

Submarine Cable and Capacity Pricing Trends in Asia-Pacific

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TeleGeography
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Topics

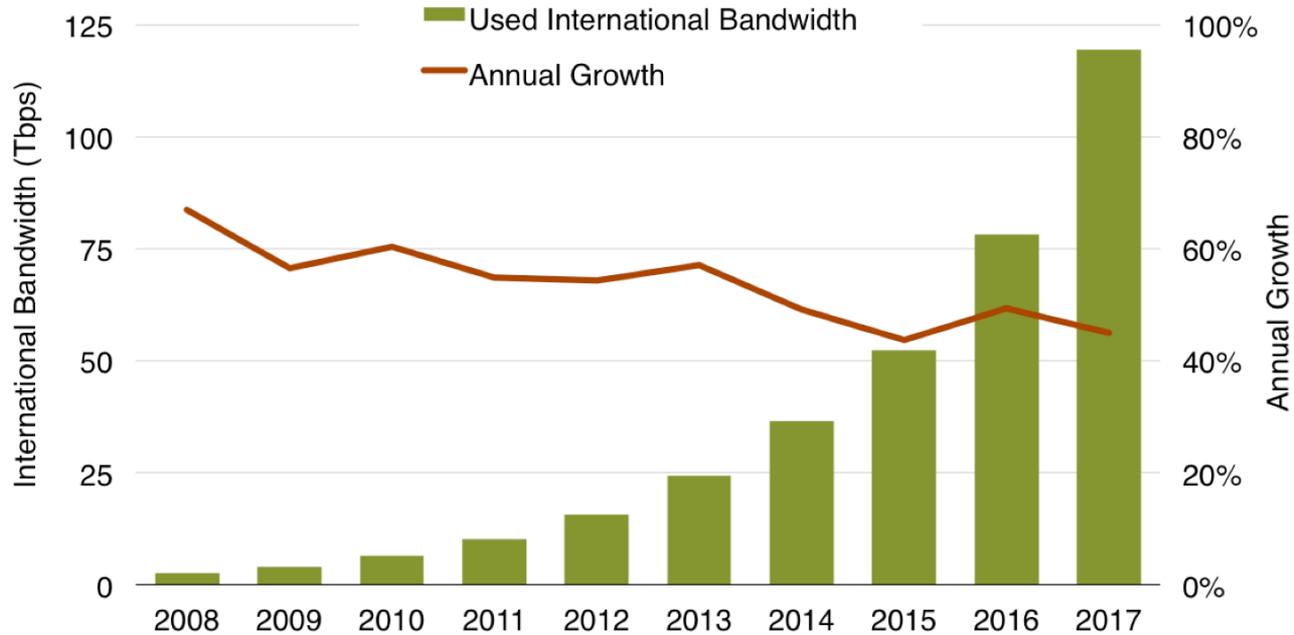
- Submarine Cables
 - Demand growth trends
 - Submarine cable investment growth
 - New cable traits

- Capacity Pricing
 - Transport pricing trends
 - Price parity?
 - 10G versus 100G
 - IP transit erosion

Submarine Cables

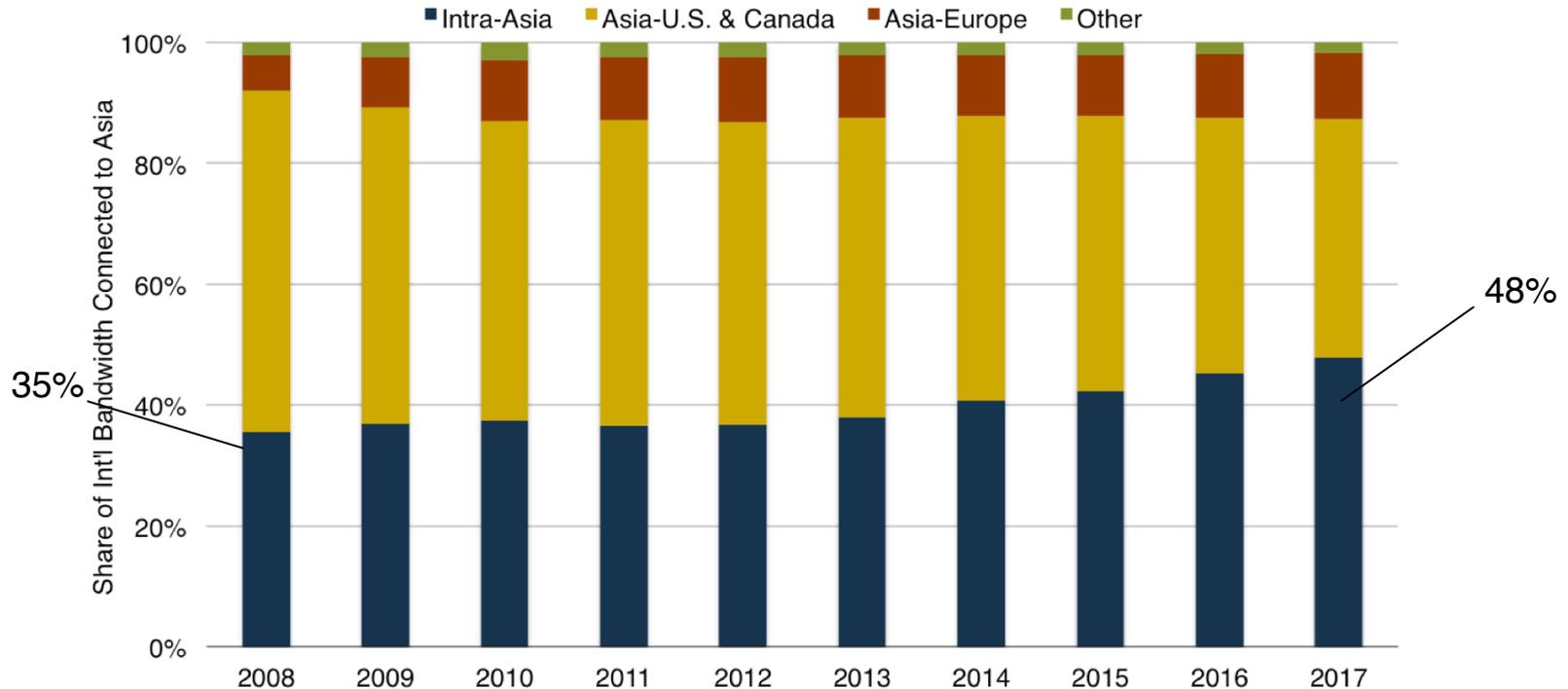
Demand growth remains strong

Asia-Pacific Used International Bandwidth Growth, 2008-17



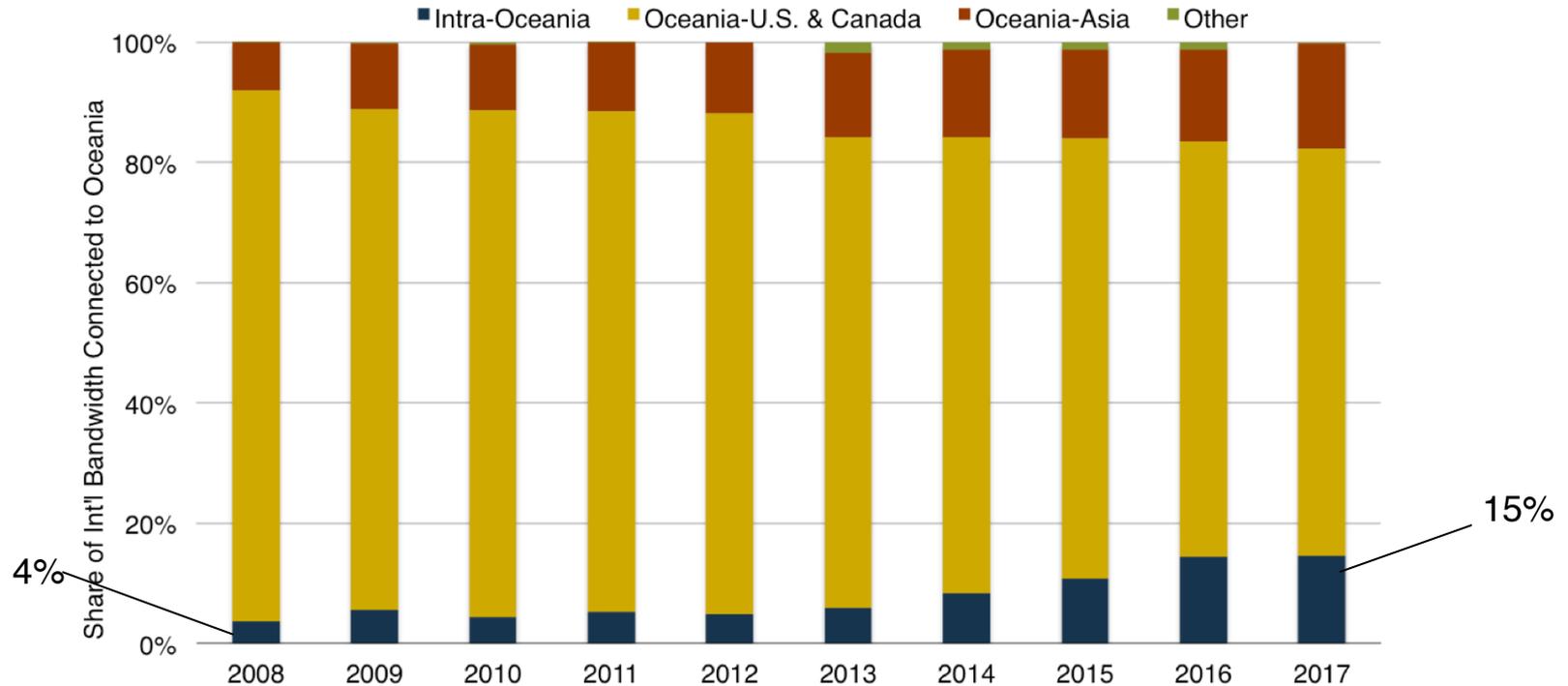
Increasing intra-regional focus for Asia...

Asia Used International Bandwidth by Route, 2008-17



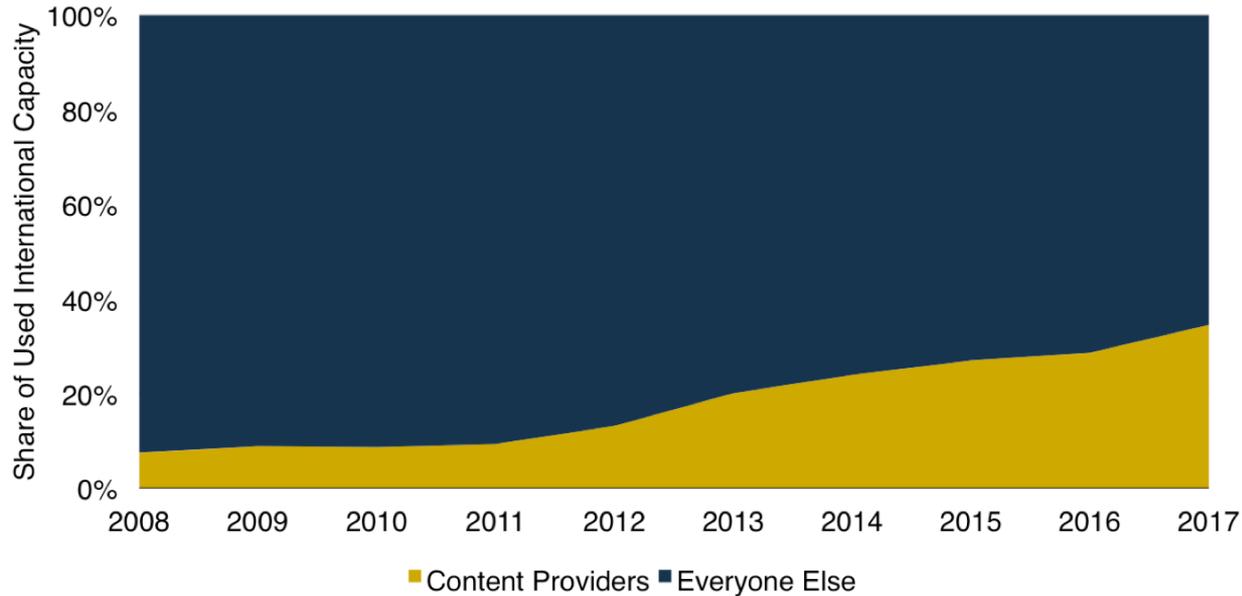
...as well as Oceania

Oceania Used International Bandwidth by Route, 2008-17



Content providers increasingly driving demand

Source of Used International Bandwidth Connected to Asia-Pacific



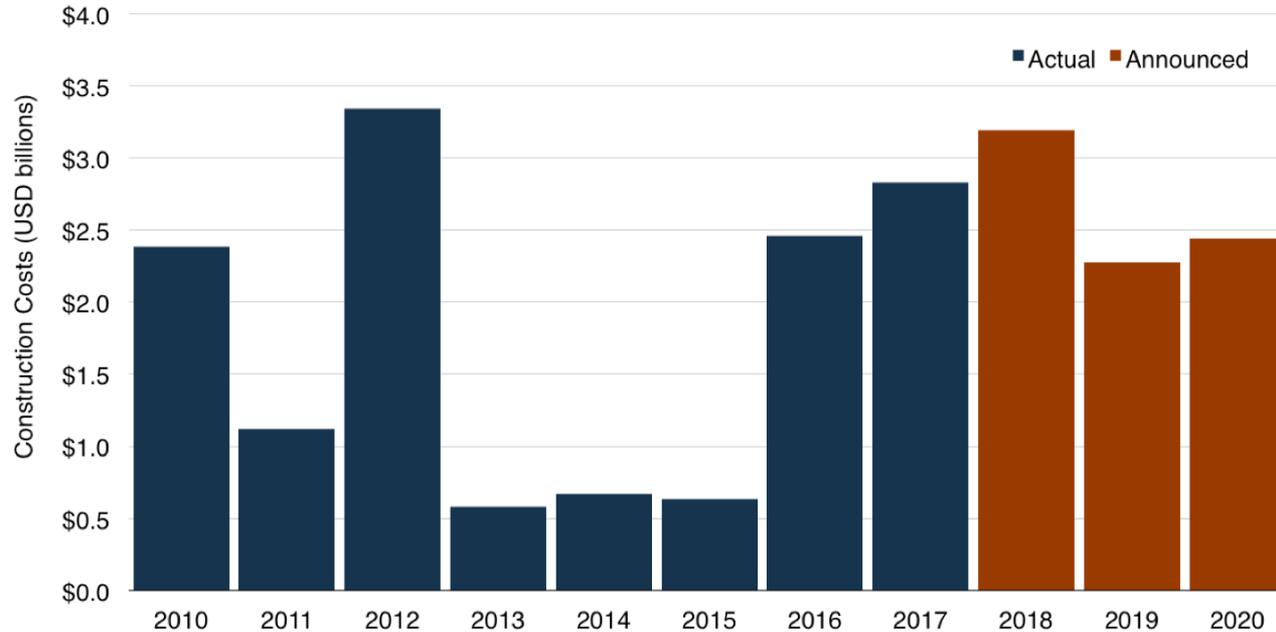
Content provider cable investments in Asia-Pacific

- **Google**
 - Unity (2010)
 - Southeast Asia Japan Cable (2012)
 - FASTER (2016)
 - Pacific Light Cable Network (2019)
 - Indigo (2019)
 - Hong Kong-Guam (2020)
 - Hong Kong-Americas (2020)
- **Amazon**
 - Pacific Light Cable Network (2019)
 - JUPITER (2020)
 - Hong Kong-Americas (2020)
- **Microsoft**
 - New Cross Pacific (2018)
- **Facebook**
 - Asia Pacific Gateway (2016)

Notes: Cables shown based on publicly announced cable investments in the Asia-Pacific region and excludes investment in fiber pairs post-RFS, spectrum, or other managed bandwidth purchases.

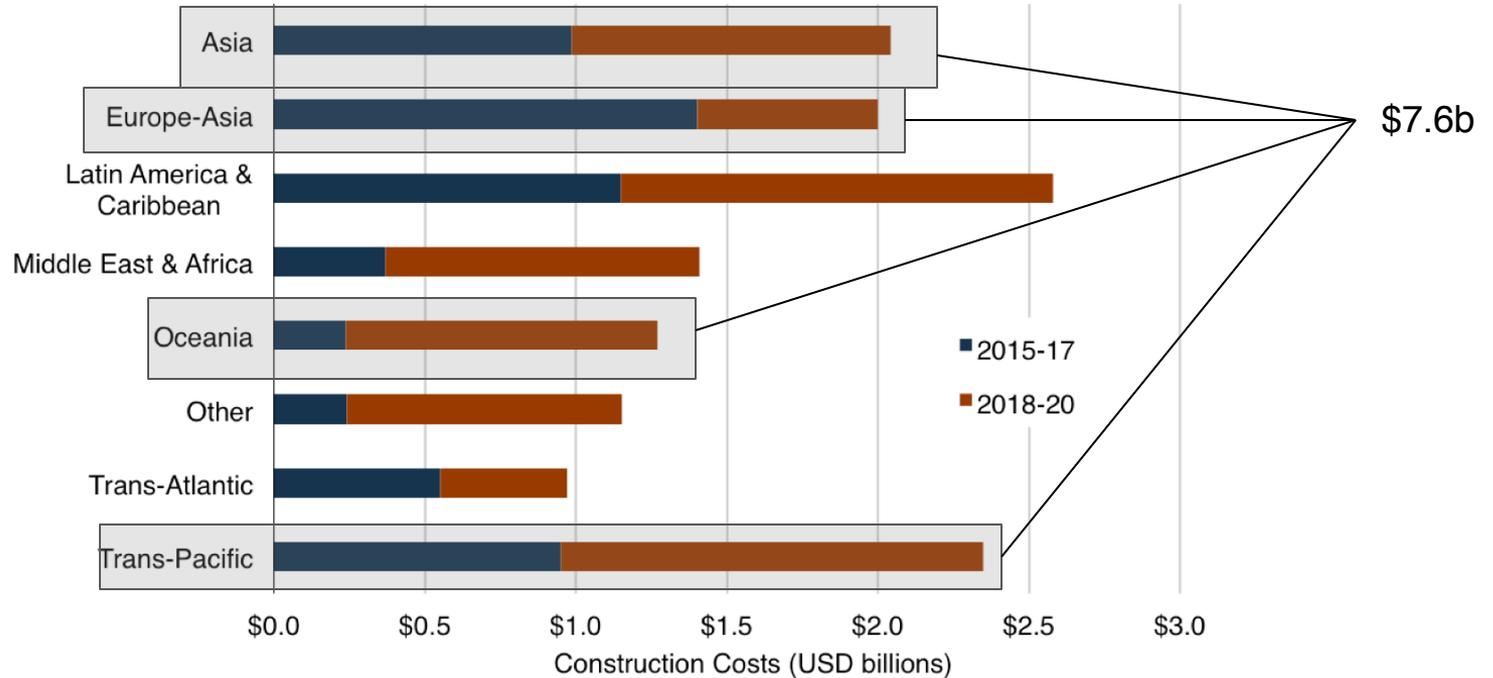
Investment in new cables is surging

Global Cable Construction Costs, 2010-2020



Asia-Pacific new cable activity is strong

Cable Construction Costs by Region, 2015-2020



Recently activated Asia-Pacific cables

- **Trans-Pacific**
 - FASTER (June 2016)
 - SEA-US (August 2017)
- **Europe-Asia**
 - SeaMeWe-5 (December 2016)
 - AAE-1 (June 2017)
- **Intra-Asia**
 - Asia Pacific Gateway (November 2016)
 - Malaysia-Cambodia-Thailand (March 2017)
- **Oceania**
 - Tasman Global Access (March 2017)
 - Tui-Samoa (February 2018)

More cables on the way

- Trans-Pacific
 - New Cross Pacific (2018)
 - Hawaiki (2018)
 - Pacific Light Cable Network (2019)
 - Southern Cross NEXT (2019)
 - JUPITER (2020)
 - Hong Kong-Americas (2020)
- Intra-Asia
 - SEAX-1 (2018)
 - Indonesia International Gateway (2018)
 - Hong Kong-Guam (2019)
 - Palapa Ring (2019)
- Oceania
 - Chuuk-Pohnpei (2018)
- NATITUA (2018)
- Australia-Singapore Cable (2018)
- Indigo-West (2019)
- Indigo-Central (2019)
- Japan-Guam-Australia (2020)
- Asia-Africa
 - IOX Cable (2019)
 - PEACE Cable (2019)

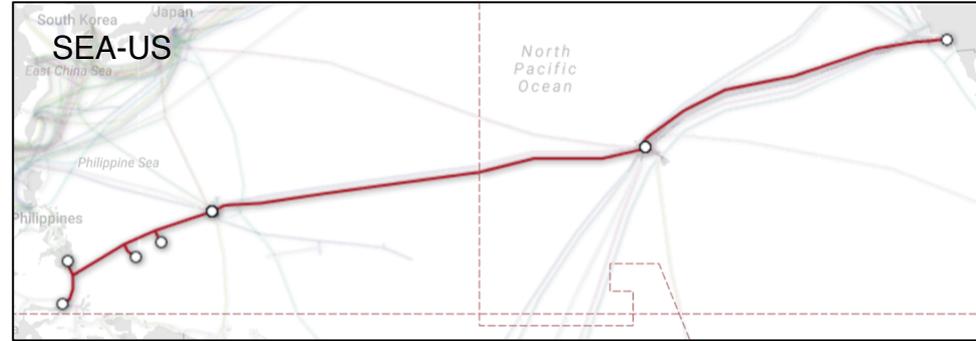
Notes: Cables shown are only those which are publicly announced as of February 2018. Additional cables are planned.

New diverse paths

Australia-Southeast Asia

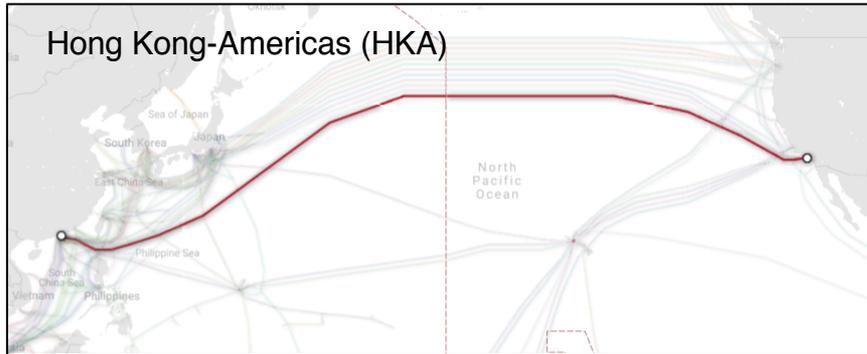
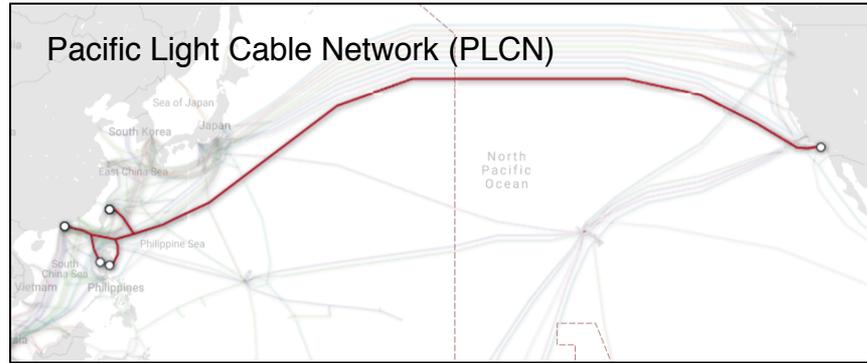


Southeast Asia-US



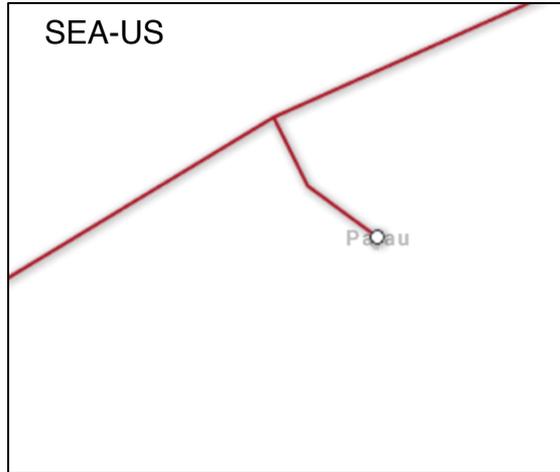
New direct routes (no hops in Hawaii or Guam)

Hong Kong-Los Angeles

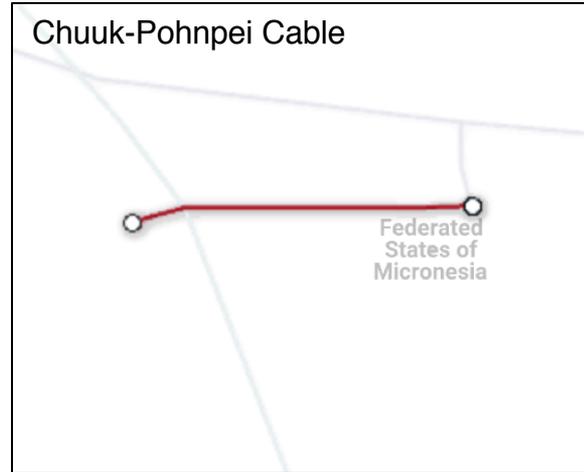


First cables

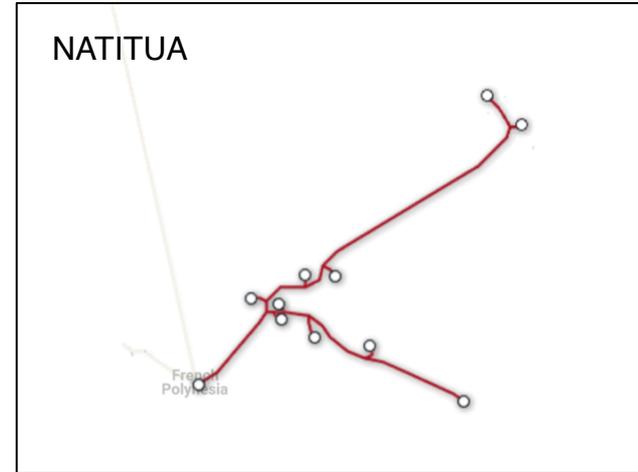
Palau



Micronesia (Chuuk)

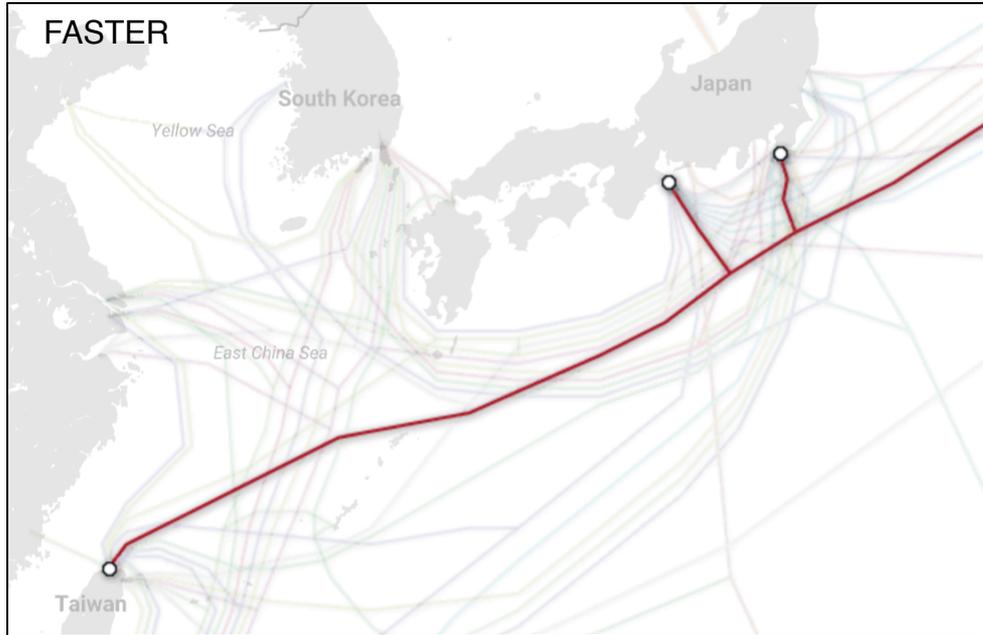


French Polynesia

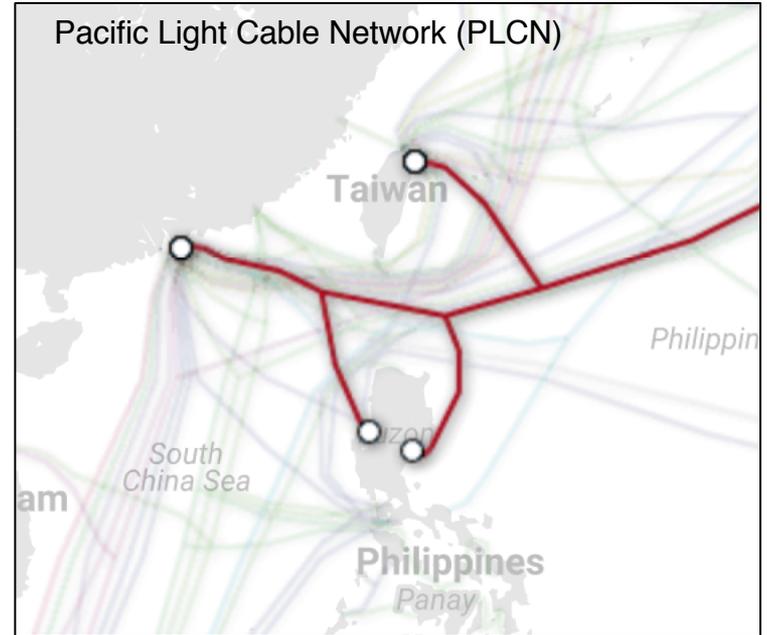


Privately-owned branches

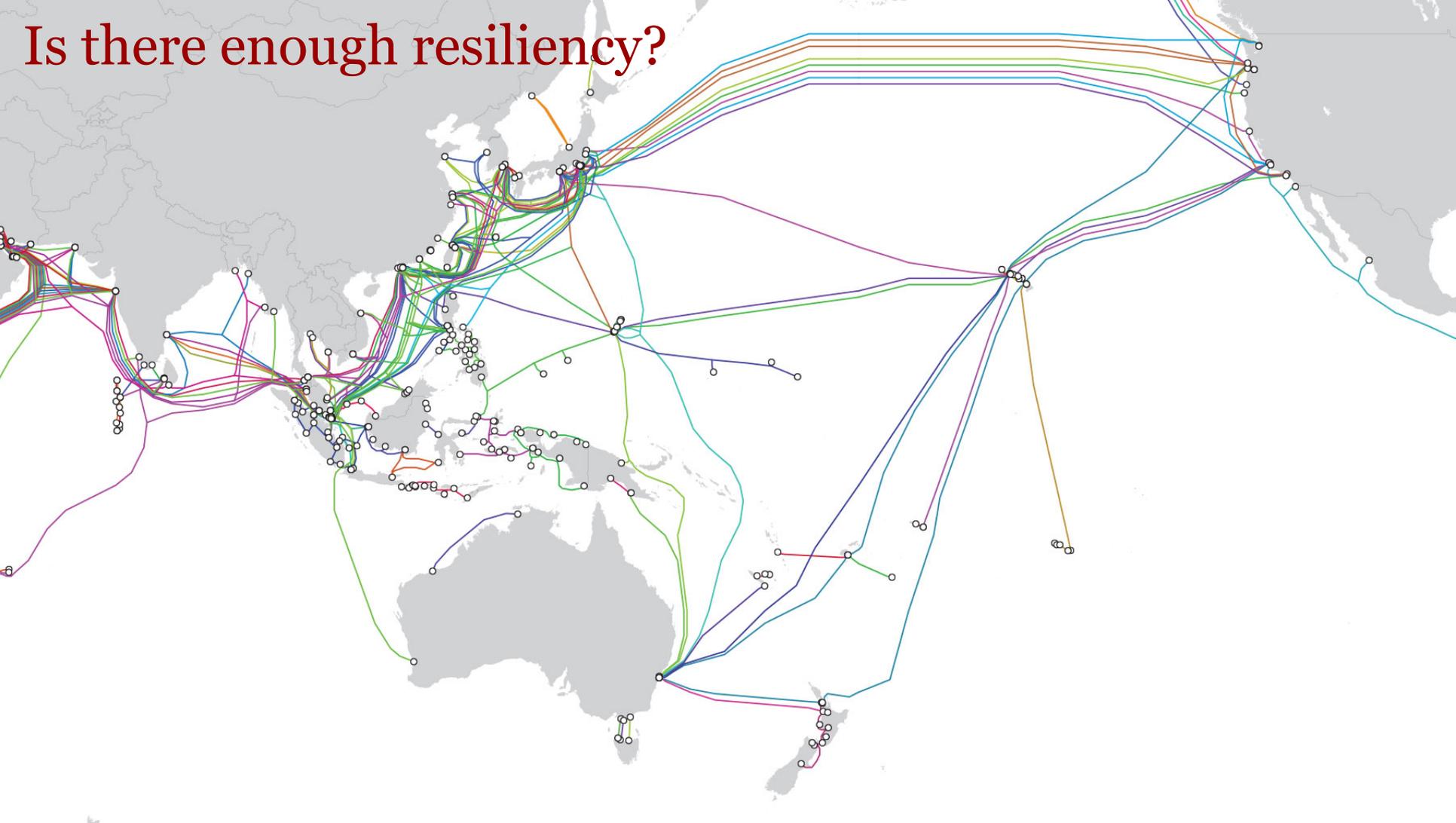
Google to Taiwan



Google to Taiwan and Facebook to the Philippines



Is there enough resiliency?



Examples of cable faults in 2017

Pakistan experiences slow internet due to 'outage in international submarine cable systems'

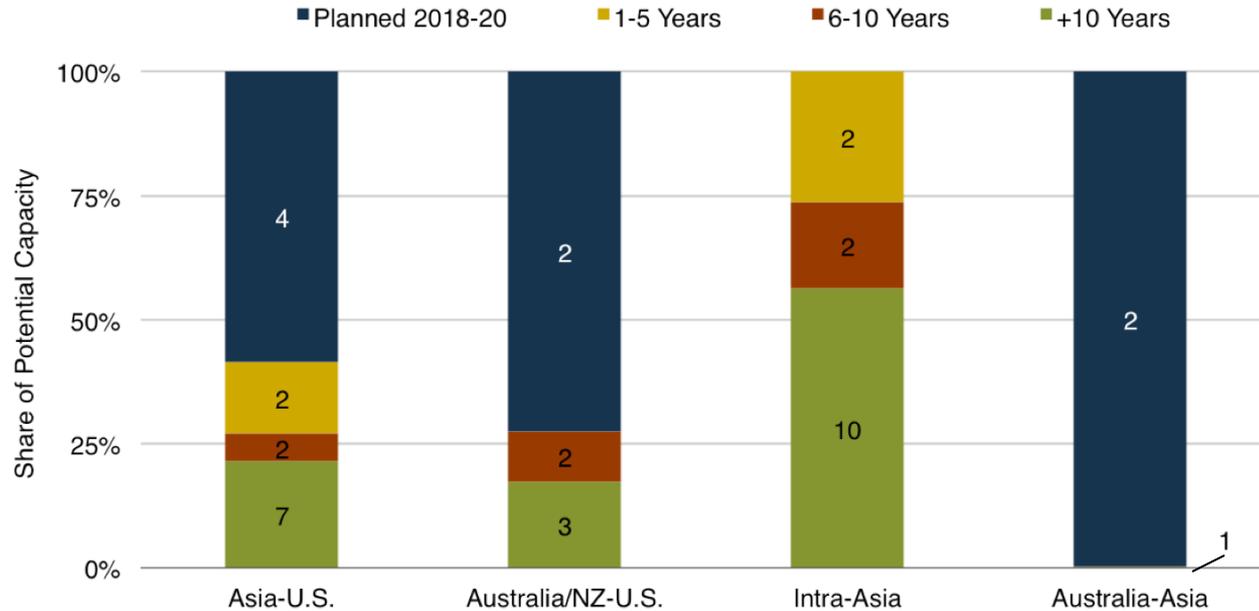
Repairs to Vietnam's busted internet cables to take up to four weeks

Tropical storms sever sub-sea links between Australia and Asia

The damage is leading to increased latency and packet-loss for some local telco customers

More cables needed for diversity

Cable Age and Capacity by Route



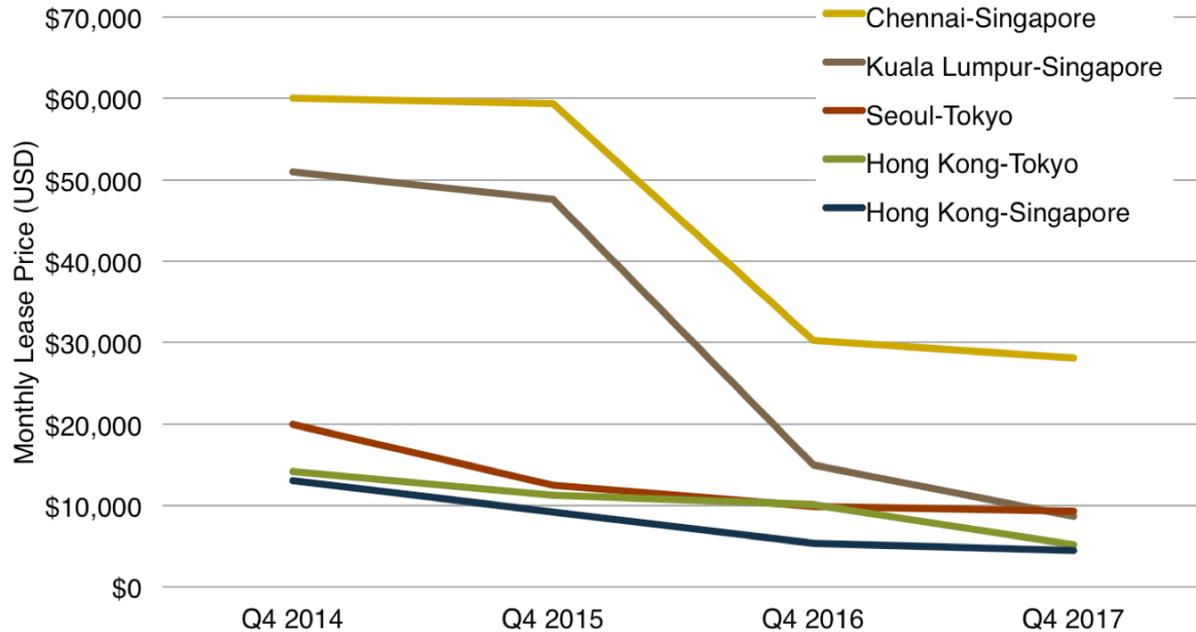
Capacity Pricing

Caution

- TeleGeography has collected pricing data anonymously from operators around the world since 2002. We also confer with buyers to validate market price levels.
- The prices shown on subsequent slides are weighted **median** prices for a **single** unit for a **one-year** term.
 - A broad range of prices exists for all routes/cities.
 - Substantial discounts exist for higher volumes and longer terms.
 - Discounts also exist depending on who you are (carrier or content/cloud provider) and the broader commercial relationship.

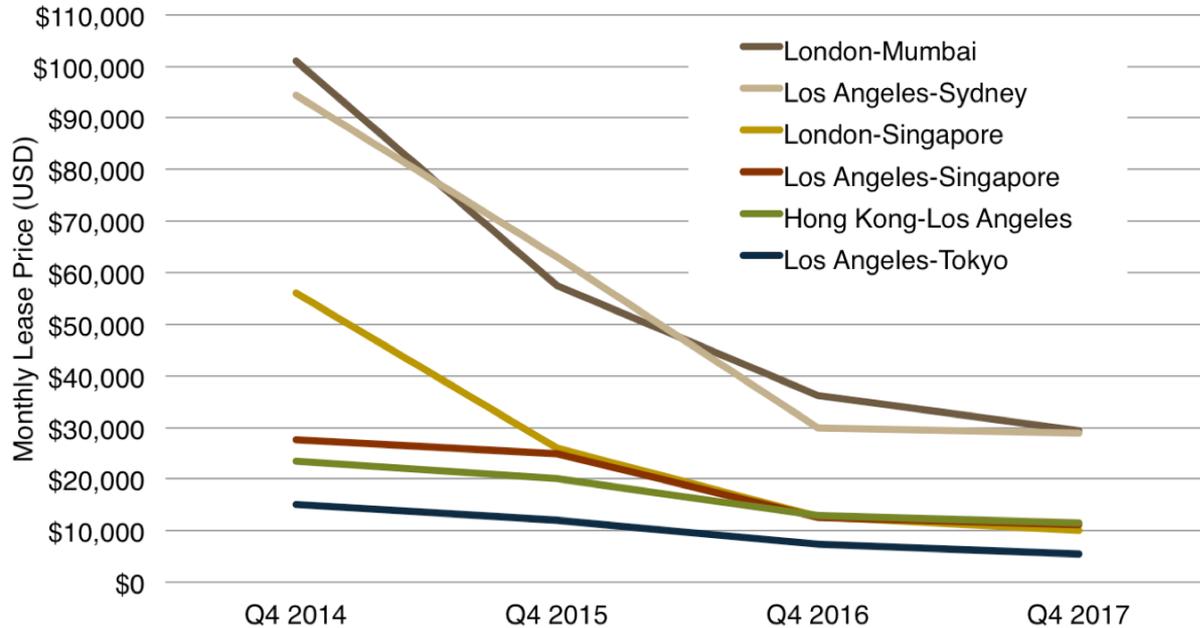
Persistent price erosion within Asia...

Weighted Median Monthly 10 Gbps Prices, Q4 2014-Q4 2017



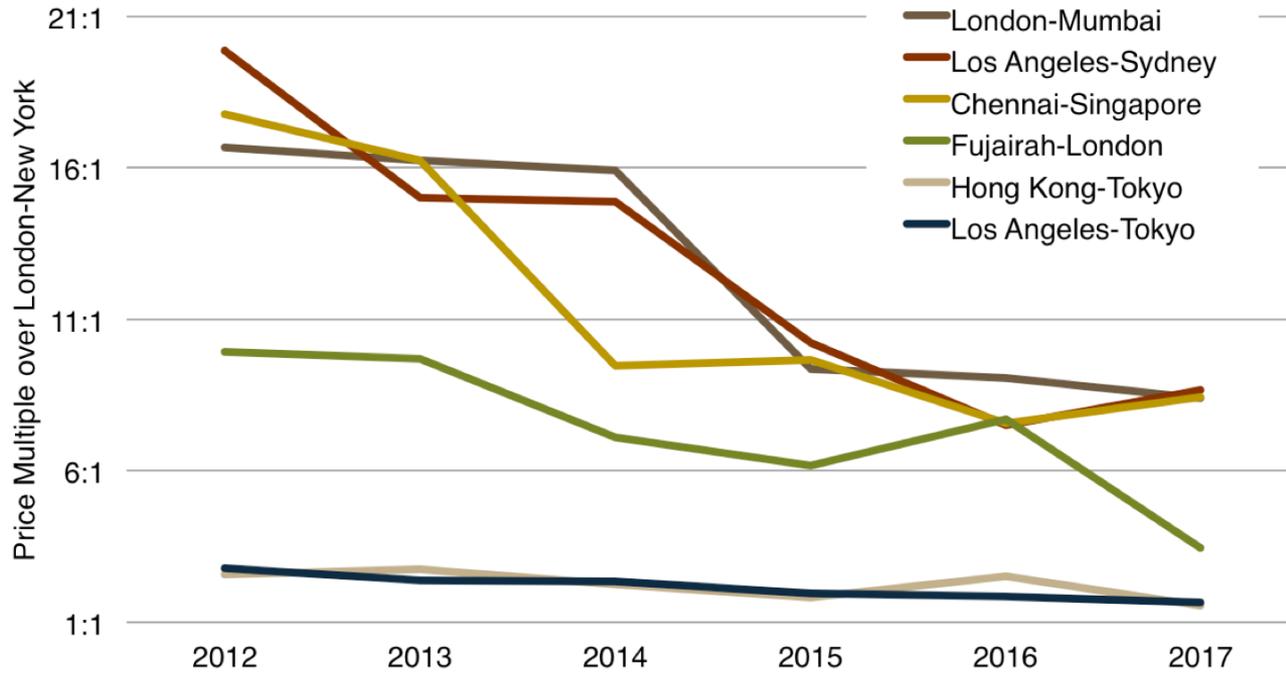
...as well as across the Pacific and to Europe

Weighted Median Monthly 10 Gbps Prices, Q4 2014-Q4 2017



Price differences narrowing

10 Gbps Wavelength Lease Price Multiples over London-New York

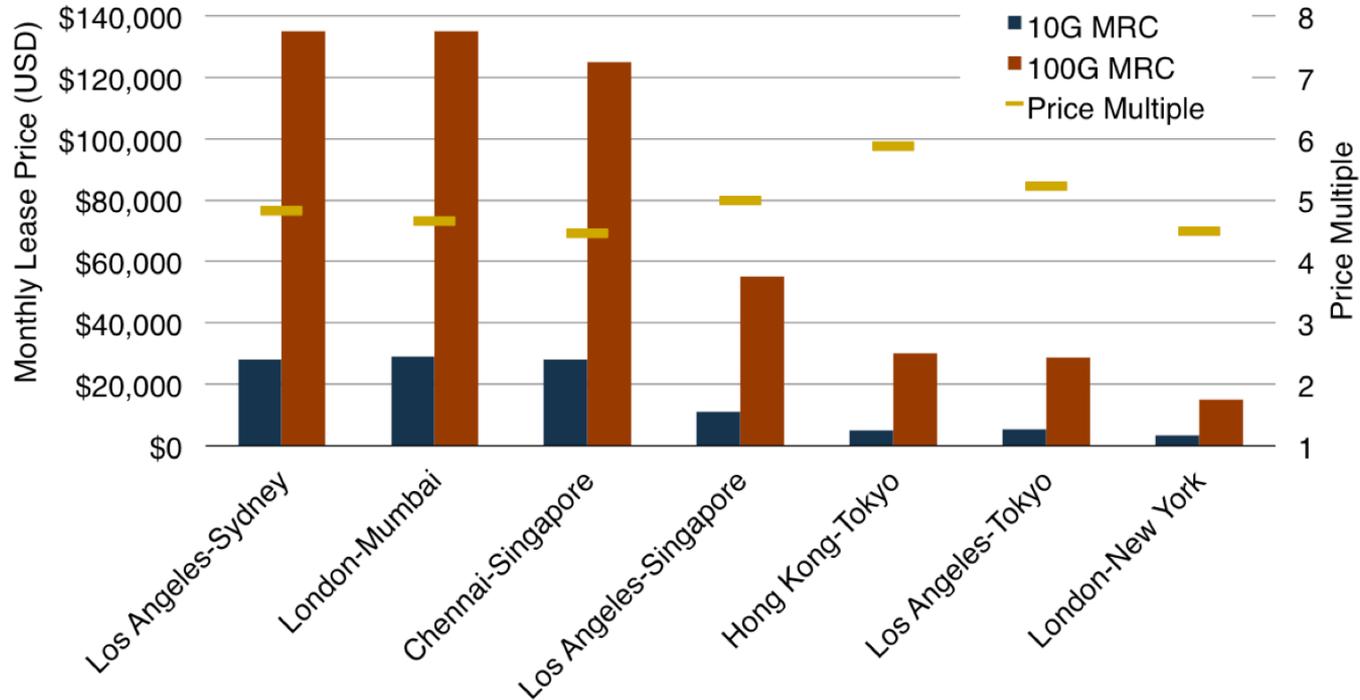


Factors preventing price parity

- Varying demand levels per cable -> differences in unit costs
- Varying number of segments per route -> differences in upgrade costs
- Varying levels of competition -> differences in the price erosion

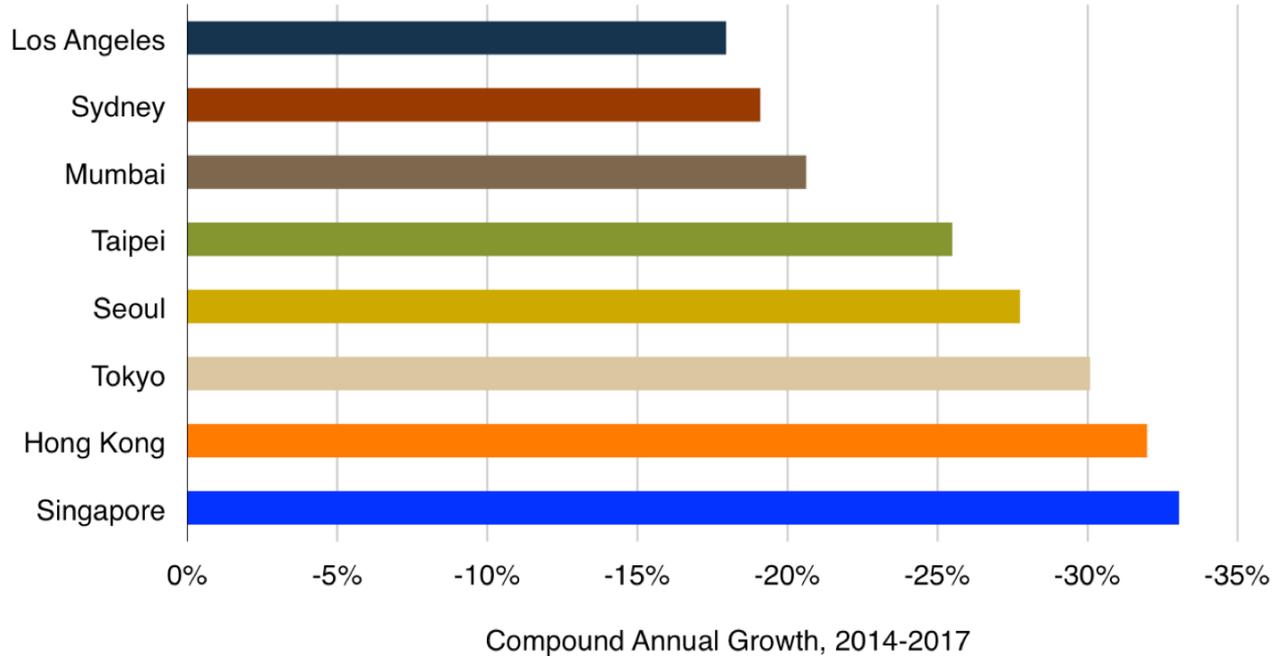
From 10G to 100G

Weighted Median 10 Gbps and 100 Gbps Prices, Q4 2017



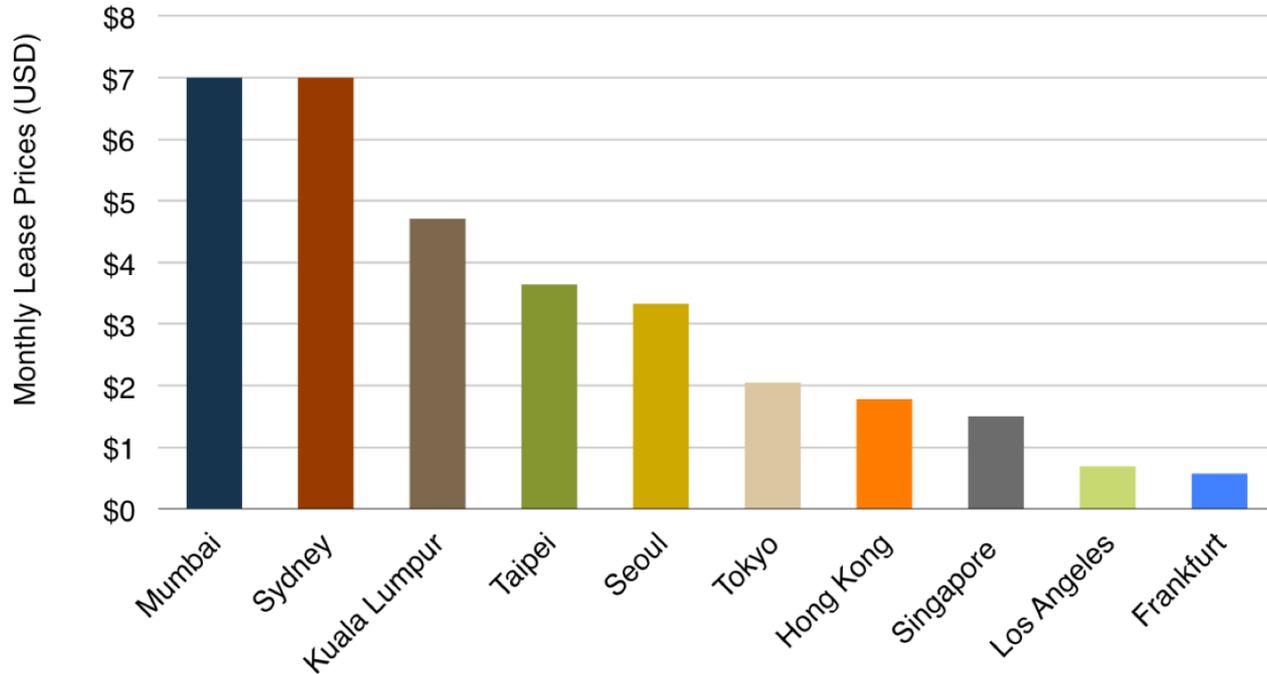
IP transit price erosion continues

Weighted Median 10 GigE IP Transit Prices in Selected Cities, 2014-17 CAGR



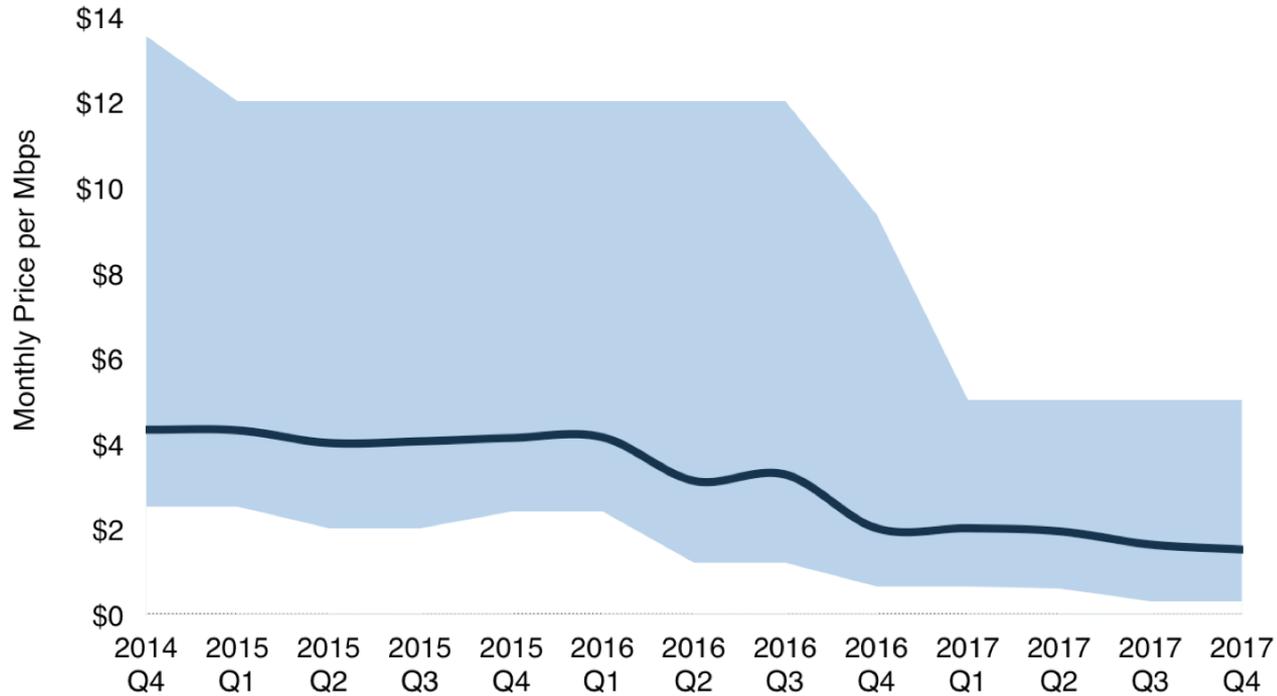
Broad variance among cities...

Weighted Median 10 GigE IP Transit Prices in Selected Cities, Q4 2017

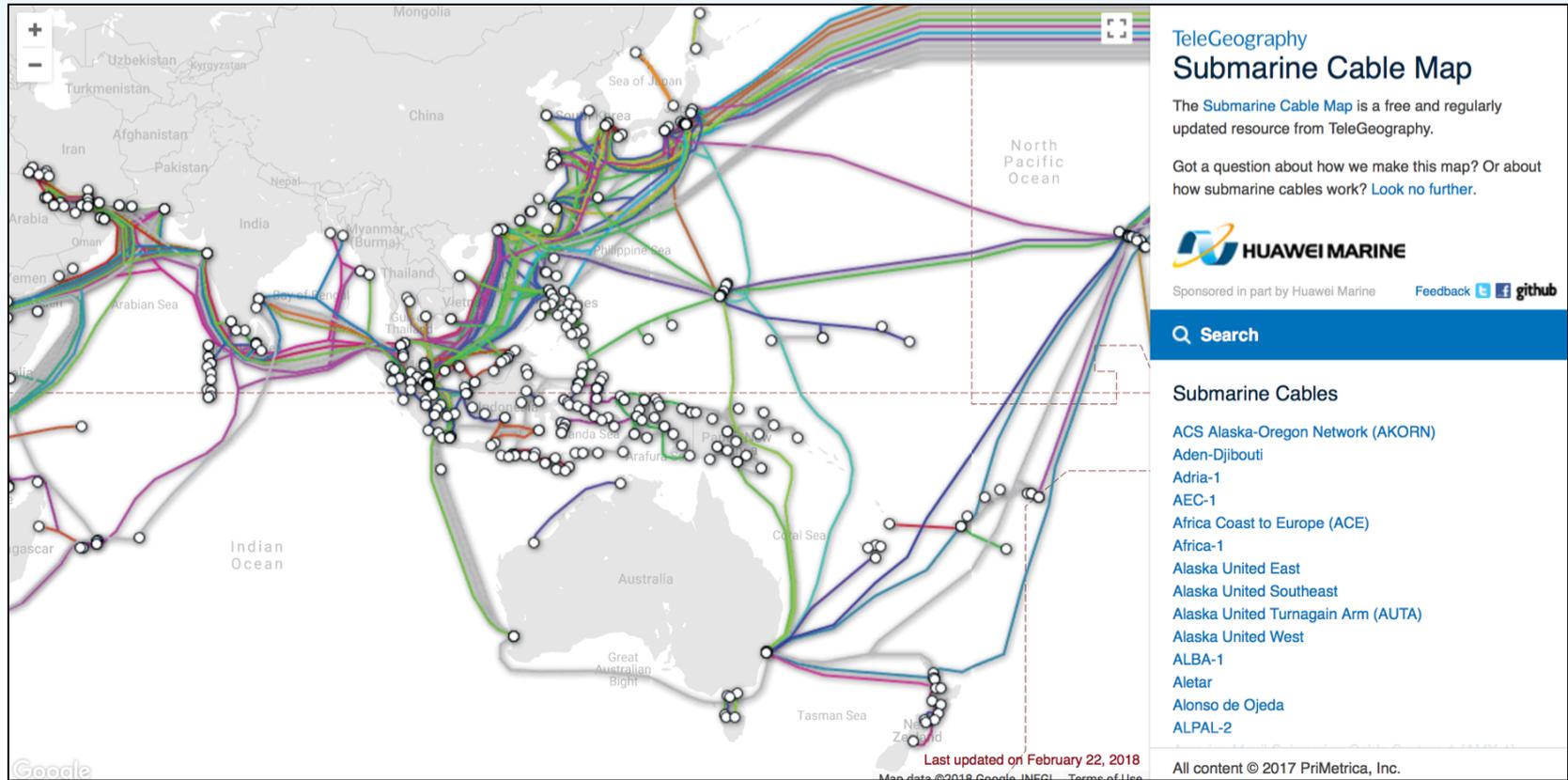


...and within cities

Weighted Median and Price Range for 10 GigE IP Transit in Singapore, 2014-17



For more submarine cable fun...



www.submarinecablemap.com

Thank You

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