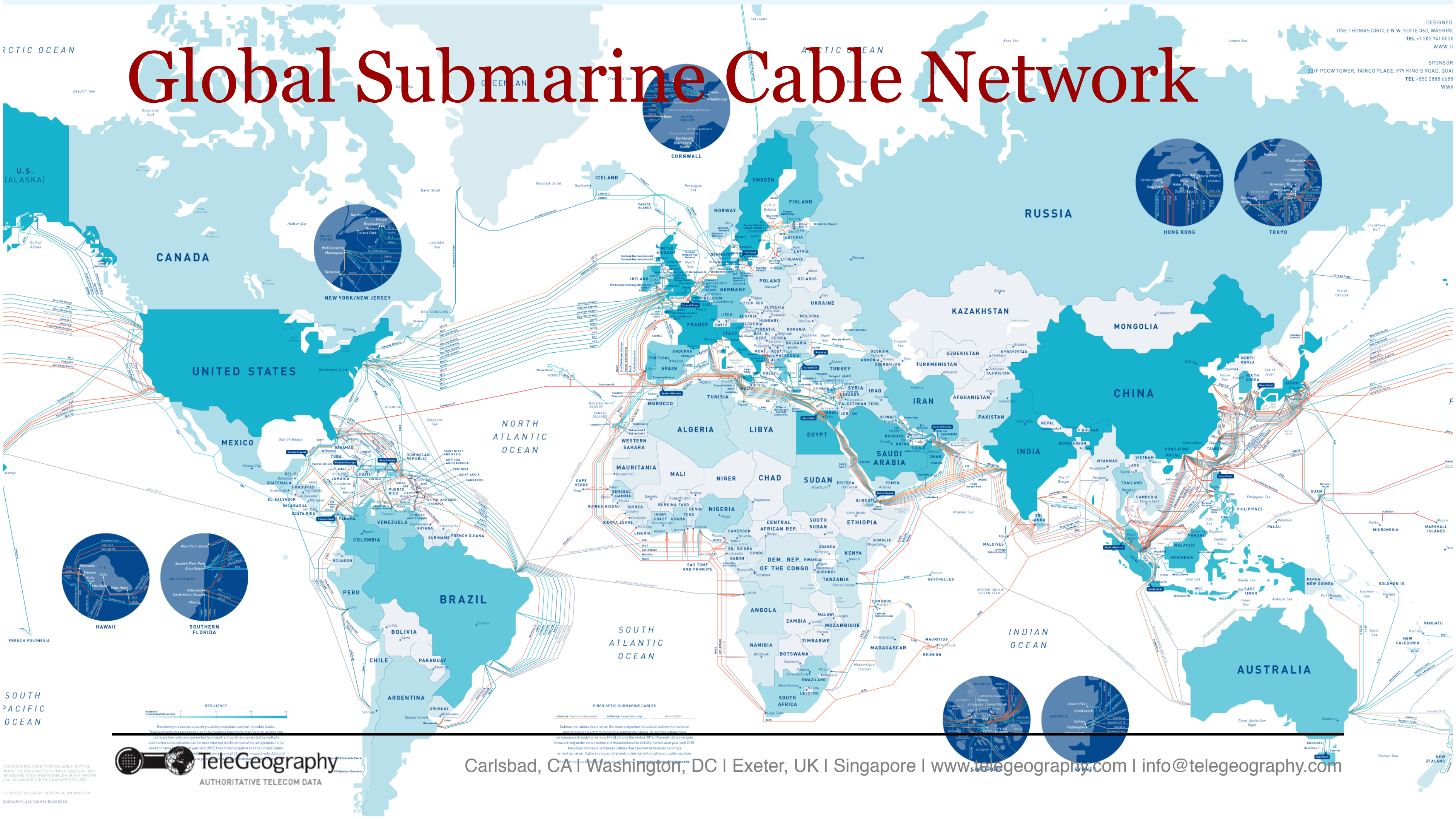
Global WAN, Cloud & Bandwidth Market

Coverage, Pricing & Traffic Trends

Patrick Christian

Senior Analyst, TeleGeography

Global Submarine Cable Network

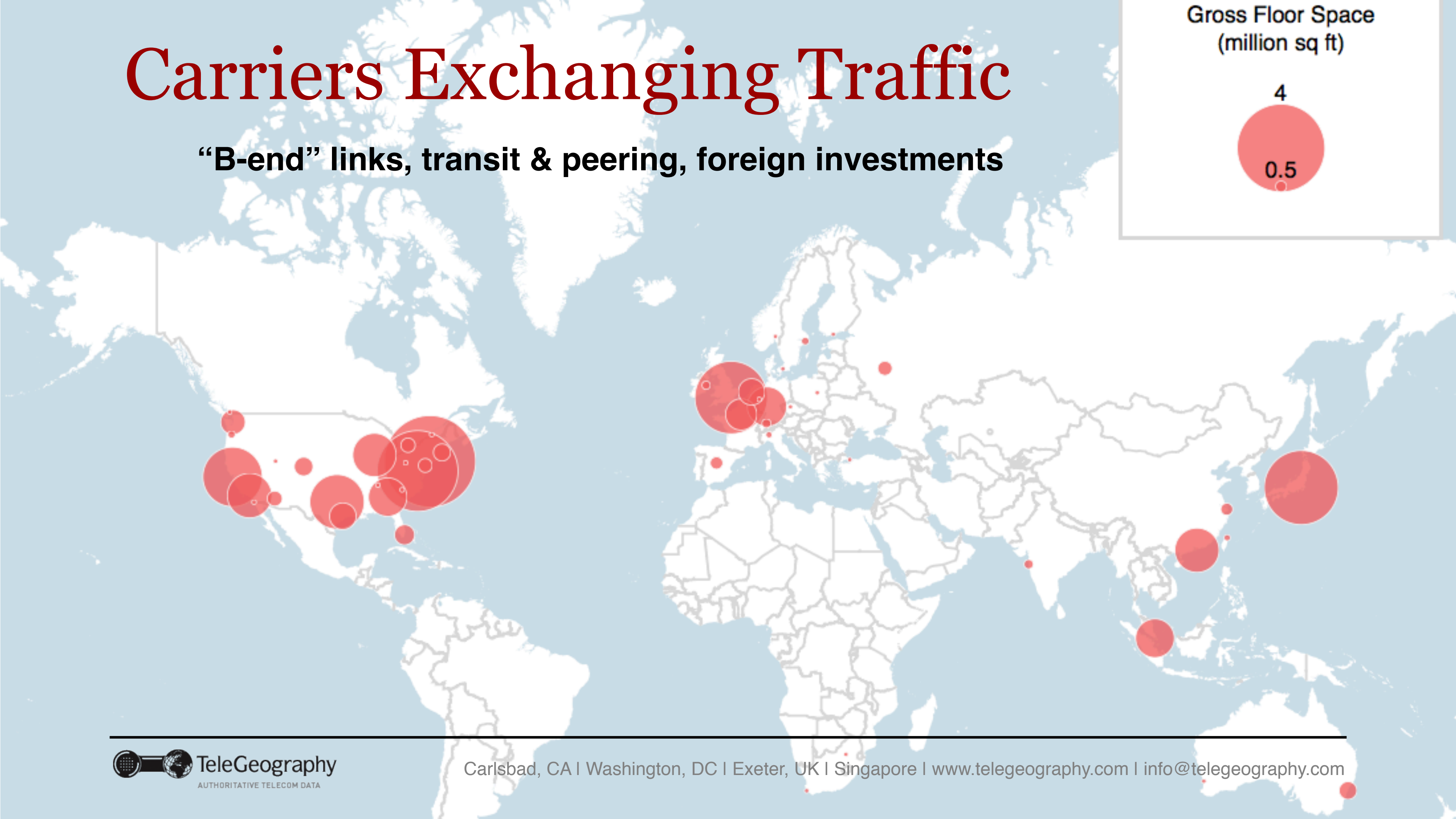


TeleGeography
AUTHORITATIVE TELECOM DATA

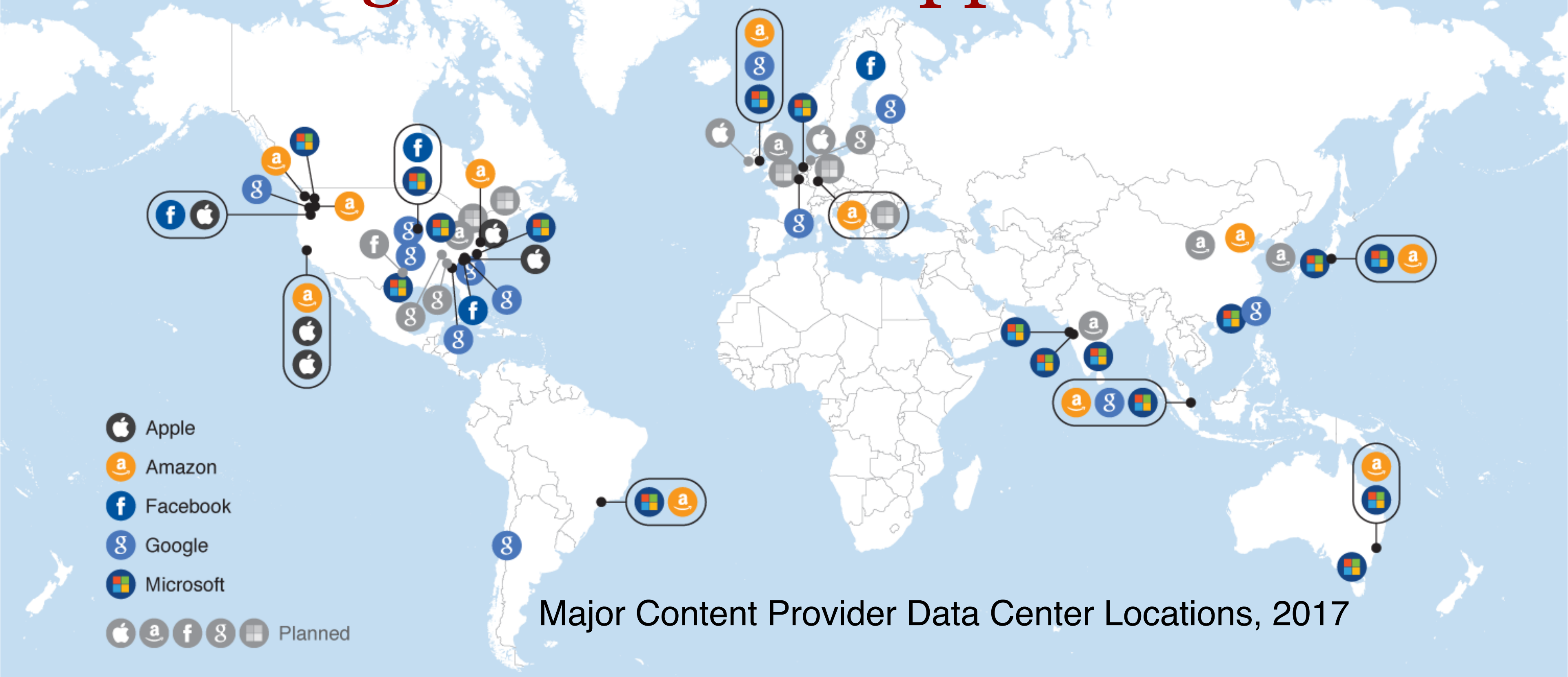
Carlsbad, CA I Washington, DC I Exeter, UK I Singapore I www.telegeography.com I info@telegeography.com

Carriers Exchanging Traffic

“B-end” links, transit & peering, foreign investments

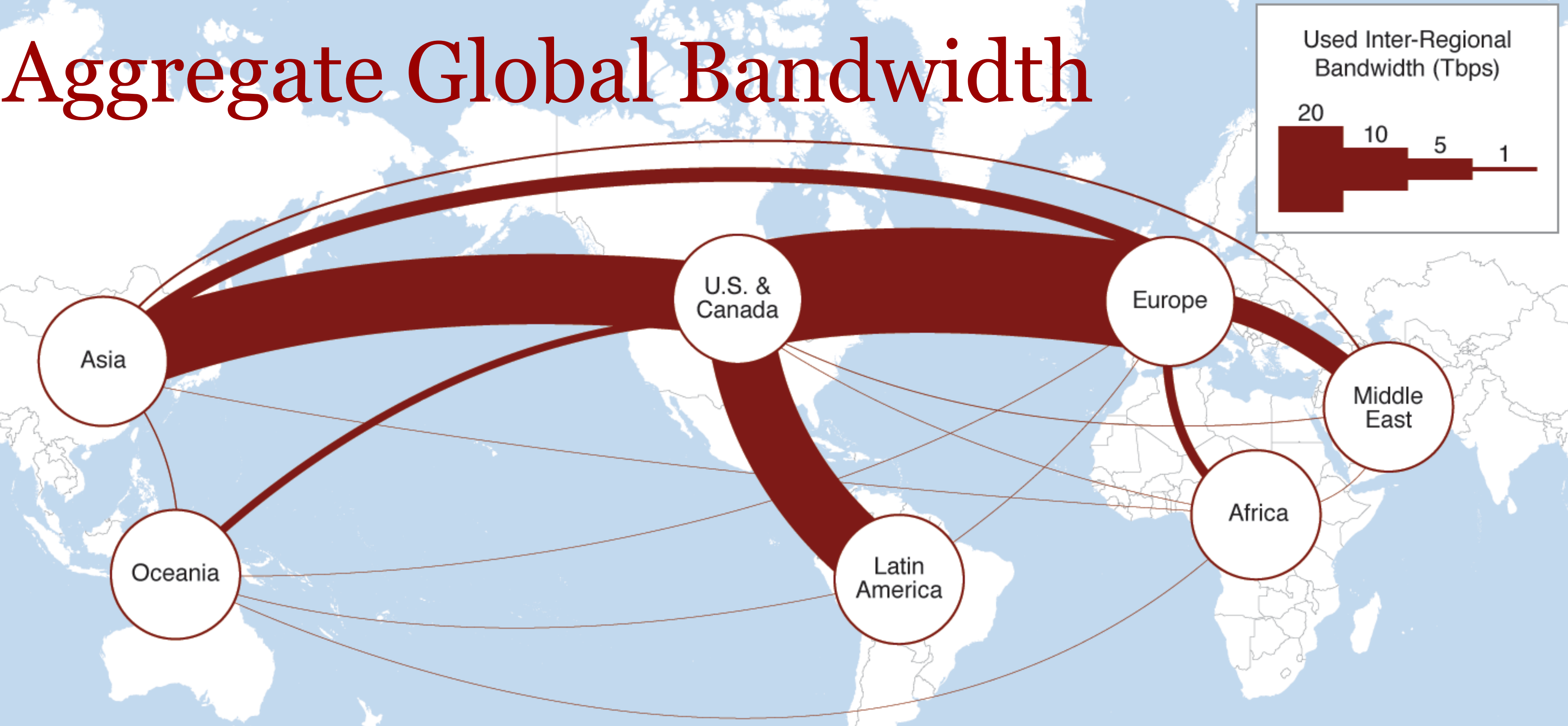


Linking Content and Applications



Major Content Provider Data Center Locations, 2017

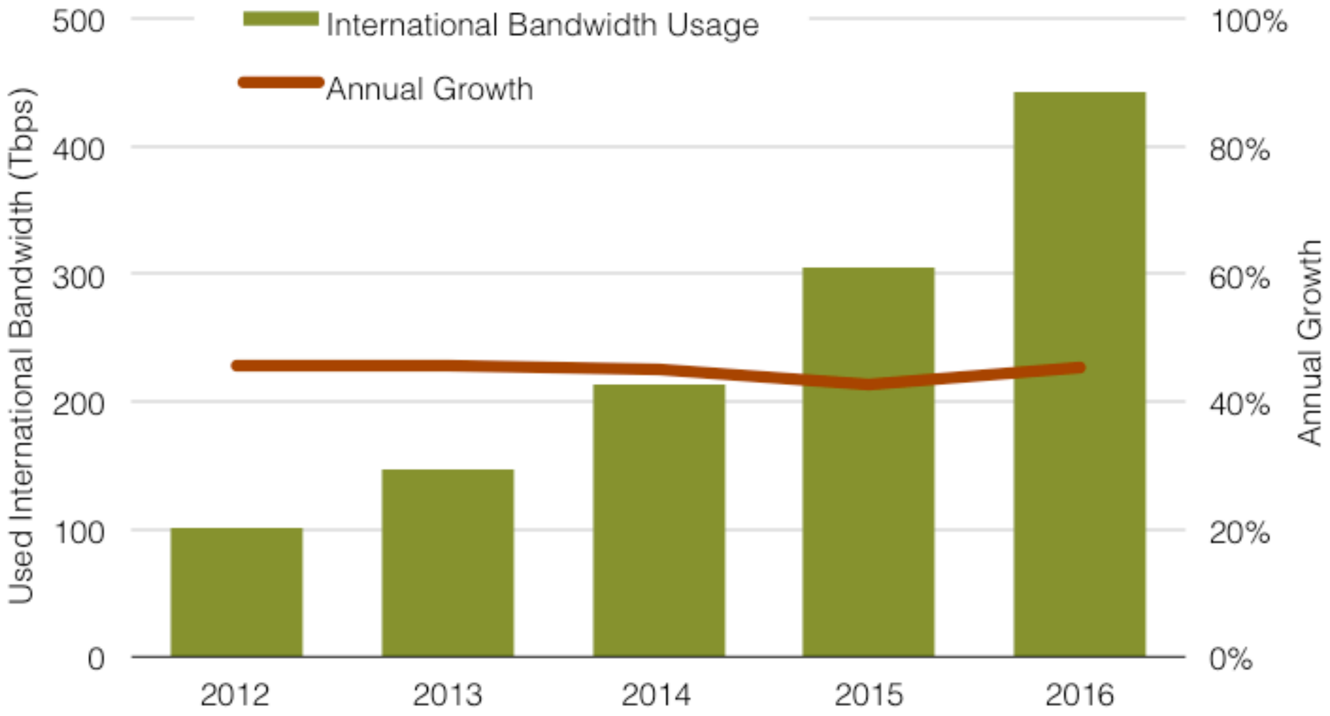
Aggregate Global Bandwidth



- Linking global hubs and users to hubs
- Favorable space, power, connectivity, population, business climate, etc.

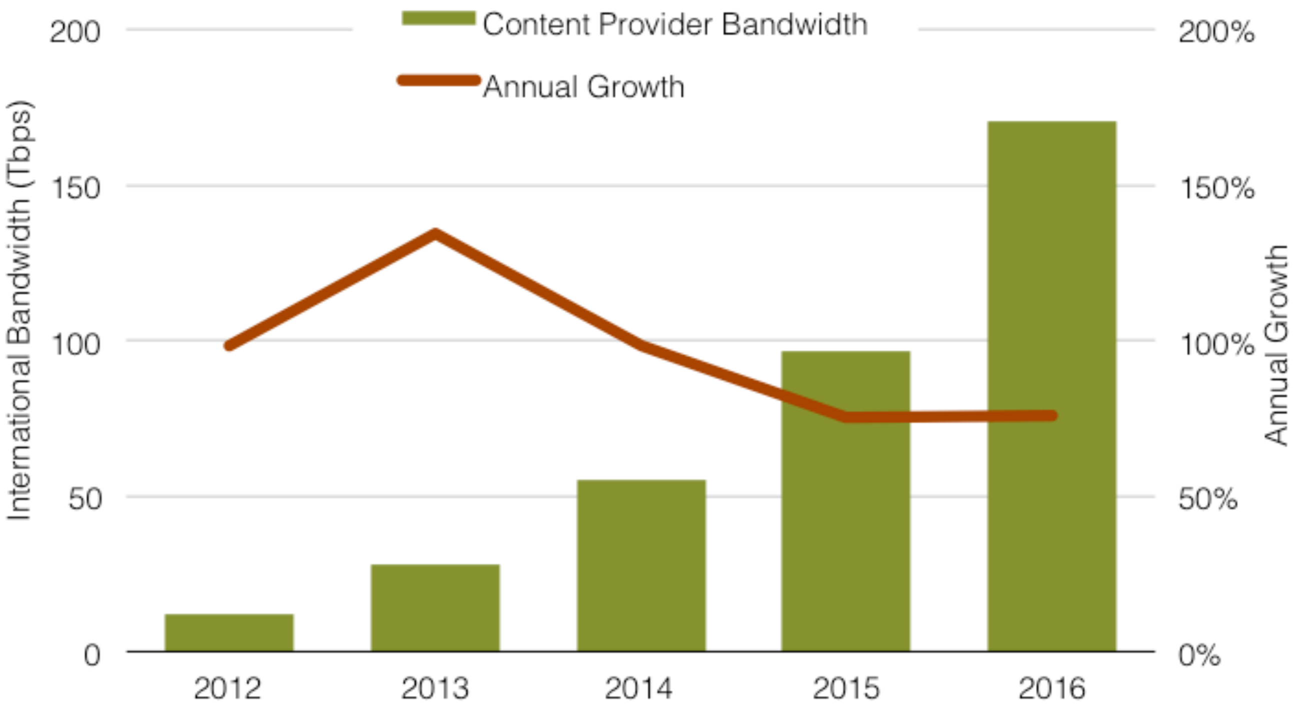
Aggregate Demand Growth "Flat"

Used International Bandwidth Growth, 2012-16



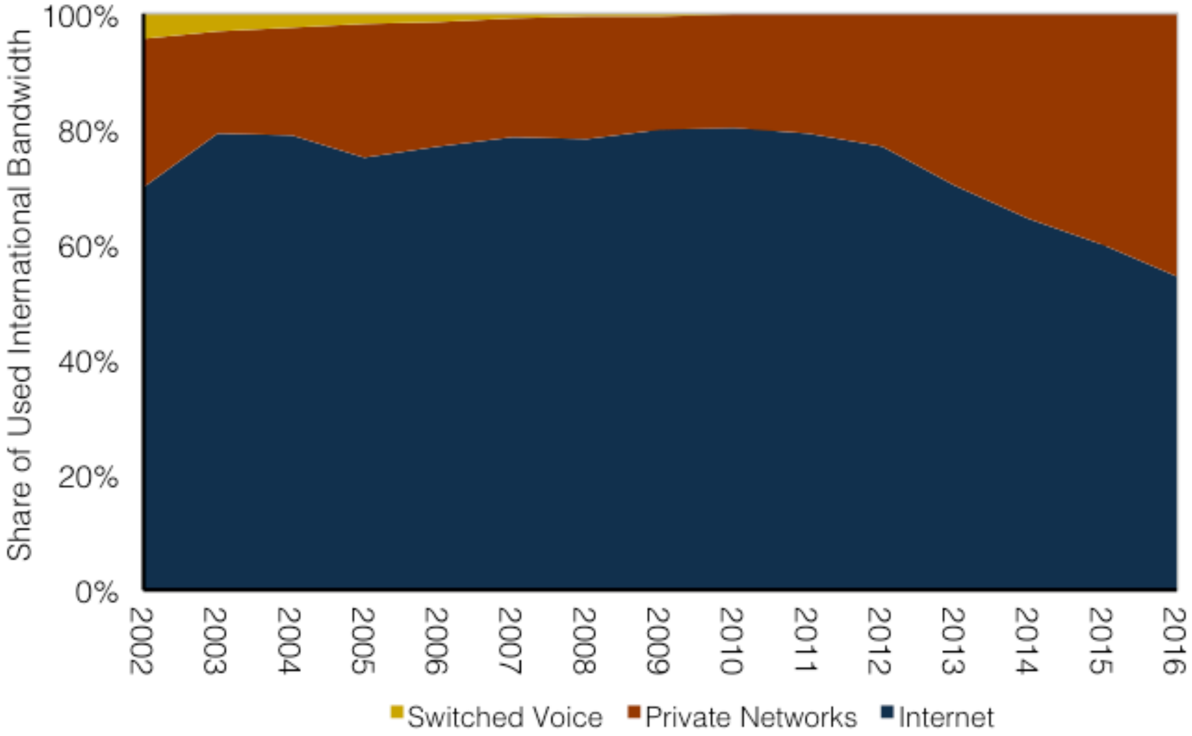
Content Provider Growth

International Bandwidth Growth, 2012-2016

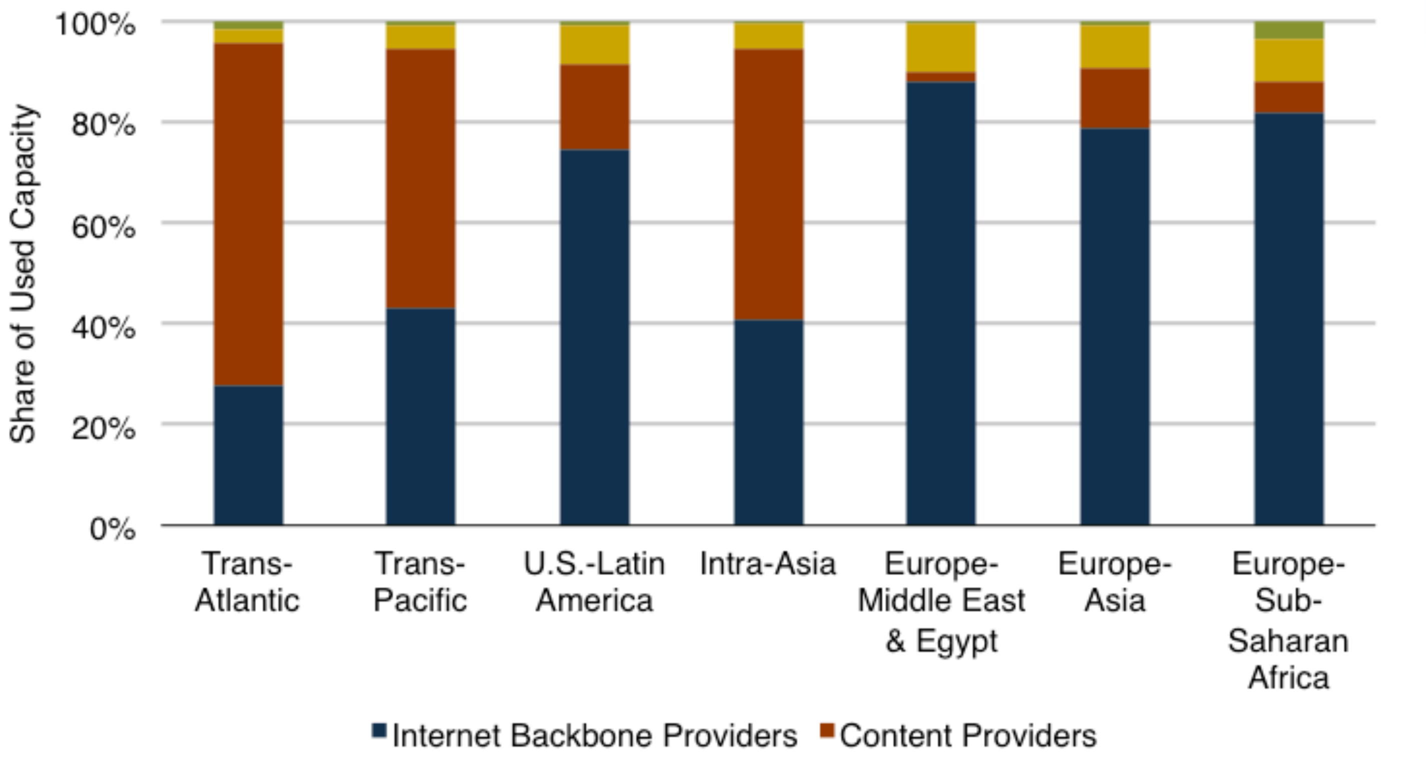


Private Networks Gaining Share

International Internet, Private Network, & Switched Voice Capacity, 2002-16

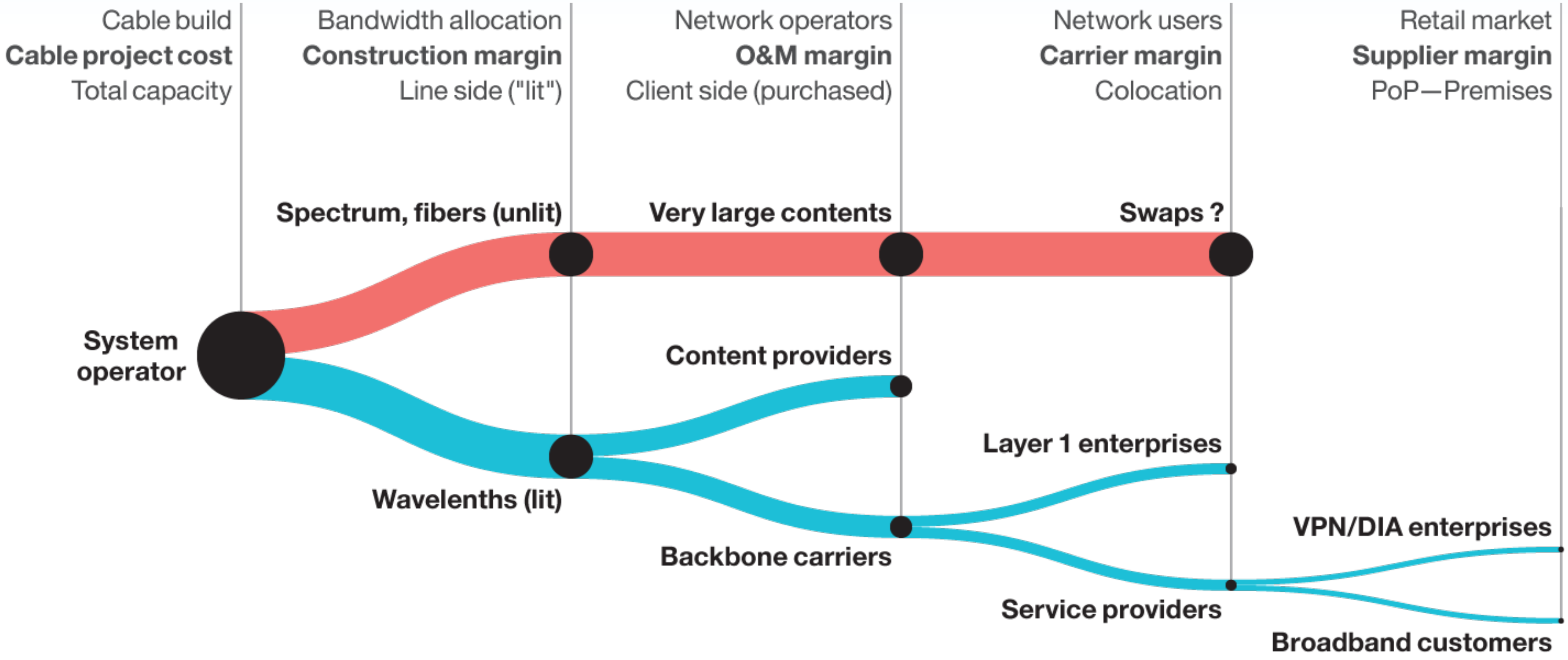


Private Network Share Varies by Route



Private Network Bandwidth Share by Route, 2016

Cable Bandwidth Supply Chain



Cable build
Cable project cost
Total capacity

Bandwidth allocation
Construction margin
Line side ("lit")

Network operators
O&M margin
Client side (purchased)

Network users
Carrier margin
Colocation

Retail market
Supplier margin
PoP—Premises

System operator

Spectrum, fibers (unlit)

Very large contents

Swaps ?

Content providers

Wavelenths (lit)

Layer 1 enterprises

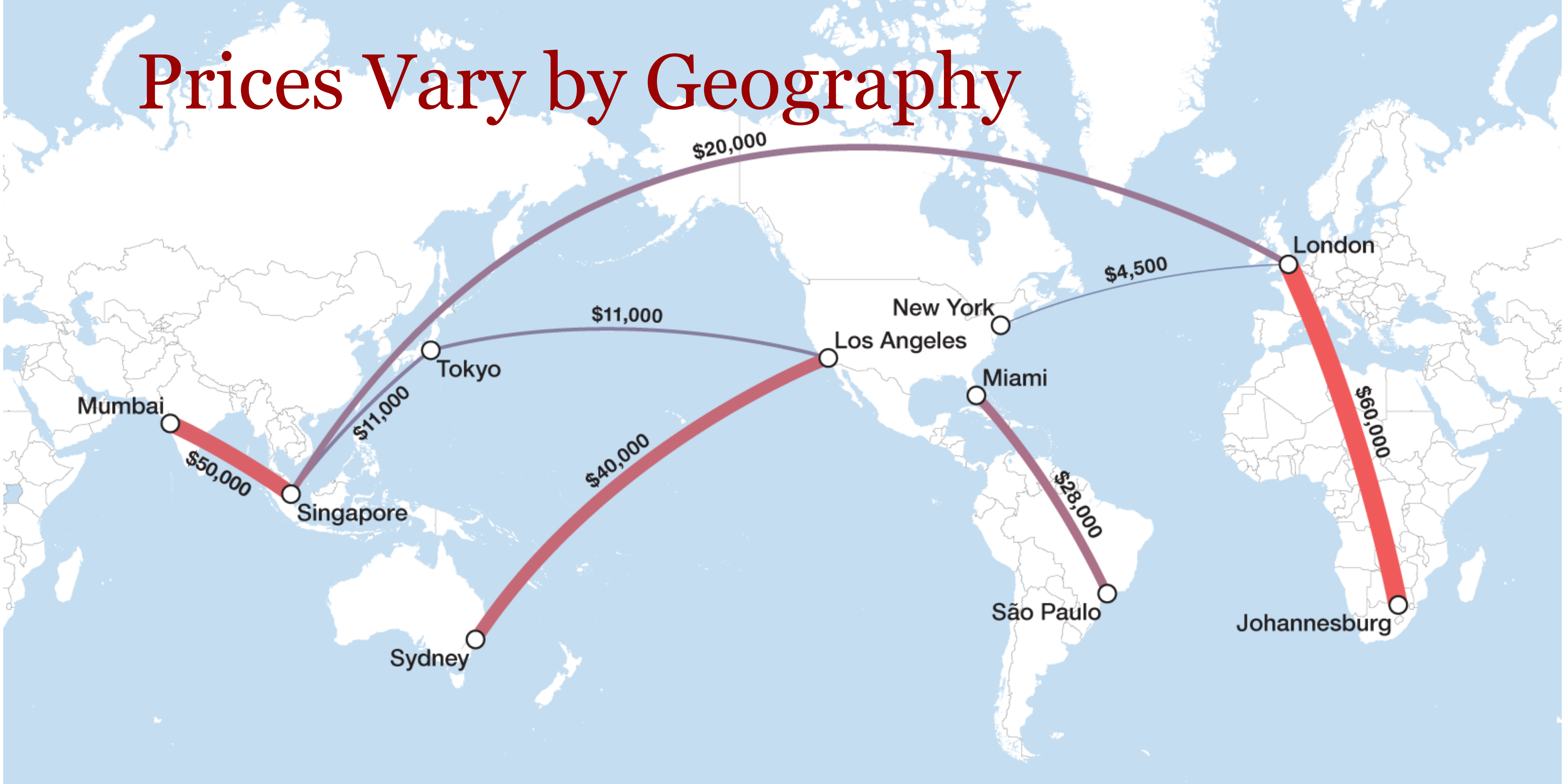
Backbone carriers

VPN/DIA enterprises

Service providers

Broadband customers

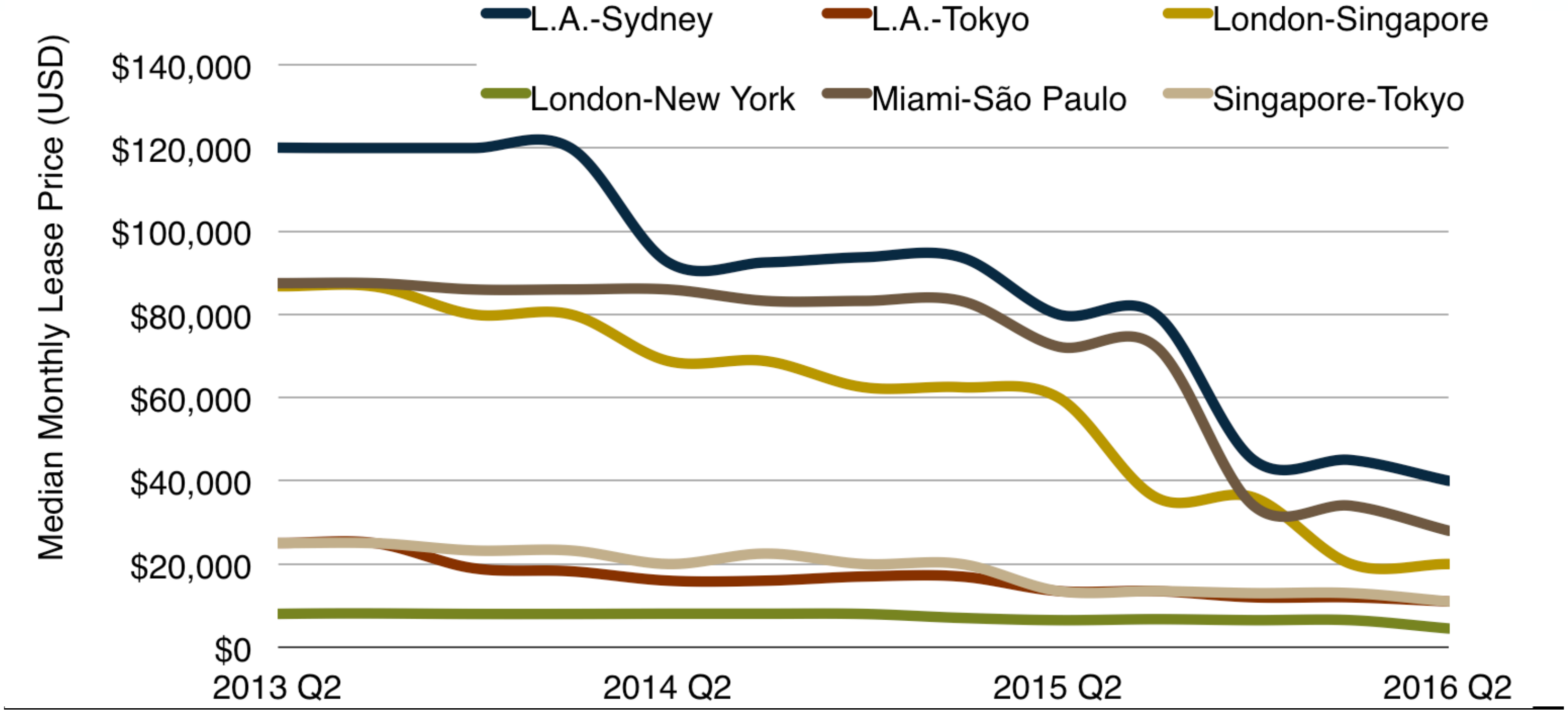
Prices Vary by Geography



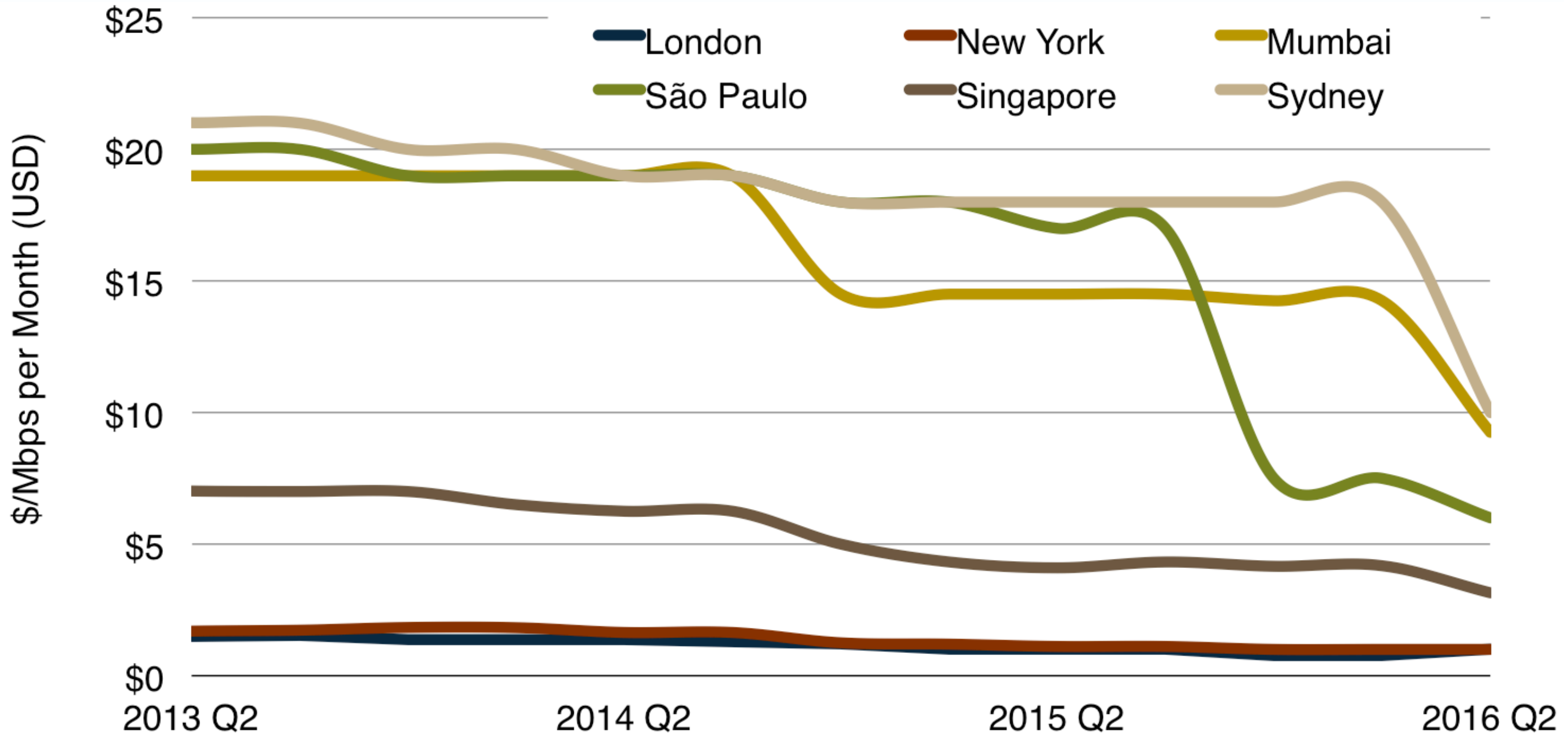
TeleGeography
AUTHORITATIVE TELECOM DATA

Transport Prices Decline

Median 10 Gbps Wavelength Monthly Lease Prices, 2013-16



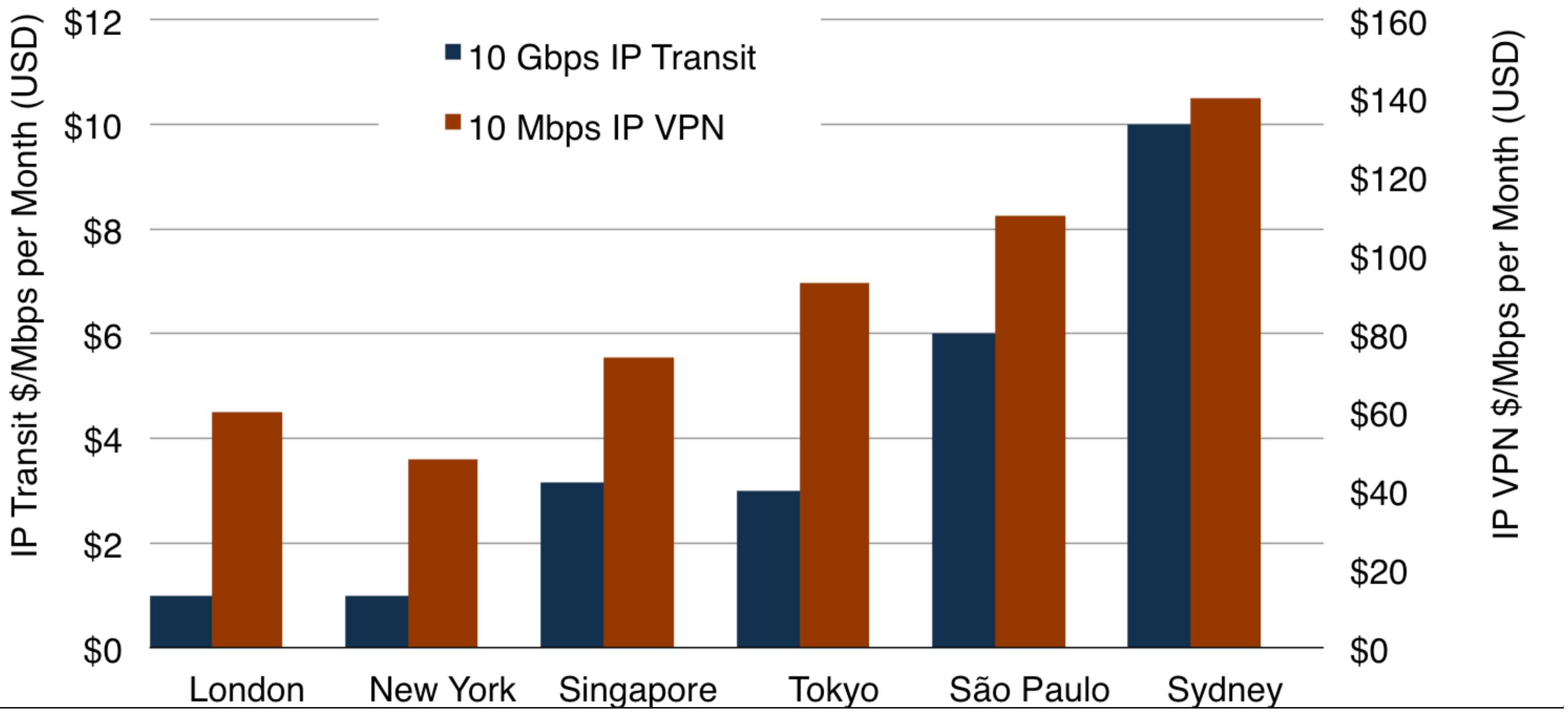
Transit Prices Follow them Down



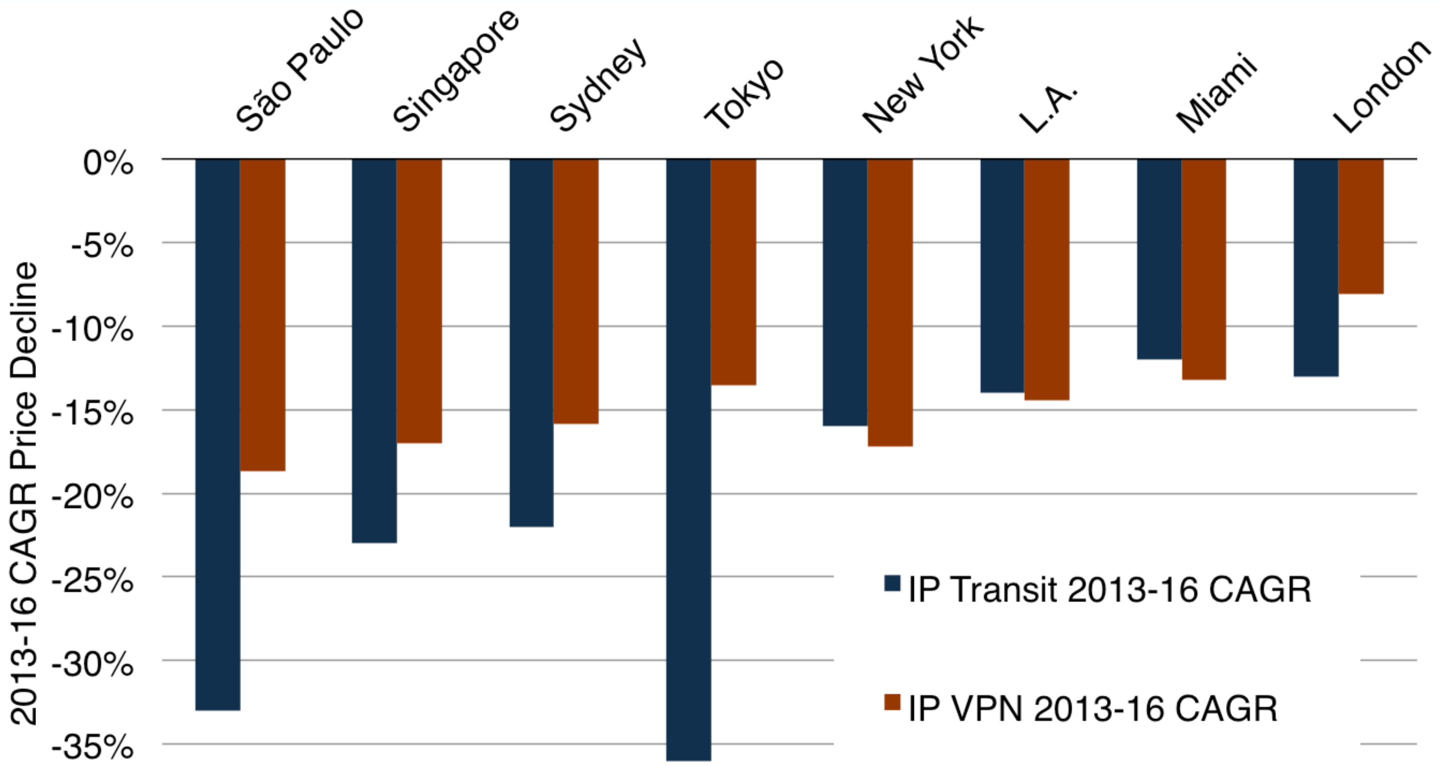
Median 10 GigE IP Transit Port Prices, 2013-16

Enterprise Prices Map to Wholesale

Median 10 GigE IP Transit & 10 Mbps IP VPN Port Prices, 2016

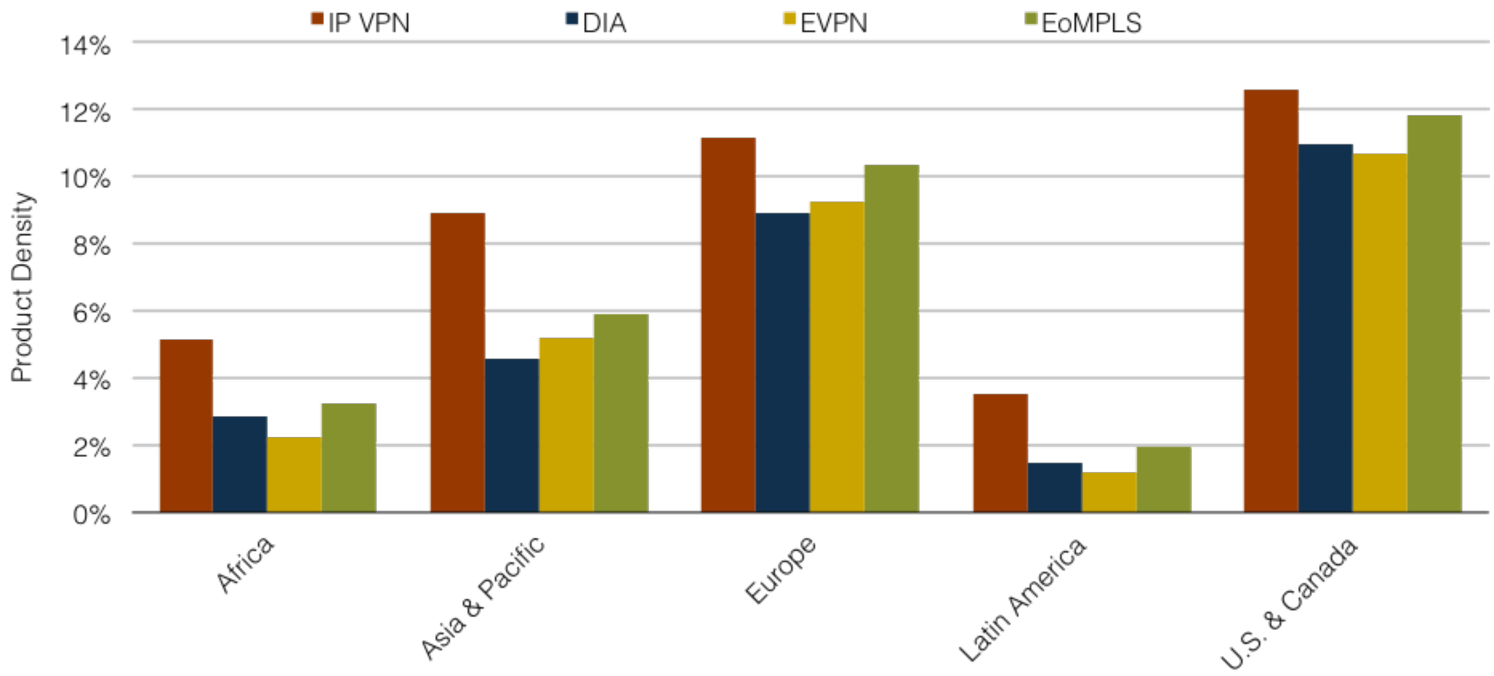


And Exhibit Similar Trend

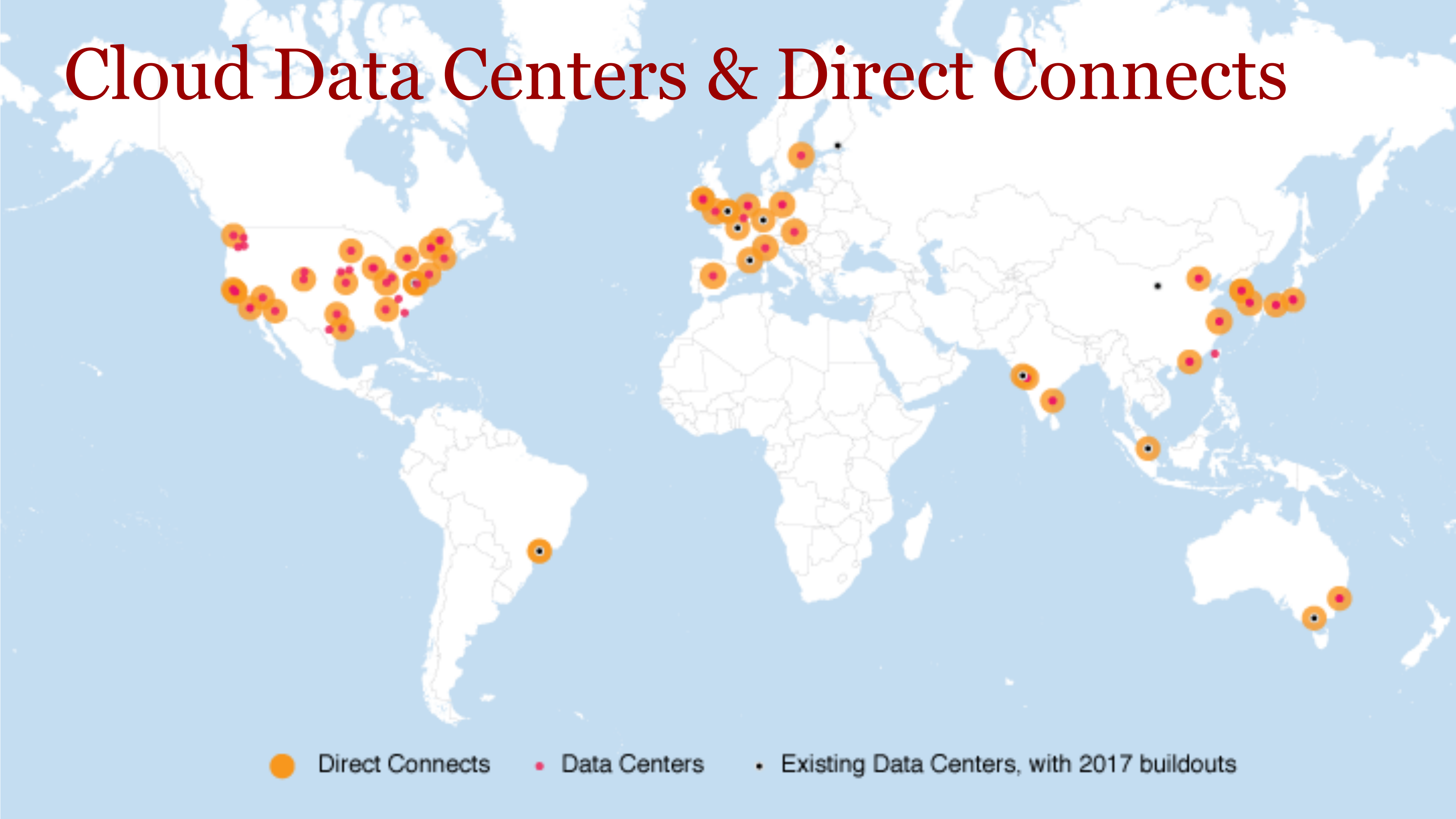


Product Density by Region

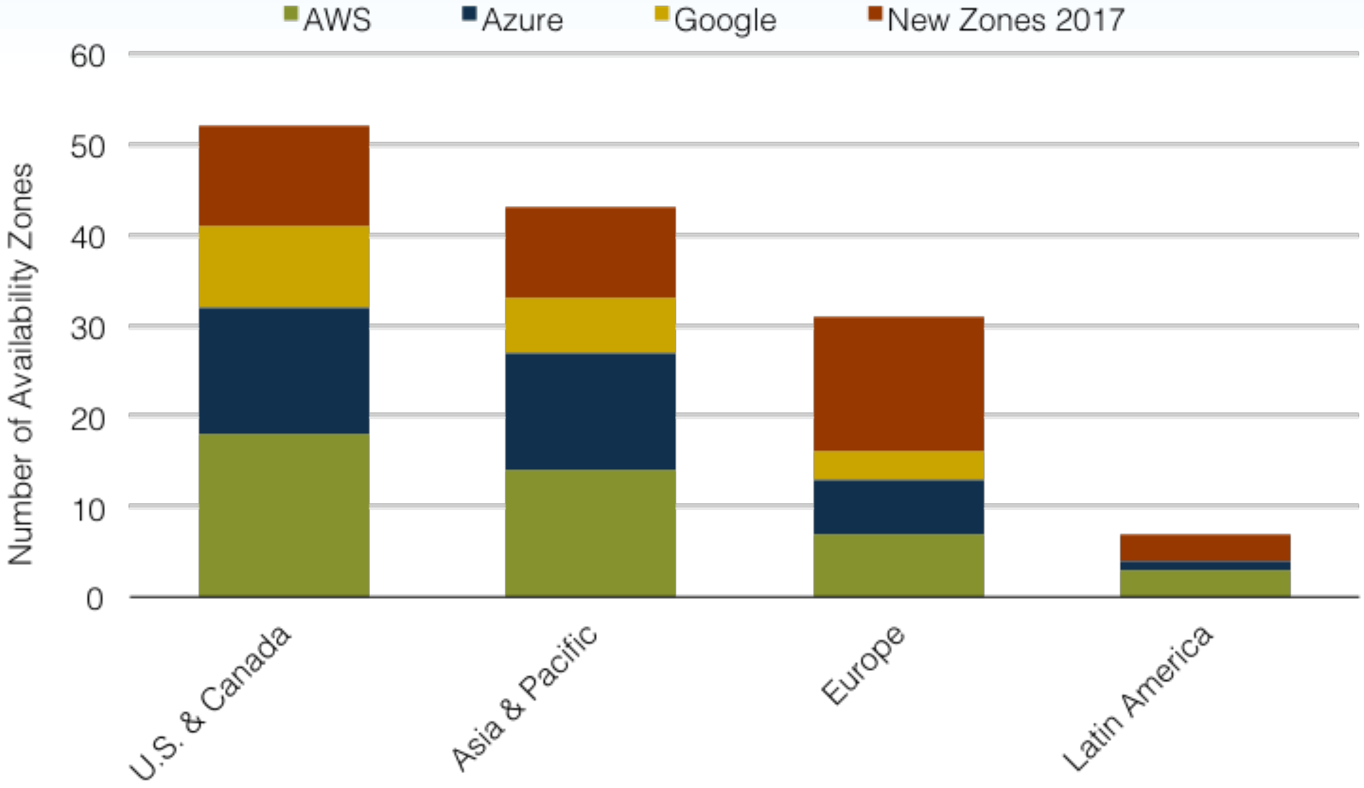
IP VPN, DIA, EVPN, EoMPLS density in key global business markets 2016



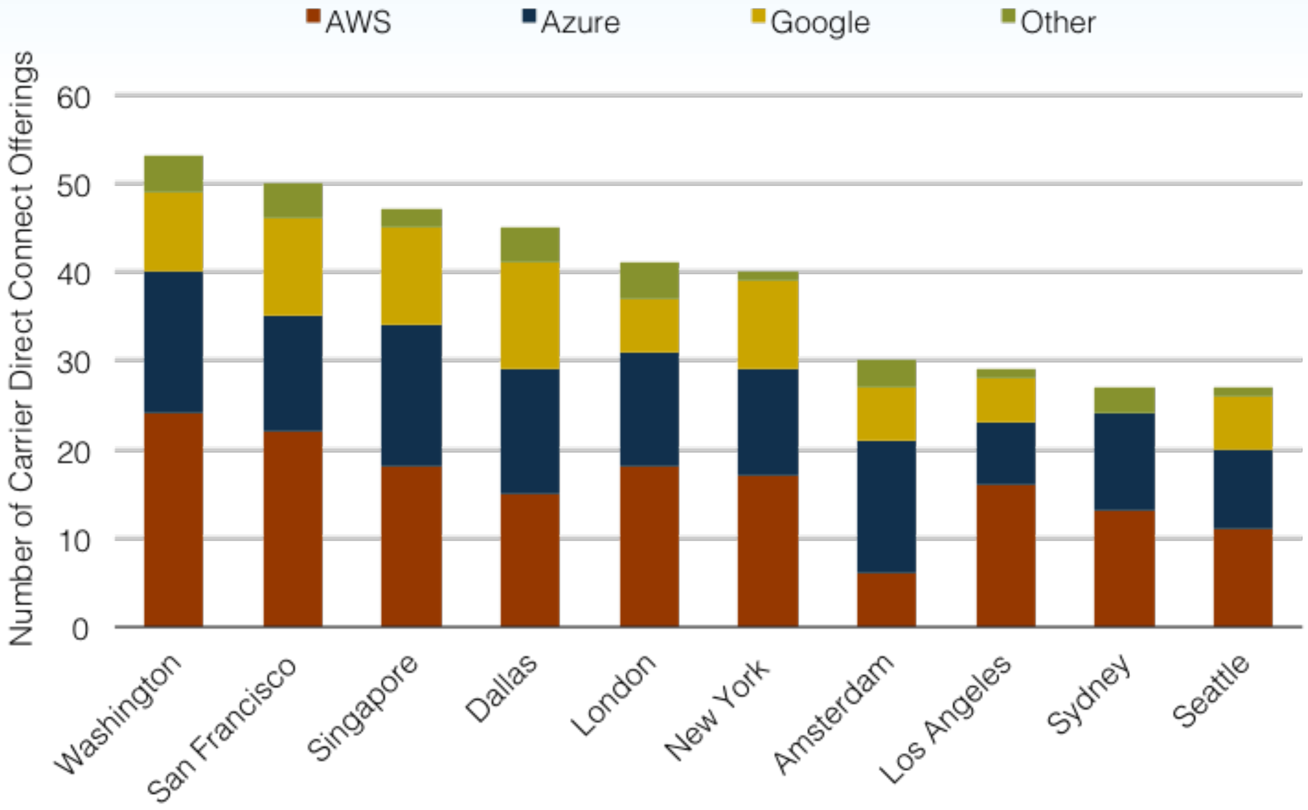
Cloud Data Centers & Direct Connects



Cloud Provider Zones & Regions

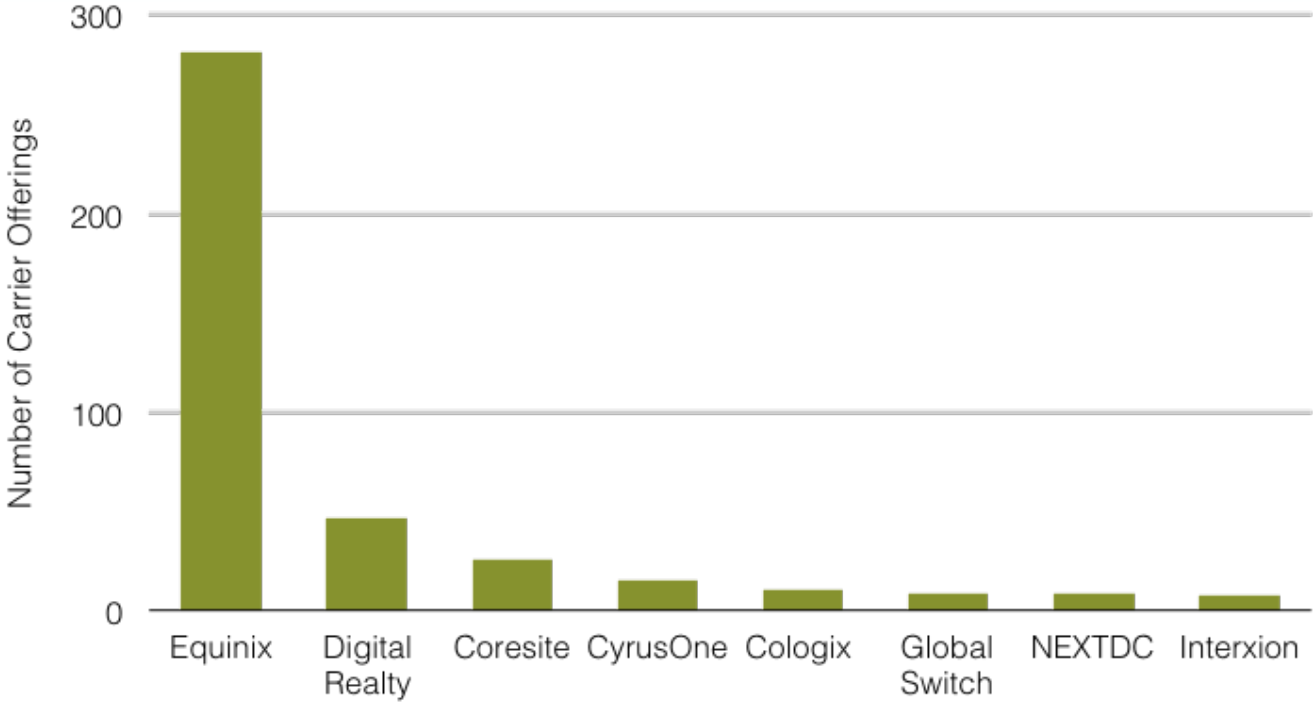


Direct Connect Offerings by City



Colo Facilities Connecting WANs to the Cloud

Total Carrier Direct Connect Offerings to Cloud Providers, 2016



Summary

- Global network of primary hubs
- Demand growth is as reliable as price erosion
- Enterprise WAN costs predicated on wholesale prices
- Content Provider growing faster than the internet
- Cloud Data Centers rapidly expanding in same markets

Thank You!

Questions?

pchristian@telegeography.com