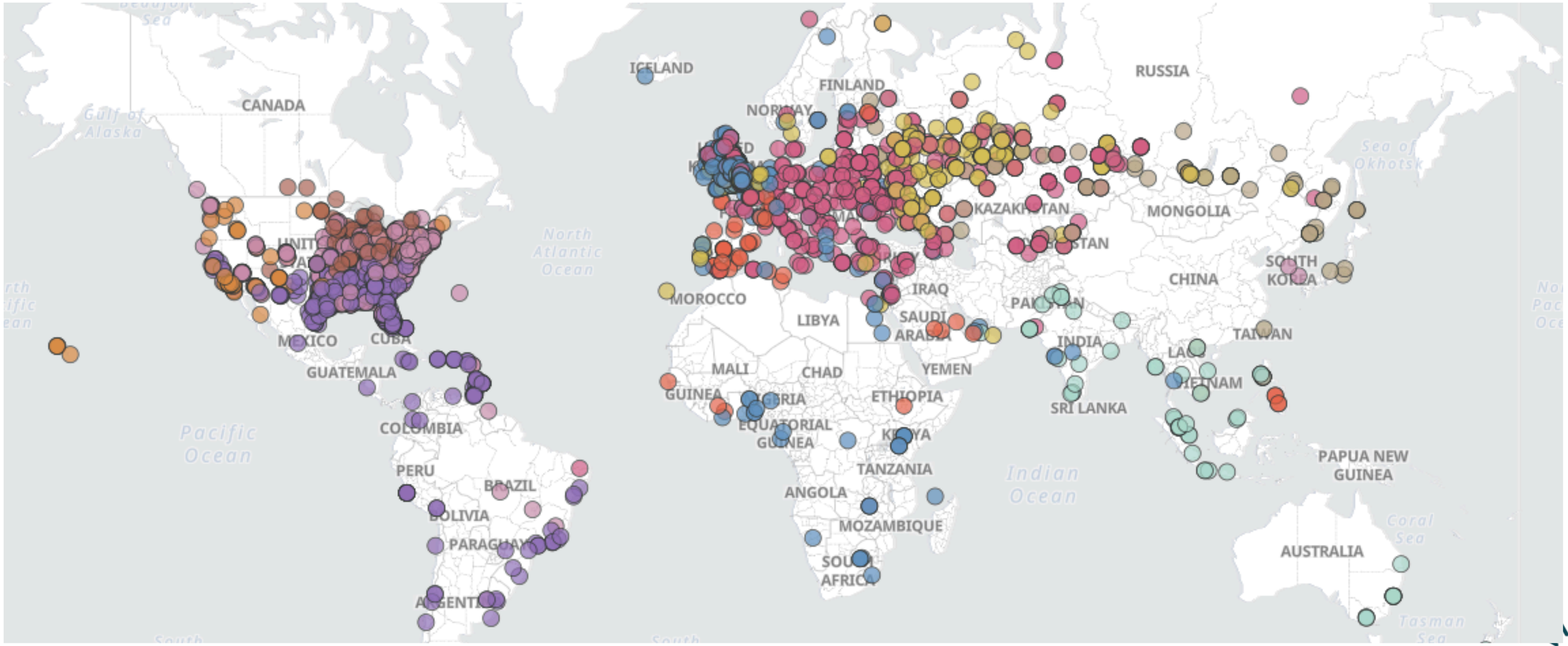


Errored Clients Anycast demo

ISP	ASN	IPv4.maxmind_country....	Count
ATT-INTERNET4	7018	US	3
Virgin Media Limited	5089	GB	3
British Telecommunication...	2856	GB	2
COMCAST-7922	7922	US	2
FRONTIER-FRTR	5650	US	2
Korea Telecom	4766	KR	2
PJSC Ukrtelecom	6849	UA	2
ACS-INTERNET	27364	US	1
BHN-33363	33363	US	1
Bitrace telecom Ltd.	49893	RU	1

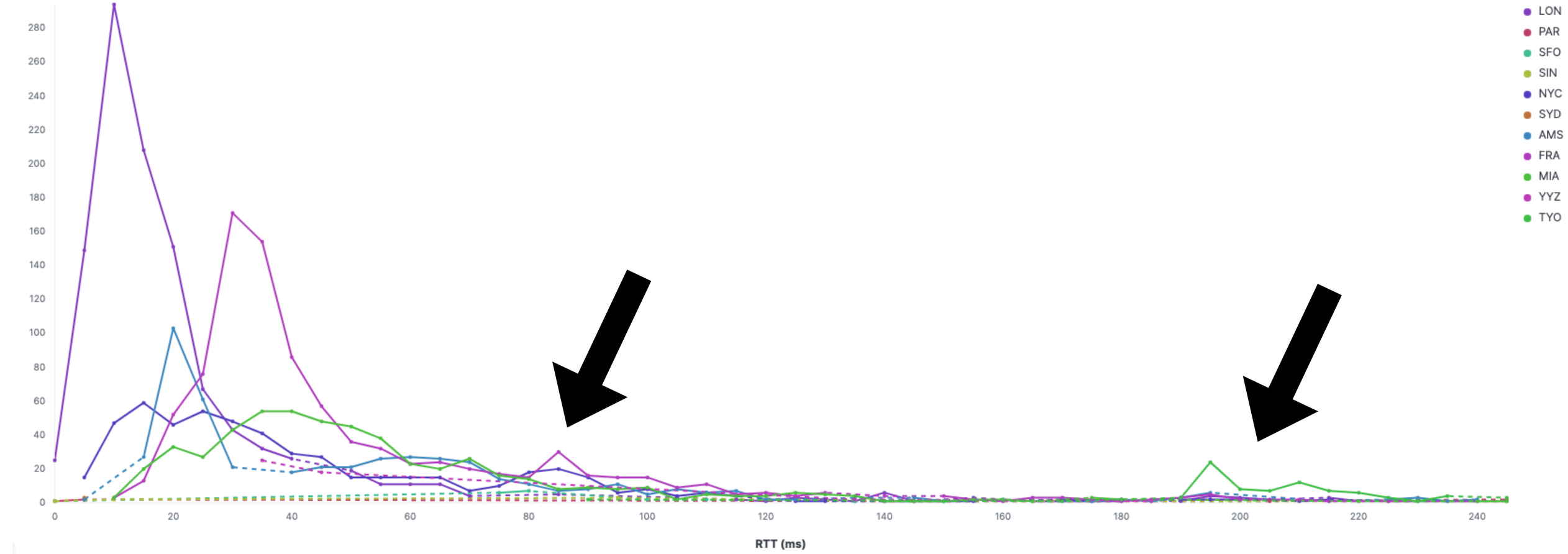
Measuring from the Client Side

Which POP do users end up at in the last hour?



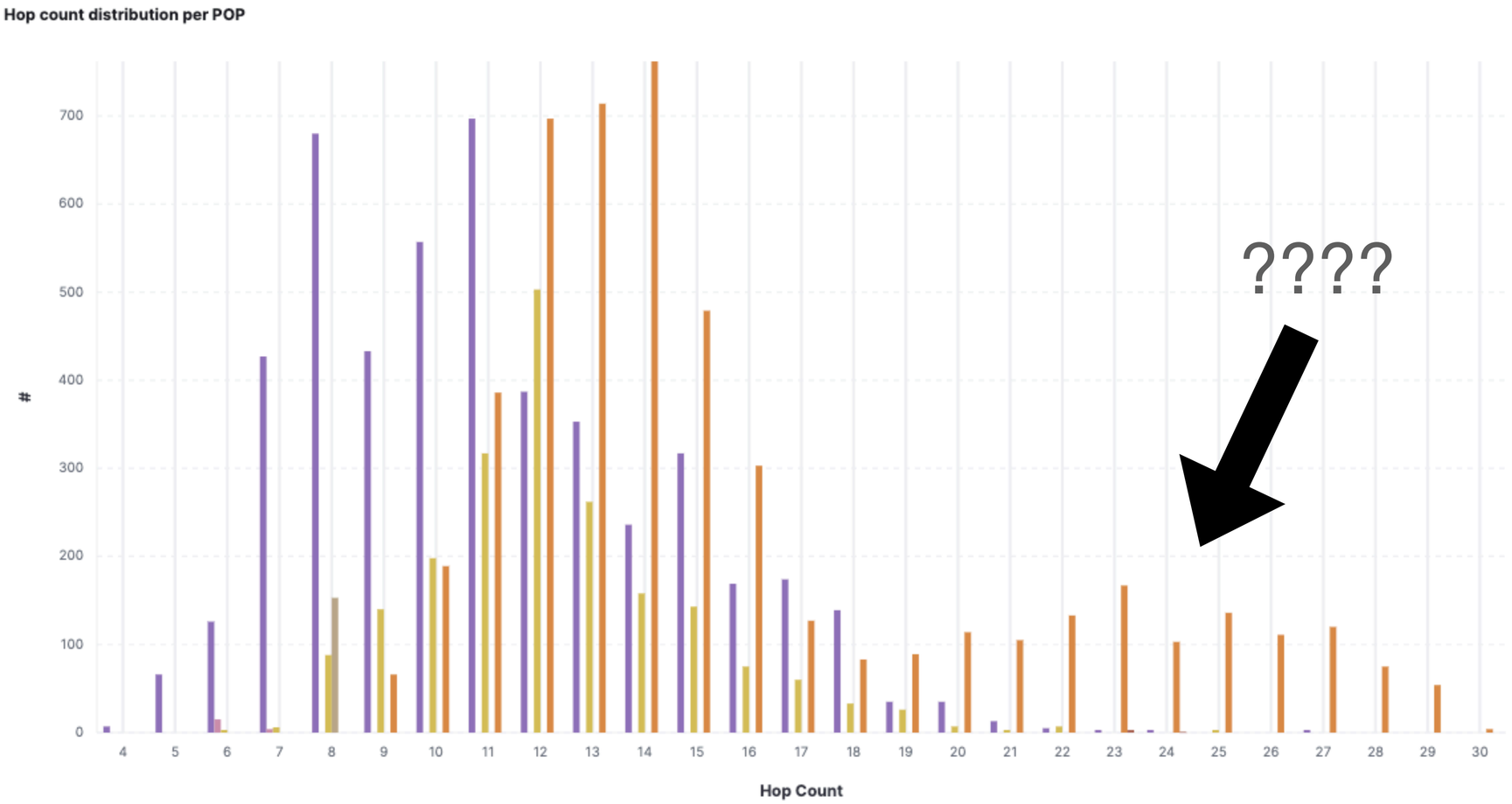
Measuring from the Client Side

What are the outliers?



Measuring from the Client Side

How efficient is the routing?

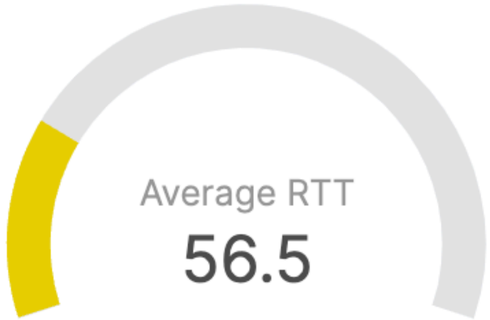


Measuring from the Client Side

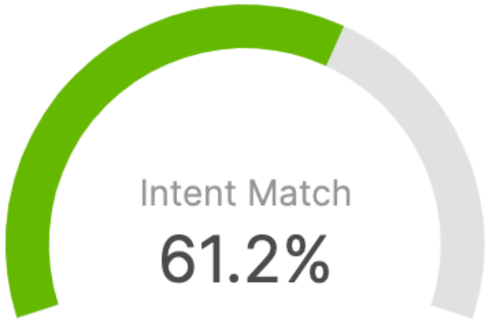
Am I hitting my performance objectives?

success rate anycast demo

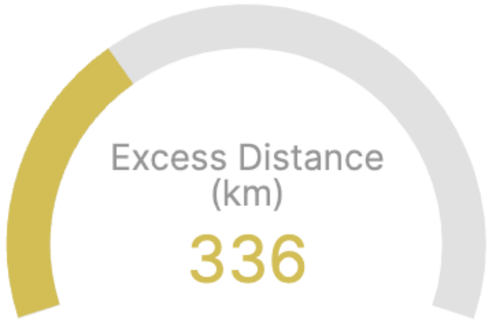
average RTT Anycast demo



Intent match rate anycast demo



closest pop rate anycast demo



Measuring from the Client Side

What’s my Homework?

POP anomalies

Export

ASN	Country	POP	RTT	Count
5089	GB	FRA	40.629	277
5089	GB	AMS	28.6	223
13285	GB	FRA	37.151	156
9105	GB	FRA	39.073	106
7922	US	NYC	70.971	90
12389	RU	AMS	95.33	54
22773	US	NYC	86.004	54
7018	US	MIA	57.184	46
12389	RU	TYO	200.064	38
7922	US	MIA	90.085	37

Automation

- Dashboards are nice, but most of this work should be done by computers
- Building an ML/AI model for network performance requires huge data sets
- Continuous data feeds help
- Flow analysis only tells you what already happened

Conclusions

Anycast is a bit like a Formula 1 car:

- If you get the settings exactly right, it’s incredible
- If you don’t, things get mediocre really quickly
- The environment is the defining factor
- Specialist tools are needed

Questions?

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