HOW A CONTENT PROVIDER ‘MIGHT’ MAKE STRATEGIC DECISIONS WHEN EVALUATING THE PACIFIC ISLANDS

WHO AM I?

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- Network Engineer previously, for several Australian carriers
- Amazon Web Services - Global Interconnection Strategy Team. My region is Oceania.
- NZ-IX Committee member
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WHAT DRIVES CONTENT TRAFFIC?

- Number of users. Larger populations = larger demand.
- Speed of local access. 5G mobile networks. Uncongested local telco networks. Plenty of subsea capacity = More content downloaded.
- Price. Cheap access to internet for users, and affordable access to subsea cable links for carriers.
- The greater the content volumes being requested, the more likely content providers will build infrastructure into that region.

TRAFFIC TO AUSTRALIA

P95 LAST 30 DAYS

site_code_as_path: Descending	Average egress_p95
syd1 | 1221	222.5GB
mel50 | 1221	218.0GB
syd1 | 7474,4804	162.4GB
syd1 | 7545	115.0GB
mel50 | 7545	104.7GB
mel50 | 7474,4804	90.7GB
per50 | 1221	62.1GB
mel50 | 4764	47.4GB
syd1 | 4826,9443	45.0GB
syd1 | 4764	41.3GB
syd1 | 7224	40.5GB
mel50 | 4826,9443	37.8GB
per50 | 7545	37.7GB
syd1 | 133612	36.1GB
syd1 | 1221,135887	31.1GB
mel50 | 1221,135887	29.6GB
syd1 | 54113	27.8GB
syd1 | 38622	22.2GB
syd1 |	20.3GB
syd1 | 20940	19.5GB
	1.9TB

TRAFFIC TO NEW ZEALAND

P95 LAST 30 DAYS

site_code_as_path: Descending	Average egress_p95
akl50|4771	54.2GB
akl50|9500	35.9GB
akl50|9790	16.2GB
akl50|55850	12.8GB
akl50|23655	12.8GB
akl50|45177	8.9GB
akl50|133579	3.9GB
akl50|9876	2.4GB
akl50|135069,136795	1.7GB
akl50|9790,140220	1.5GB
akl50|56030	1.4GB
akl50|14593	1.1GB
akl50|45267	991.8MB
akl50|20940	987.0MB
akl50|9500,4768,55872	950.0MB
akl50|38022,38305	941.0MB
akl50|9500,4768	701.8MB
akl50|17705	678.9MB
akl50|135069	634.4MB
akl50|4049	565.8MB
	173.7GB

TRAFFIC TO FIJI

P95 LAST 30 DAYS

site_code_as_path: Descending	Average egress_p95
syd1|38442	647.8MB
syd1|4648,132528,45355	531.9MB
syd1|45349,4638	348.9MB
syd1|38442,139898	85.5MB
syd1|38442,9249	52.0MB
sfo4|4648,132528,45355	44.8MB
lax1|4648,132528,45355	35.8MB
sin2|4648,132528,45355	34.6MB
syd1|45349,136921	21.3MB
iad79|3257,4648,132528,45355	16.1MB
iad89|3257,4648,132528,45355	15.7MB
mel50|1221,38561,2914,4648,132528,45355	15.7MB
syd1|4648,132528,45355,132429	12.0MB
syd1|4648,9241,9249	11.9MB
sfo5|3257,4648,132528,45355	11.8MB
hio50|1299,4648,132528,45355	10.0MB
sea4|7575,136921	7.9MB
sea19|1299,4648,132528,45355	7.7MB
atl50|3257,4648,132528,45355	7.4MB
ord51|3257,4648,132528,45355	7.0MB
	2.5GB

POPULATION DRIVES TRAFFIC VOLUME. YES/NO?

Selected Countries and Economies

Country	Most Recent Year	Most Recent Value
Pacific island small states	2021	2,566,494

Pacific island small states

Country	Most Recent Year	Most Recent Value
Fiji	2021	902,899
Kiribati	2021	121,388
Marshall Islands	2021	59,618
Micronesia, Fed. Sts.	2021	116,255
Nauru	2021	10,873
Palau	2021	18,174
Samoa	2021	200,144
Solomon Islands	2021	703,995
Tonga	2021	106,759
Tuvalu	2021	11,925
Vanuatu	2021	314,464

Country	Most Recent Year	Most Recent Value
Australia	2021	25,739,256

Country	Most Recent Year	Most Recent Value
New Zealand	2021	5,122,600

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IS TRAFFIC JUST A PRODUCT OF POPULATION SIZE?

New Zealand

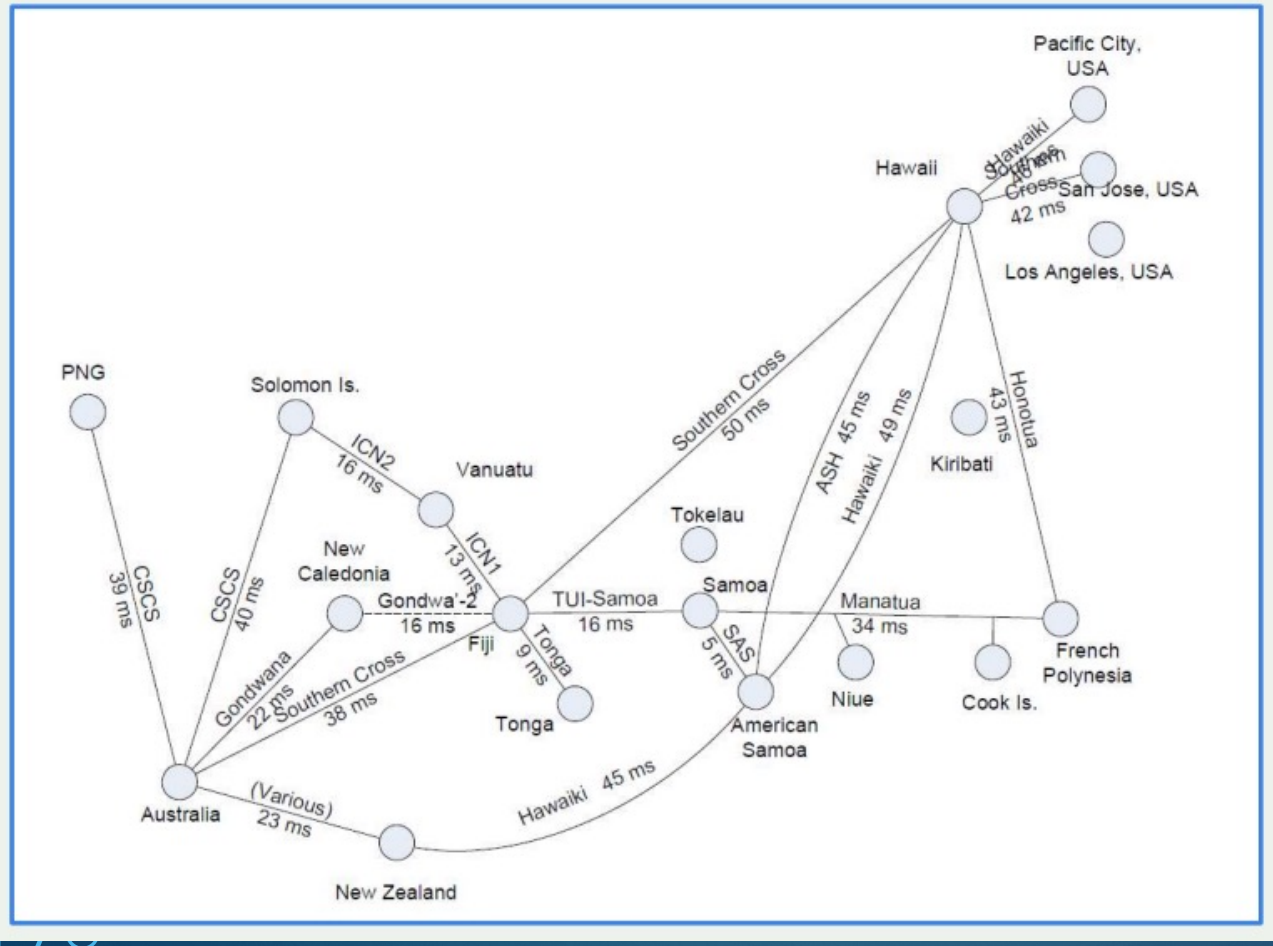
- Population of 5 Million
- p95 traffic of 173G

Fiji

- Population of 1 million
- p95 traffic of 2.6G

20% of the population of NZ, yet 1.5% of the traffic of NZ. This makes no sense to me.

I need to dig deeper to find the answer. Lets look at some of the Pacific Island countries to see why traffic is lower than expected.



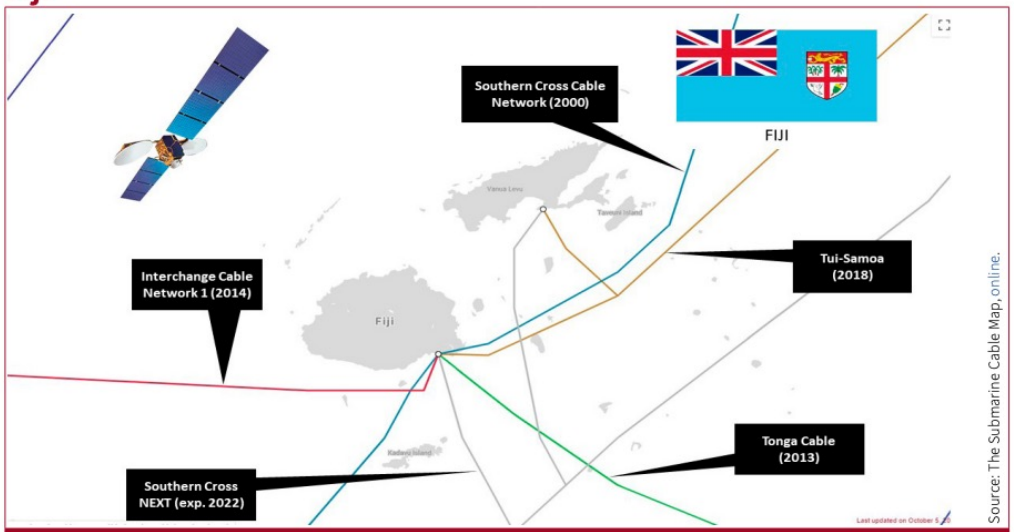
Before I get started , I look at the whole area, the countries, and get an understanding of what the RTT latencies are to Australia.

Ok, great. Latencies are not too bad. For reference, its 45 msec Sydney to Perth, so these don't look too bad. Most countries are closer than Perth. ☺

I will reference these numbers as I dive in….

Reference:
https://www.unescap.org/sites/default/d8files/event-documents/Pacific-IX%20Internet%20Exchange%2C%20Key%20Consultations%20%E2%80%93%20Fiji-IX%2C%20ISOC.pdf

Fiji



Source: The Submarine Cable Map, online.

Facts and figures

Geography

Fiji is an archipelago of more than 330 islands (of which 110 are permanently inhabited) and more than 500 islets. The two major islands (Viti Levu and Vanua Levu) account for 87% of the total population of 916,000 (2019 est.).

World rankings

- ITU ICT Development Index (2017): 107
- UN E-government Index (2018): 102
- ITU Global Cybersecurity Index (2018): 121
- GSMA: Transitioner

Connectivity and coverage

- Mobile subscriptions: 1.19 million
- Percentage of population: 130%
- Internet users: 550,000
- Percentage of population: 60%

Telecommunications operators and internet service providers

- Digicel
- Vodafone
- Telecom Fiji Ltd
- Fiji International Telecommunications Ltd (Fintel)

Platform	P10	P25	50th Percentile ↑
Akamai Object Delivery	40ms	62ms	80ms
Limelight CDN	53ms	72ms	85ms
Cloudfront CDN	66ms	72ms	85ms
Fastly CDN	63ms	73ms	86ms
Cloudflare CDN	55ms	73ms	88ms
Azure CDN from Microsoft	72ms	77ms	91ms
Google Cloud CDN SSL	61ms	73ms	96ms

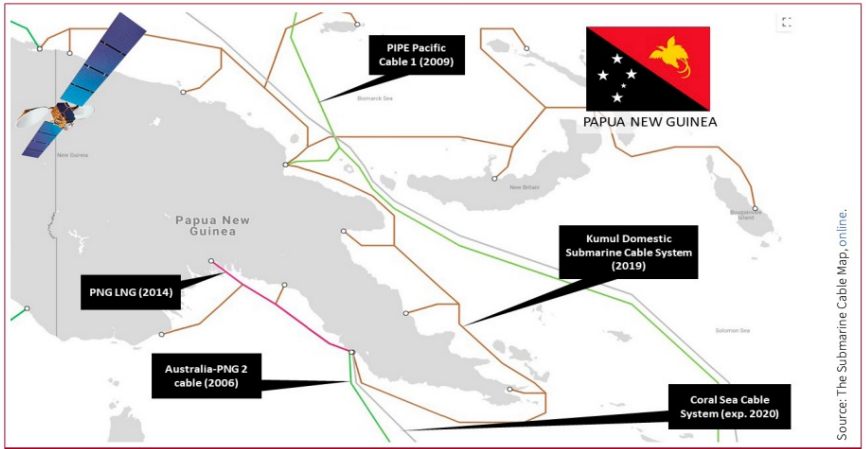
Good number for mobile penetration.
60% have internet – fair.
Latency really varies which shows congestion and likely reduced capacity on sub sea cables.

It's a good size. 1 million people. (Plus lets not forget all the Aussie tourists on top of this!) Why do we only see 2.6G of traffic?

Traffic is low because latency isn't great. This makes any content slow to load. Lack of access to Internet is also causing lower traffic.

Slides taken from the Australian Strategic Policy Institute
https://ega.ee/wp-content/uploads/2021/08/ICT-for-development-in-the-Pacific-islands.pdf

Papua New Guinea



Facts and figures

Geography

PNG is the world's third largest island country in size. The two largest cities—Port Moresby (the capital; population 375,000) and Lae—are located on the mainland. The total population of 8.5 million is predominantly concentrated in the highlands and the eastern coastal areas.

World rankings

- ITU ICT Development Index (2017): not available
- UN E-government Index (2018): 171
- ITU Global Cybersecurity Index (2018): 139
- GSMA: Emerging

Connectivity and coverage

- Mobile subscriptions: 2.73 million
- Percentage of population: 32%
- Internet users: 906,700
- Percentage of population: 11%

Telecommunications operators and internet service providers

- Digicel (Papua New Guinea) Ltd
- bmobile Ltd
- Telikom PNG
- Digitec
- DATEC
- Kacific
- Speedcast
- Lightspeed (Click Pacific)
- Emstret

Platform	P10	P25	50th Percentile ↑
Google Cloud CDN SSL	59ms	70ms	91ms
Fastly CDN	412ms	412ms	412ms
Limelight CDN	442ms	442ms	442ms

Note: Community reports show the overall experience of millions of users connecting to the Interne community as a whole but particular individual customer experience may vary. Citrix ITM uses netwo the specific networks from which their users originate.

8.5 Million people. A lot more than NZ.

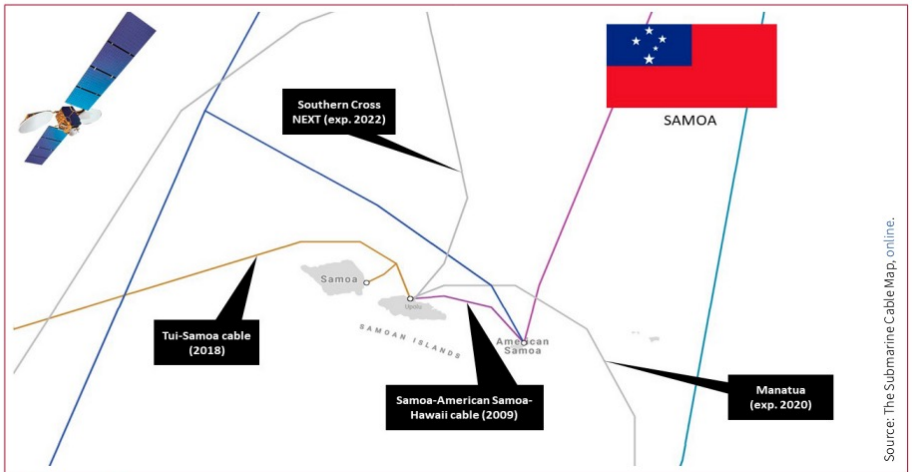
11% of population connected to the Internet. Terrible.

32% have mobile access.

The RTT between Sydney and PNG is 39 msecs

This data tells me the traffic is not low due population, but due to lack of internet access, and congested backhaul to Sydney.

Samoa



Source: The Submarine Cable Map, online.

Facts and figures

Geography

Samoa is made up of two main islands (Savai'i and Upolu) and four smaller islands. Of the population of 198,000 (2019 est.) about 75% live on the island of Upolu. The capital city, Apia, is home to approximately 36,000 people.

World rankings

- ITU ICT Development Index (2017): 127
- UN E-government Index (2018): 128
- ITU Global Cybersecurity Index (2018): 98
- GSMA (2019): Transitioner

Connectivity and coverage

- Mobile subscriptions: 142,600
- Percentage of population: 72%
- Internet users: 100,000
- Percentage of population: 50–57%

Telecommunications operators and internet service providers

- Bluesky Samoa Ltd
- Digicel (Samoa) Ltd
- Computer Services Limited
- Netvo Samoa
- Lesa's Telephone Services Ltd

Platform	P10	P25	50th Percentile ↑
Akamai Object Delivery	33ms	33ms	33ms
Google Cloud CDN SSL	94ms	95ms	101ms
Azure CDN from Microsoft	123ms	123ms	123ms
Cloudflare CDN	125ms	125ms	125ms
Cloudfront CDN	147ms	147ms	147ms
Limelight CDN	235ms	235ms	235ms
Fastly CDN	255ms	255ms	255ms

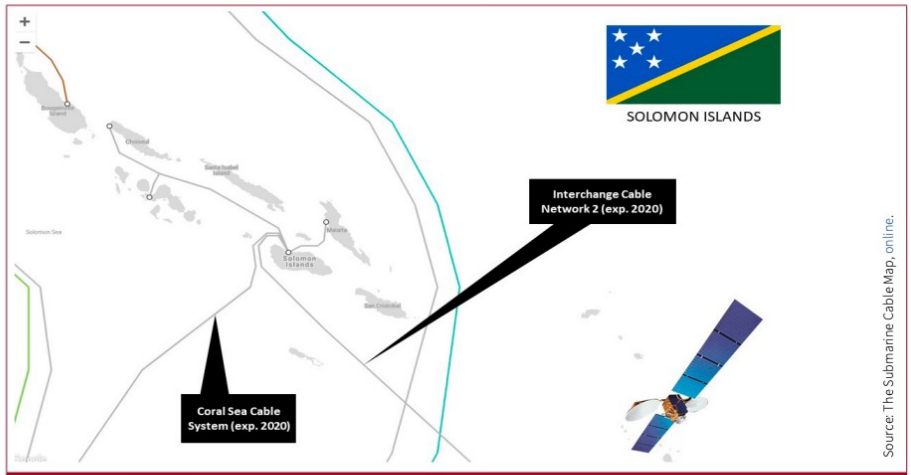
Small Population.

Mobile and Internet connectivity - fair.

Consistent latencies! Fantastic Samoa! Content providers are encouraged by this, as it shows stability and available capacity in the network.

This data tells me the traffic low mainly due to population and somewhat due to not everyone having internet access.

Solomon Islands



Facts and figures

Geography

Solomon Islands is made up of six major islands and more than 900 smaller islands. The capital, Honiara, is home to approximately 85,000 people. About 20% of the total populace of 630,000 (2019 est.) lives in urban areas.

World rankings

- ITU ICT Development Index (2017): 157
- UN E-government Index (2018): 169
- ITU Global Cybersecurity Index (2018): 160
- GSMA: Emerging

Connectivity and coverage

- Mobile subscriptions: 459,000
- Percentage of population: 73%
- Internet users: 88,000
- Percentage of population: 14%

Telecommunications operators and internet service providers

- Solomon Telecom / Our Telekom
- Vodafone

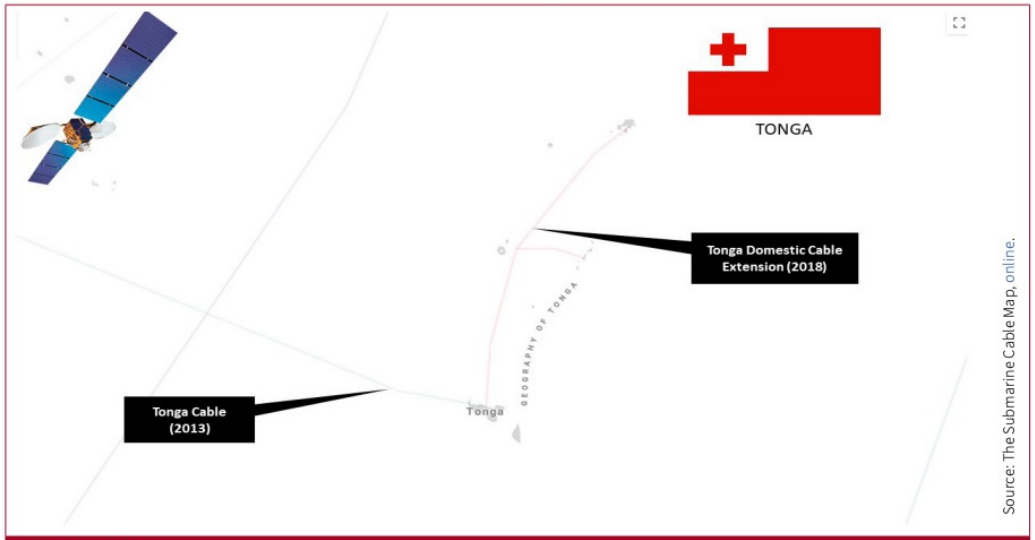
Platform	P10	P25	50th Percentile ↑
Cloudfront CDN	73ms	73ms	73ms
Google Cloud CDN SSL	73ms	74ms	81ms

Note: Community reports show the overall experience of millions of users connecting to the community as a whole but particular individual customer experience may vary. Citrix ITM uses the specific networks from which their users originate.

Population is small.
Internet access BAD. 14%.
Again consistent latencies. Fantastic Solomons! Good backhaul.

This data tells me the traffic low mainly due to due to very low access to the Internet. Is that a pricing issue maybe? It looks like its also due to 80% of the population not living in the main city. Hard to service remote users.

Tonga



Facts and figures

Geography

Tonga is an archipelago comprising 169 islands, of which 36–45 are inhabited. The country has a population of 109,500 people (2019 est.), of whom 70% reside on the main island of Tongatapu.

World rankings

- ITU ICT Development Index (2017): 110
- UN E-government Index (2018): 109
- ITU Global Cybersecurity Index (2018): 116
- GSMA: Transitioner

Connectivity and coverage

- Mobile cellular subscriptions: 109,800
- Percentage of population: 100%
- Internet users: 66,000
- Percentage of population: 60%

Telecommunications operators and internet service providers

- Digicel Tonga Ltd
- Tonga Communications Corporation Ltd
- EZNet

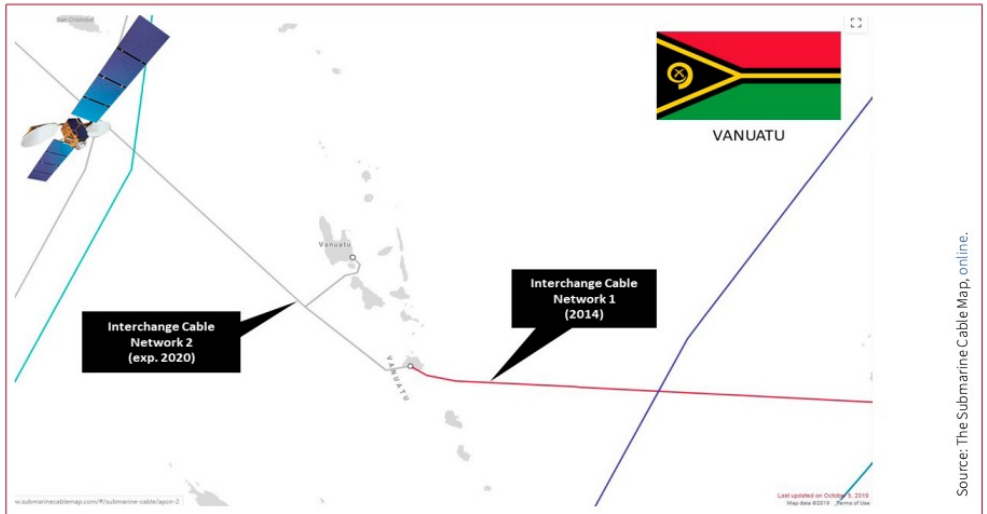
Platform	P10	P25	50th Percentile ↑
Google Cloud CDN SSL	190ms	194ms	204ms

I'm sorry Tonga. You are only 9 msec RTT from Fiji, yet your latencies are terrible to Australia. Double those of Fiji.

Population small.
Internet access 60% - the same as Fiji's

This data tells me the traffic low due to small population and not enough access. It also indicates there are serious congestion or lack or correct capacity out of Tonga.
Is the backhaul too expensive to purchase? Without faster access to download content, users won't download much.

Vanuatu



Source: The Submarine Cable Map, online.

Facts and figures

Geography

Vanuatu is made up of four main islands and 80 smaller islands. Of the population of 285,000 (2019 est.) about 25% live in the cities of Port Vila (the capital) and Luganville.

World rankings

- ITU ICT Development Index (2017): 141
- UN E-government Index (2018): 137
- ITU Global Cybersecurity Index (2018): 147
- GSMA Mobile Connectivity Index (2019): Transitioner

Connectivity and coverage

- Mobile subscriptions: 329,700
- Percentage of population:116%
- Internet users: 90,000
- Percentage of population with internet access: 32%

Telecommunications operators and internet service providers

- Digicel (Vanuatu) Ltd
- Telecom Vanuatu Ltd (TVL)

Platform	P10	P25	50th Percentile ↑	P75	P90	P95	Mean
Akamai Object Delivery	53ms	53ms	53ms	53ms	53ms	53ms	53ms
Fastly CDN	59ms	59ms	59ms	59ms	59ms	59ms	59ms
Cloudfront CDN	62ms	62ms	62ms	62ms	62ms	62ms	62ms
Limelight CDN	82ms	82ms	82ms	82ms	82ms	82ms	82ms
Azure CDN from Microsoft	102ms	102ms	102ms	102ms	102ms	102ms	102ms
Google Cloud CDN SSL	95ms	104ms	145ms	214ms	287ms	435ms	178ms

I've posted the whole table here to show an example of the most consistent latencies in the region.
Population small.
Internet access 32% - not good.
I also see a lack of carrier choices in the market.

This data tells me Vanuatu has great link capacity back to Australia. Its very stable and predictable. The traffic low due to small population of whom only a small number can access the Internet.
Could the lack of competition in the market drive higher pricing?
Could it be the landscape of where users live?

IF CONTENT WON'T COME TO YOU, CAN YOU GO TO THE CONTENT?

- Sydney has a high density of Content Providers which can be accessed via an IX Port.
- Examples: Amazon ☺, Akamai, Cloudflare, Google, Microsoft, Alibaba, Fastly, Edgecast, Facebook, Sony, Twitter, Valve/Steam, Yahoo.
- Costs – yep – subsea isn't cheap. (Off the record, I would say its hugely overpriced in the Pacific). That's not fair.
- There also need to be multiple paths into each county for diversity.
- How do we encourage lower pricing and less congestion on the subsea cables?
  - Regulatory?
  - More competitors?
  - I don't know – but I'd like to see this solved.

THE END

Hope to see you in person next time!