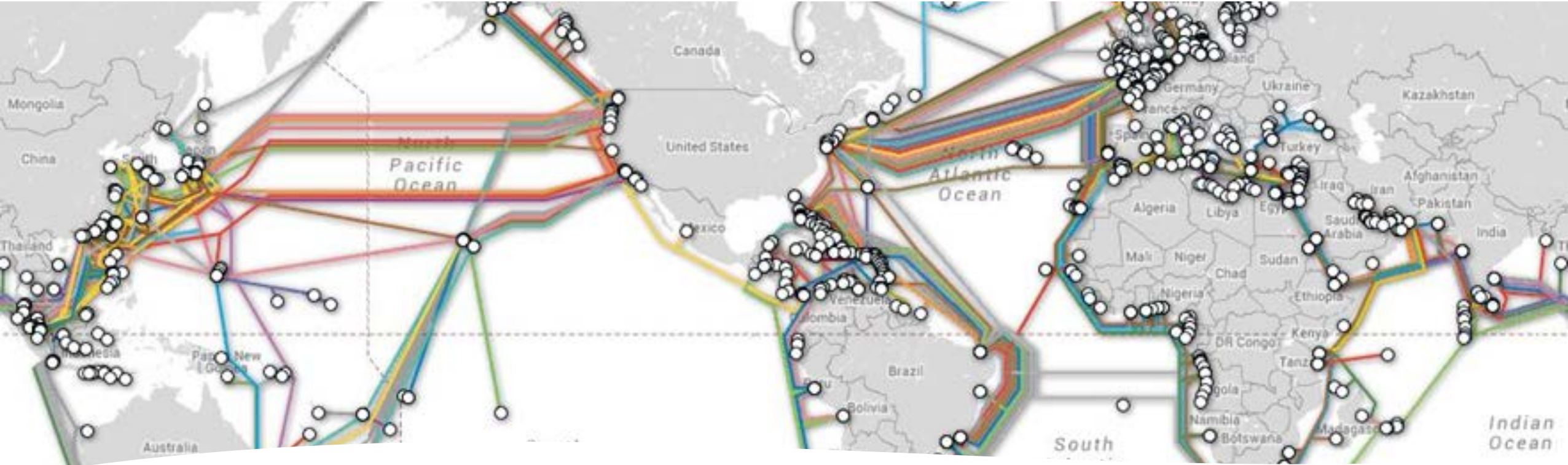


EQUINIX

Keith Russell Shaw EMEA

September 2019



Global Connectivity

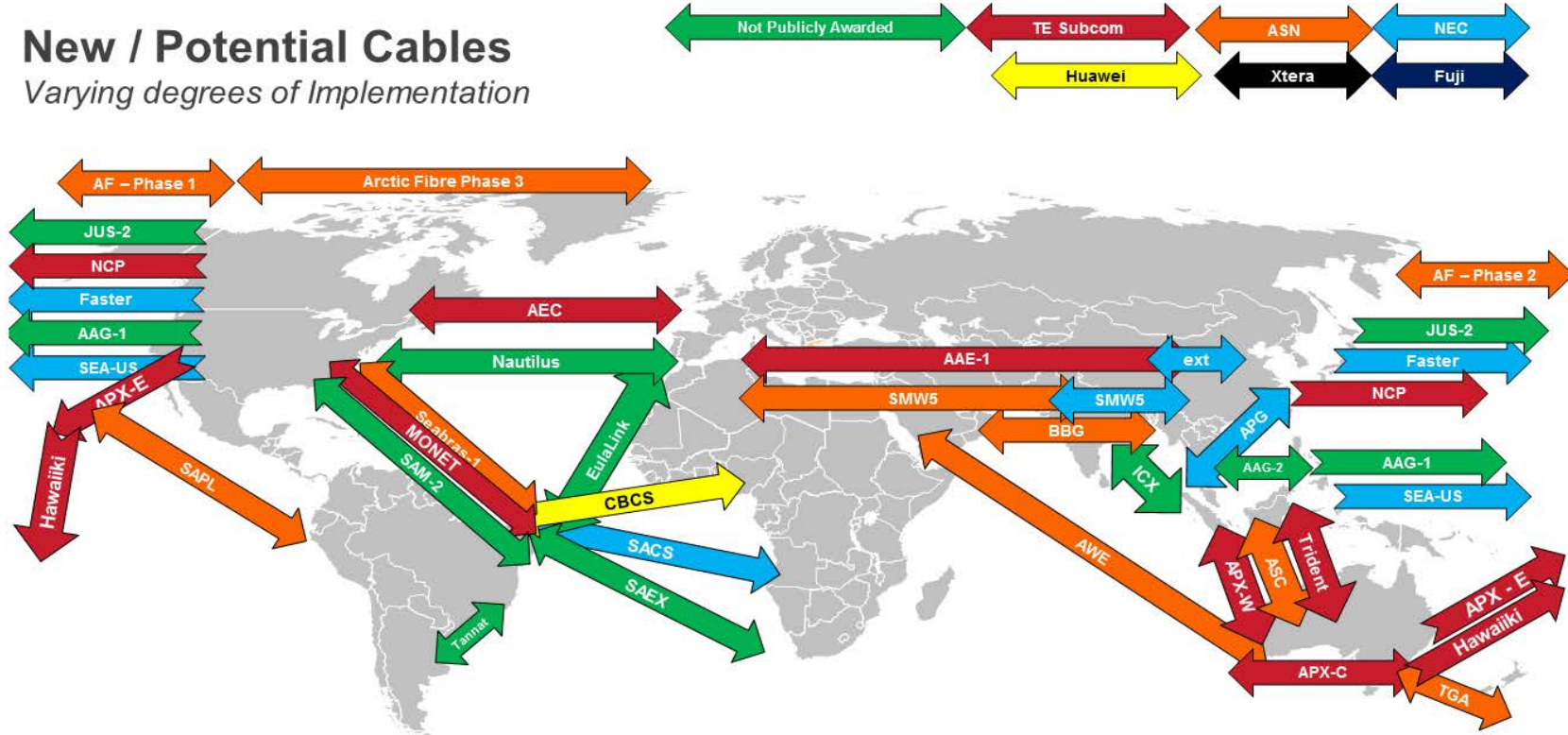
- A submarine cable is a cable laid on the sea bed between land-based stations to carry telecommunication signals across stretches of the ocean and sea.
- As of early 2019, there are approximately 428* submarine cables in service around the world.

* The total number of cables is constantly changing as new cables enter service and older cable are decommissioned.

Summary of current SubSea Cable landscape from the various Suppliers viewpoints

New / Potential Cables

Varying degrees of Implementation



Introduction to Open Cables

- Outlining key considerations when designing or purchasing a new submarine cable, open or otherwise
- It is intended to help ensure the network is upgradeable day 1, or in the future, to best leverage the significant investment made
- The benefits of open cables have become generally accepted
- within the submarine cable industry.

Introduction to Open Cables

– Technologies – Breaking the mould

Business benefits are:

- Freedom to choose best-in-breed vendors with the decision based purely on their wet plant performance
- Freedom to choose a best-in-breed Submarine Line Terminal Equipment (SLTE) at a later date, taking full advantage of:

Faster innovation cycles

Trends toward Point-of-Presence (POP-to-POP) and DC Interconnection

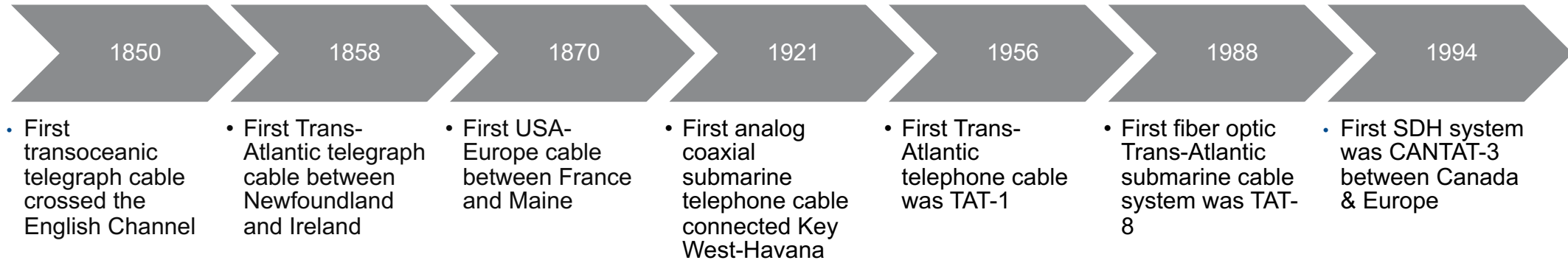
Traffic patterns, away from (CLS-to-CLS), are more fitting

Submarine upgrade vendors with strong terrestrial network portfolios

Elimination of vendor lock-in, resulting in improved:

Competition, Economics, and Politics

History



Sample of the first Trans-Atlantic telegraph (1858)



First fiber optic submarine cable - TAT-8 (1988)

Submarine Cables

How do cables work?

Modern submarine cables use fiber-optic technology. Lasers on one end fire at extremely rapid rates down thin glass fibers to receptors at the other end of the cable. These glass fibers are wrapped in layers of plastic (and sometimes steel wire) for protection.



How thick are undersea cables?

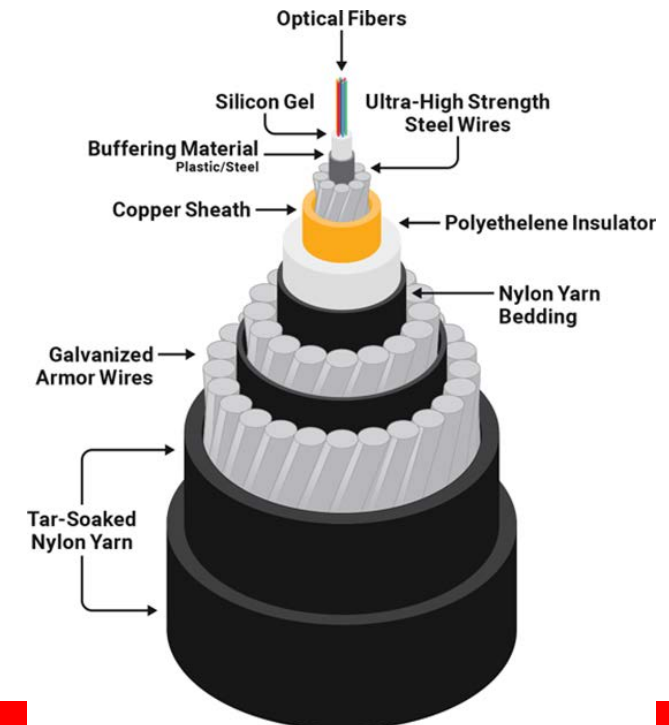
For most of its journey across the ocean, a cable is typically as wide as a garden hose. The filaments that carry light signals are extremely thin – roughly the diameter of a human hair.

Who owns these cables?

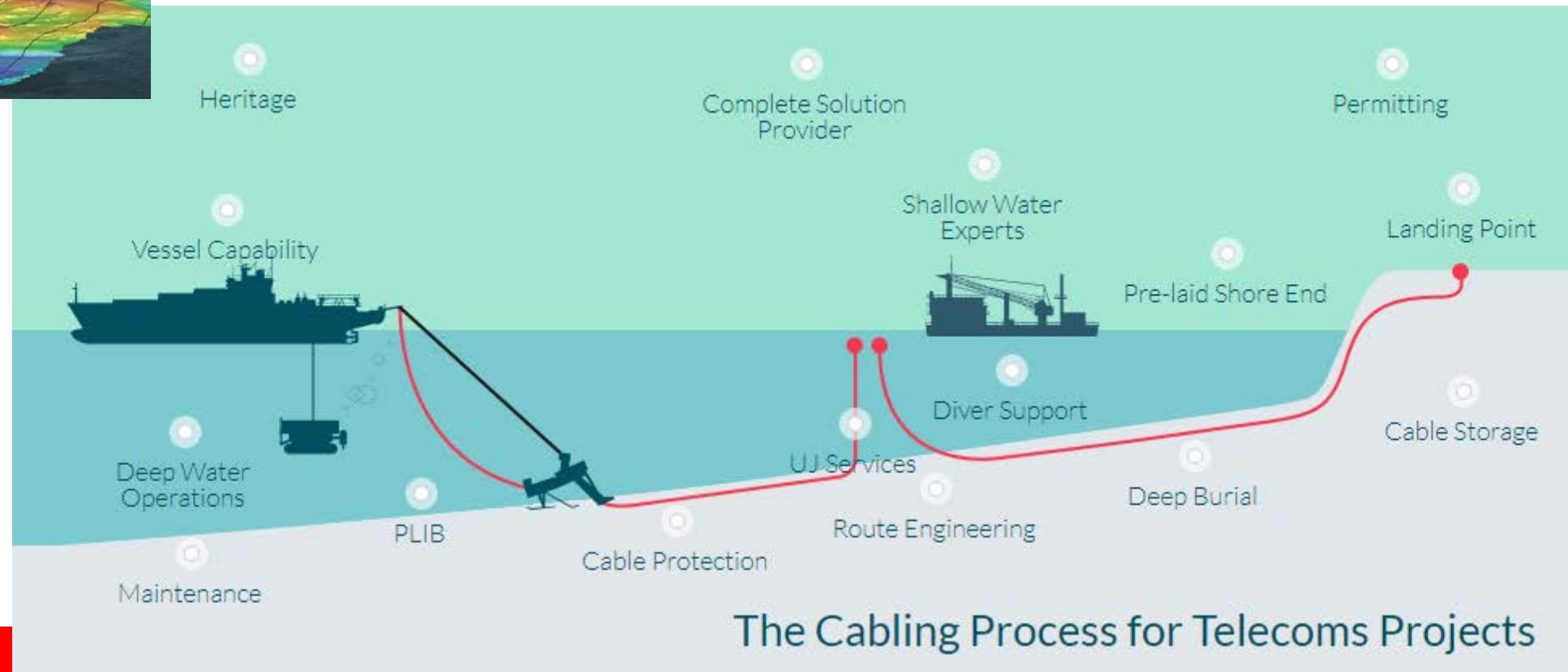
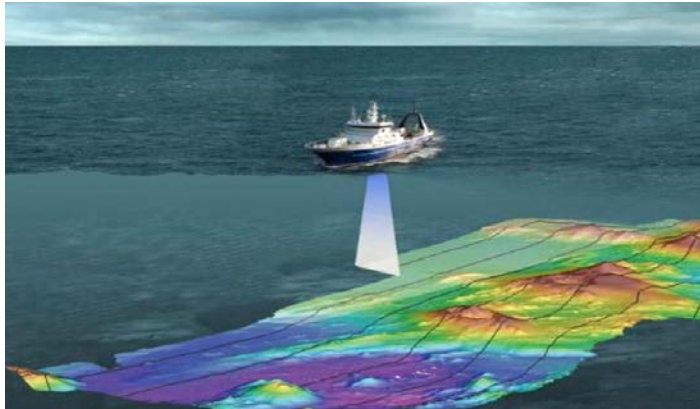
Cables were traditionally owned by telecom carriers/PTT's who would form a consortium.

In the late 1990s, an influx of entrepreneurial companies built lots of private cables and sold off the capacity to users.

Providers such as Google, Facebook, Microsoft, and Amazon are major investors in new cable. Faced with the prospect of ongoing massive bandwidth growth, owning new submarine cables makes



- Prove and document the initial route
- Develop the initial route to avoid obstructions & hazards found during the survey
- Determine final cable engineering and cable quantities
- Confirm or amend preliminary cable protection strategies
- Provide all data and documentation necessary to support cable installation
- Provide the database framework for system maintenance



Video showing Cable being deployed/laid....

How to design a subsea network with diversity?

- Most companies follow a “safety in numbers” approach for usage by spreading their networks’ capacity over multiple cables so that if one break, their network will run smoothly over other cables while service is restored on the damaged one.

Atlantic	Australia-Asia	LATAM
AC-1 Aquacomm Hibernia	ASC SMW-3 AJC	Globenet East/West SAM-1 SAC

- How do Google achieve this today ?
The network consists of fiber optic links and **subsea cables** between 100+ points of presence, 7500+ edge node locations, 90+ Cloud CDN locations, 47 dedicated interconnect locations and 15 GCP regions
This is called a “MESHED” Network



Content providers are driving the submarine cable market



APG, MAREA, Pacific Light



Unity, SJC, FASTER, MONET, Tannat and Pacific Light



Hawaiki



NCP, Seabras-1, AEC, MAREA

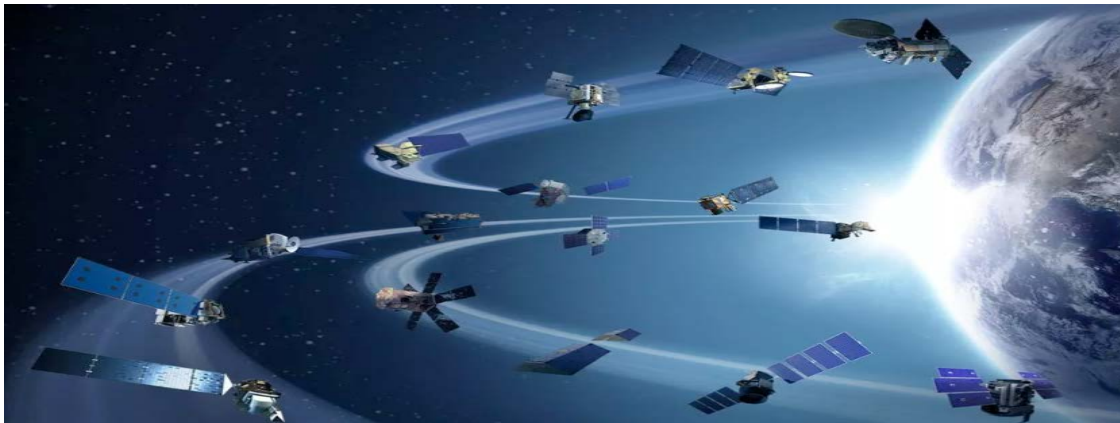
New Submarine Cables

Caribbean	Atlantic	EMEA	Australia-Asia
Deep Blue	ARBR BRUSA Durant ELLALink Globenet Havfrue SABR SACS SAEX SAIL	ACE-2 Africa-1 DARE Eagle East Eagle West Hav HK-S IFC-1 IGG IOX JGA-N MYTHIC PEACE SEAX-3 SJC-2 SKR1M	ASC AWE “H” Hawaiiiki Indigo Central Indigo West JGA-S SX Next

Source: Ciena Sales

Why subsea over satellite?

- Satellites are better for reaching areas that aren't yet wired for fiber as well as distributing content from one source to multiple locations.
- On a bit-for-bit basis, there's just no beating fiber-optic cables. Cables carry far more data at a far less cost than satellites **and you would need a lot of Satellites !**
- Statistics released by the U.S. FCC indicate that satellites account for just 0.37 percent of all U.S. international capacity.



Subsea Global Reach 2018

5

Continents

22

Countries

44

Markets

200

Data Centers

35

Metro Subsea Enabled

AMERICAS



EMEA



ASIA-PACIFIC



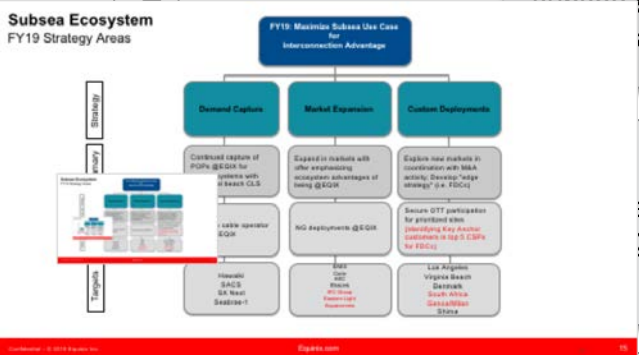
Subsea Ecosystem

FY19 Strategy Areas

FY19: Maximize Subsea Use Case for Interconnection Advantage

Strategy

Primary



Targets

Demand Capture

Continued capture of POPs @EQIX for subsea systems with local beach CLS

Local cable operator @EQIX

Hawaiki
SACS
SX Next
Seabras-1

Market Expansion

Expand in markets with offer emphasizing ecosystem advantages of being @EQIX

NG deployments @EQIX

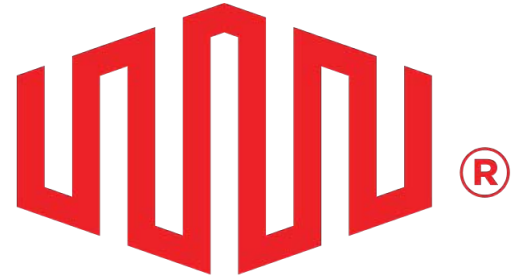
SAEX
Curie
ASC
EllaLink
IFC Group
Eastern Light
Aquacomms

Custom Deployments

Explore new markets in coordination with M&A activity; Develop "edge strategy" (i.e. FDCc)

Secure OTT participation for prioritized sites
(Identifying Key Anchor customers in top 5 CSPs for FDCc)

Los Angeles
Virginia Beach
Denmark
South Africa
Genoa/Milan
Shima



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WHERE OPPORTUNITY CONNECTS