

A Peering Strategy for the Pacific Islands

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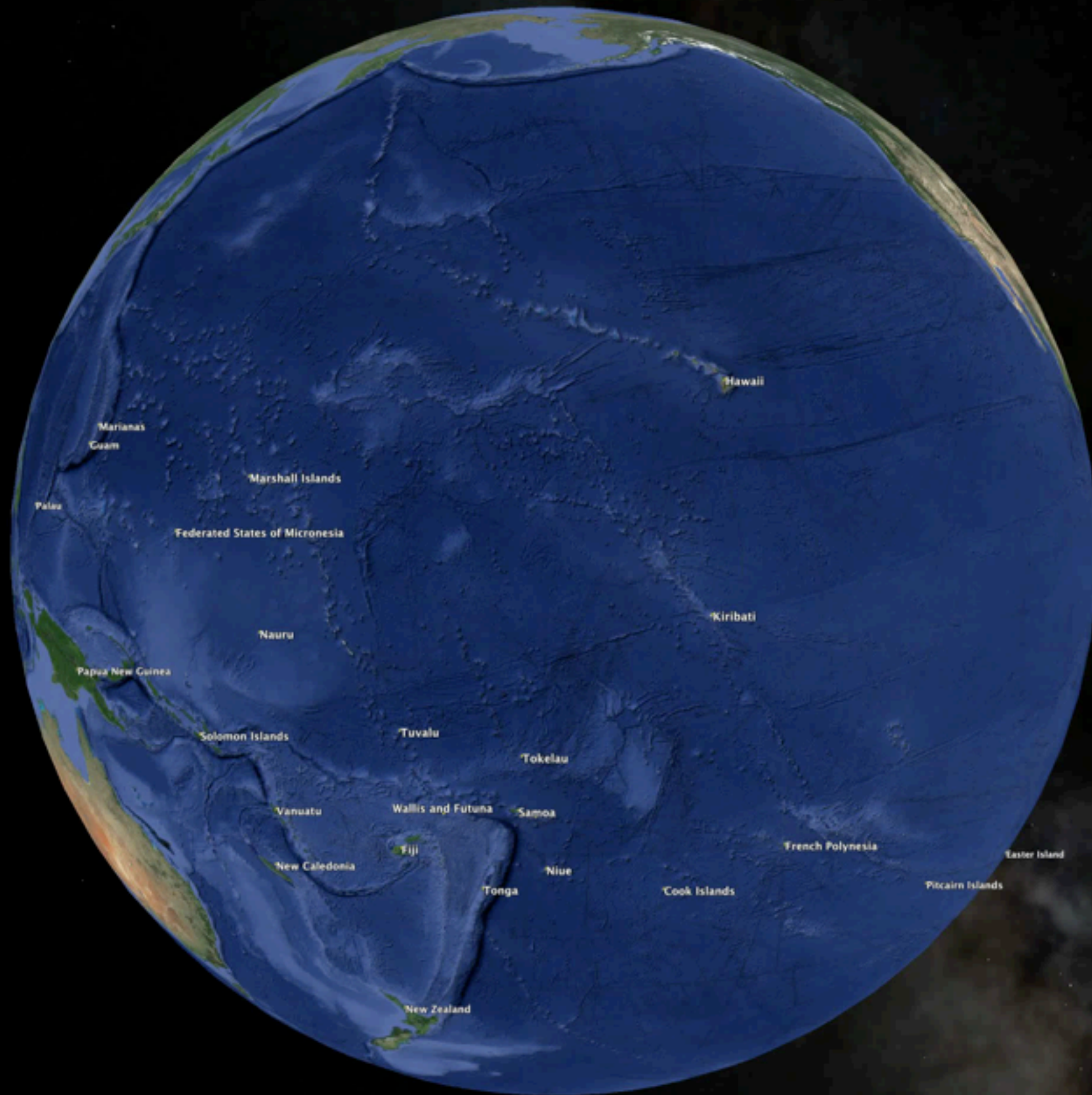


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Pacific Island Networking Issues

- 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



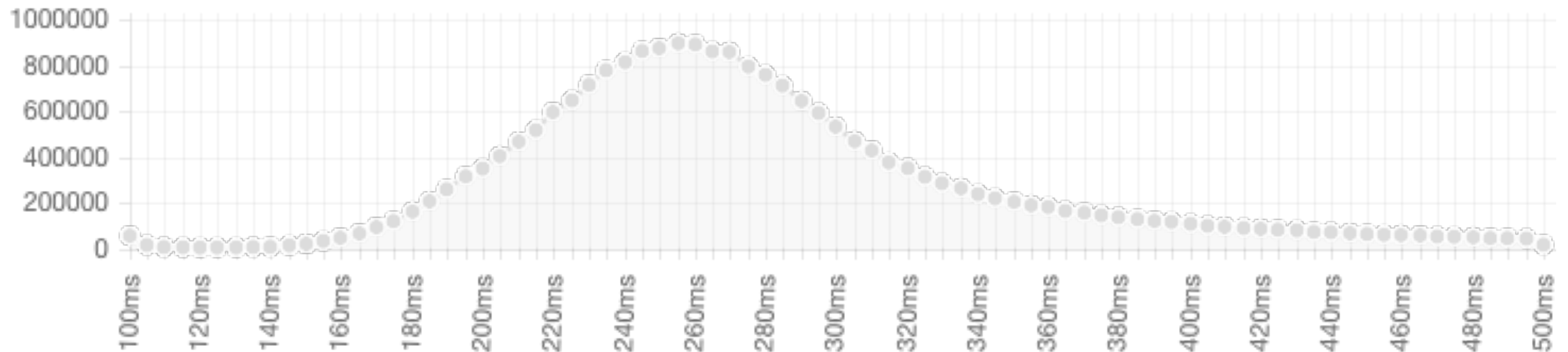
Google earth

Image courtesy
Data: 2000 Columbia, NSF, NOAA
Data: 2000 NOAA, U.S. Navy, NOAA, 2000/02

“People buy Horsepower, but drive torque.”

“People buy Megabits, but surf latency.”

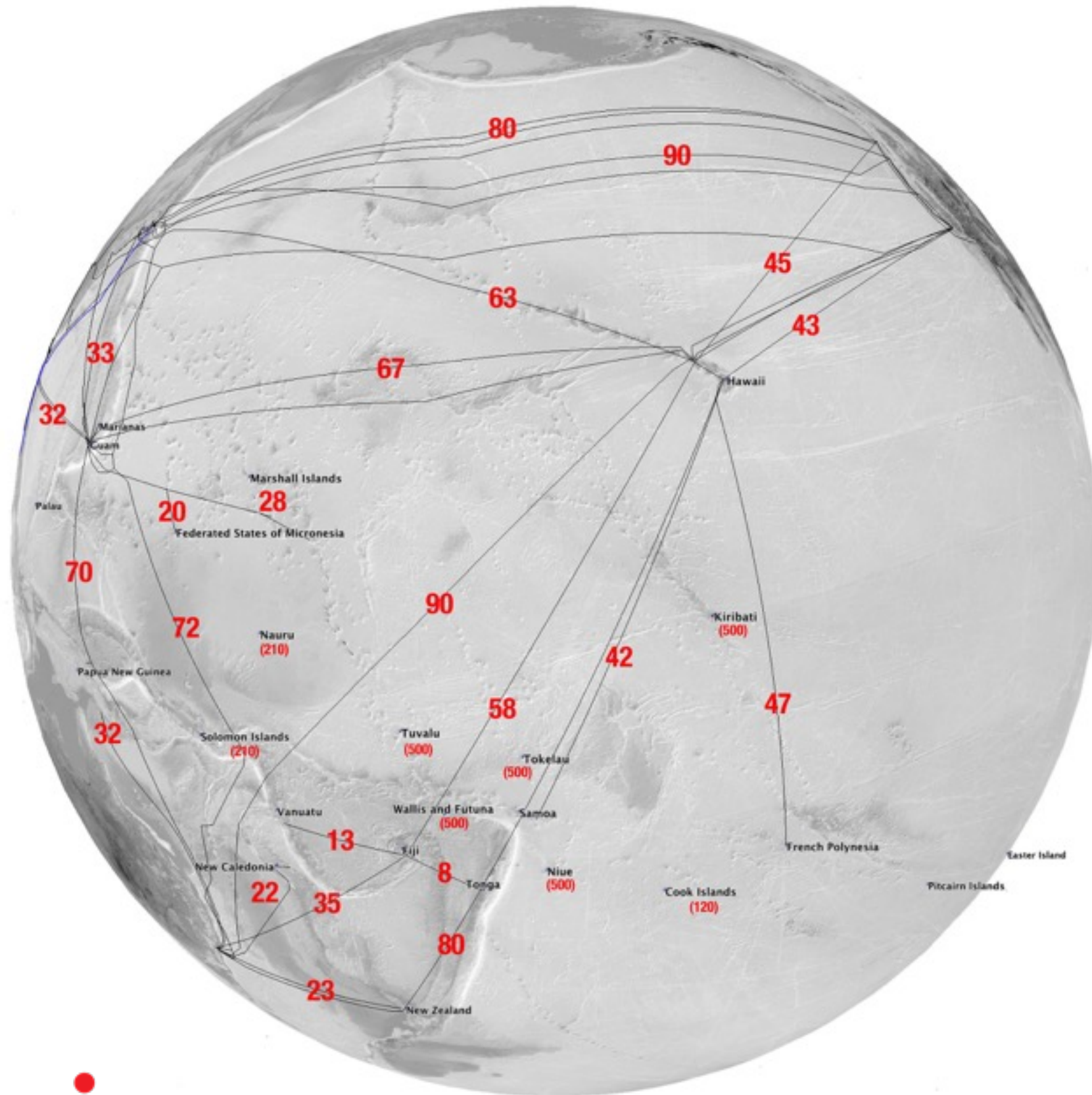
Latency & Human Reaction Time



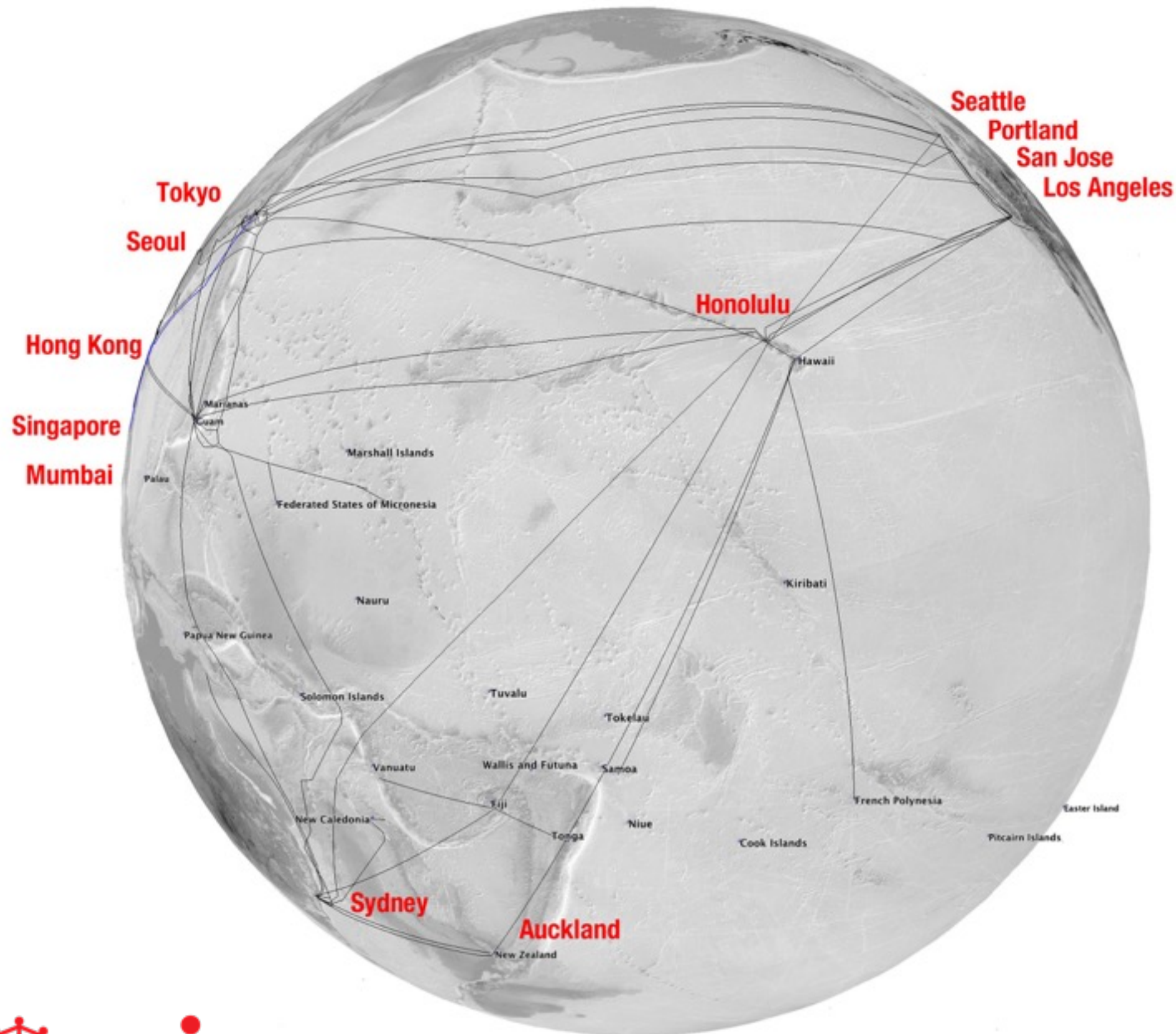
<http://www.humanbenchmark.com/tests/reactiontime/statistics>

24m tests show median reaction ~250ms

Pacific Cables: Ideal RTT Latencies



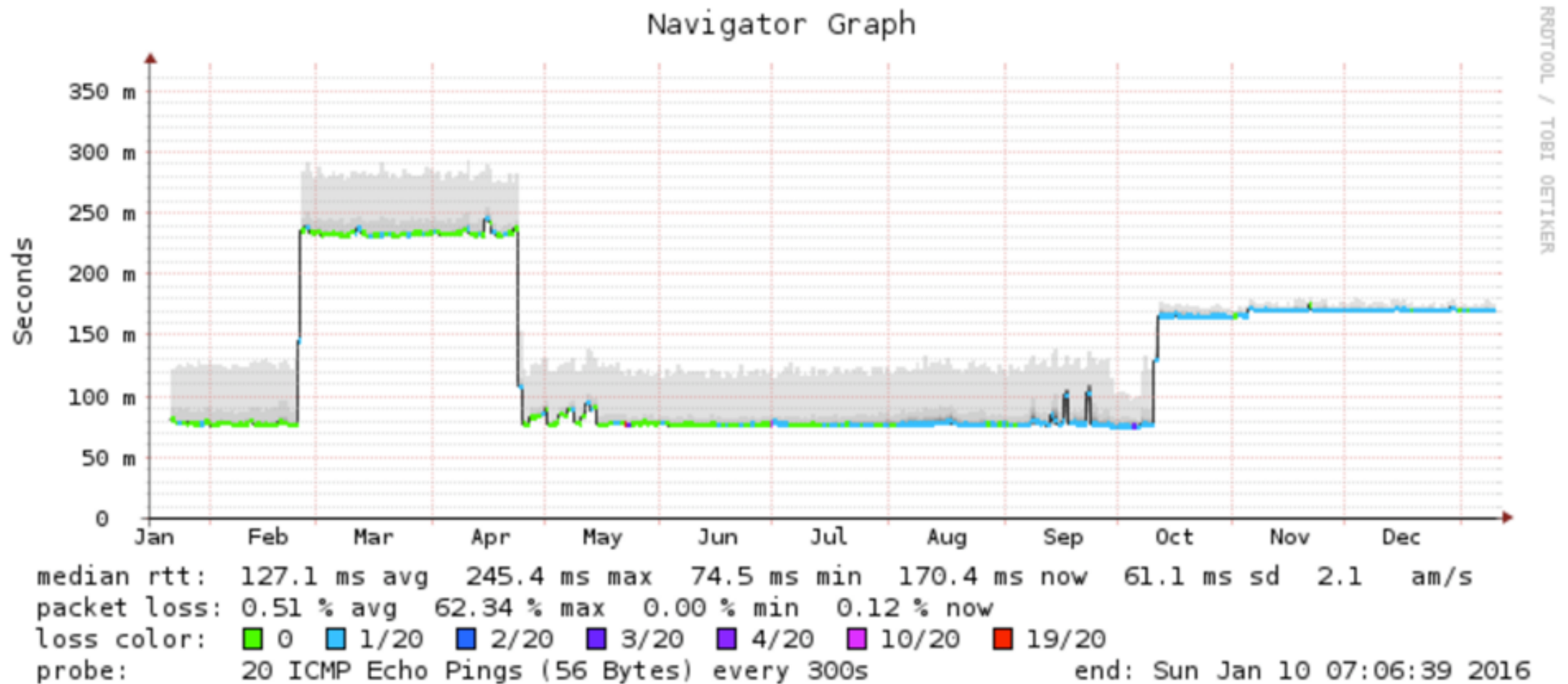
Pacific Latency Observers



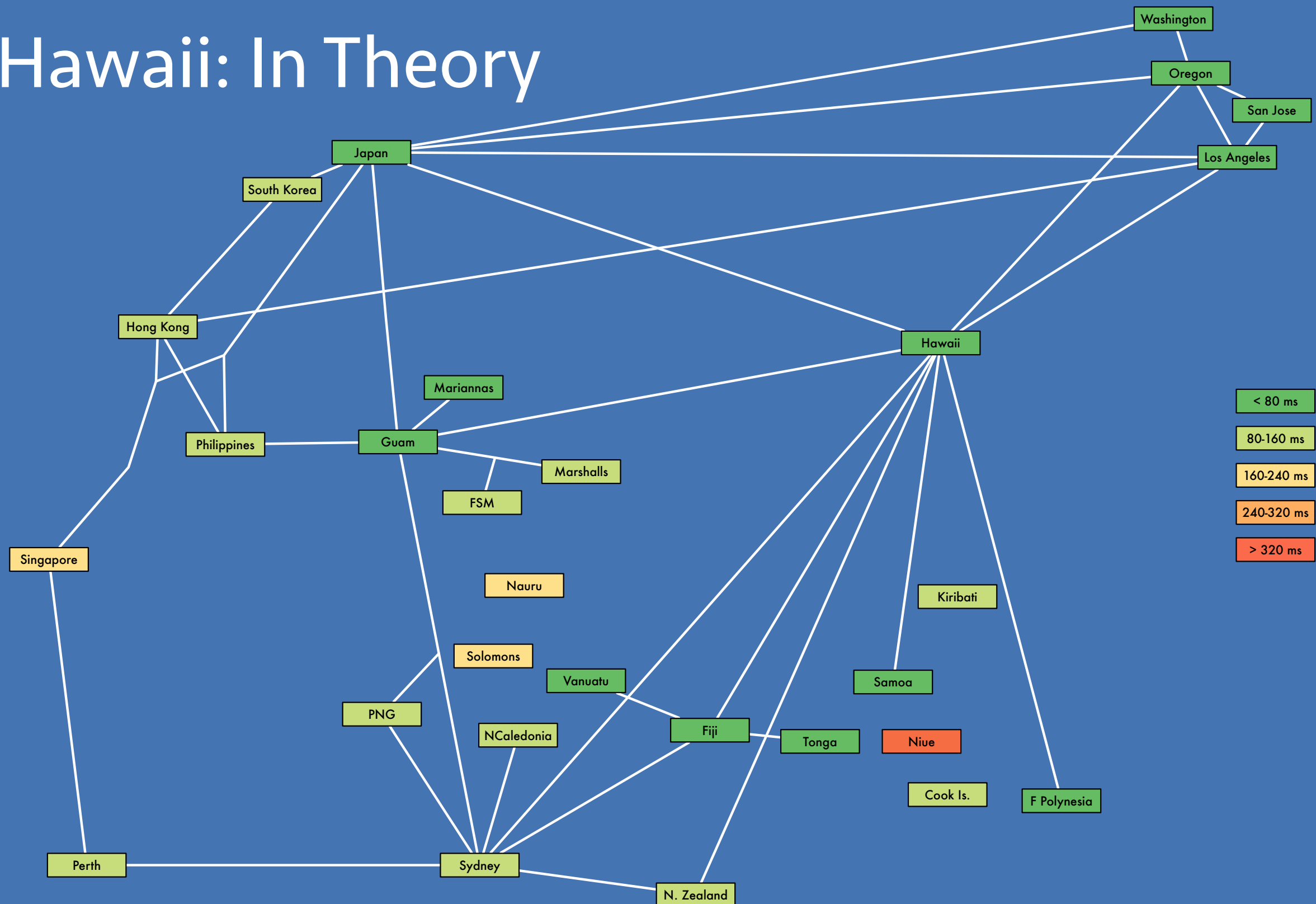
Pacific Latency Observers

- 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

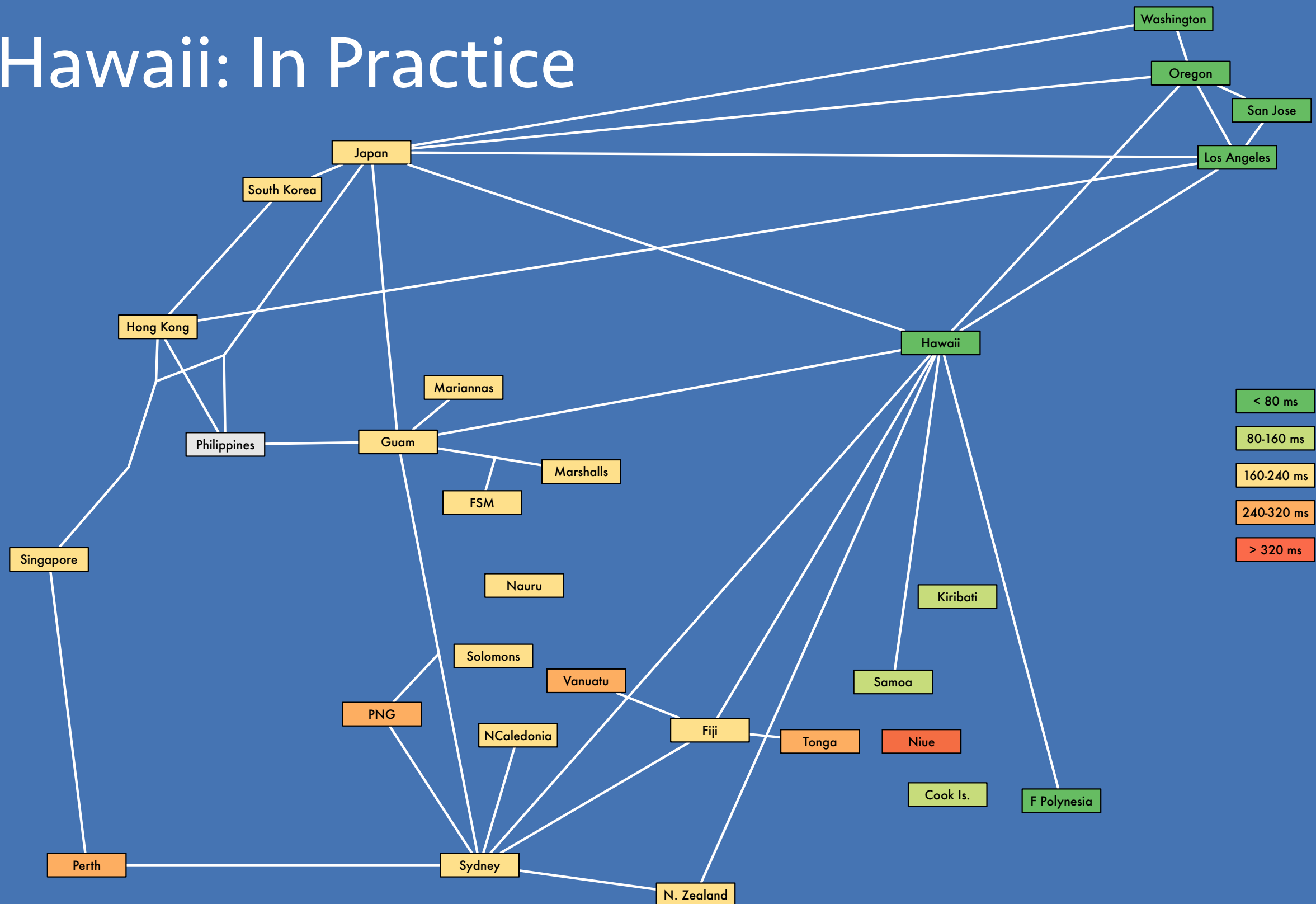
Pacific Latency Observer



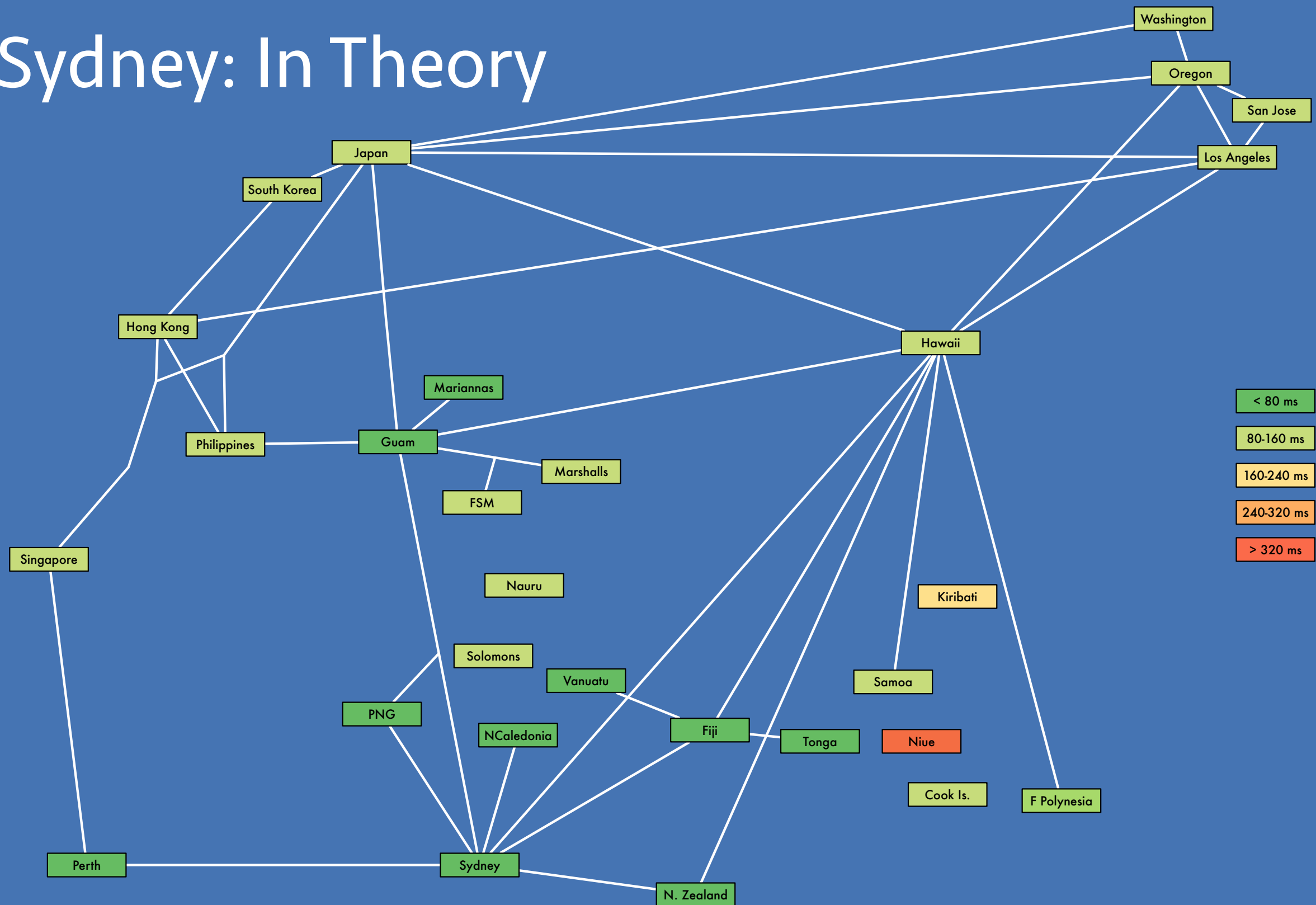
Hawaii: In Theory



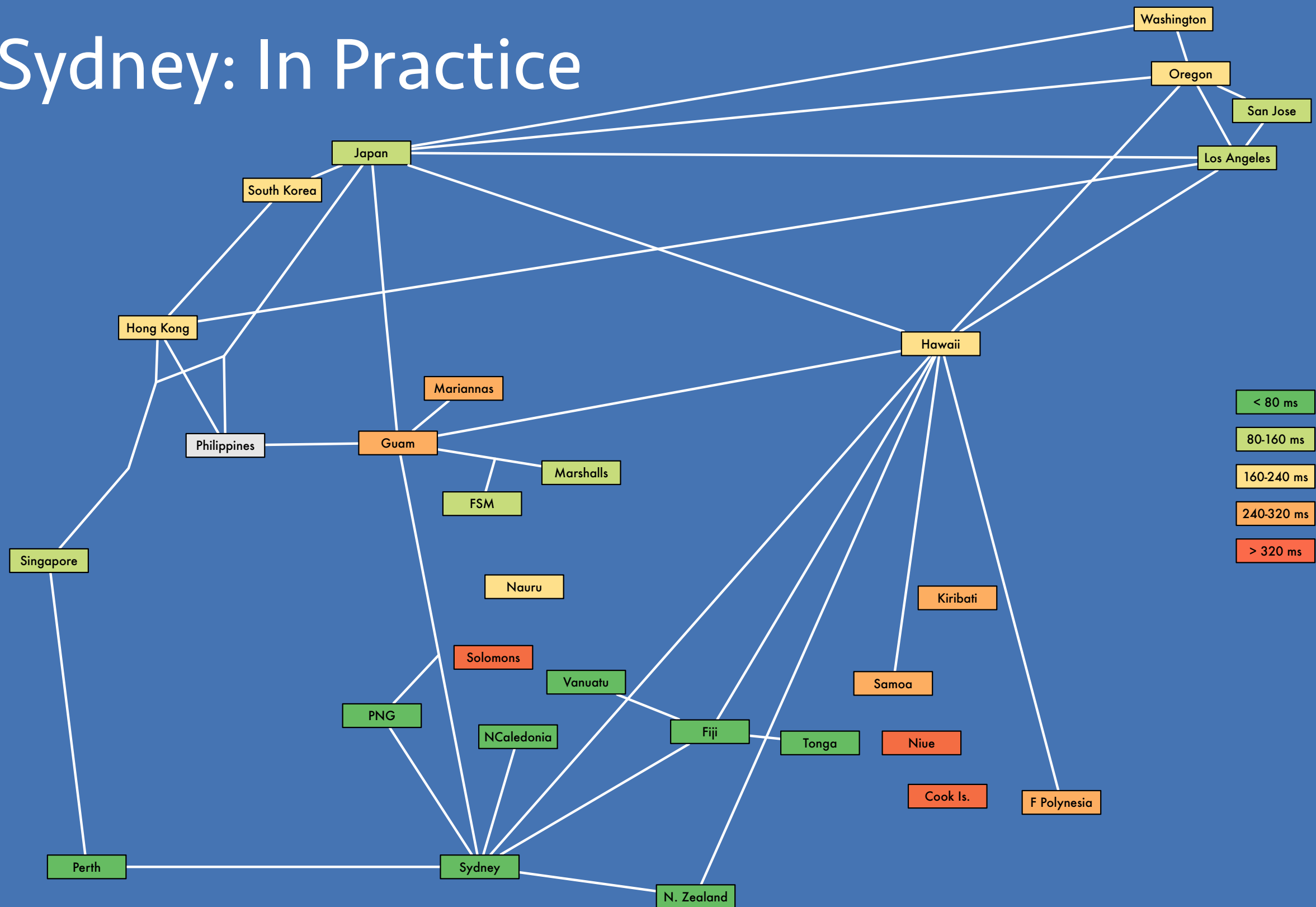
Hawaii: In Practice



Sydney: In Theory

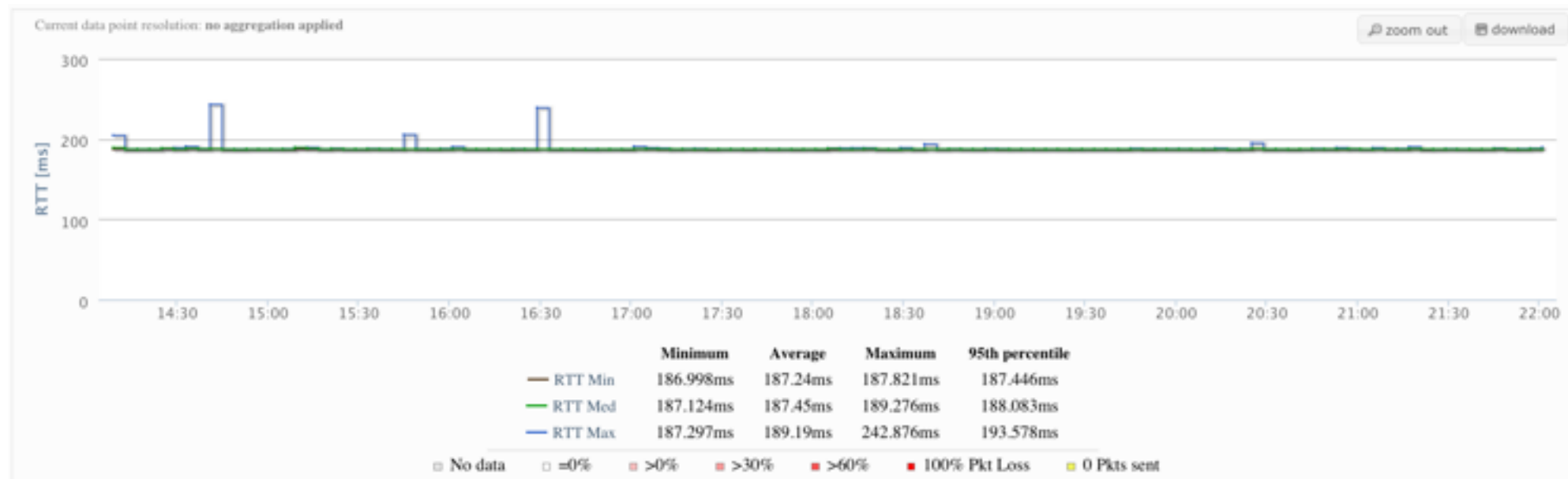


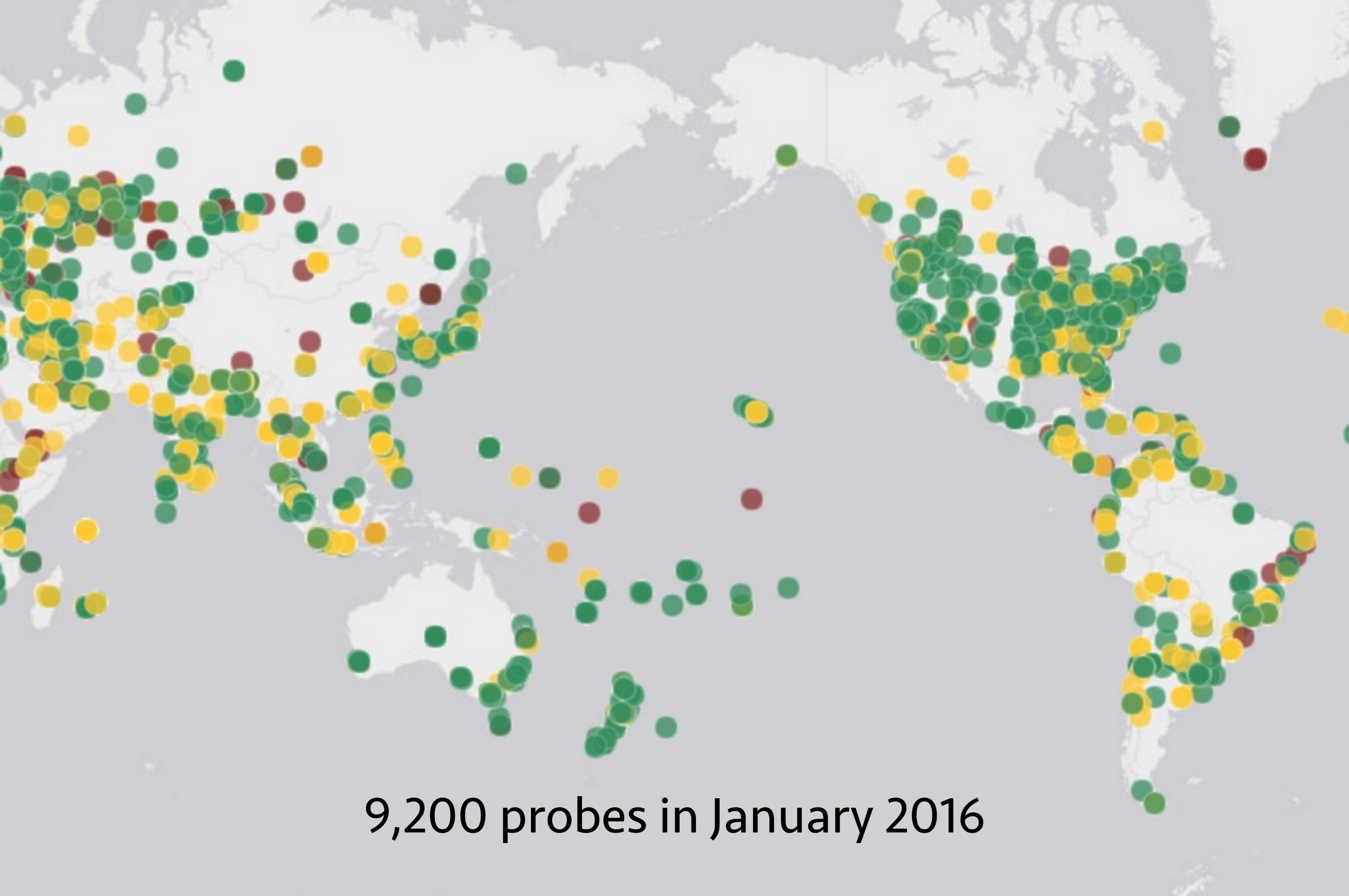
Sydney: In Practice



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

General Information **Probes** Map OpenIPMap Prototype Results

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	AS17456	268.817ms	268.739ms	268.829ms

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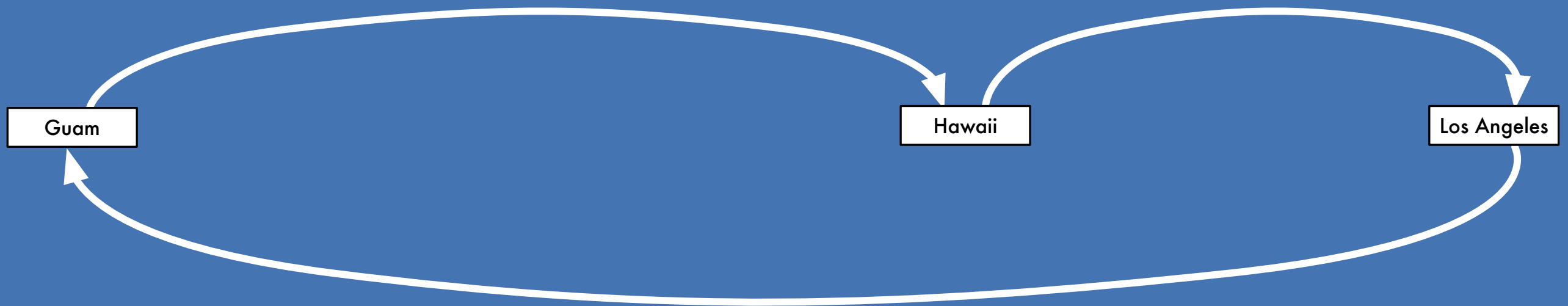
Guam via RIPE Atlas: November 2015

	Docomo	GTA	iConnect	IT&E	PDS
Docomo					
GTA					
iConnect					
IT&E					
PDS					

FSM & Marshall Islands: November 2015

	Docomo	GTA	iConnect	IT&E	PDS
FSM					
MINTA					

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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