

Guam: Cables, Datacenters and IXPs

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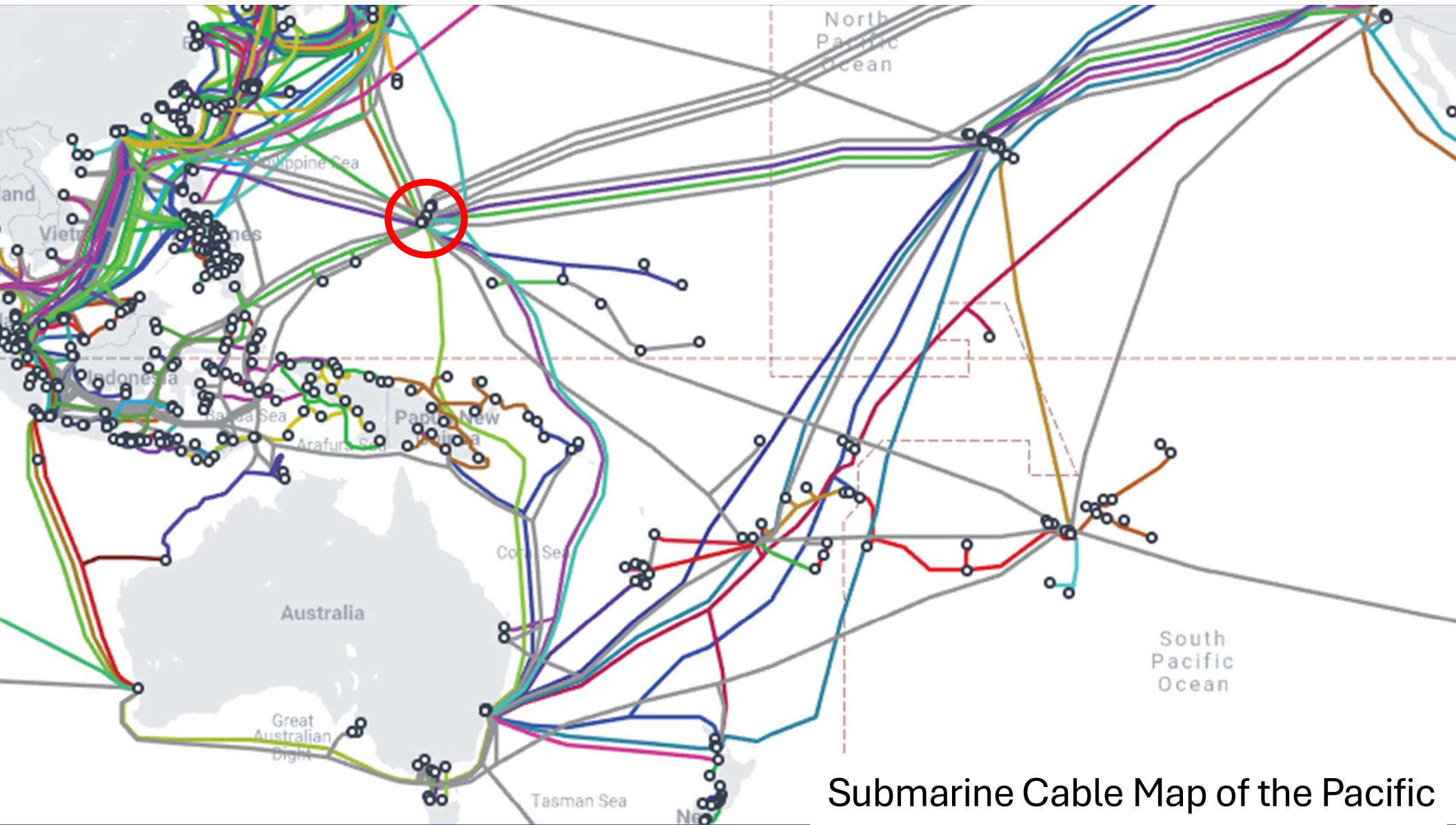
PacNOG 34 - Apia, Samoa

November 25, 2024

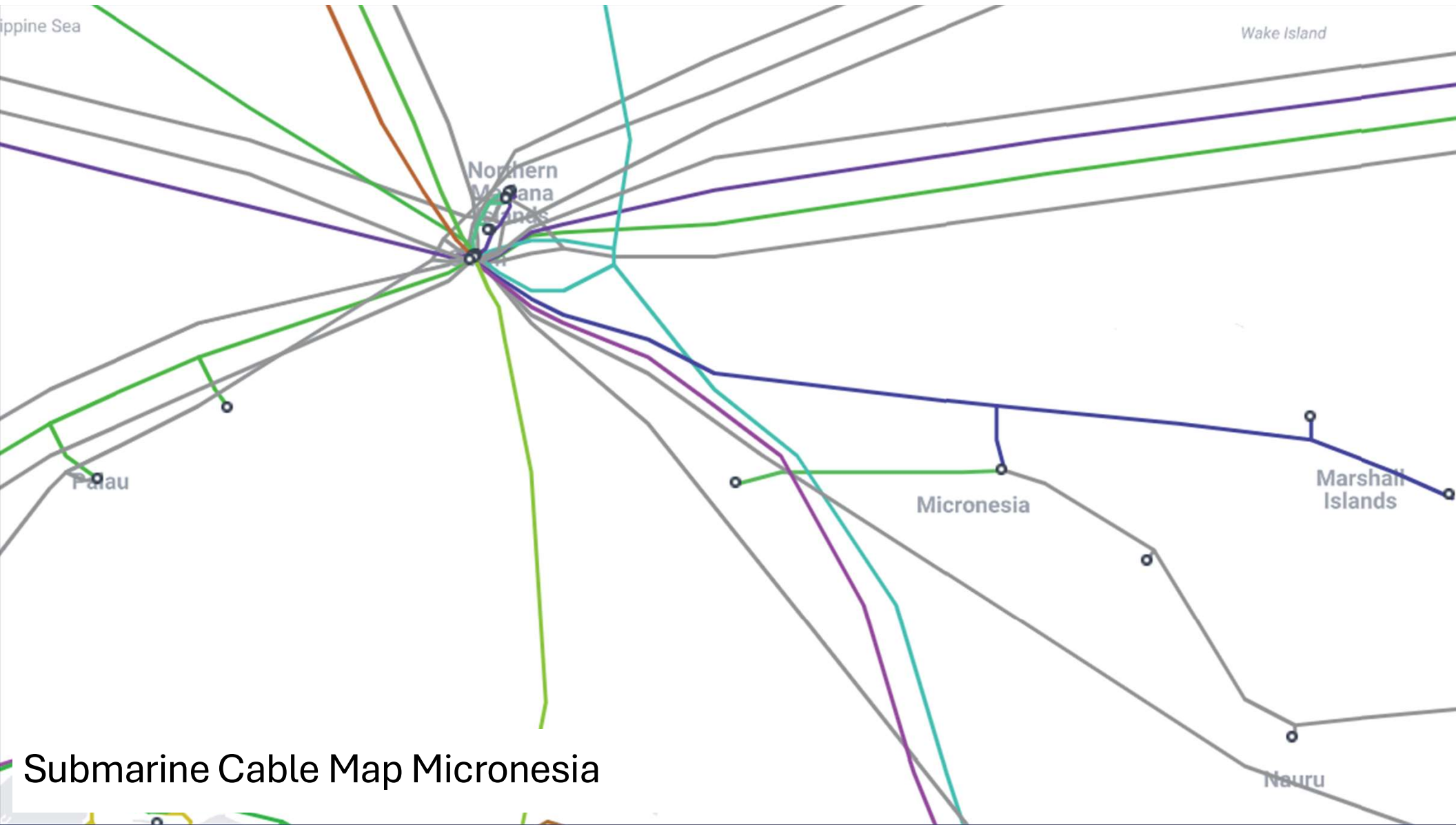


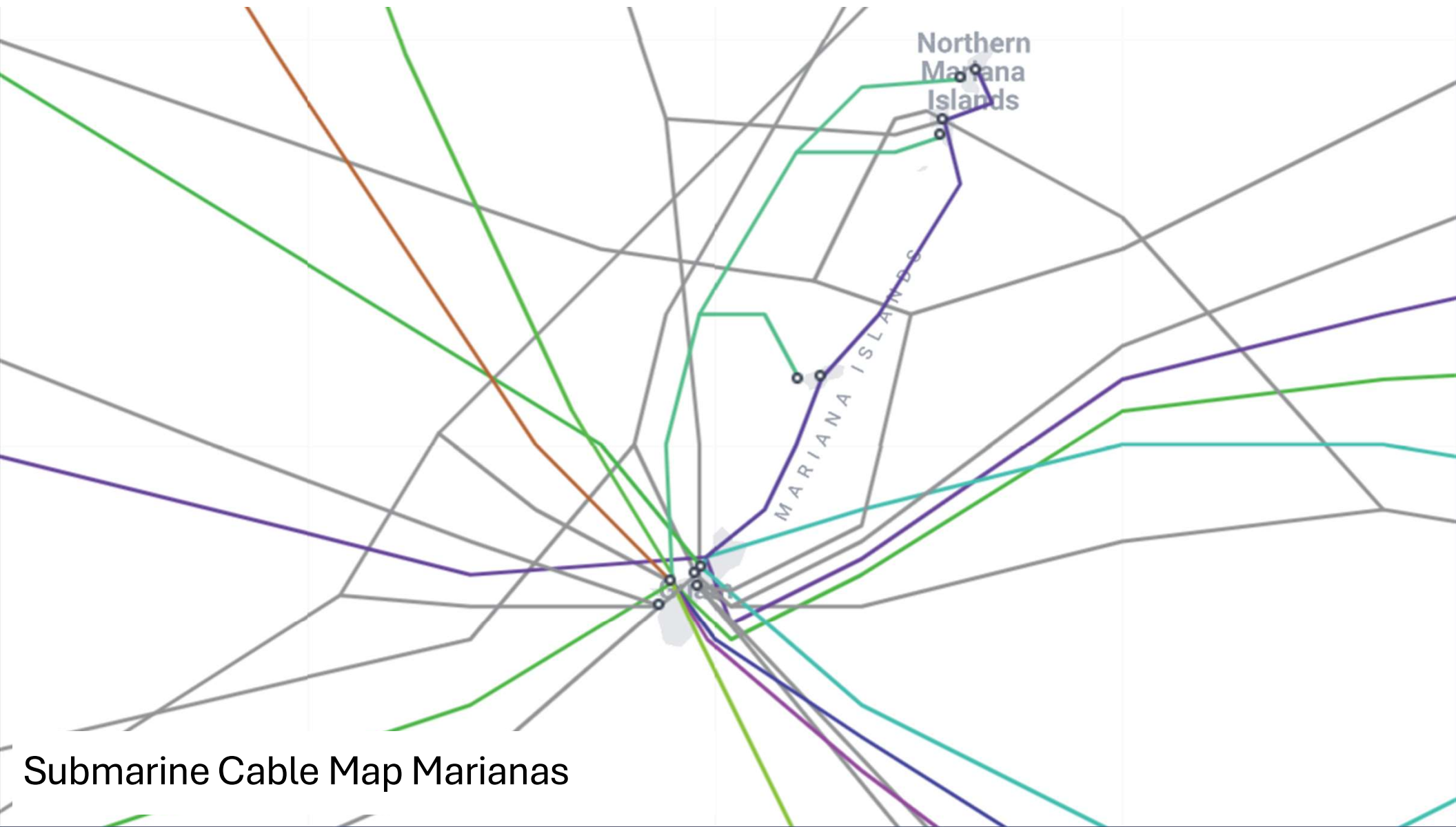
Guam is a hub in the West pacific

- + 11 Cables currently in service
- + 10 more to land in the next 5 years
- + Directly interconnecting 14+ countries
- + Spanning 3 different continents

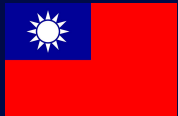


Submarine Cable Map of the Pacific





Submarine Cable Map Marianas



Taiwan



CNMI



USA



Fiji



Japan



Philippines



Singapore



Indonesia



Palau



French Poly



Australia



Malaysia



Micronesia



Marshall Islands

Facilities on Guam



| Name ^{AZ} ^v Management | CLLI NPA-NXX | City Country | State Postal Code | Networks |
|---|-----------------|-----------------|----------------------|----------|
| Guam Exchange Guam Exchange | - - | Harmon GU | GU 96913 | 1 |
| IT&E Guam IT&E | - - | Tamuning GU | GU 96913 | 1 |
| MCV Guam Datacenter Guam Cablevision, LLC. | - - | Dededo GU | GU 96929 | 2 |
| RTI Guam GNC RTI Connectivity Pte. Ltd | - - | Piti GU | Guam 96915 | 8 |
| TATA Communications - Piti Cable Landing St... TATA Communications Ltd | - - | Piti GU | GU 96925 | 7 |
| UoG - Office of Information Technology University of Guam | - - | Magilao GU | - 96923 | 4 |

Cable Landing Stations

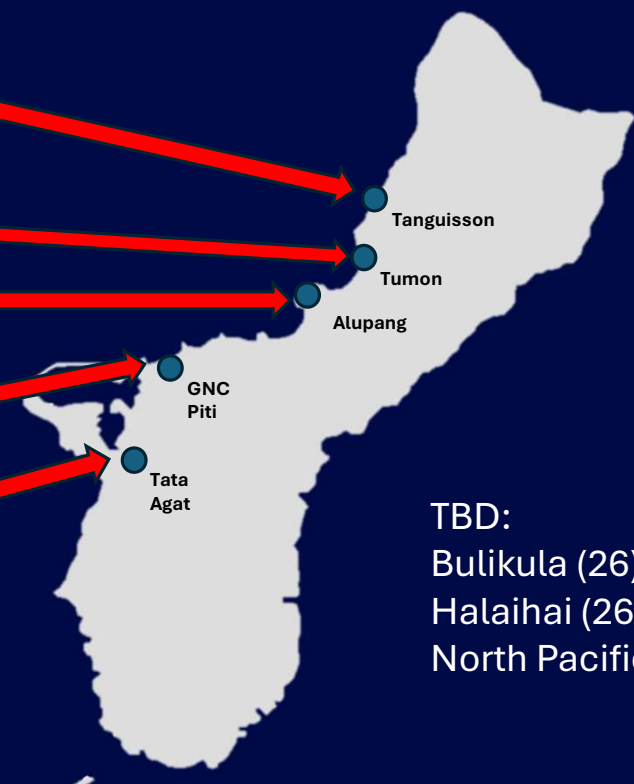
AAG, AJC, Mariana-Guam
TPU (25), PROA (26)

AJC, GOKI

Bifrost (25), MYUS (28)
ACC-1 (28)

JGA N/S, SEA-US, Atisa

TGN, PPC-1, HANTRU-1
Echo (25), Apricot (26)



TBD:
Bulikula (26)
Halaihai (26)
North Pacific Connect Interlink (26)

IXPs in Guam



| Name <small>A-Z</small> ▾ | Country | City | Networks |
|---|---------|----------|----------|
| <u>GU-IX</u> Guam Internet Exchange | GU | Guam | 1 |
| <u>GOREX</u> Guam Open Research & Education Exchange | GU | Tumon | 2 |
| <u>MARIIX</u> Mariana Islands Internet Exchange | GU | Mangilao | 10 |
| <u>Guam IX</u> Guam IX | GU | Harmon | 5 |

AS 152735

GUAM IX

Powered By
GUAM EXCHANGE

AS 35889

GOSEX

Guam Open Research & Education eXchange

Powered By
UNIVERSITY of HAWAI'I

AS 23676

MARIIX

Powered By
UNIVERSITY OF GUAM
UNIBETSEDÁT GUÁHAN

AS 3605

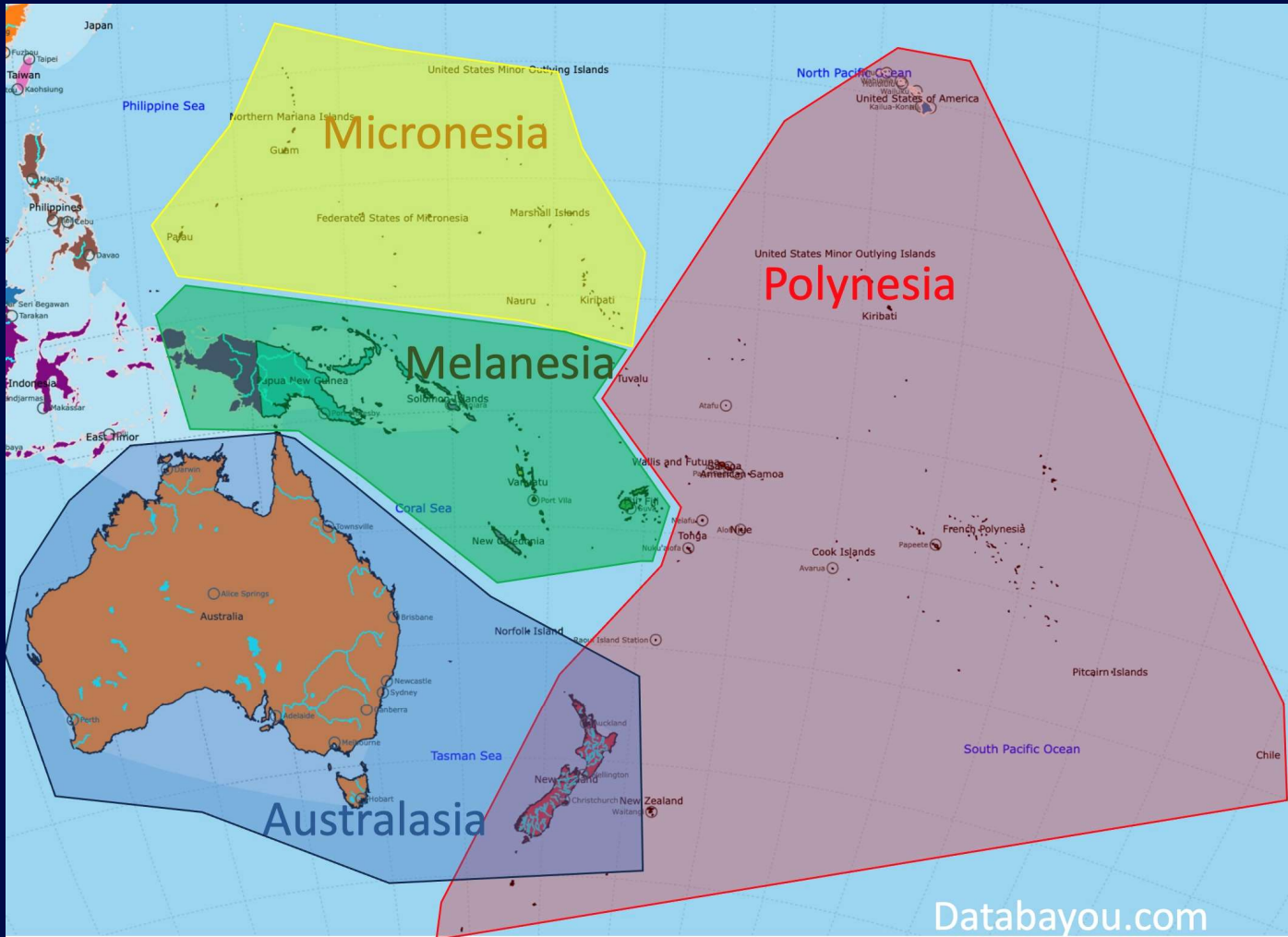
GU-IX

Powered By
docomo pacific


CITADEL

IXPs keep local traffic, local

But what is local?



Population Density

Oceania – 45,000,000

Micronesia – 322,000

Melanesia – 12,000,000

Polynesia – 690,000

Australasia – 32,000,000

Source: Top Bing Searches

How big is the Pacific Ocean?

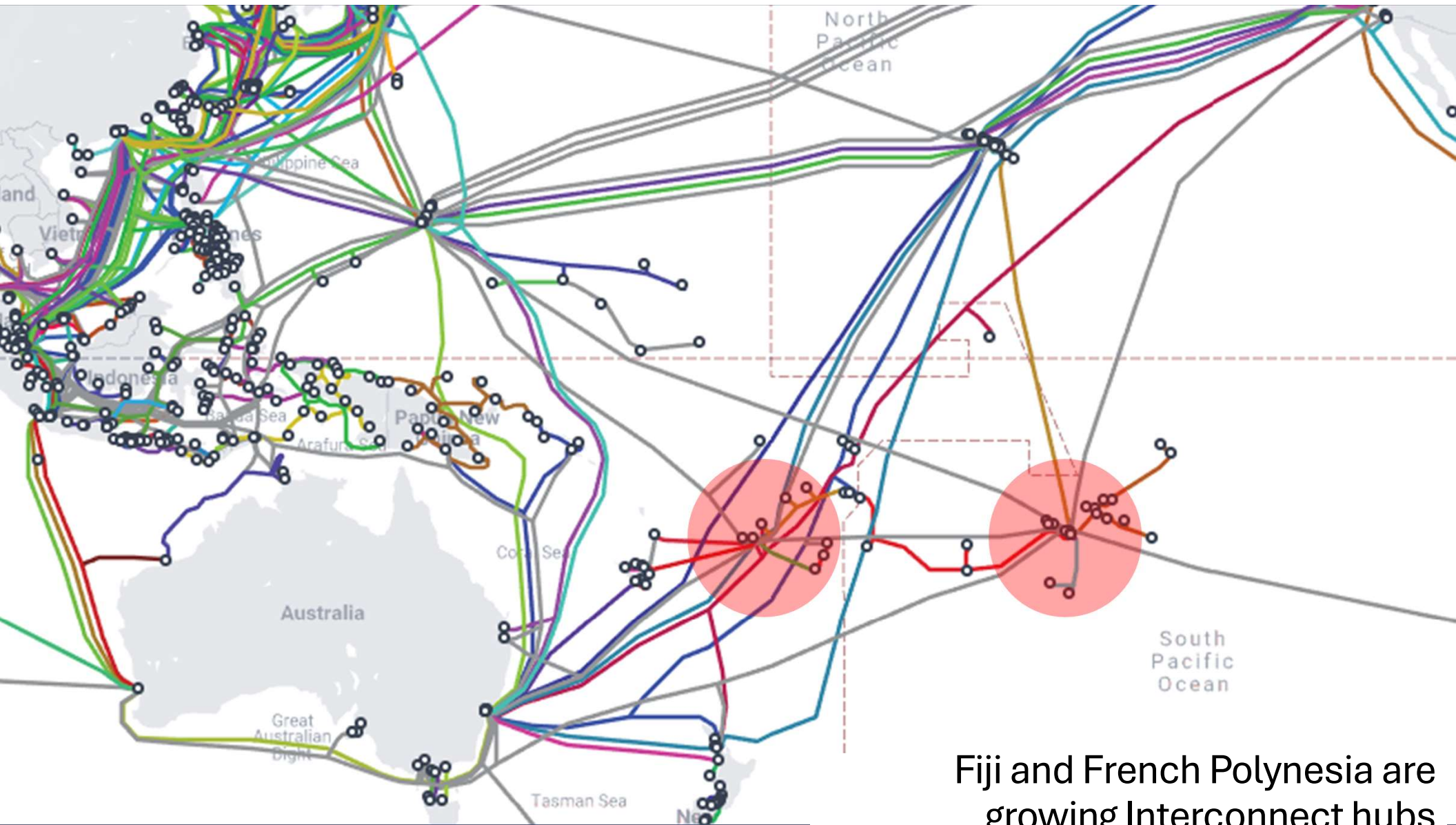
The Pacific Ocean is the largest and deepest ocean basin on Earth, covering more than 155 million square kilometers (60 million square miles) and averaging a depth of 4,000 meters (13,000 feet).

The United States is 9.83 million square kilometers (3.79 square miles)

Internet in the pacific is unique, diverse, and growing

Divided by tide, united by fiber!





Fiji and French Polynesia are growing Interconnect hubs


```

My traceroute [v0.95]
hyperjump (103.142.152.5) -> 110.5.112.1 (110.5.112.1)      2024-11-24T16:28:44+1000
Keys:  Help   Display mode   Restart statistics   Order of fields   quit

          Packets
Host      Loss%  Snt   Last   Avg    Best  Wrst  StDev
1.  _gateway      0.0%   34    0.2    0.7    0.2   4.1   1.0
2.  202.88.72.118 0.0%   34    0.3    0.6    0.3  11.3   1.9
3.  10ge0-5.core1.gum1.he.net 0.0%   34    1.3    1.5    1.2   1.8   0.1
4.  100ge0-59.core2.hnl1.he.net 0.0%   34   67.4   67.5   67.3  68.8   0.3
5.  port-channel7.core3.lax2.he.net 2.9%   34  126.4  126.9  126.0 135.7   1.8
6.  port-channel14.core2.lax1.he.net 97.0%   34  133.6  133.6  133.6 133.6   0.0
7.  port-channel16.core3.sjc2.he.net 93.9%   34  137.6  137.5  137.5 137.6   0.1
8.  port-channel17.core2.pao1.he.net 93.9%   34  128.8  128.9  128.8 129.0   0.1
9.  port-channel2.core3.sjc1.he.net 41.2%   34  138.2  138.2  138.0 139.4   0.3
10. 100ge0-76.core1.syd1.he.net 0.0%   34  225.9  226.7  225.8 231.9   1.8
11. 17993-sy4-ix.equinix.com 0.0%   34  234.5  234.6  234.5 234.9   0.1
12. 202.4.32.9 0.0%   34  226.3  226.9  226.1 248.6   3.9
13. 202.4.37.10 0.0%   34  275.6  277.8  275.5 292.0   3.7
14. 202.4.37.9 0.0%   33  275.0  274.8  274.7 275.1   0.1
15. 202.4.37.5 0.0%   33  285.2  285.2  284.8 288.4   0.7
16. 202.4.37.1 0.0%   33  276.0  276.6  275.8 279.7   0.8
17. 110.5.112.1 0.0%   33  284.2  284.2  284.0 284.5   0.1

```

Philippine Sea

HAWAII

Guam to Hawaii is 5,900 km with ~70-90 ms

Guam

5,671.56 km

5,000.00 km

4,000.00 km

3,000.00 km

2,000.00 km

Papua New Guinea

Port Moresby

Solomon Islands

Samoa

Fiji

Measure distance

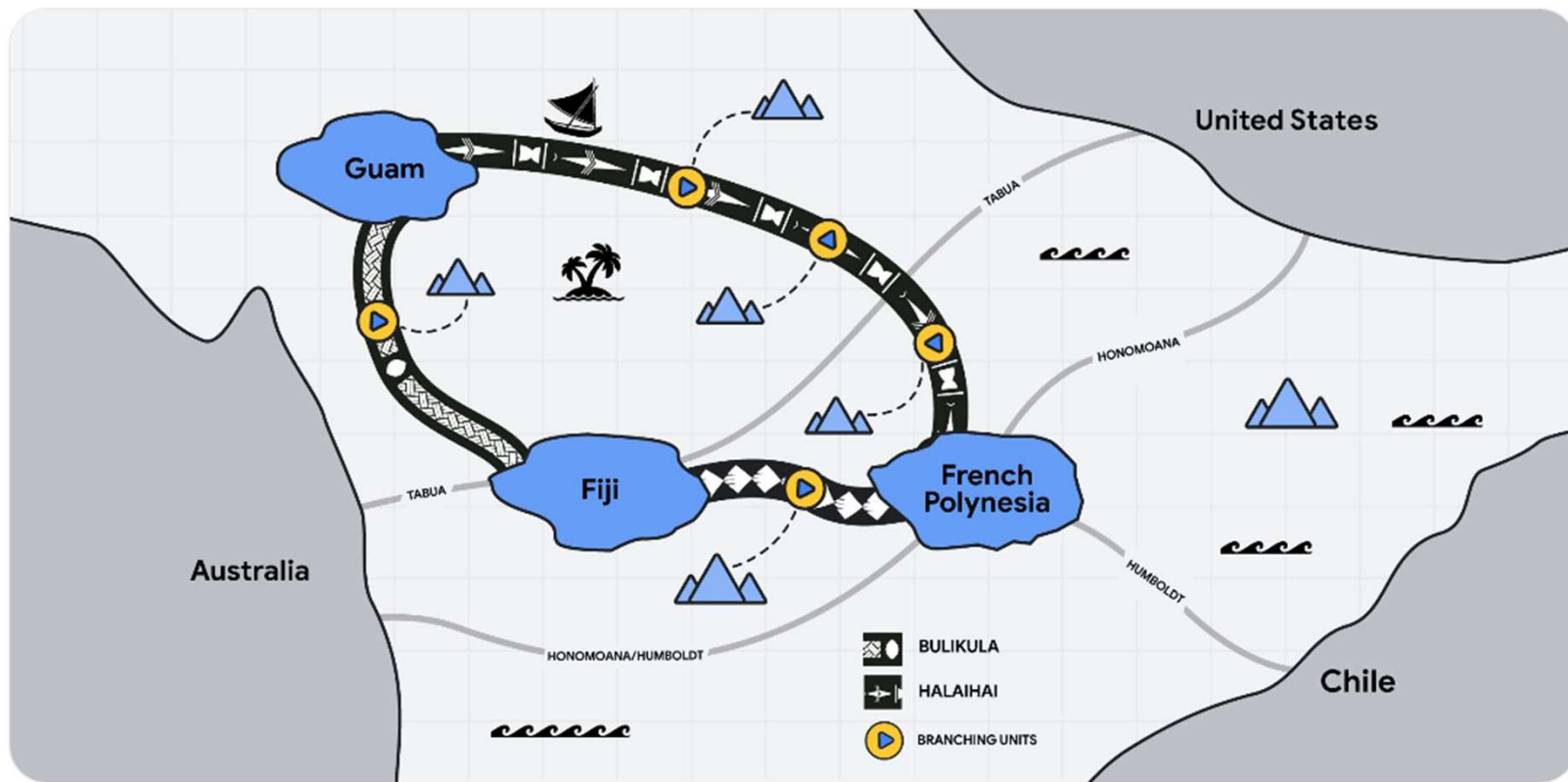
Click on the map to add to your path

Total distance: 5,671.56 km (3,524.14 mi)

NORTHERN TERRITORY

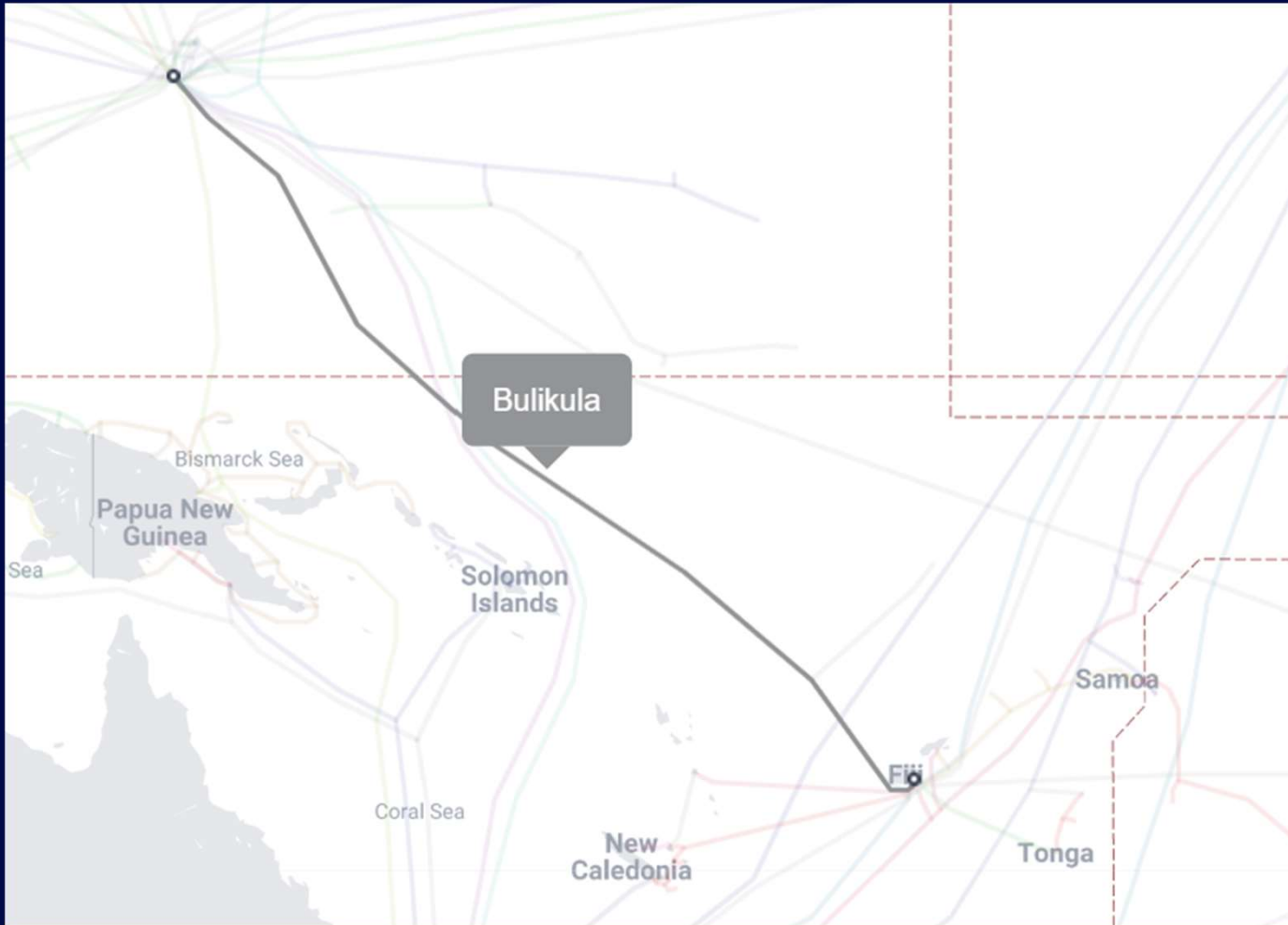
Introducing Bulikula and Halaihai, subsea cables to connect the central Pacific

January 18, 2024



Source: <https://cloud.google.com/blog/products/infrastructure/introducing-bulikula-and-halaihai-subsea-cables-to-connect-the-central-pacific>

Bulikula RFS 2026



All these fiber activities network developments
bode a positive outlook towards

Performance
Resiliency
Redundance

For the Pacific network ecosystem

Tools used in this slide

- Linux MTR
 - <https://github.com/traviscross/mtr>
- PeeringDB
 - <https://peeringdb.com>
- Submarine Cable Maps Telegeography
 - <https://www.submarinecablemap.com/>
- Google Maps Distance Measurement
 - <https://www.google.com/maps/>