Enabling Connectivity with Express Lanes for the World's Data

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The next time you're riding along a highway or traveling by train, take note of how similar the nation's transportation infrastructure is to the foundation of a global telecommunications network.

Across the country, there are different types of roads and highways with varying speed limits and numbers of lanes. Passenger vehicles take people from point A to point B, as they go to work or visit family and friends. Commercial trucks deliver products to stores. In parallel, a national railroad grid works with the over-the-road transit system. Without this interwoven transportation network, commerce would grind to a halt.

It's no different with a global subsea fiber optic cable infrastructure—the transportation system that Internet data rides across, with different "lanes" and different modes of transmission to get data where it needs to be.

Depth of understanding

A common perspective is that the vast majority of data traffic around the world is carried on satellites or through the cloud. That's not the case—99 percent of international data is actually carried on subsea fiber that sits on the ocean floor, forming the backbone of the Internet.

For a telecommunications company, this type of network—when managed and leveraged properly—is a powerful asset in more ways than one.

These cable systems are essentially highways for all inter-country and intercontinental commercial communications across the Internet. When a company has ownership of this highway, it has the ability to truly add value to growing markets that need to be served with this bandwidth. It's an opportunity to be a change-maker for good, directly impacting markets traditionally underserved when it comes to connectivity.

Many of these markets are in regions that don't have any subsea assets and may be completely reliant on one connectivity method, such as satellite. Satellite is a proven network edge technology that will continue to augment and complement other delivery options by providing network diversity and access to remote locations.

Despite ongoing improvements in cost and quality, however, satellite technology is limited in bandwidth and robustness compared to its cable counterparts. These limitations, for now, are preventing satellite from advancing to the point where it's an end-all, be-all connectivity solution—at least not without mutually beneficial partnerships with telcos to leverage their terrestrial system assets. For example, a satellite ground station will still have to connect to a remote data center to access an Internet Point of Presence (PoP), which is done via fiber optic cables.

Serving new communities by investing in cable systems and offering access to modern technology experiences enhances people's lives. It also provides a wealth of opportunities, culturally and economically, that were previously unavailable.

Advantages of subsea cable network ownership

From an entirely different perspective, companies that own cable systems have a definite strategic and competitive marketplace advantage, not only for them, but also for their customers.

Owners can reduce latency by creating branching units to equip different markets that might be of interest to certain enterprises.

A cable system owner can directly control the paths for large anchor customers needing particular routing requirements as part of their business. For over-the-top (OTT) platforms and global content owners, their whole network is dependent on the way these cable systems are routed. The cable owner can directly influence that, giving those types of customers a truly compelling reason to work with them.

Anchor tenants can have a say in where the path is built as well as specific engineering details that may be tailored to their unique needs. But other types of tenants can still benefit from the work the anchor tenants do with the system owner in terms of system routing to provide access to new regions, for example.

There is a great deal more flexibility and control when you're actually designing the cable system and owning it versus purchasing capacity as a tenant. Then you're limited to using available bandwidth versus controlling your own destiny. Essentially, you can adapt and modify for market changes more easily.

Subsea cable network challenges

The telecommunications industry has a limited number of players building and managing subsea cables, due to the complexity and difficulty of creating, building, and maintaining these systems. If you can do it well and maintain a leading position within this scarce market, you provide a tremendous benefit and value to customers. As one example, Telstra owns and operates a network of more than 250,000 miles of fiber optic subsea cable, the underlying platform for products and services connecting North America, the Asia Pacific region, and the world. Designing, laying, and connecting subsea routes across the ocean is a big task on its own, but maintaining them can be just as challenging. Laying cables is a unique beast and an expensive exercise—from the time they are unspooled from giant drums loaded onto cable landing ships, to the constant threat of cable damage from commercial fishing vessels and ship anchors to the remotely operated vehicles (ROV) used for inspection.

Some cables run thousands of meters underwater, with one cable crossing the Mariana Trench, the deepest water in the world. Fixing one of these is hardly a quick job. Even just getting the grappling hook down to the cable to repair any damage can take a whole day.

Managing subsea cable networks is hardly a "set it and forget it" proposition and requires 24/7 monitoring with a series of proactive maintenance measures to ensure ongoing cable quality and performance, and to minimize any risk or degradation of service impact as much as possible. Some examples include:

- Automatic Identification System (AIS) to assist with identification of ships identified to be stationary over cables

- Use of guard boats to move fishing boats away from cables

- Establishment of protection zones to avoid hazardous activities such as anchoring or trawling near cables

- Strengthened cable burial procedures and locations to improve protection against fishing threats

The upside of subsea cable network ownership

But any expense or logistical headaches are well worth it.

With many customers—especially global cloud and content players—this network is the sole reason they buy from us, or at the very latest a deal-breaker. For example, in some areas of the business, the subsea network can be responsible for up to 20 percent, to 30 percent of Telstra's revenue.

An efficient subsea cable network can lay the groundwork for many key enterprise offerings that will constantly expand over time. For example, Telstra's Octagon global trading solution

infrastructure and the Global Media Network are core offerings tied to the subsea network as a basis for future development.

These cables can also be set up for expansion through complementary new projects.

Telstra's investment in the Southern Cross Next Trans-Pacific cable provides a low-latency route between Australia and North America, while enhancing the existing network's already strong capacity across the Pacific region. Acquiring the Digicel Pacific business in the South Pacific region again broadened global capacity while also serving a long-underserved region.

Enabling future growth

As the global economic landscape evolves and new players emerge, cable system networks and their routes will follow suit to enable growth. Content and social media companies like Google, Facebook, and Microsoft are building their own cable system infrastructure. But they need telecom partners with the right assets already in place to monetize and develop their emerging functionalities. Subsea cable systems will also become increasingly crucial for the backhaul of emerging technologies, particularly the Internet of Things (IoT), low-earth-orbit (LEO) satellites, and 5G.

Subsea technology is always advancing to where we can generate more capacity out of the same systems far more efficiently. As recently as four years ago, 10 gig communication was considered "high-speed." Then it was 100 gig cards. Now, we're in the next generation of achieving 400 gigabits. And this is being achieved as the overall capacity of subsea cables increases without changing the underwater foundation but by adding software and hardware innovations to digital coherent technology on the terrestrial terminals of the cable systems.

The importance of a properly designed and managed cable system illustrates a fundamental telecommunications concept: connectivity is no longer a "nice to have." It's a social and economic requirement, and it's our collective responsibility as an industry to deliver it as we continually perfect the customer experience.