

A Peering Strategy for the Pacific Islands

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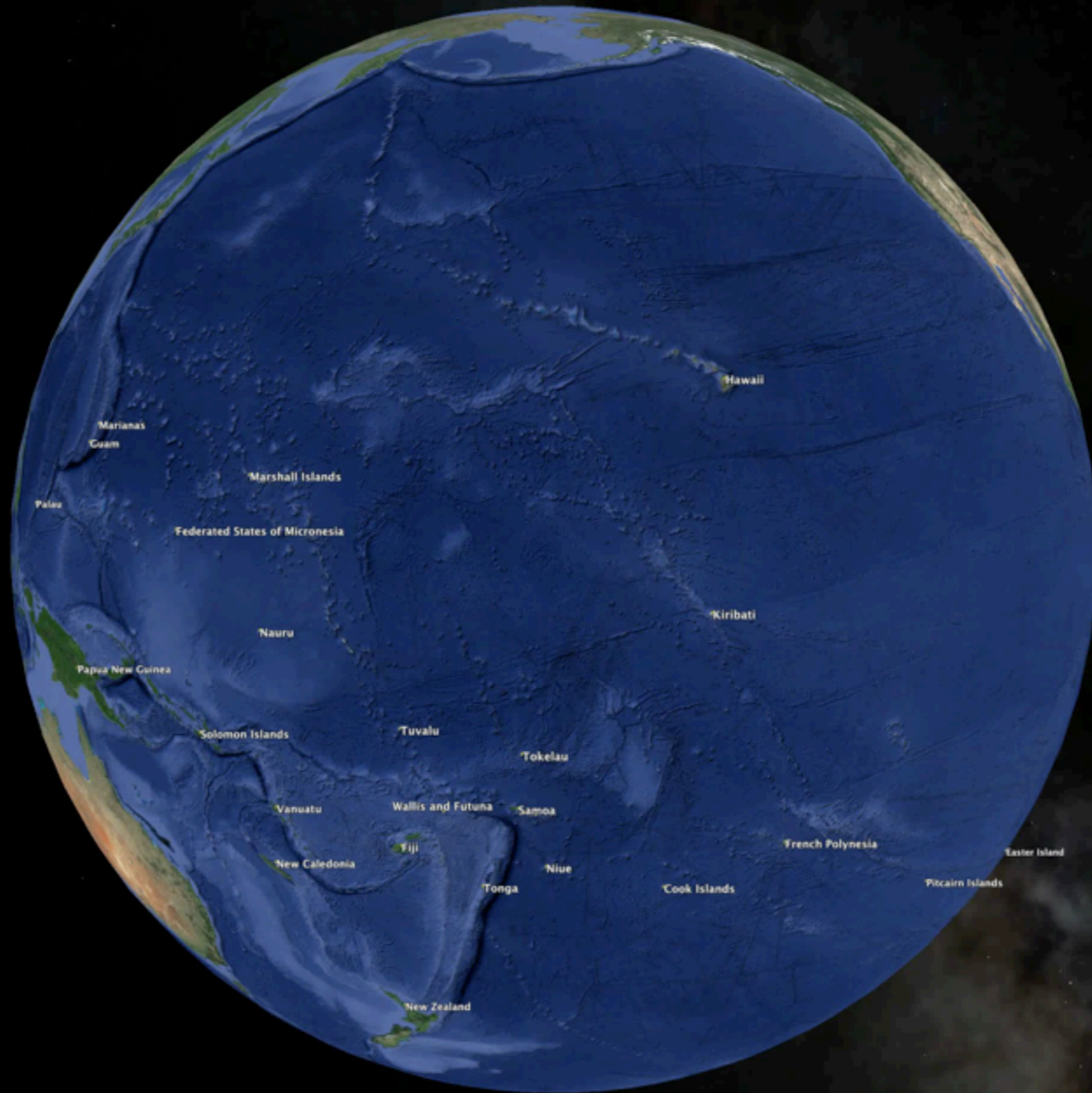


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Pacific Island Networking Issues

- Poor performance, even from new cable infrastructure
- Exceptionally poor in-country performance
- Little emphasis on Research & Education networking
- No consideration for regional peers or trading partners
- Focus on purchasing the cheapest capacity available

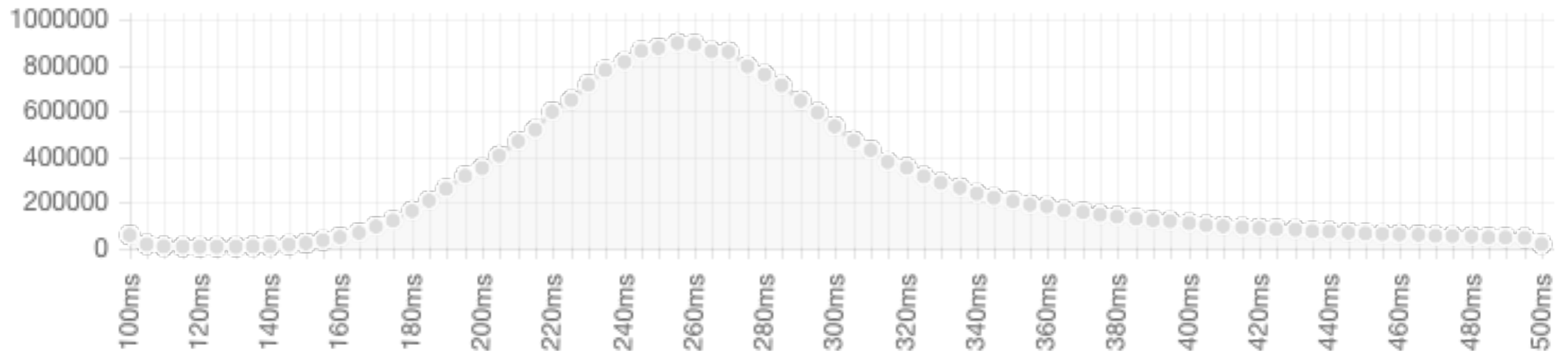


Google earth
Image Landsat
Data USPO Columbia NSF NOAA
Data 2002 NOAA U.S. Navy NOAA USNSC

“People buy Horsepower, but drive torque.”

“People buy Megabits, but surf latency.”

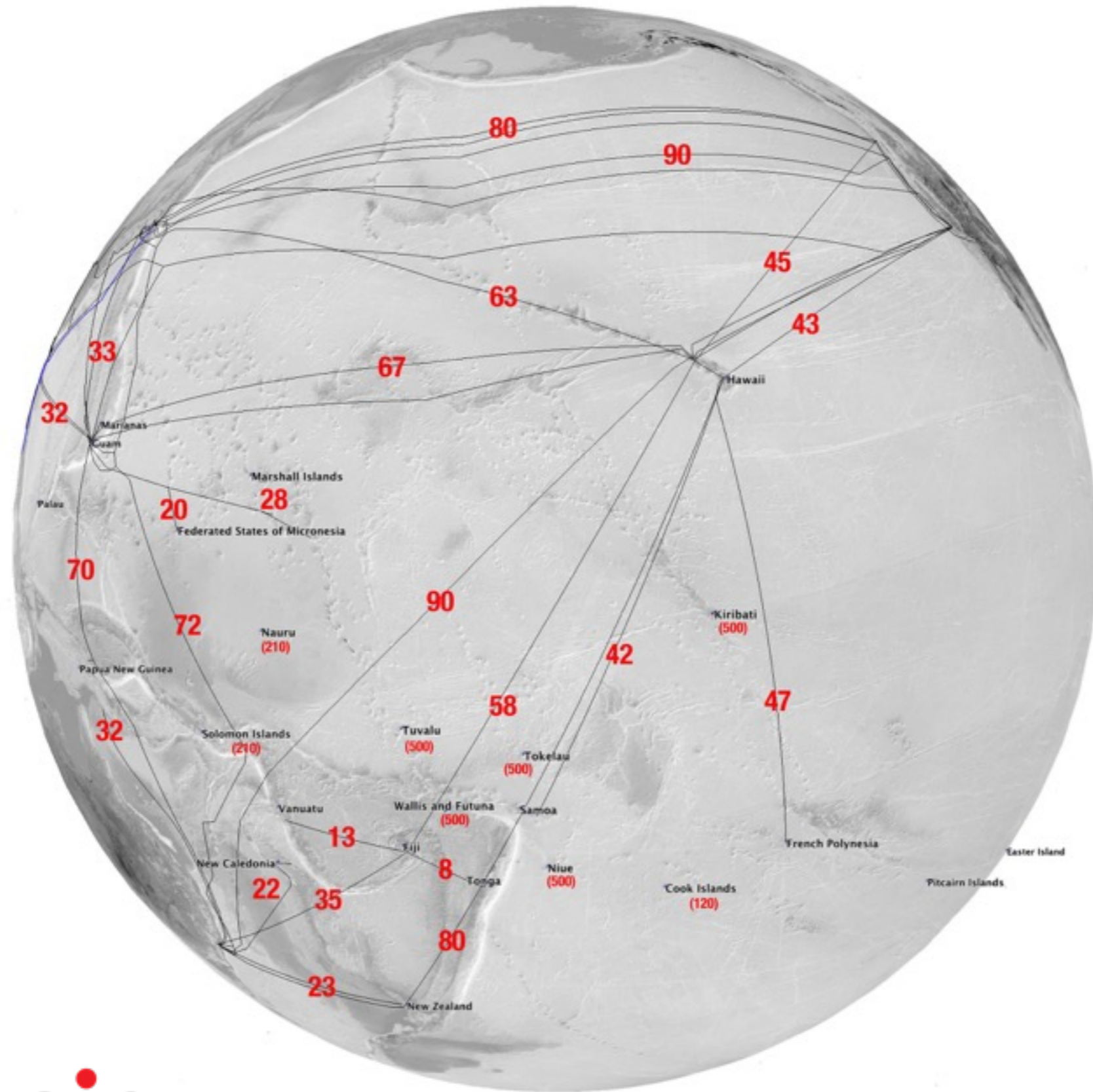
Latency & Human Reaction Time



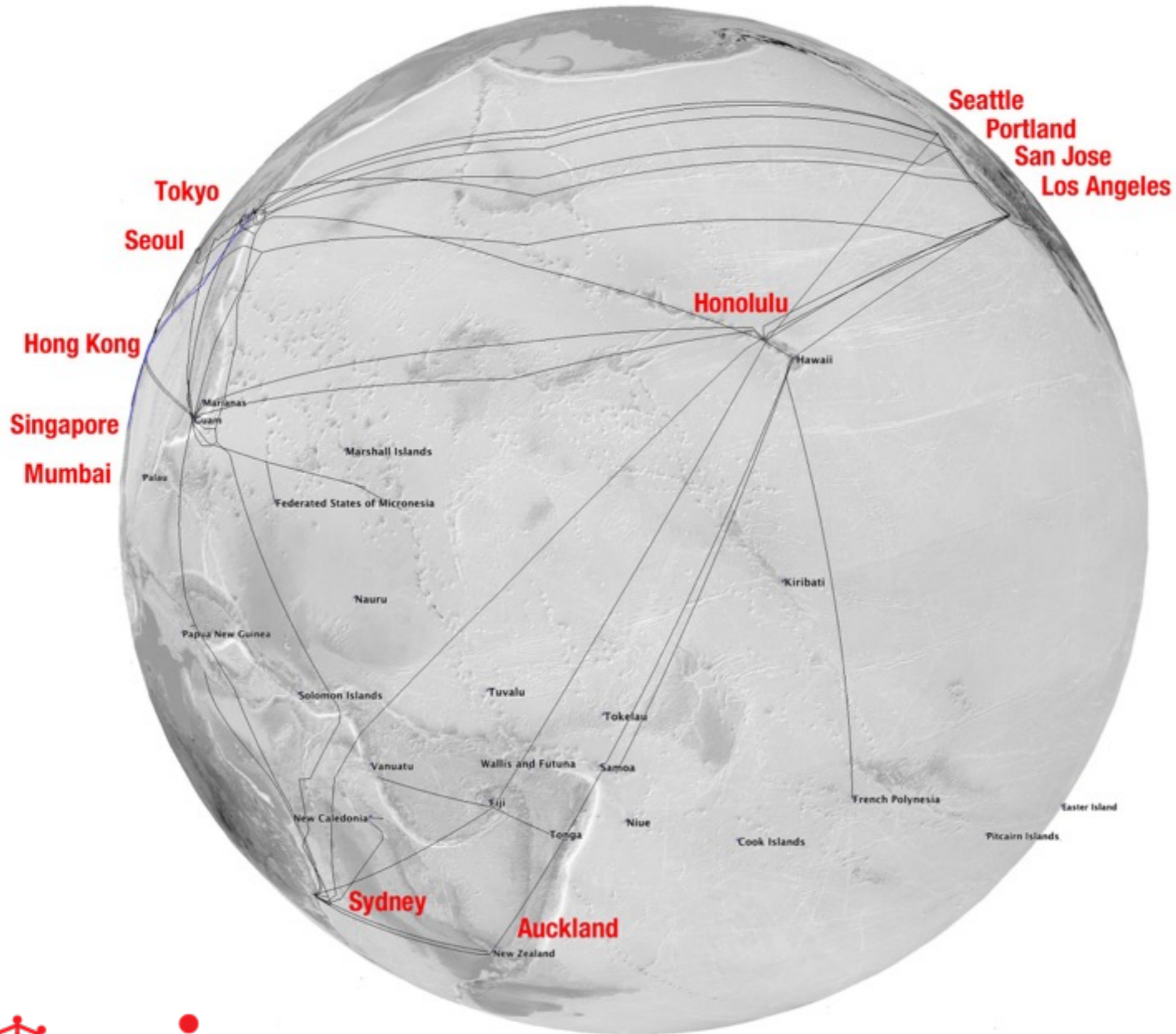
<http://www.humanbenchmark.com/tests/reactiontime/statistics>

24m tests show median reaction ~250ms

Pacific Cables: Ideal RTT Latencies



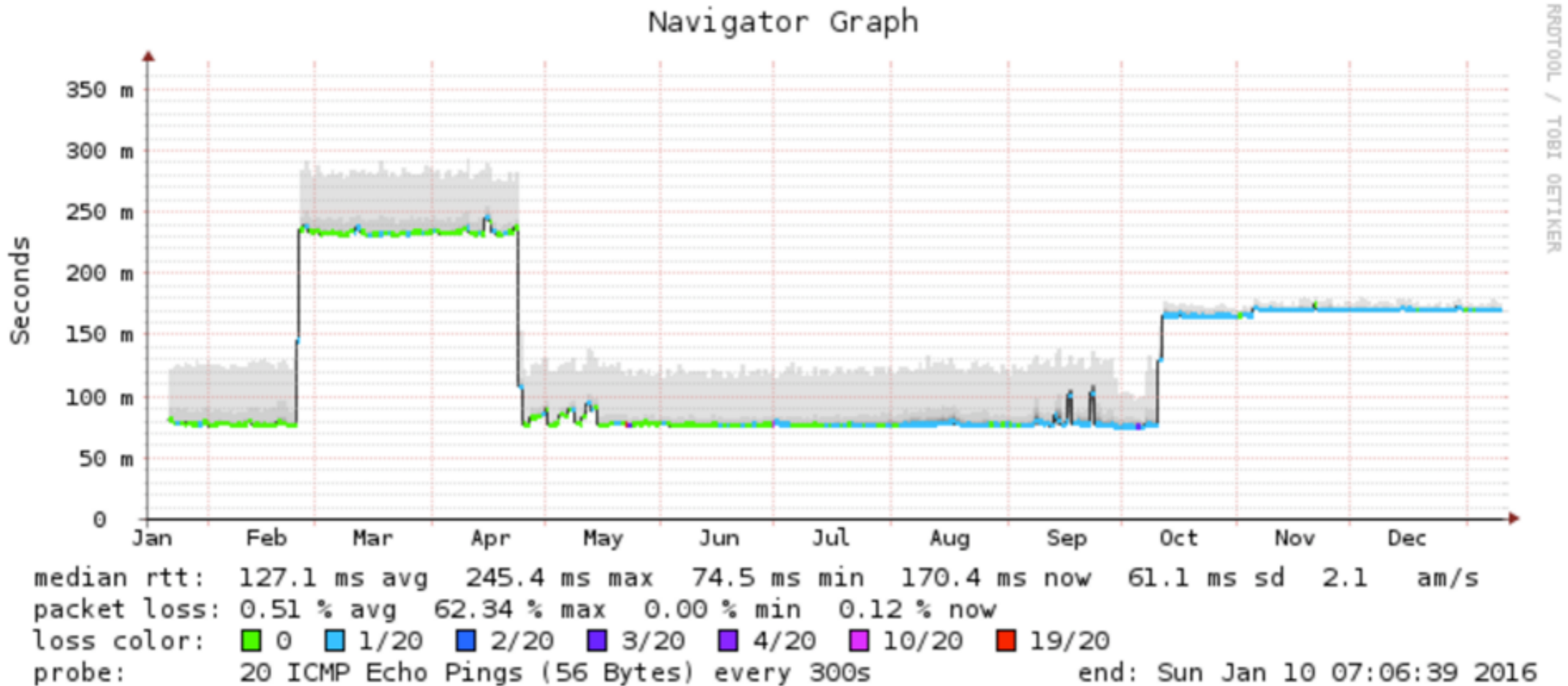
Pacific Latency Observers



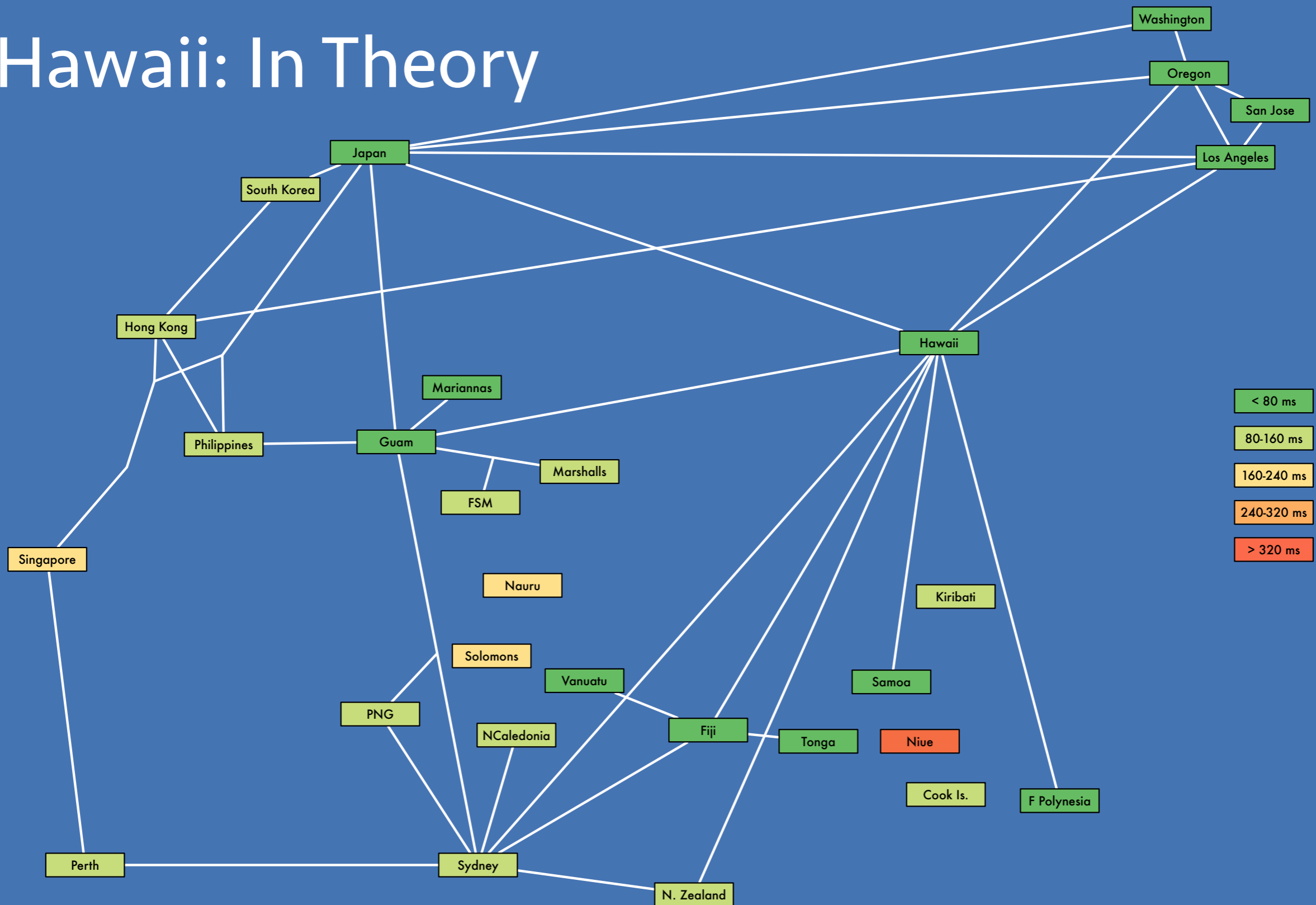
Pacific Latency Observers

- Based on the Smokeping Network Monitoring Tool
- 15 servers, 12 in Asia-Pacific Region
- Monitoring 77 Pacific networks every 5 minutes
- Servers co-located near or at cable landing points
- Between 6-18 months of data available for all networks
- Data will be publicly available as part of the project

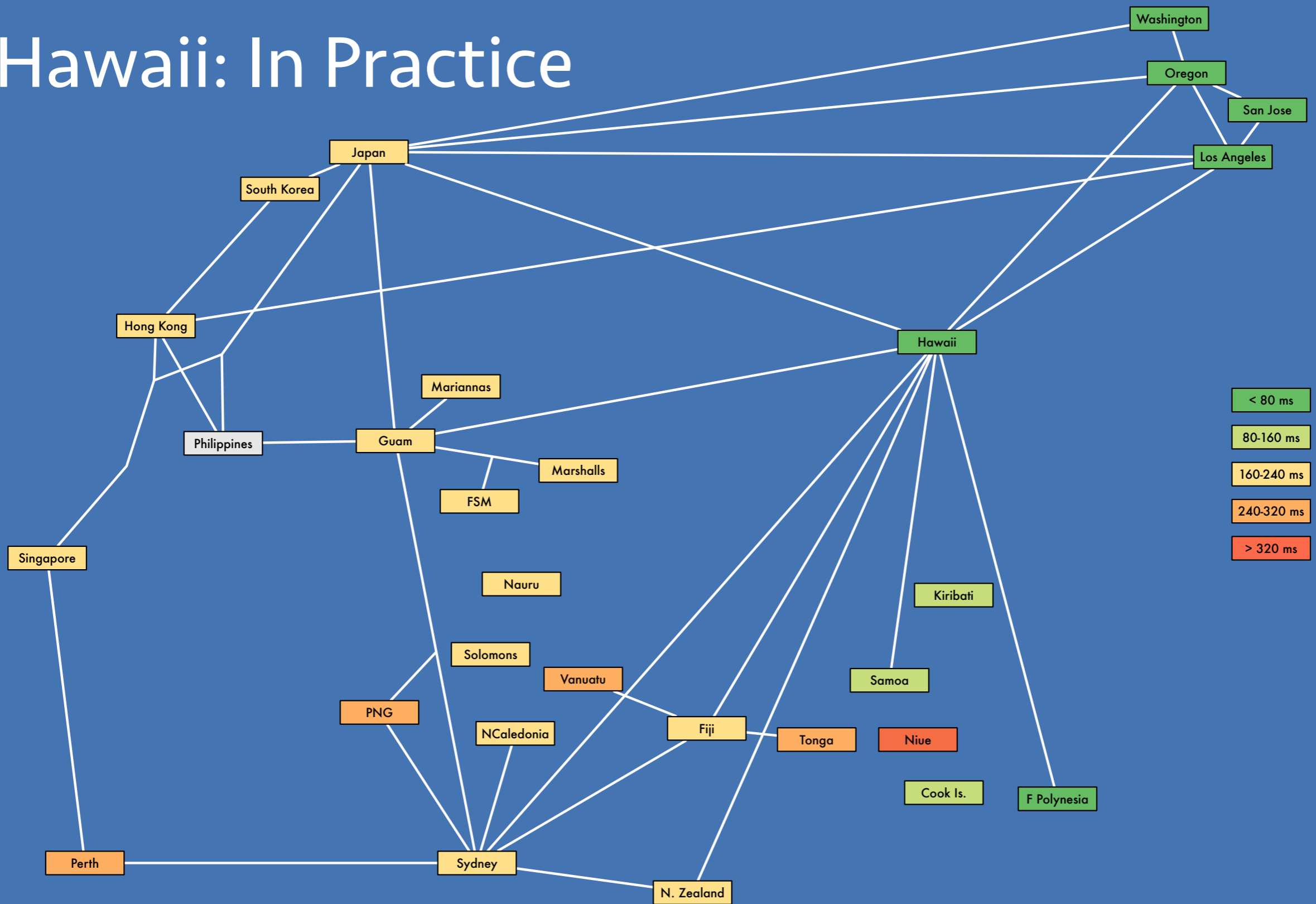
Pacific Latency Observer



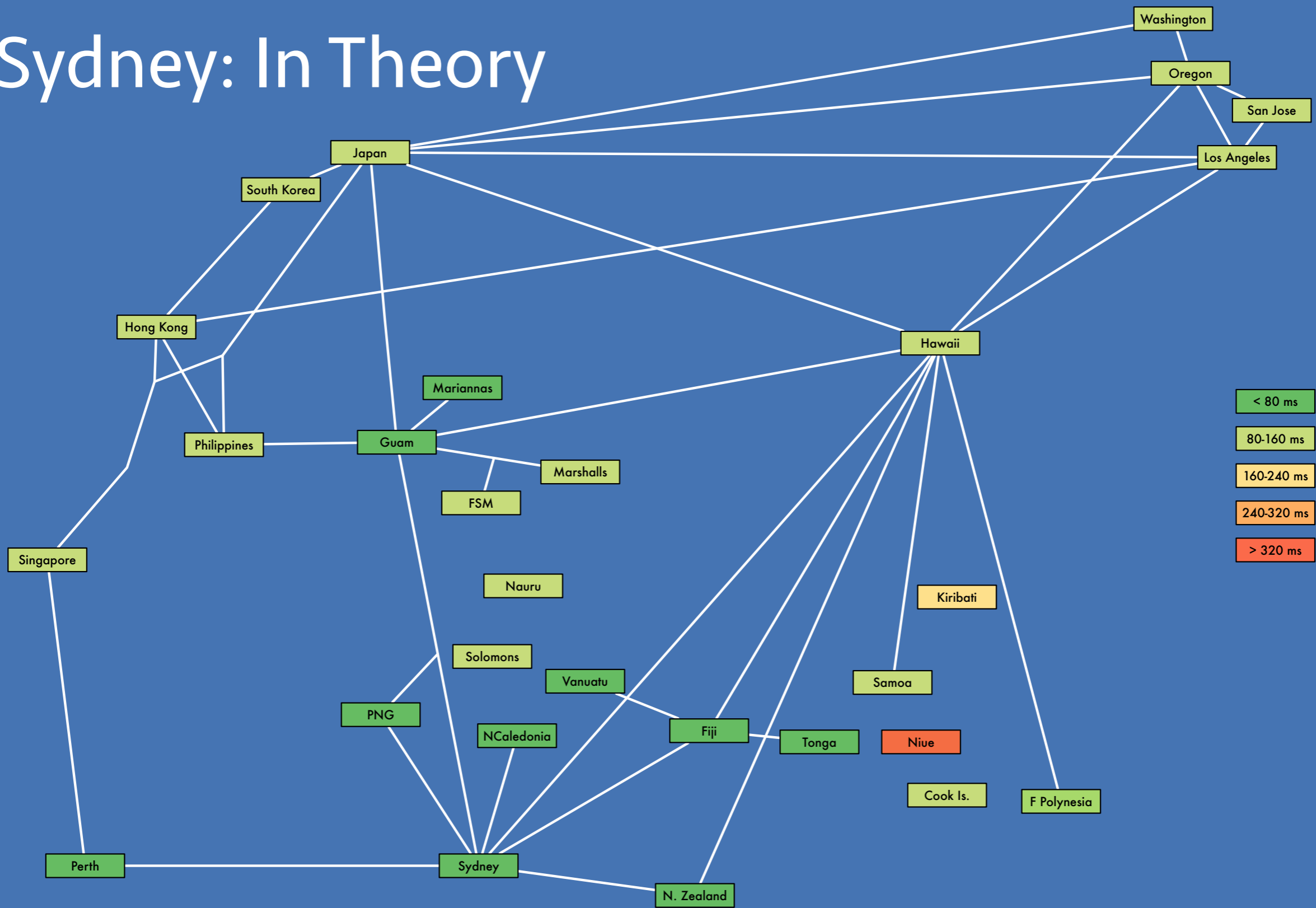
Hawaii: In Theory



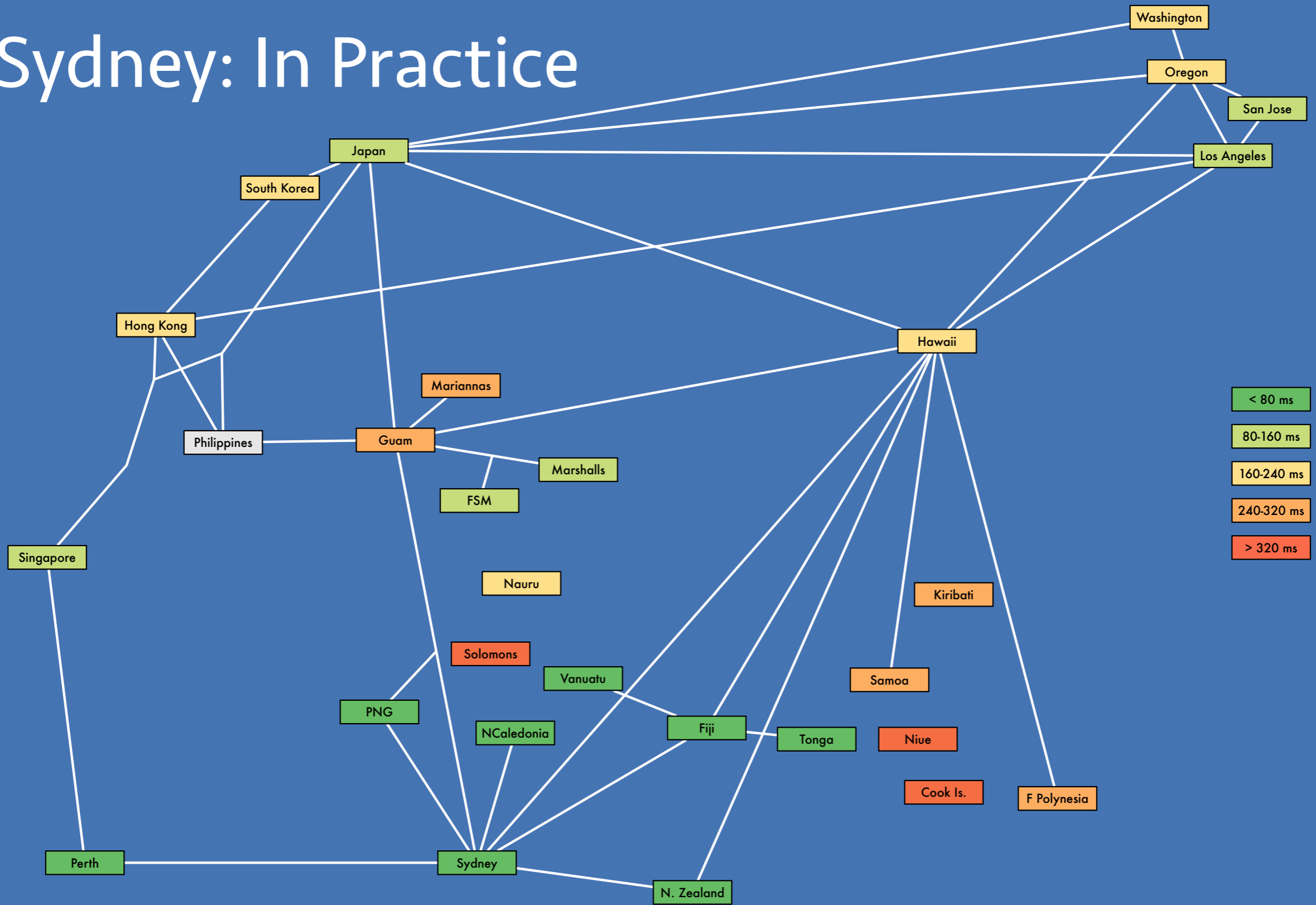
Hawaii: In Practice



Sydney: In Theory

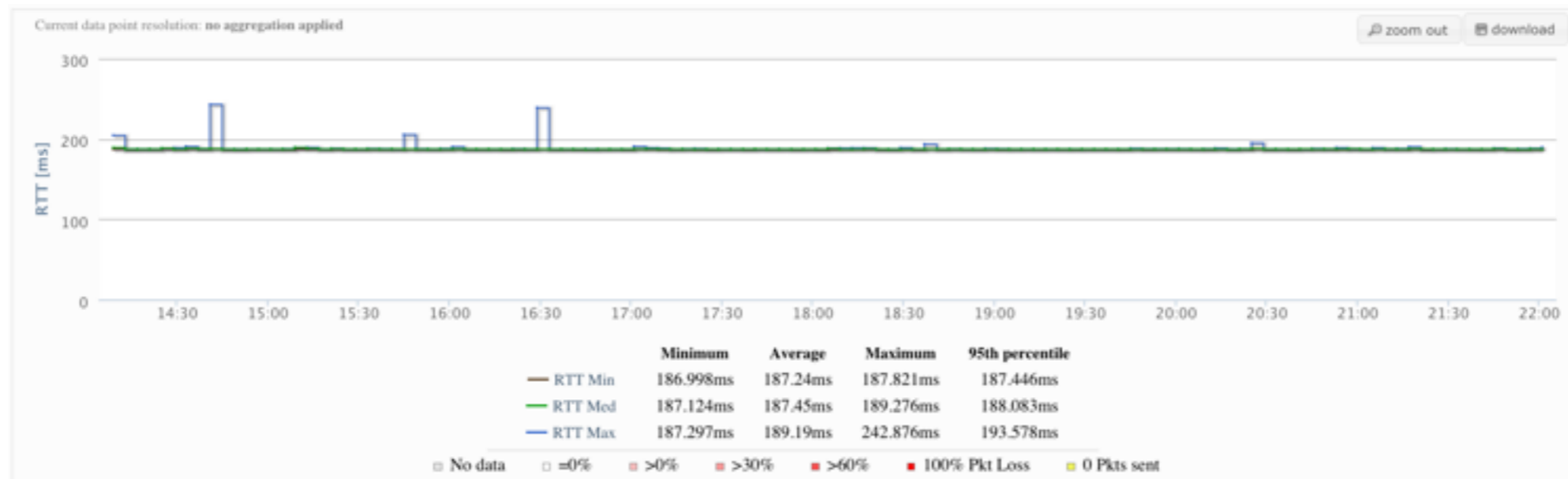


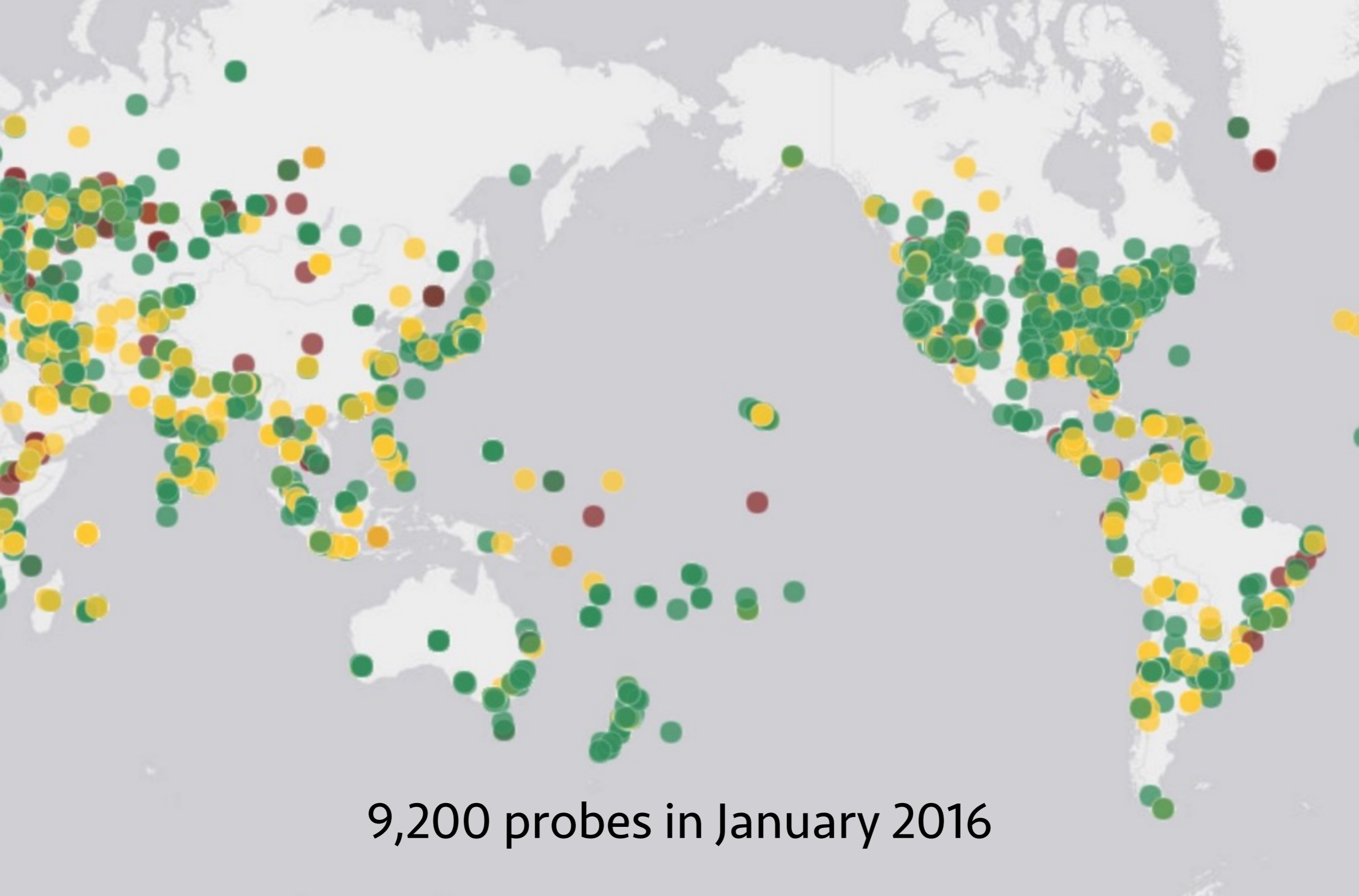
Sydney: In Practice



RIPE Atlas Project

- RIPE Atlas is a network of probes
- Measuring Internet connectivity & reachability
- Using DNS, HTTP, ICMP, and NTP





9,200 probes in January 2016

Atlas Measurements

⚡ Traceroute from Guam to PDS Saipan

Probe	ASN (v4)	ASN (v6)	Time	RTT	Hops
329	3605		2015-11-4 19:39	275.476	
22639	3605		2015-11-4 19:39	268.817	
22667	7131		2015-11-4 19:39	5.467	8
22668	9246		2015-11-4 19:39	0.443	7
22745	9246		2015-11-4 19:39	54.960	
22751	3605		2015-11-4 19:39	287.910	
23039	9246		2015-11-4 19:39	6.349	

Traceroute Result for Probe #22639

2015-11-04 19:39 UTC

Traceroute to 203.95.13.1 (203.95.13.1), 48 byte packets

1	202.128.12.10	AS3605	0.548ms	0.355ms	0.32ms
2	198.81.233.34		142.798ms	142.782ms	142.78ms
3	129.250.199.81	AS2914	143.077ms	143.154ms	143.191ms
4	129.250.4.119	AS2914	145.413ms	143.853ms	144.076ms
5	154.54.10.41	AS174	189.854ms	189.24ms	189.911ms
6	154.54.6.105	AS174	191.358ms	190.425ms	191.429ms
7	154.54.27.161	AS174	190.295ms	191.615ms	191.548ms
8	154.54.82.30	AS174	191.599ms	191.571ms	191.536ms
9	154.24.35.18	AS174	190.57ms	191.702ms	191.705ms
10	38.104.210.86	AS174	190.51ms	190.563ms	189.409ms
11	***				
12	***				
13	***				
14	203.95.13.1	AS17454	268.817ms	268.739ms	268.829ms

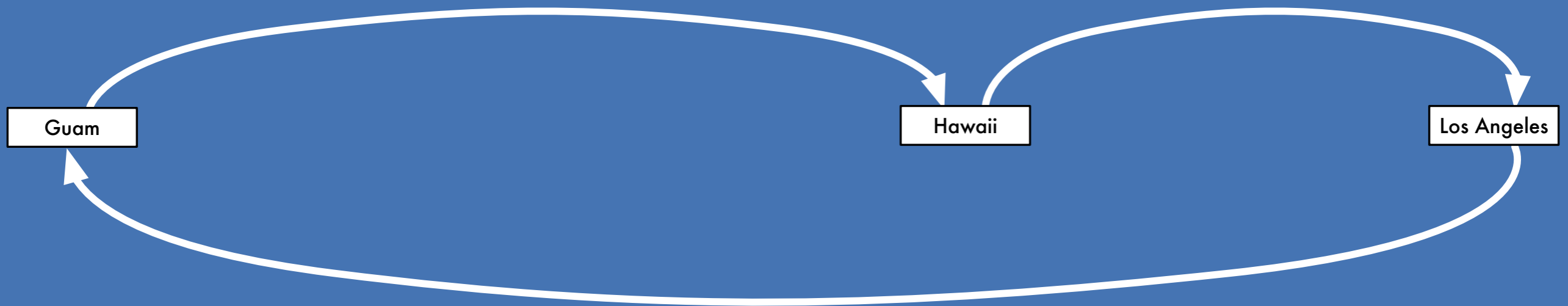
Guam via RIPE Atlas: November 2015

	Docomo	GTA	iConnect	IT&E	PDS
Docomo	Grey	Green	Orange	Green	Orange
GTA	Green	Grey	Orange	Green	Green
iConnect	Orange	Orange	Grey	Orange	Orange
IT&E	Green	Green	Orange	Grey	Green
PDS	Orange	Green	Orange	Green	Grey

FSM & Marshall Islands: November 2015

	Docomo	GTA	iConnect	IT&E	PDS
FSM	Green	Green	Green	Green	Grey
MINTA	Orange	Orange	Orange	Orange	Grey

Asymmetric Routing



A Peering Strategy for the Pacific Islands

Help: Network Visibility

- Where is your network traffic going?
- What networks are your “Top Talkers”?
- Are your customers being well served?
 - Local peering is important for this
- Are you planning your capacity based on data?
 - Or just buying on salesperson recommendations?

Help: Transit & Peering

- All transit is not equal
 - A link without committed latency can go anywhere
- Lack of understanding of transit purchase strategies
 - Long-term agreements must predict growth
- Lack of understanding of peering strategies
 - Free peering is great, paid peering is also ok

Help: Streaming Media

- CDN content is available in the Pacific at Tokyo or Sydney
 - There's no reason to take CDN traffic from Los Angeles
 - Closer content is cheaper content
- Latency matters for CDN/Streaming Media Access
 - TCP rx windows restricted to improve CDN throughput
 - Distant users suffer to increase performance for all

Help: RIPE Atlas Project

- Probes are free for networks - even multiple probes
- Assistance is available for many tasks beyond setup
 - Monitoring & Systems integration
 - Visibility from the world
 - Custom Measurements

Next Steps: ISIF Project

- Integrated Pacific Performance Website Online
- Analyse Benefits of Regional Peering Points
 - Does every country need an exchange? Maybe not.
- Assess needs for training & assistance
 - Network Visibility, Transit & Peering, CDNs, Atlas

How Can You Help?

- Interviews: Tell me your stories, please!
 - Where have things gone right?
 - Where have things gone wrong?
- RIPE Atlas Probes: Host one, please!
 - They use around ~10kbps of traffic
 - Only need to allow ping, traceroute, http(s)

Thank You!

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