

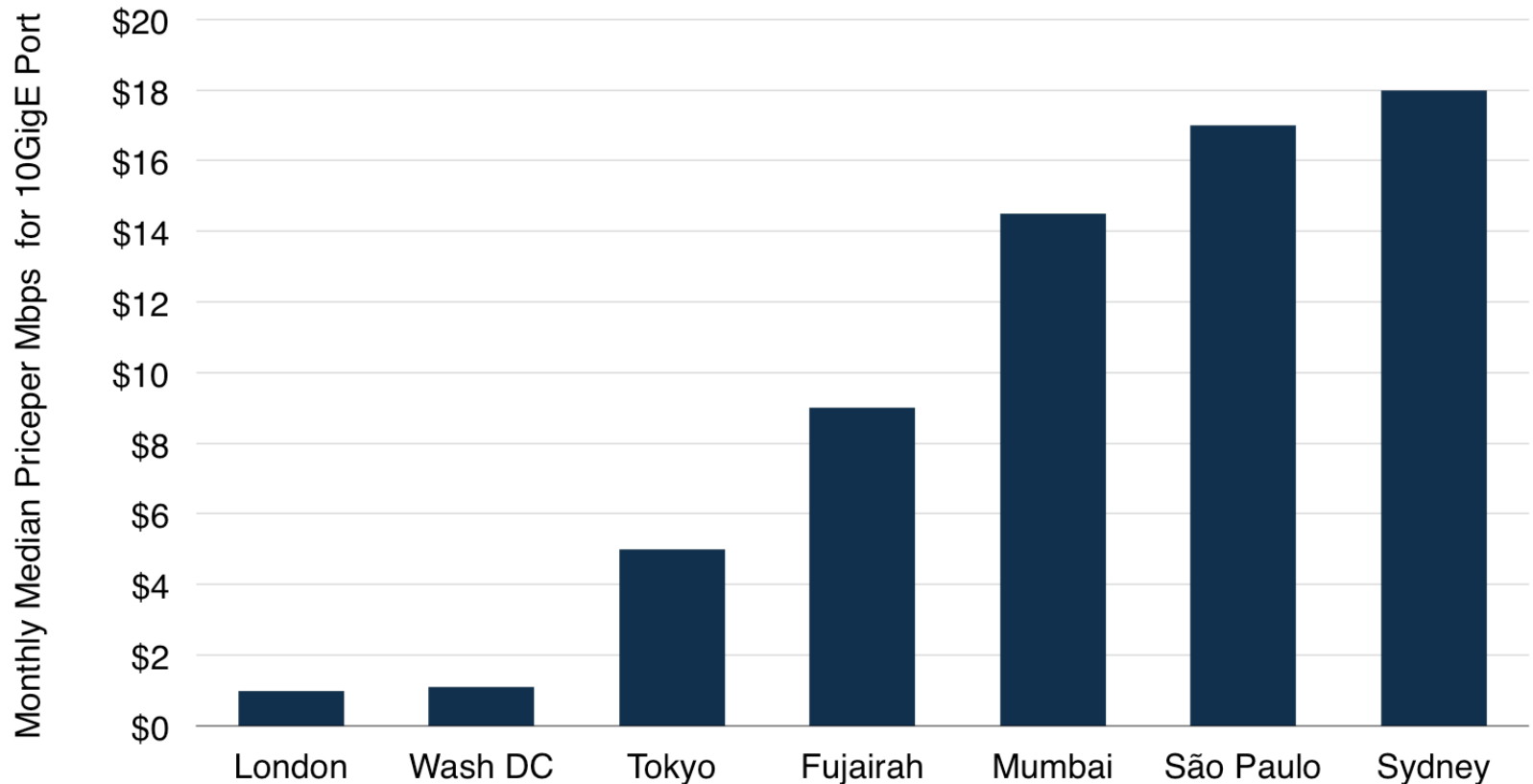
International Network Supply, Traffic, and Pricing

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Weird: IP Transit Prices Vary a Lot

IP Transit Prices, Q2 2015



Contents

- Infrastructure growth
 - How much connects countries
 - How they are connected
- Pricing trends
 - Colocation
 - Networks

Presentation Format

the GAME
SHOW
nerd edition

Today's Winner Will Receive ...



"Bumper Pug, Viking Patriot" Laser printer. 2015.

Methodology

- Infrastructure data
 - Collected directly from providers via survey
 - Summed by geography (city, country, route, etc.)
- Pricing data
 - Collected directly from providers (and buyers) via survey
 - Anonymized

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Question #1

How fast was international capacity growth last year?



Doubling every year



Doubling every 2 years

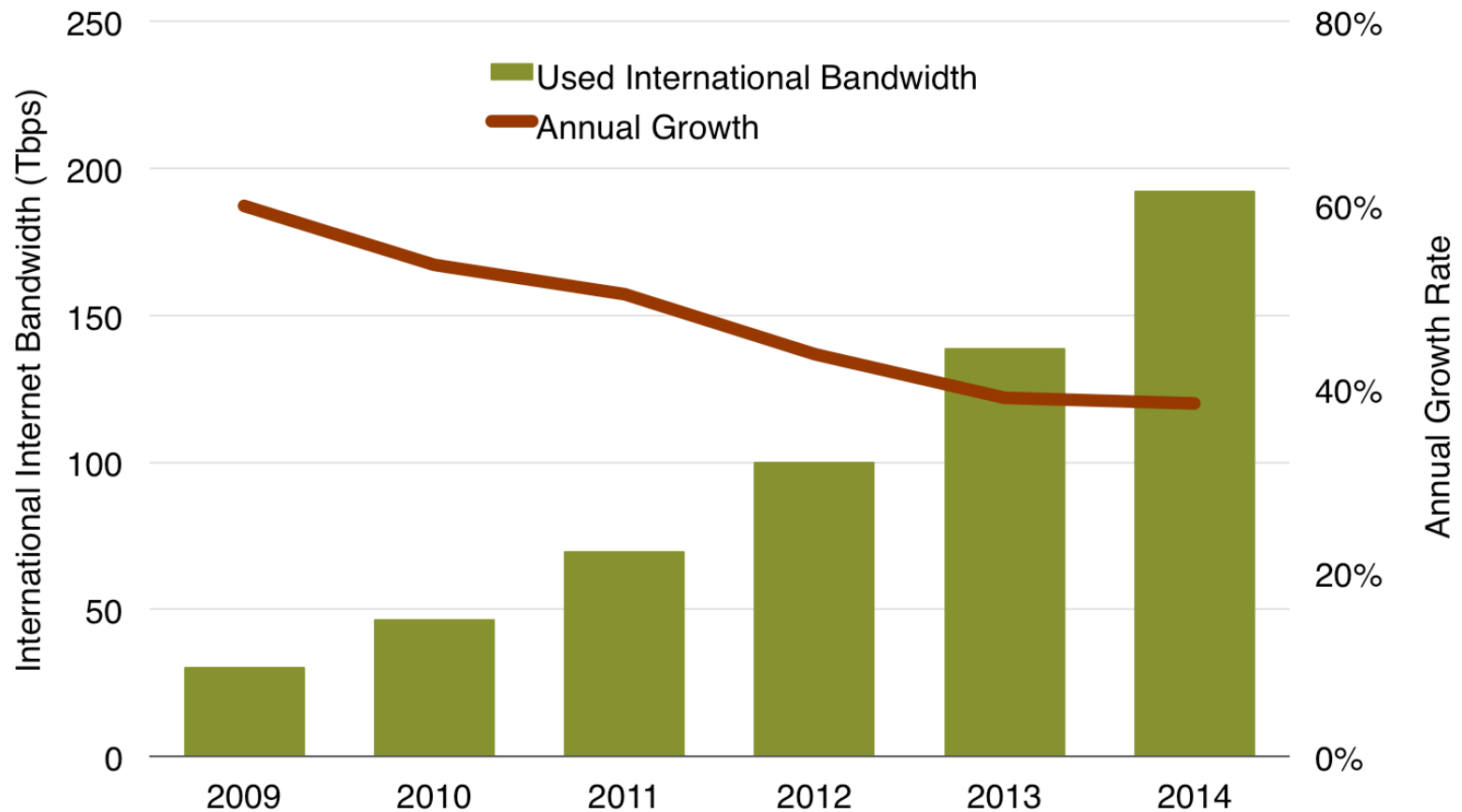


Doubling every 5 years

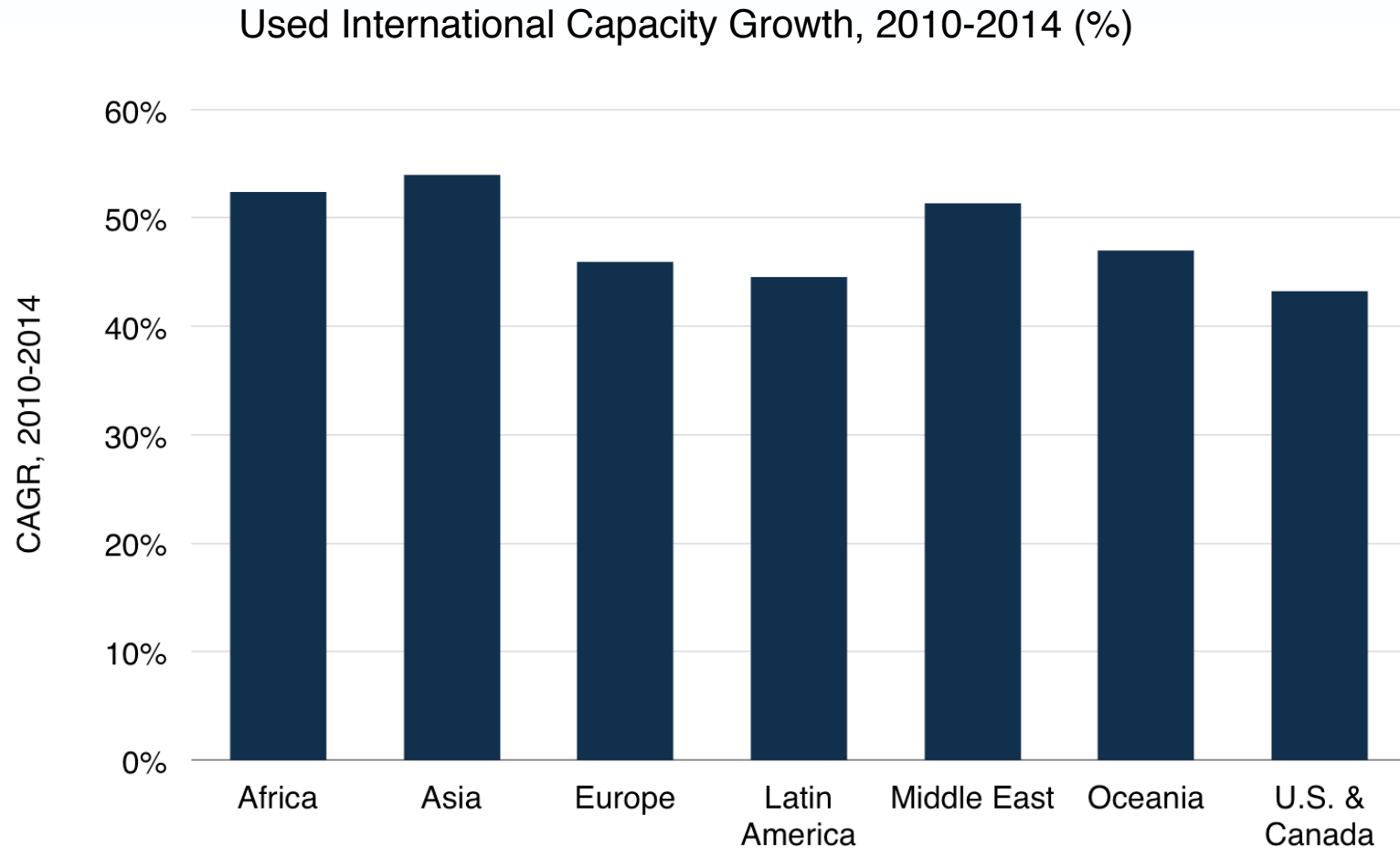


Doubling every 10 years

Growth Fundamentals Still Solid

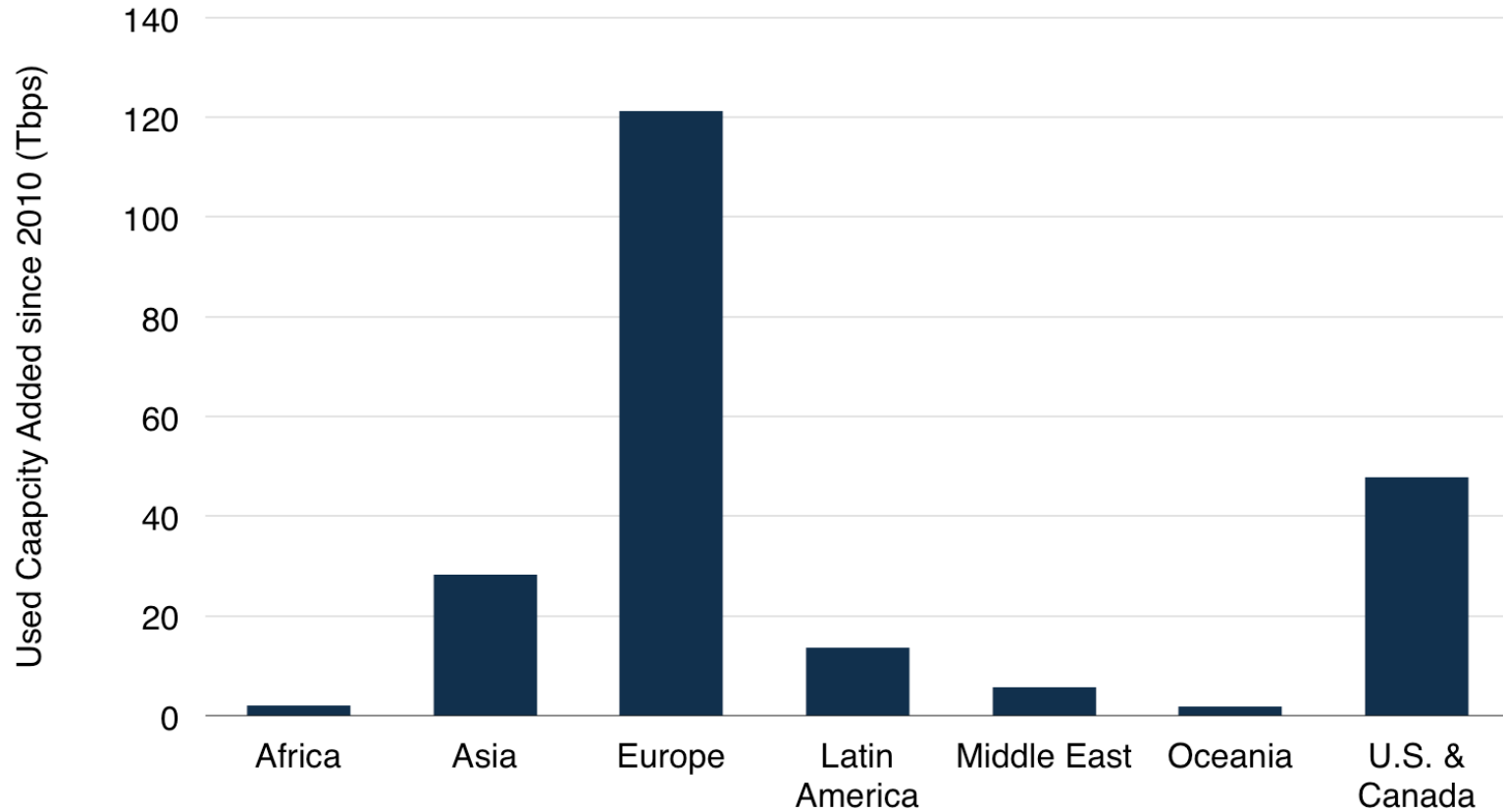


Higher Growth in Developing Markets

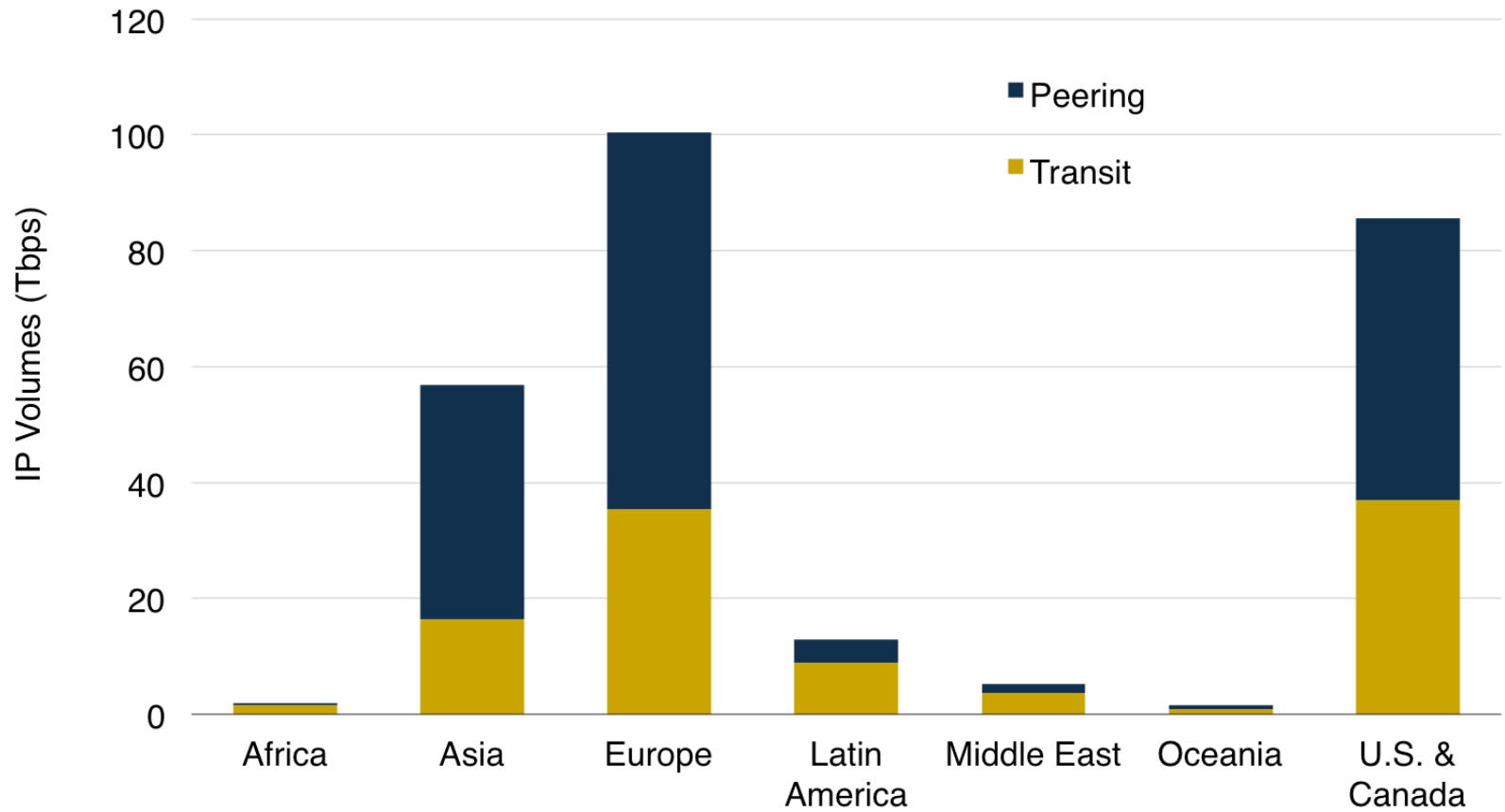


... but Scale Still Matters

Used International Capacity Growth, 2010-2014 (Tbps)



IP Transit Volumes

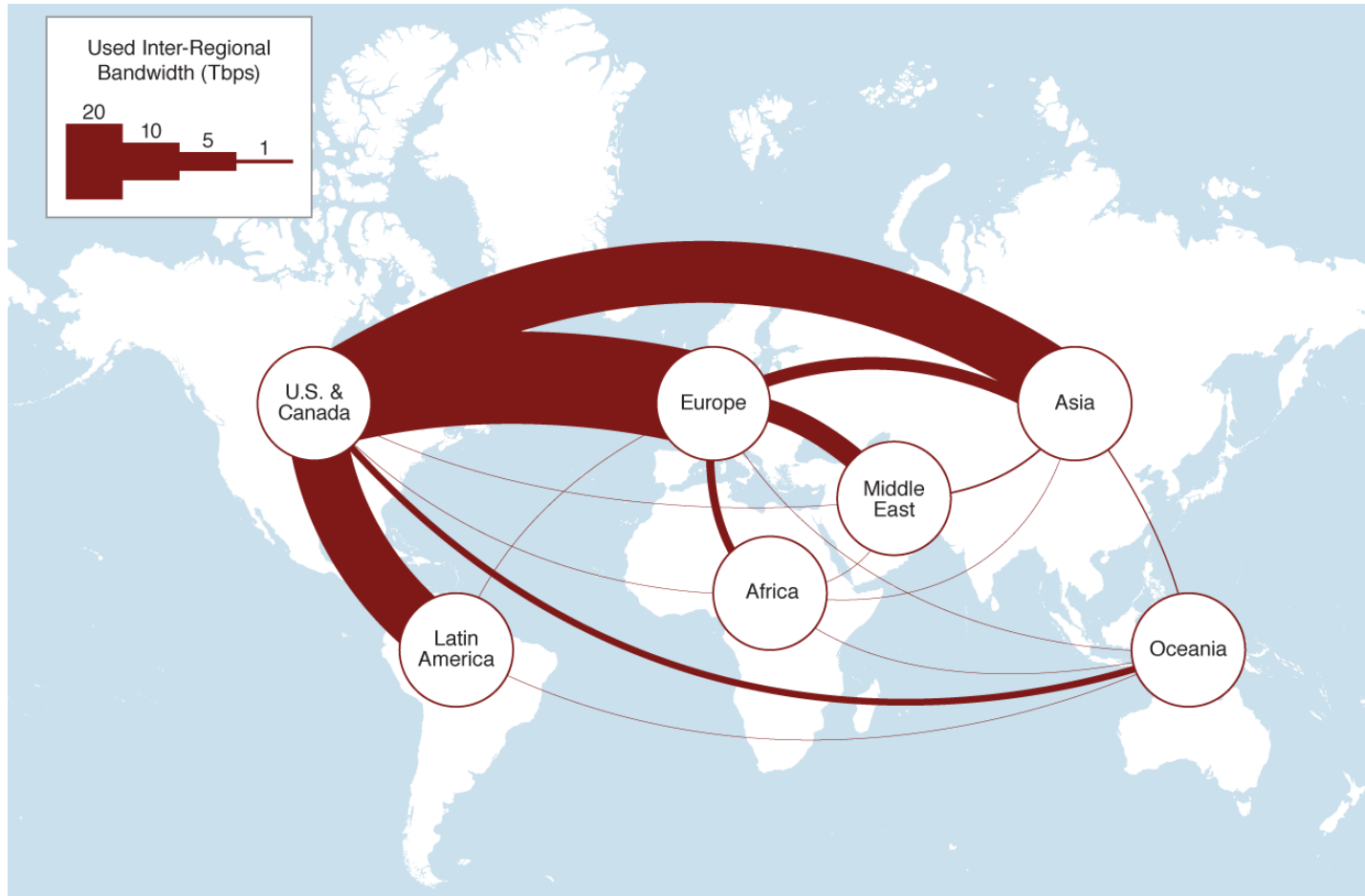


Contents

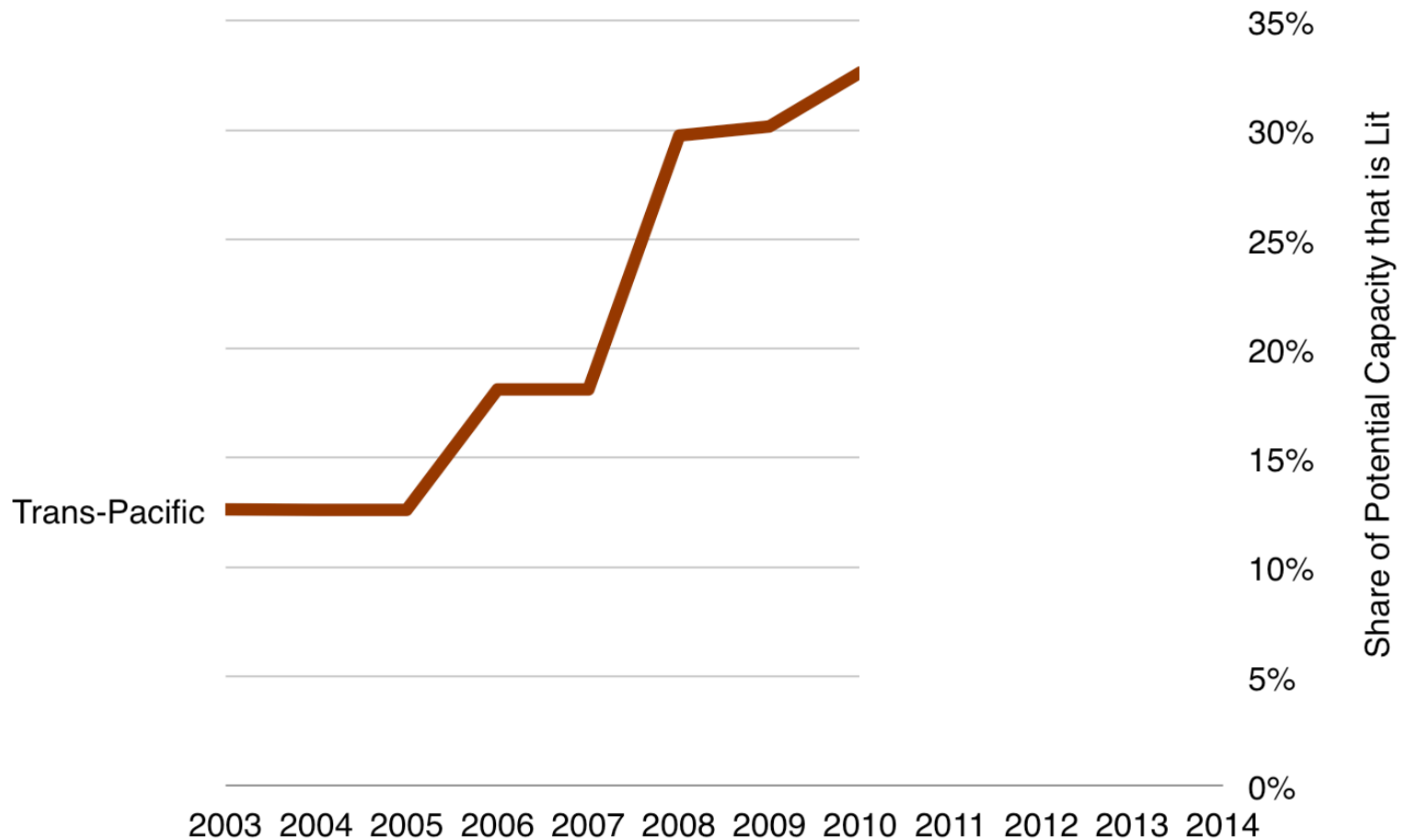
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How It All Connects

Used Inter-Regional Bandwidth, 2014



Capacity Lit Over Time



Question #2

What share of potential capacity across trans-Pacific cables is now lit?



25%



35%

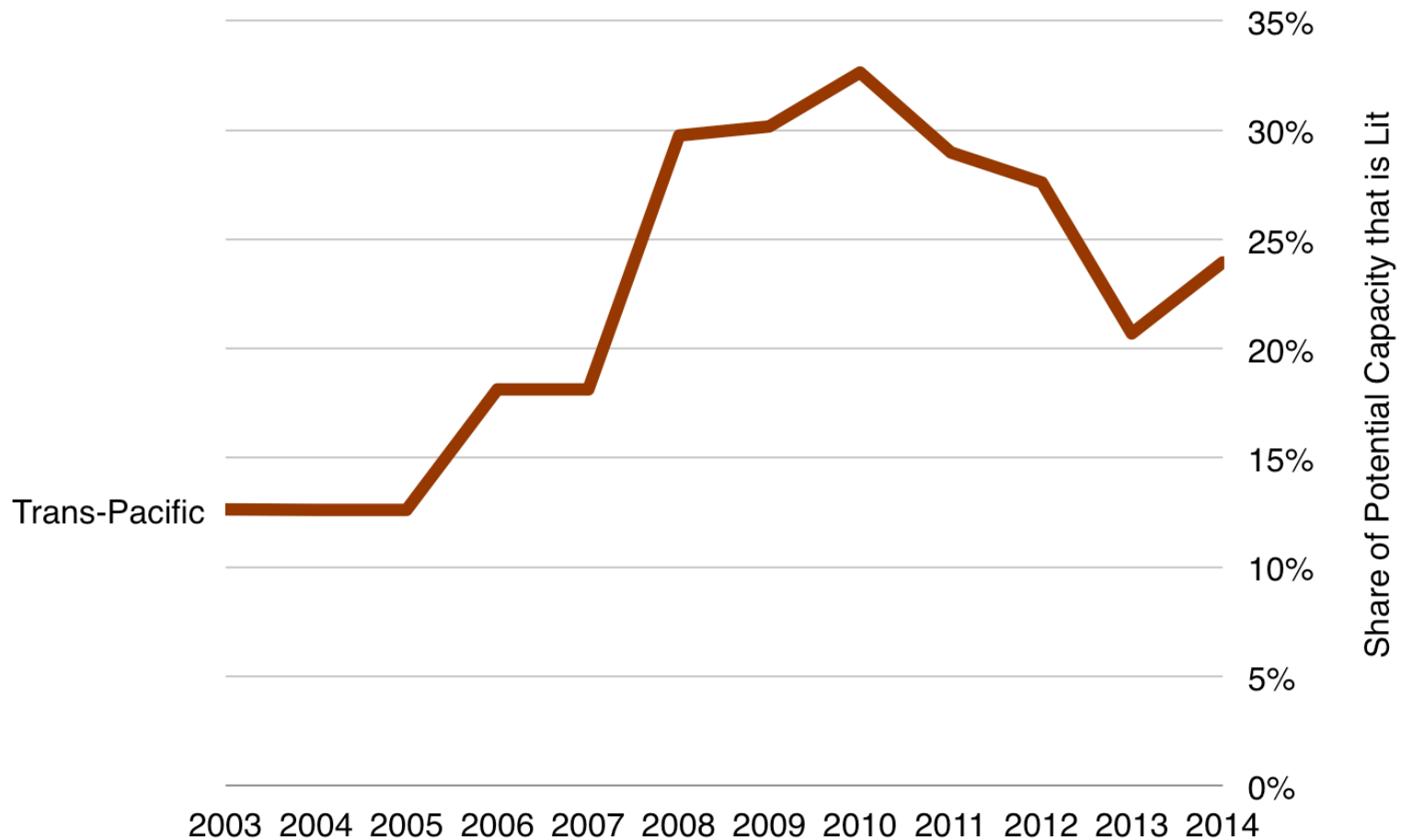


55%



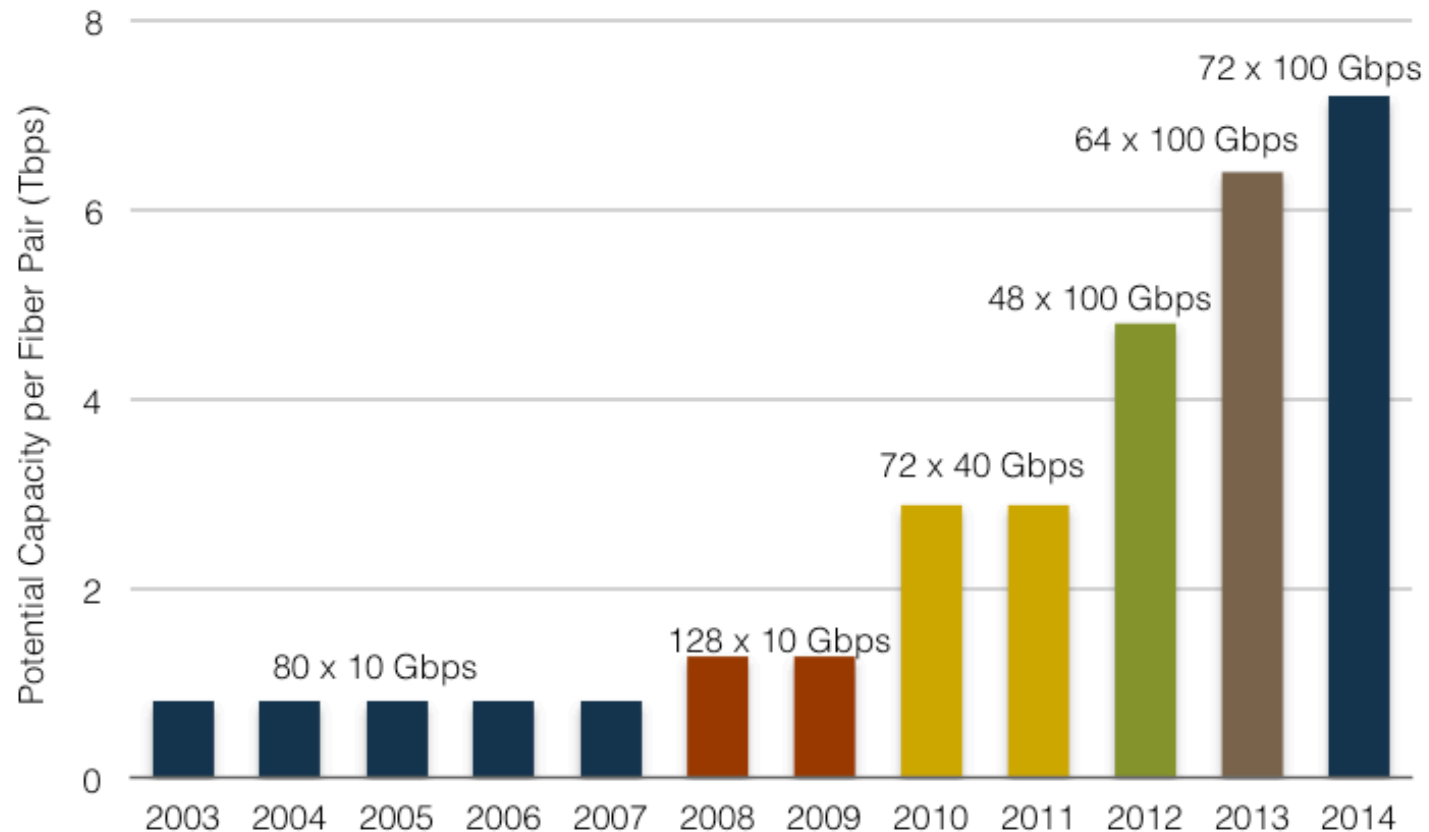
95%

Still Plenty of Potential Capacity

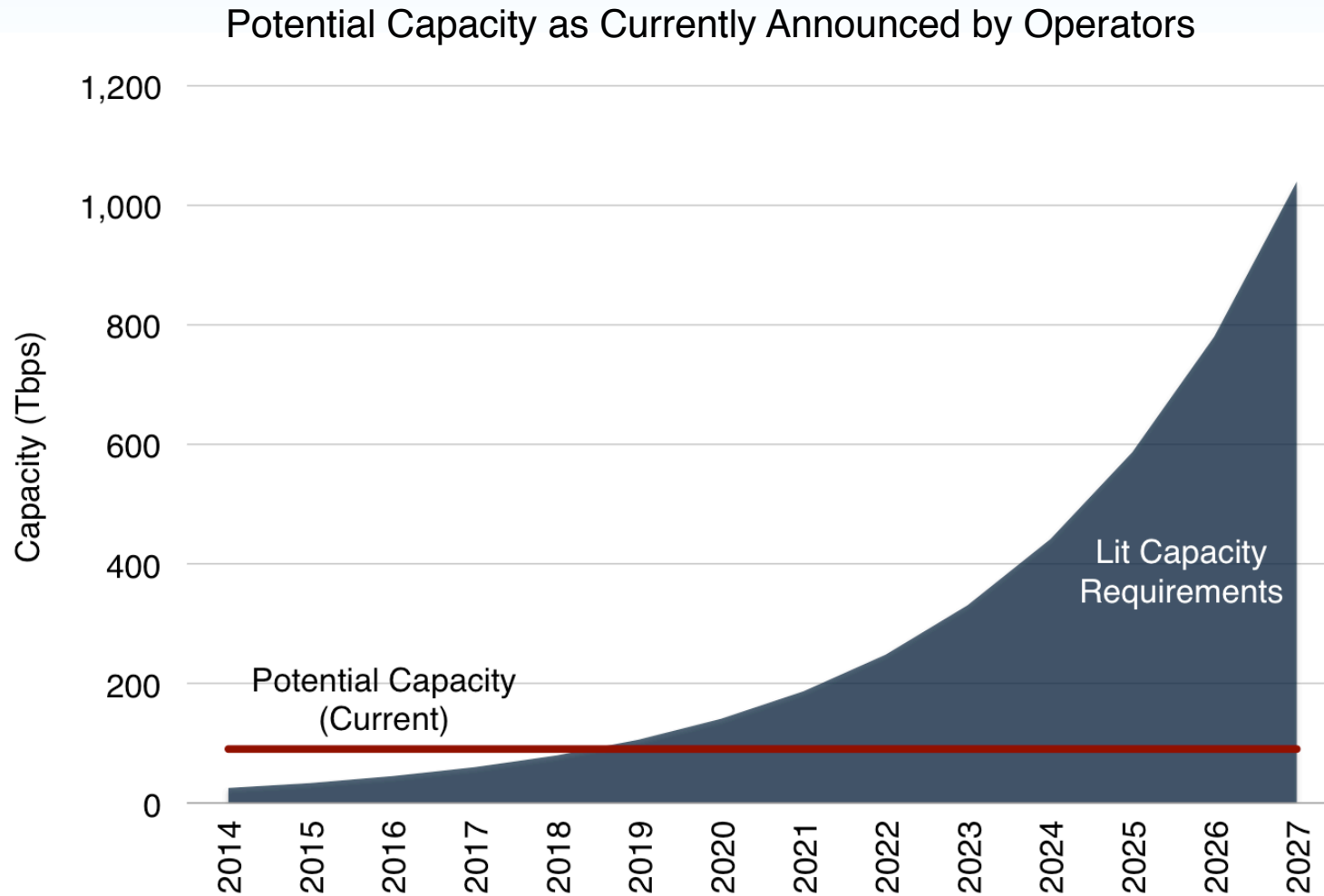


From a 10G to a 100G World

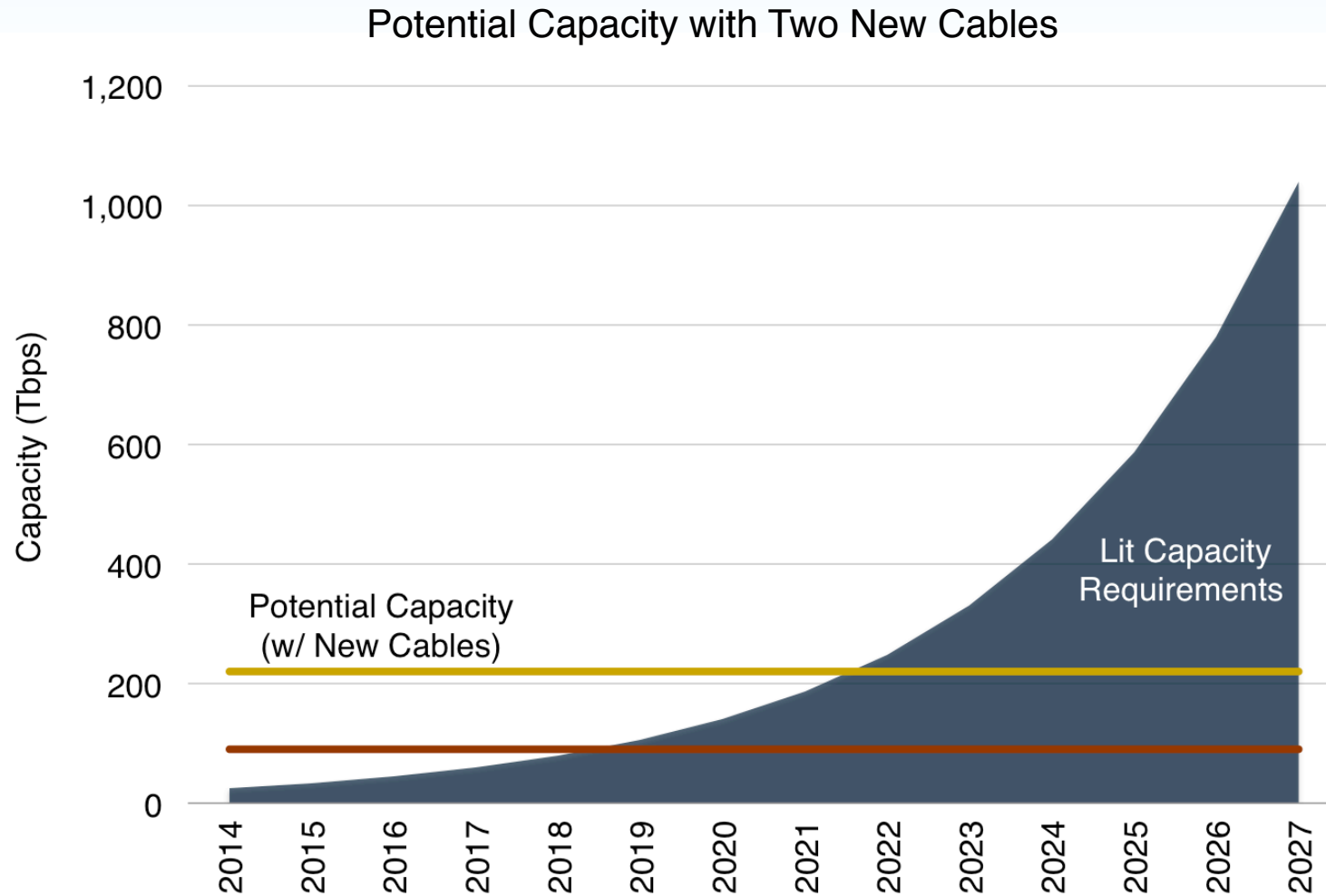
Potential Capacity per Fiber Pair on Apollo Cable, 2003-2014



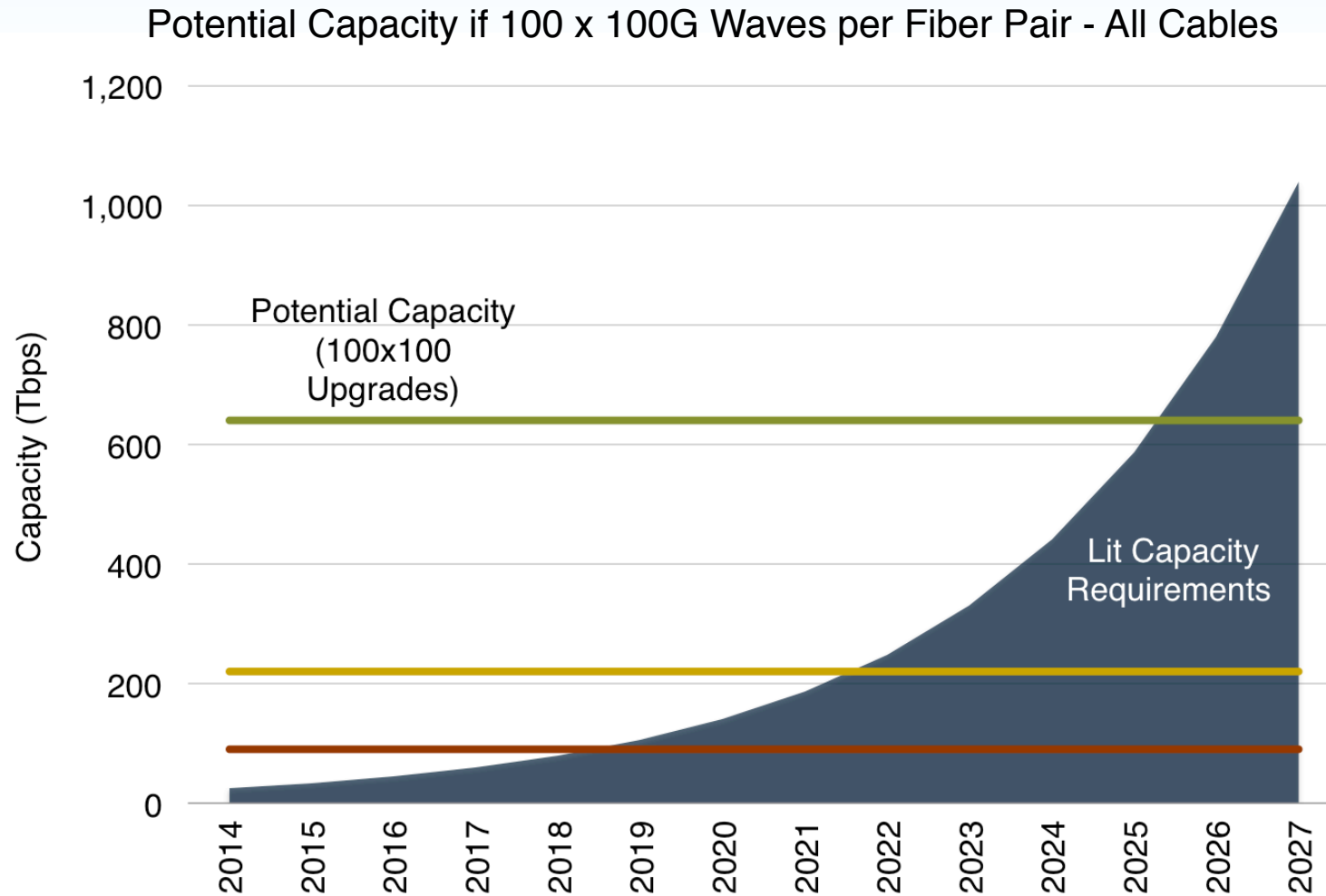
Trans-Pacific Potential Capacity



Trans-Pacific Potential Capacity

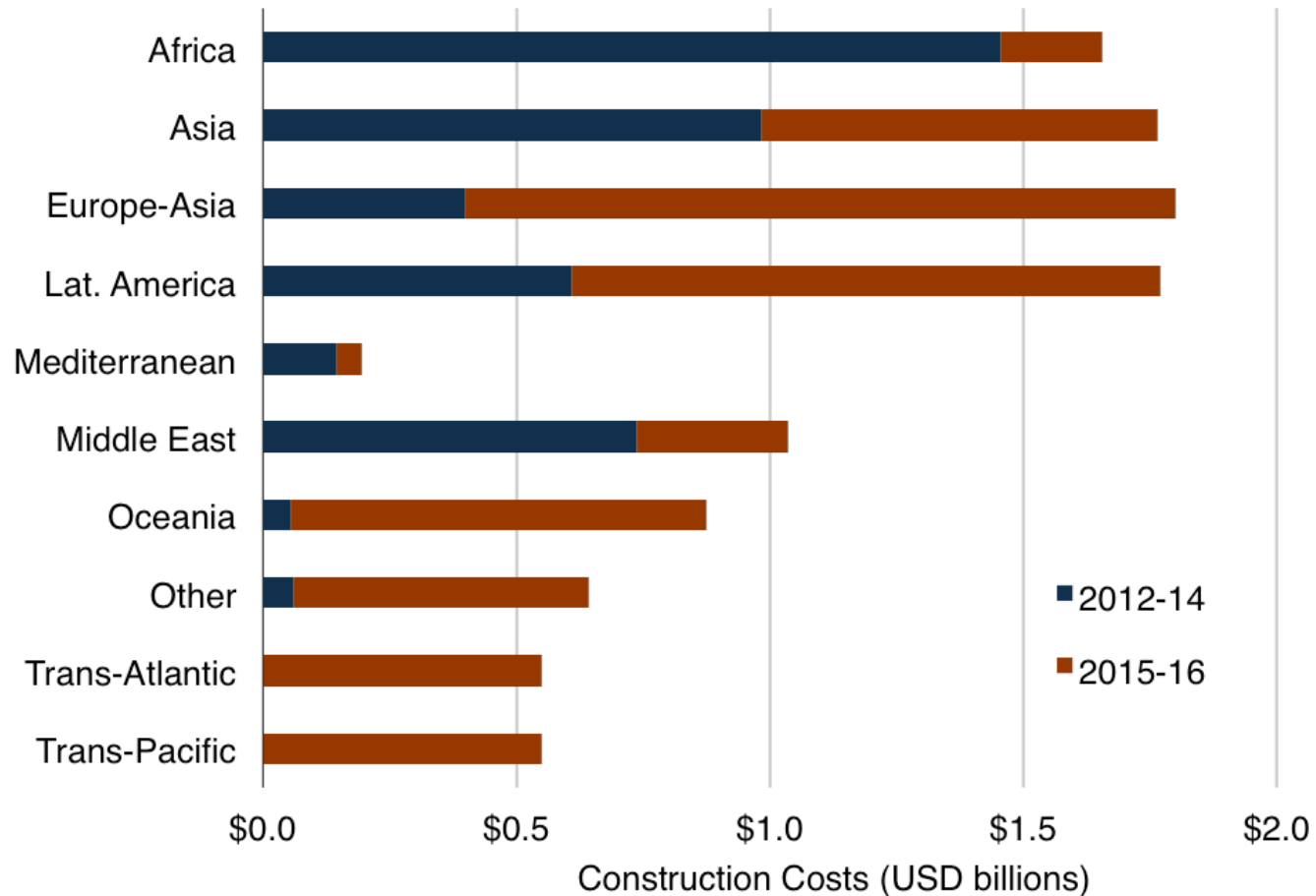


Trans-Pacific Potential Capacity

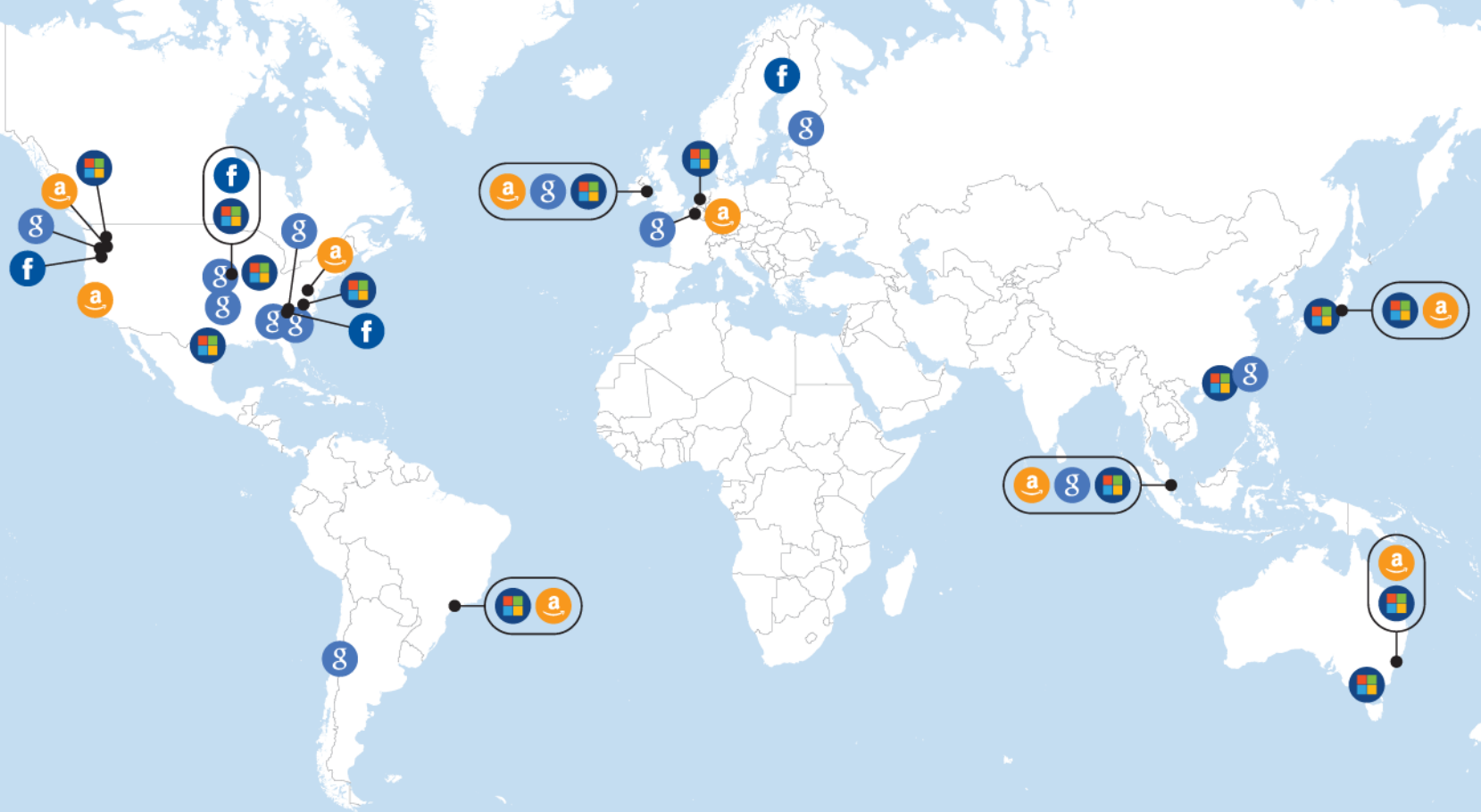


And Yet...More Cables Coming?!

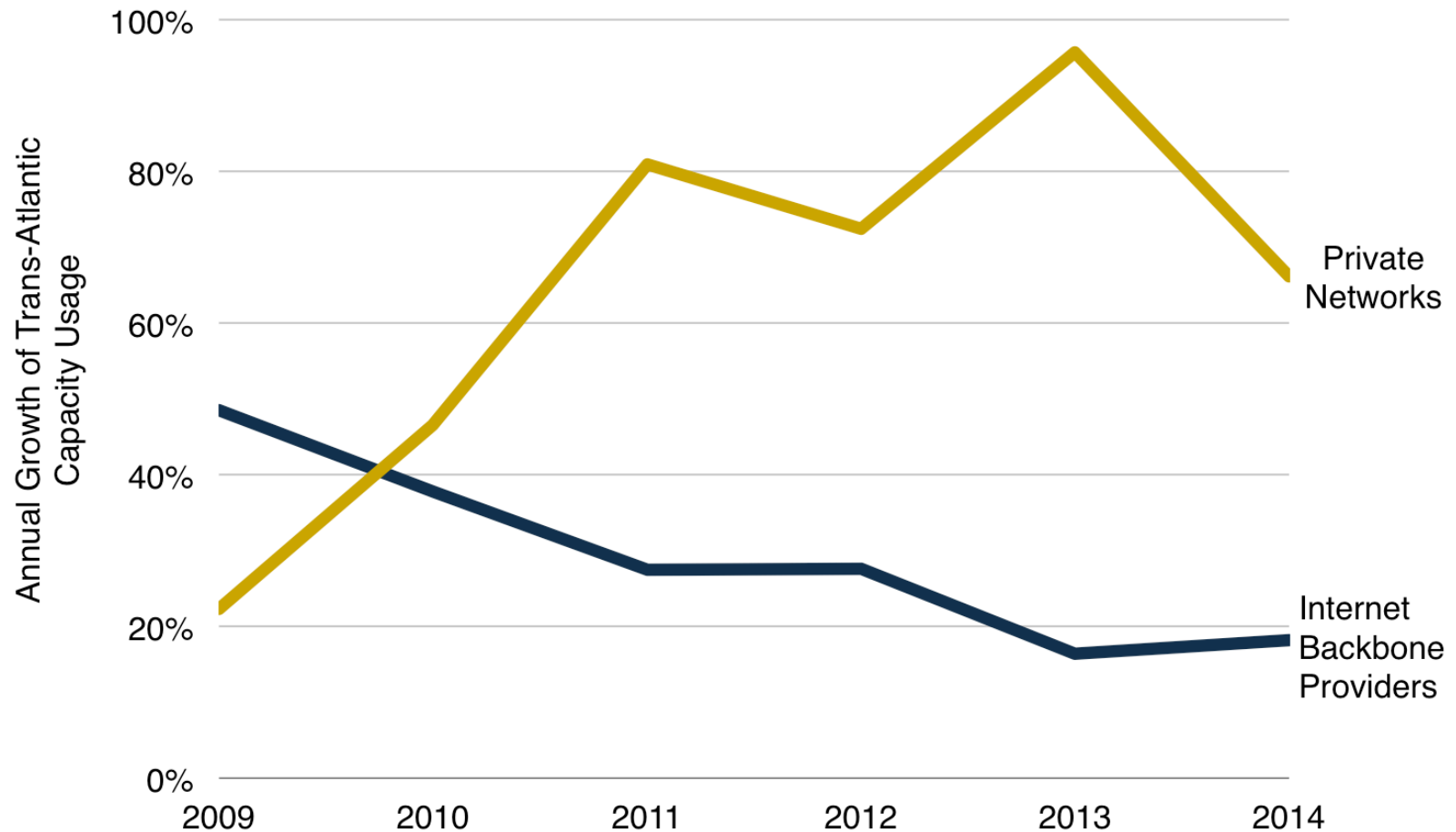
Construction Cost of New Submarine Cables Entering Service by Region, 2012-2016



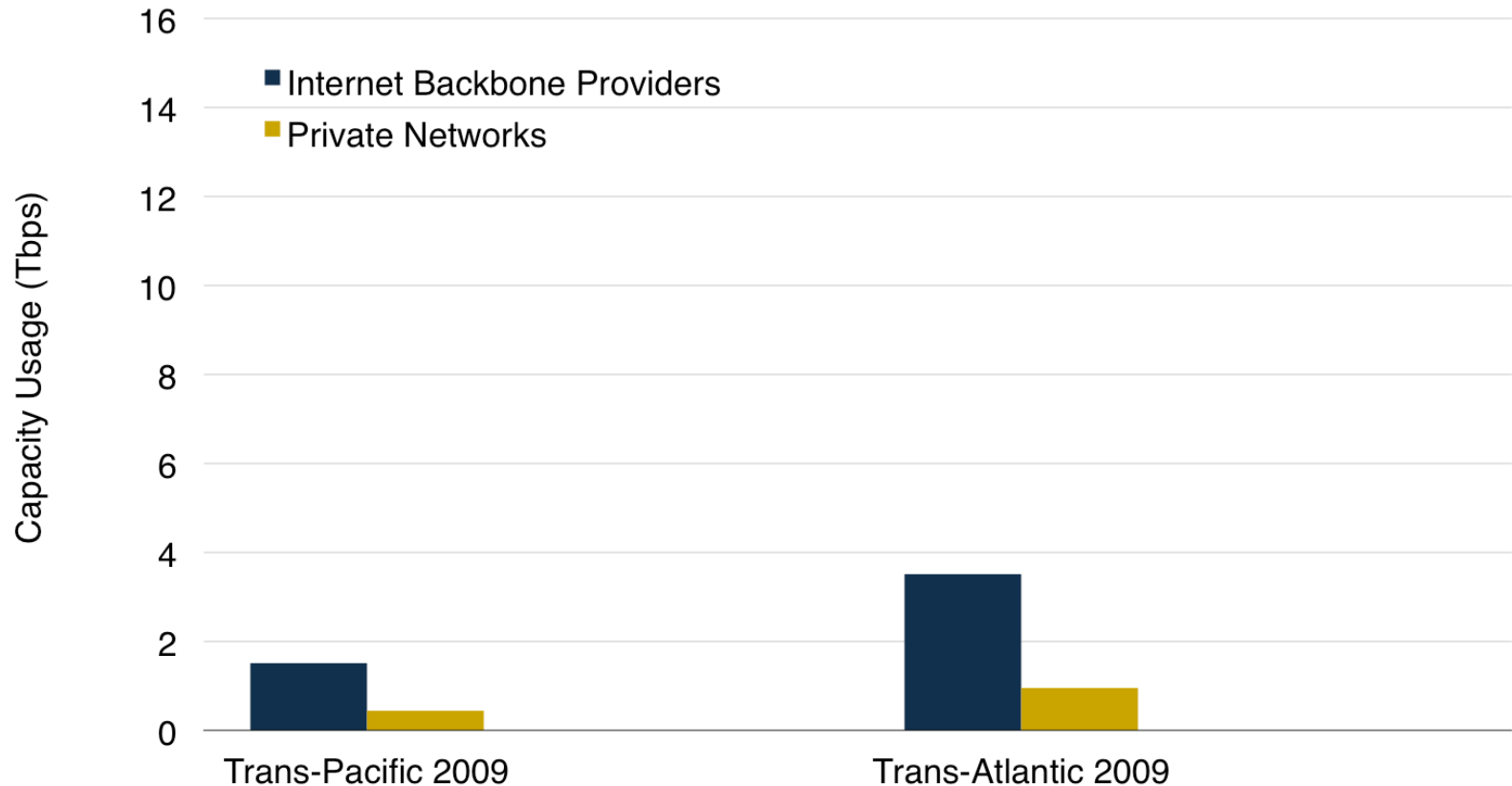
Connecting These Things Requires Bandwidth



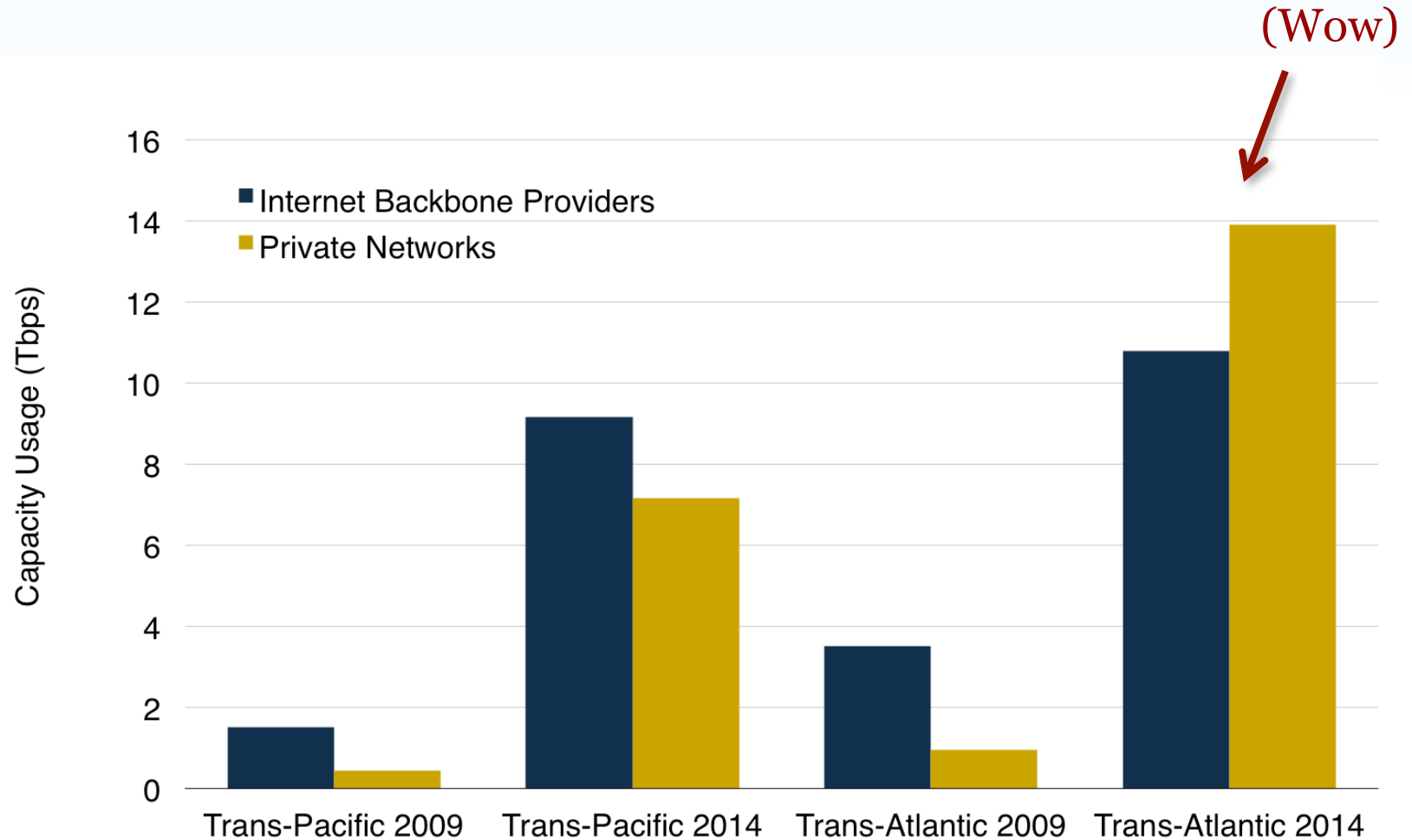
Private Networks Have Grown Fast



... and Are Now Sizeable



... and Are Now Sizeable



There's a Word for This Type of Market

“Oligopsony”

Examples of Oligopsony

- Oligopsony: market with a few, large buyers
- Example 1



Question #3

What product does this oligopsony (Cargill, ADM, and Callebaut) buy?



Canola Oil



Cocoa



Bauxite Ore



Uranium

Examples of Oligopsony

- Oligopsony: market with a few, large buyers
- Example 1



– Cocoa Industry

- Example 2

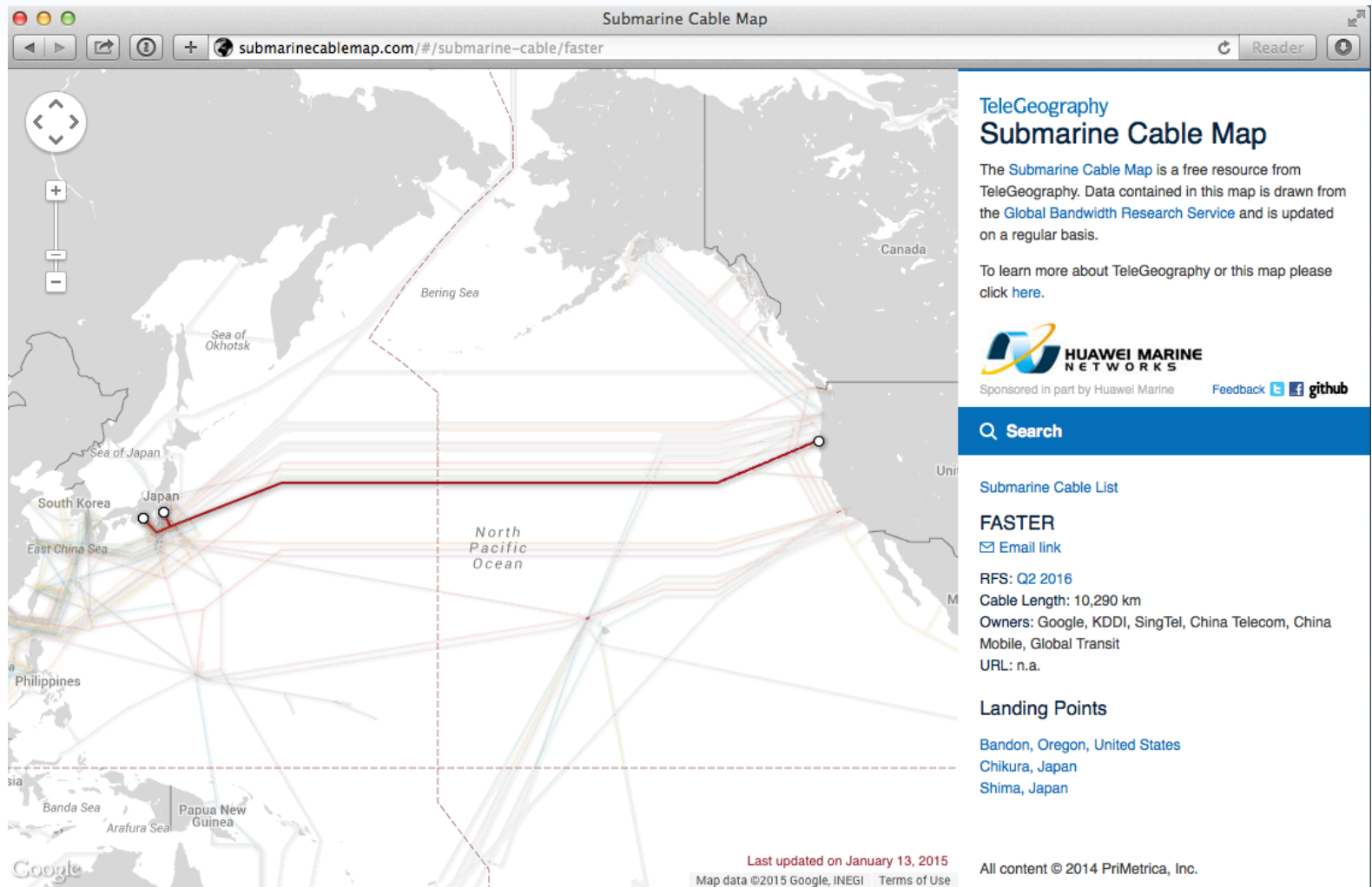


Altria



– Tobacco Industry

FASTER



Question #4

Which planned undersea cable on the U.S-South America route is code-named for a famous artist?



Da Vinci



Michelangelo



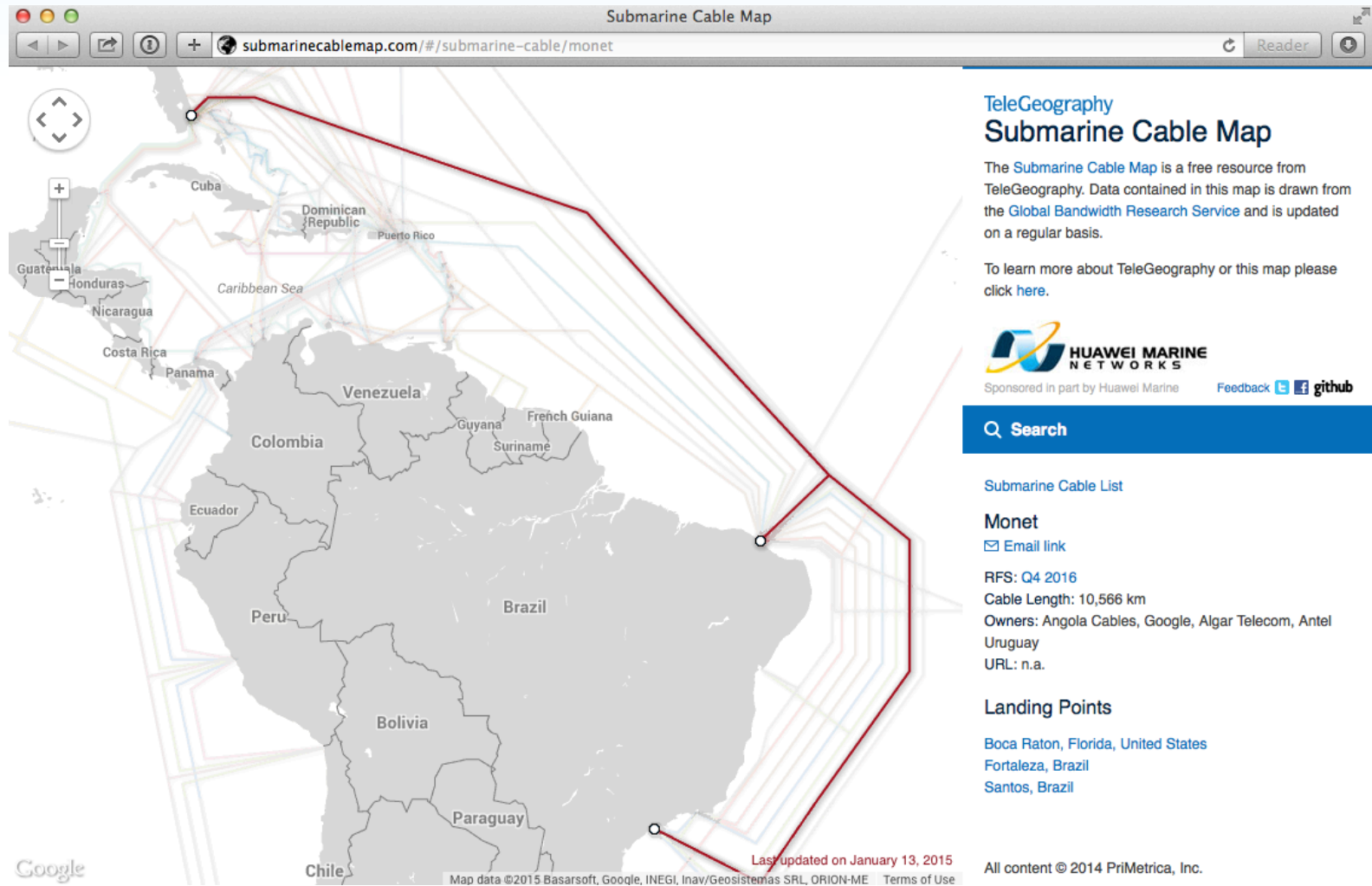
Monet



Warhol



Monet Undersea Cable: New Trend?

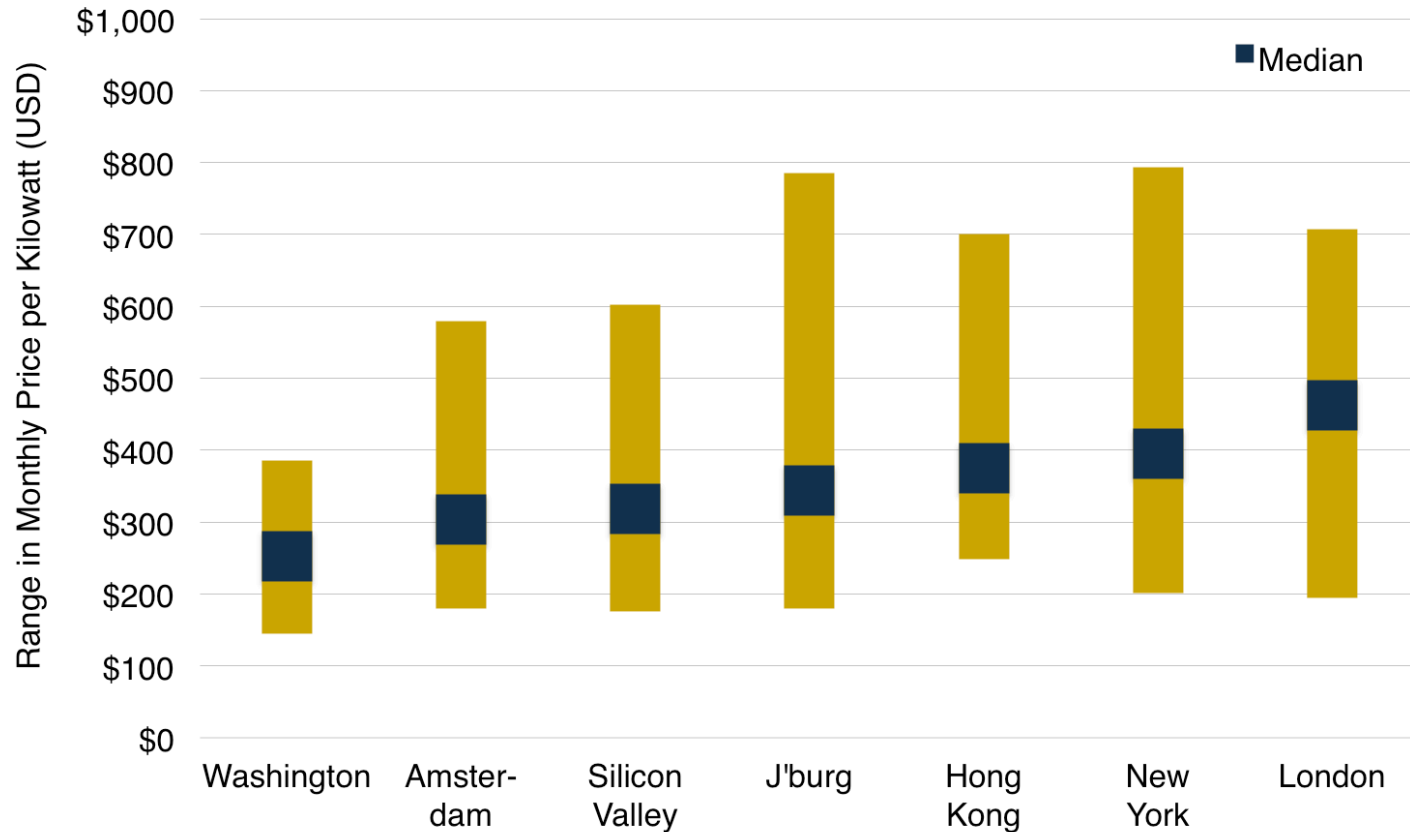


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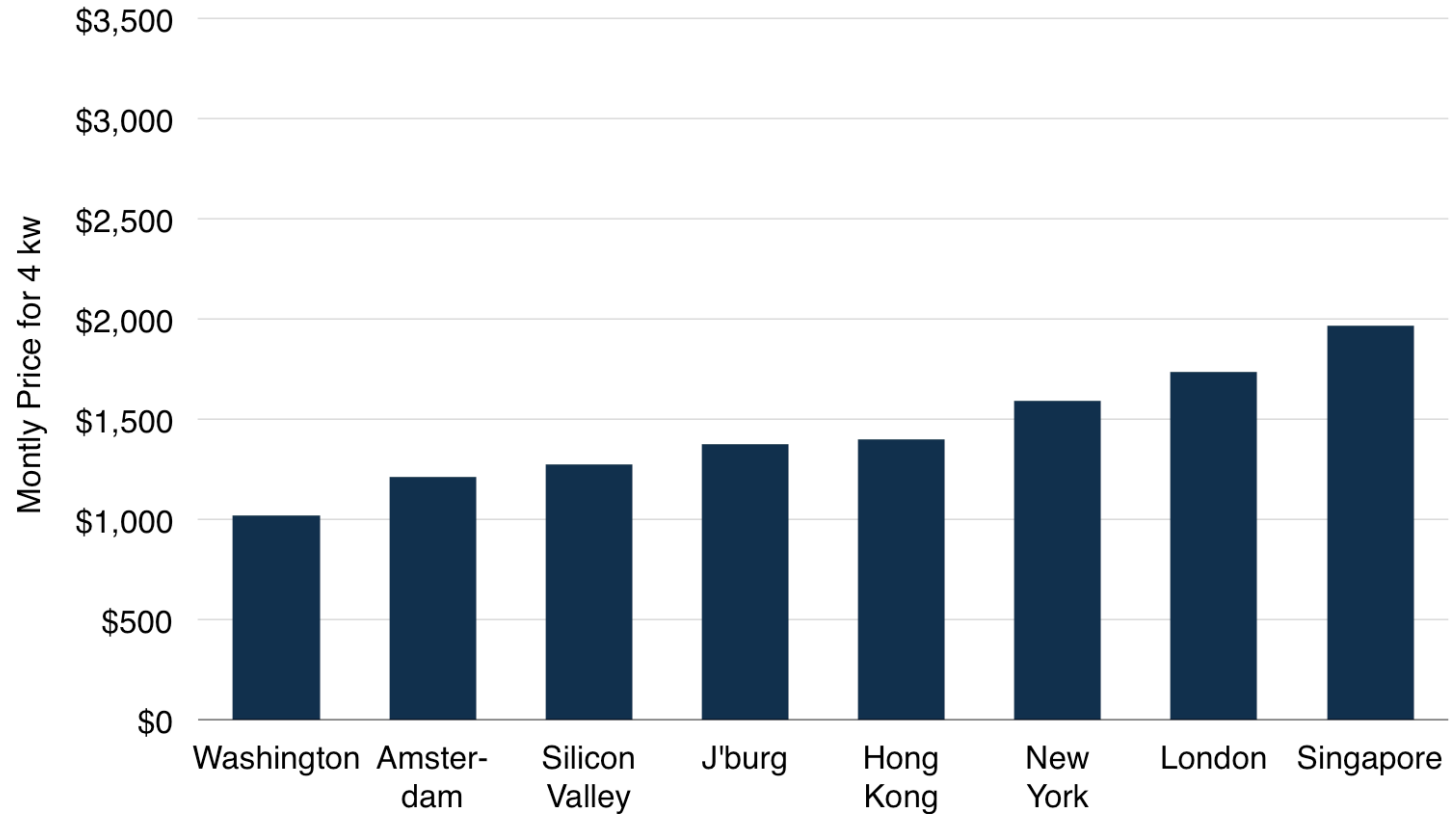
Colo Price Varies by Operator

Range in Monthly Cost per Kilowatt (4 kw Density), H2 2014



Power and Space Costs Drive Colo Price

Median Monthly Price for 4 kw Power, H2 2014



Question #5

After factoring in the cost of 5 cross-connects, which of the following metro areas (on average) features the highest colocation prices?



Washington, DC



Amsterdam



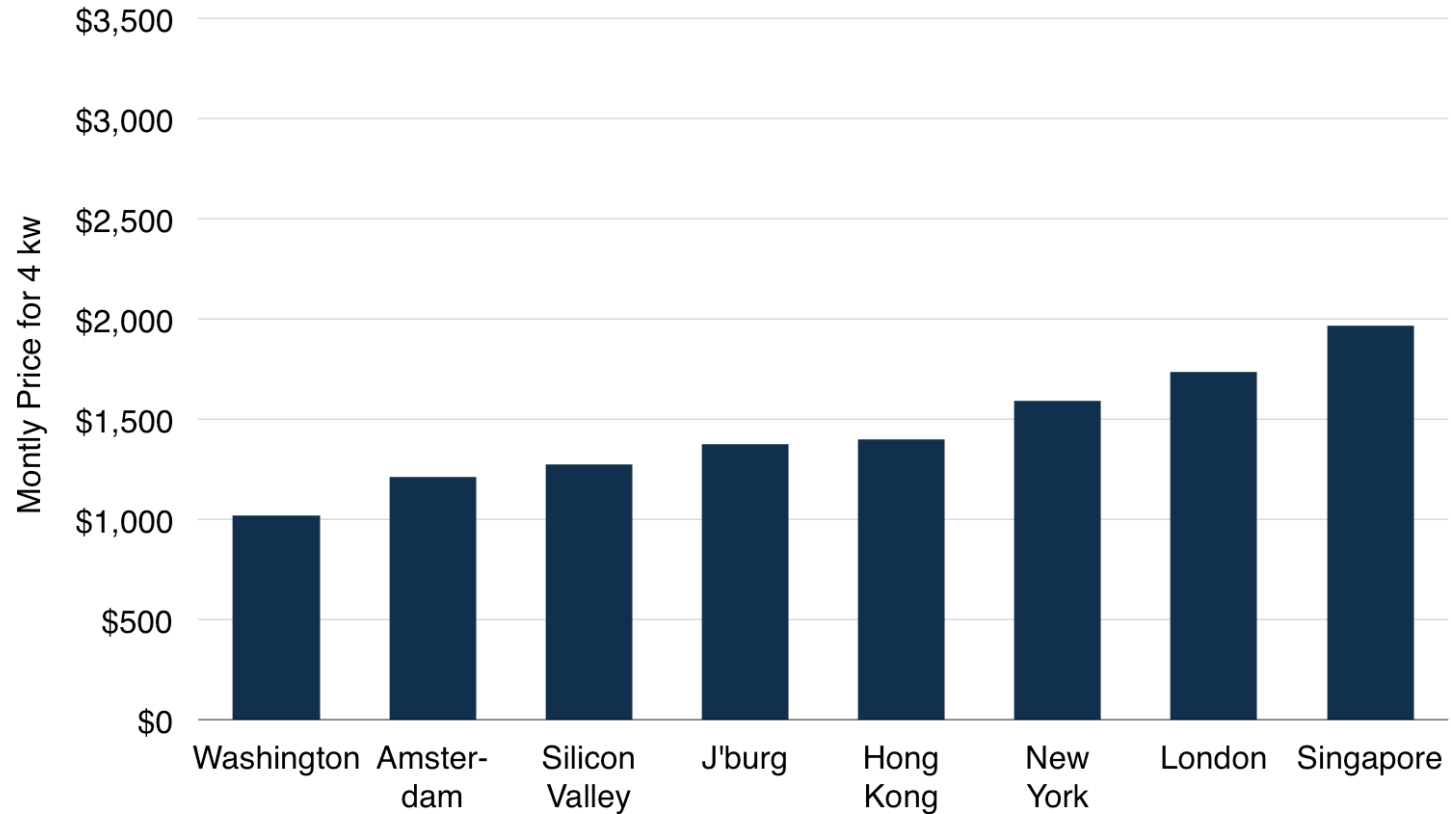
Johannesburg



London

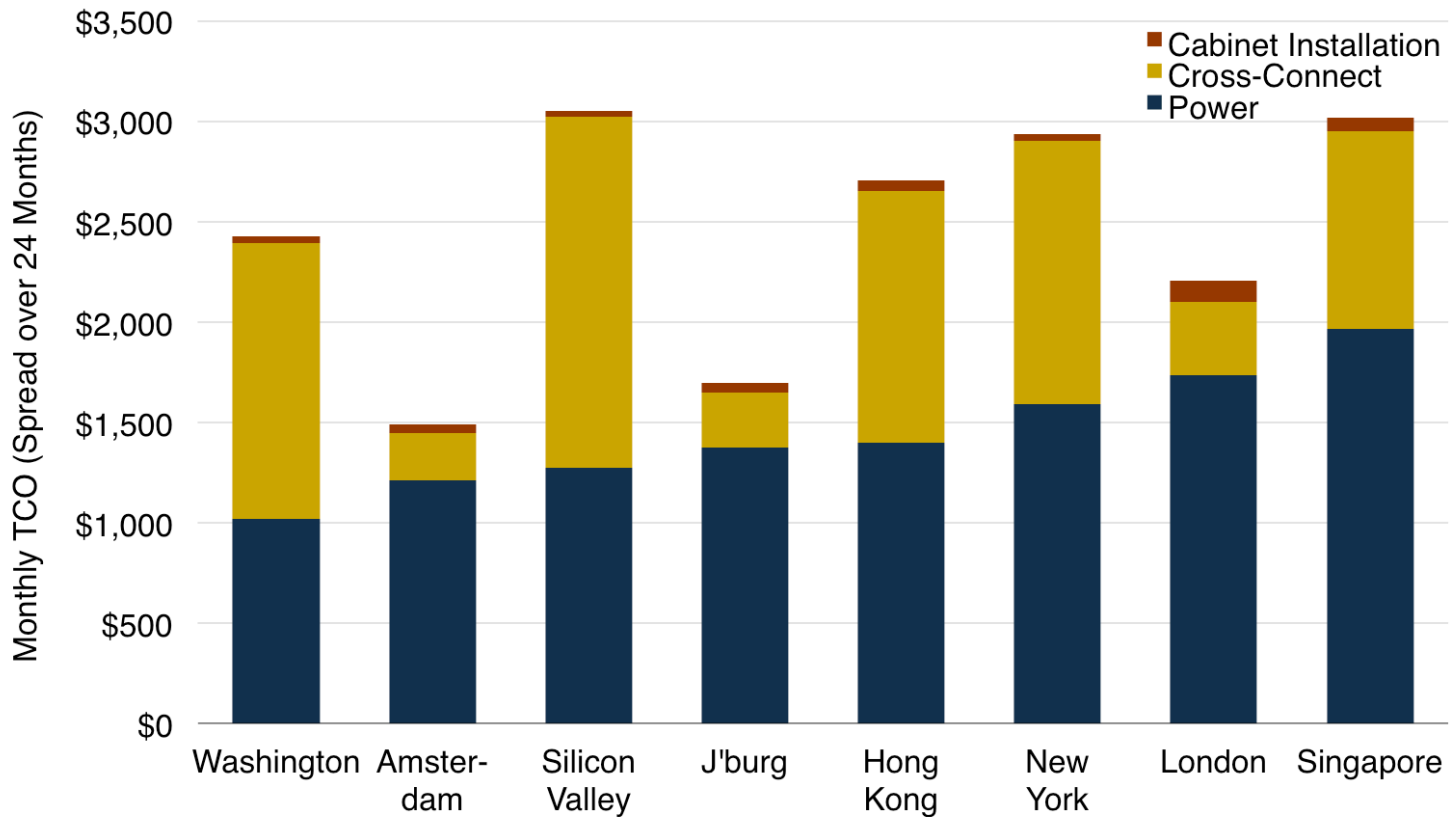
Power and Space Costs Drive Colo Price

Median Monthly Price for 4 kw Power, H2 2014



... But Power Isn't the Only Consideration

Monthly Total Cost of Ownership, H2 2014

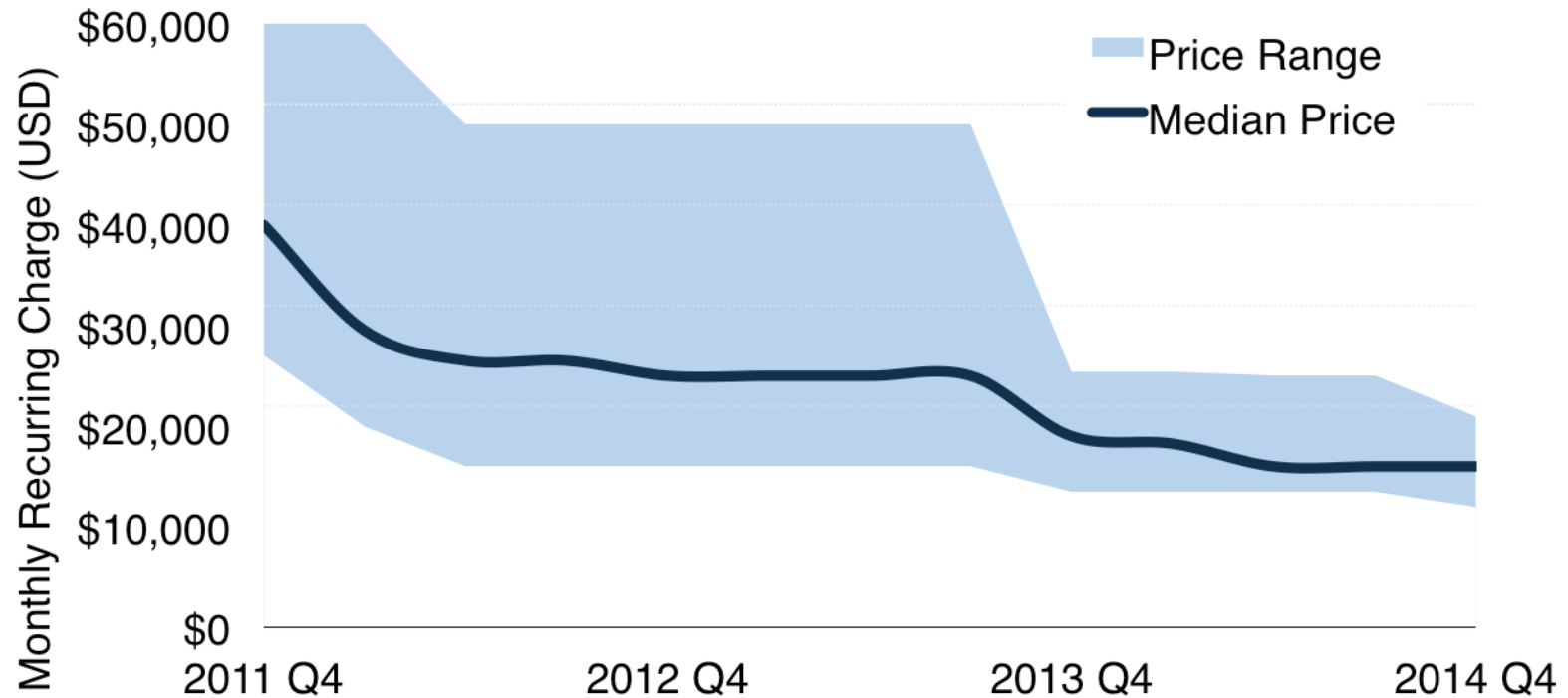


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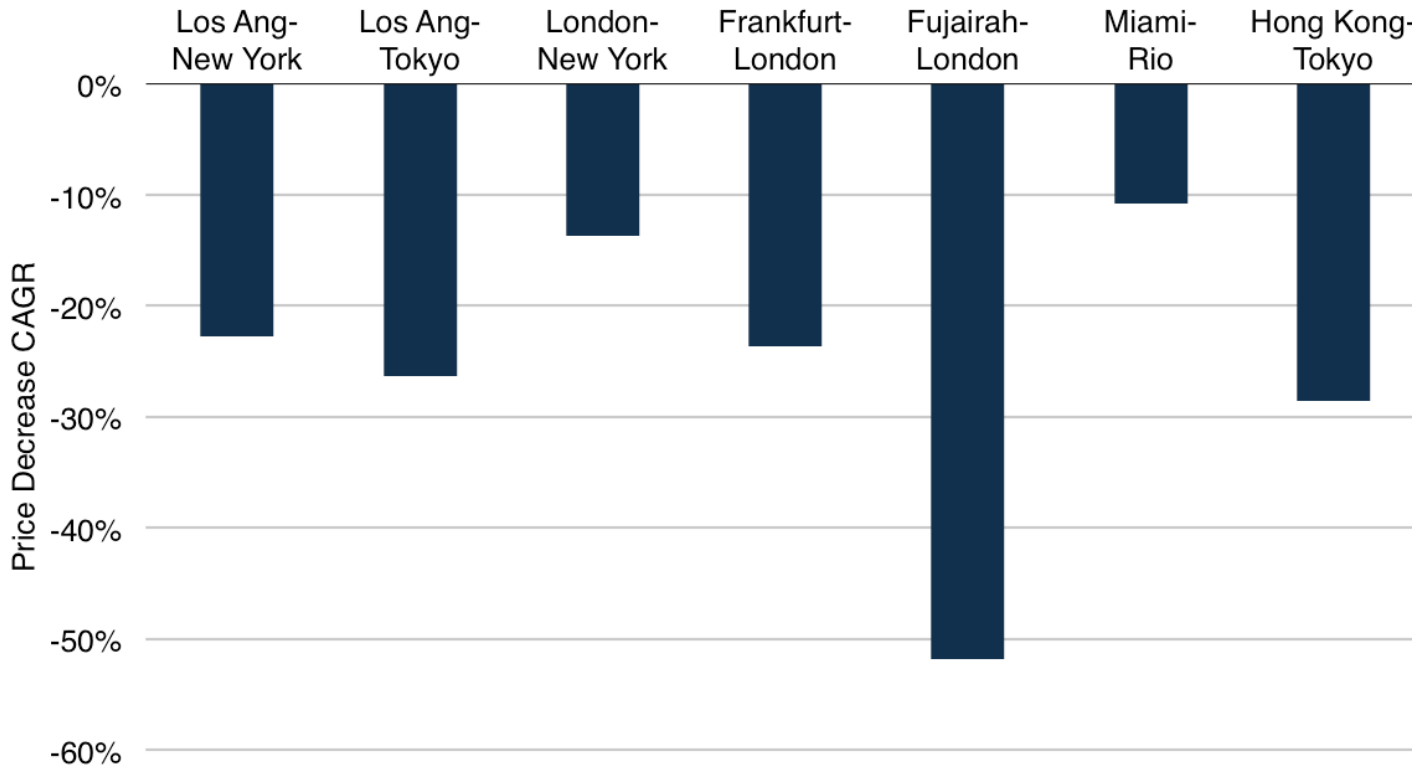
“Market Price”: No Such Thing

Price Range by Carrier, 10 Gbps, Los Angeles–Tokyo, 2011–2014



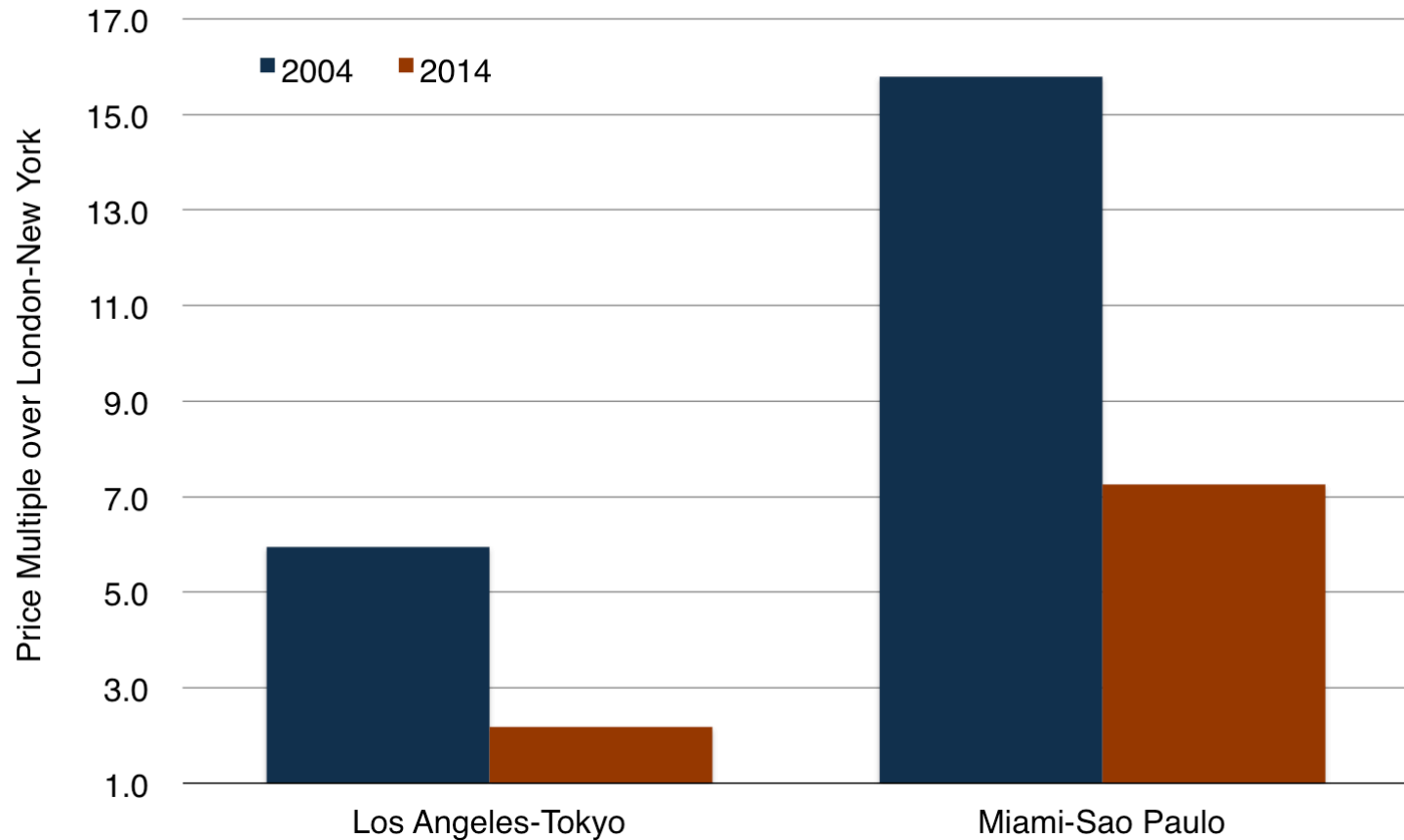
10G Prices Falling, Falling, Falling

CAGR 10G Monthly Lease Price Reductions for Selected Routes, 2011-2014



Regional Price Differences Narrow

10 Gbps Wavelength Price Multiples over London-New York



Let's Not Get Carried Away ...

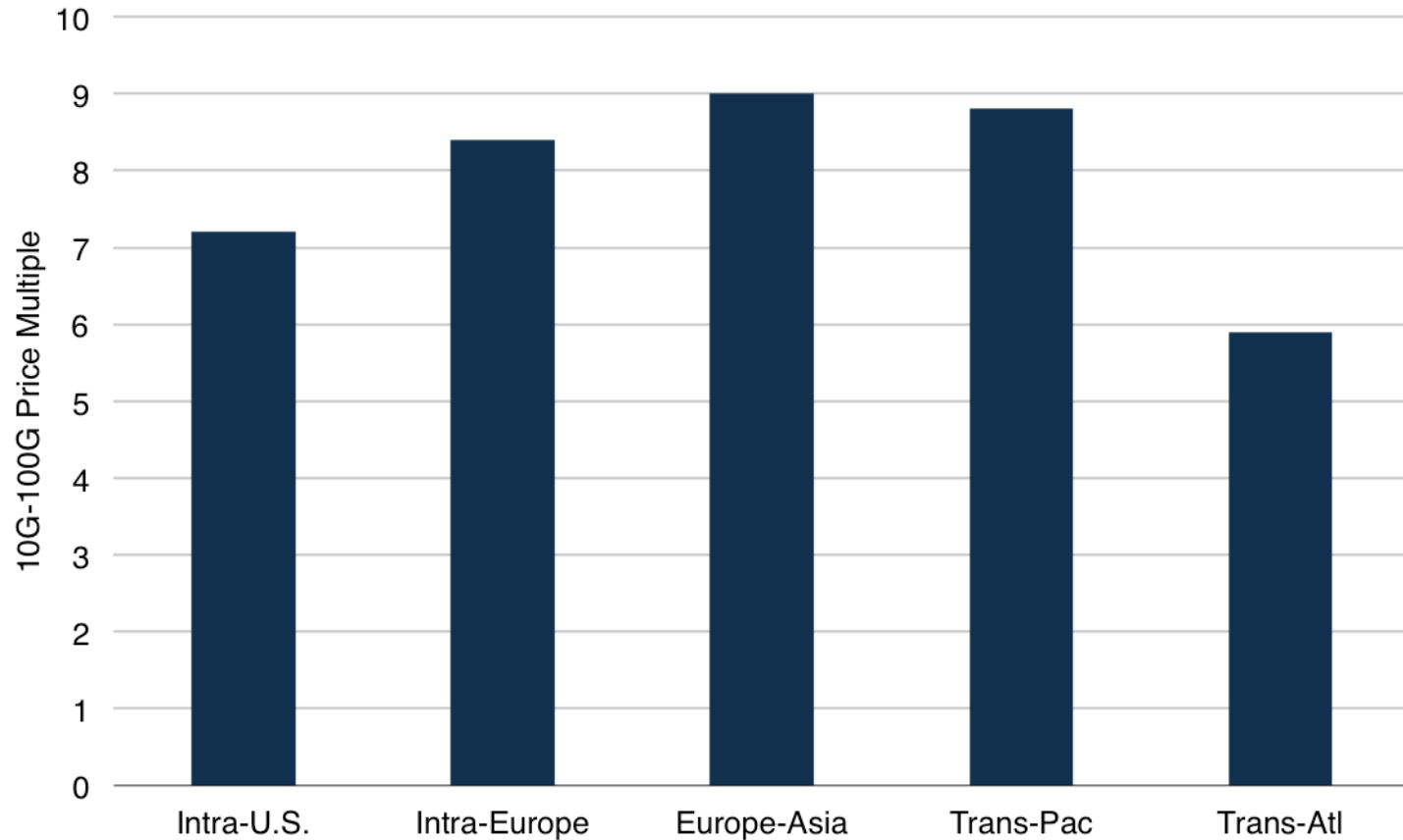
Big Differences Still Exist

Median 10 Gbps Wavelength Prices per Month, Q4 2014

| Route | Price |
|---------------------|----------|
| London-New York | ~ \$6k |
| Los Angeles-Tokyo | ~ \$14k |
| Miami-Sao Paulo | ~ \$45k |
| London-Mumbai | ~ \$80k |
| London-Johannesburg | ~ \$183k |

Bigger Circuits Mean More Value per Unit

10G-100G Price Multiples for Selected Routes, Q4 2014



Question #6

The IRU price of a trans-Atlantic 10 Gbps circuit is \$200,000 in 2015. What was the price of an STM-1 circuit in 1997 on the same route?

(Note: one STM-1 = 155 Mbps = 1/64th of a 10 Gbps circuit).



\$50,000



\$200,000



\$8,000,000



\$16,000,000

Concluding Thoughts

- Networks still expanding rapidly
 - Good ol' Internet is behind much of that growth
 - But content provider “machine-to-machine” traffic increasingly pushing growth
 - New networks still being built
- Colo prices stable; network prices not
- Still big geographic differences in prices