US DATA CENTER TRENDS & WHY THEY REQUIRE NEW DARK FIBER

by Jim Nolte

Digital transformation is recalculating the velocity of change. Enabling its transport is dark fiber.

This rise of digitization, from diverse channels such as migration to the cloud, IoT, automated anything and smart city applications is driving demand for enhanced connectivity options, according to CommScope, which is bolstering the desire for fiber optic networks that can provide high-bandwidth, low-latency, and, where possible, practical, future-proof solutions to support the next wave of IT innovation.

So, to paraphrase David Byrne as he asked in his enigmatic lyrics, "how did we get here"?

In the 90's, the telecom industry enjoyed tremendous growth, pouring vast sums of capital into building fiber optic networks. This included the laying down of fiber networks along highways and rail lines (long-haul). Simultaneously, thousands of local and regional metro-like networks were laid across large cities and population centers. However, around the turn of the century, the telecom sector witnessed a meltdown with the result being billions of unused fiber networks (unlit, or dark fiber) being sold off at bargain-basement prices by telecom providers to avoid bankruptcy.

Since then, evolving trends and innovations, like mobile data, 5G services and HD video quality for cable operators, are exponentially increasing demand for bandwidth. As a result, many telecom Service providers find

themselves scrambling to meet their customers' increasing network quality standards—more about this in a minute.

No matter how you slice it, the dark fiber networks market is on the rise.

In fact, by 2028, the market for dark fiber is set to eclipse $13.51 billion, a compound annual growth rate (CAGR) of 11.9% from 2022 to 2030. In perspective, North America's demand for dark fiber accounts for more than 40% of the overall global market value.

When Existing Fiber Falls Short

Legacy networks, emerging technologies. How does existing fiber keep up? The simple answer: It can't.

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With the rise of 5G enabled devices, Internet of Things (IoT) devices, cloud computing, autonomous vehicles and more, the need for data transmission between data centers and corporate offices, or other locations where IT infrastructure is stored, is higher than ever. Today's data centers require reliable, secure, nimble and fast fiber networks to provide connectivity between their locations and data-driven enterprises, but they're often relying on networks that are ill equipped to handle the type and volume necessary for the success of modern enterprises.

Many of the existing fiber networks in use today date back to the 1990s and were built to serve a vastly different purpose. While these legacy networks are capable of connecting data centers and IT infrastructure for enterprises, users often experience delays because the quality of those aging networks no longer meet today's higher standards.

As we move further into the Fourth Industrial Revolution, network quality standards such as signal loss, latency, diversity and inventory will be even more important to IT managers as they look for ways to scale enterprise networks. However, this transition to digital is precisely why enterprise networks must be built to handle the growing bandwidth demands that come with doing business today. Most modern businesses fall into one of two categories:

1. Digitally transformed
2. Those on their way to becoming digitally transformed

In both cases, their reliance on data is growing exponentially, which drives the need for more bandwidth – especially between data centers. If you're an IT manager in either one of those camps, consider the following four factors to evaluate existing, in-situ fiber networks:

Factor #1: Signal Loss

Many fiber networks were originally placed in the ground more than 20 years ago. What's more, many of

those networks have grown through acquisition. Company A acquires Company B's existing fiber network and mashes the two networks together to create one. This is done by splicing cables together, which results in signal loss. Signal loss is a major factor for IT managers because it results in a slower and less reliable network, which may force a throttling of the bandwidth and the purchase of more fault-tolerant hardware.

Factor #2: Latency

For IT managers at today's modern enterprises, a fiber network that is intentionally built to reach data centers on the shortest routes possible is a key factor when it comes to a network's speed. All data passes through a data center. The more direct the route between data centers, the faster that connection will be. The circuitous routes that legacy networks take result in higher latency, which can impair application performance. In an environment where time is money, higher latency is unacceptable.

Factor #3: Route Diversity

Legacy networks also struggle to offer true route diversity. Working with a fiber provider that offers a truly diverse route means enterprises have a stronger chance of remaining operational in the event of a cut line or similar situation. When many legacy networks were being built, they sought economies by burying their infrastructure in a common ditch, so chances are if one network is affected by a cut, all others in the same location will be as well. If uptime is important, dark fiber in unique routes delivers.

Factor #4: Inventory

Legacy networks were built to serve far fewer people — a few million as opposed to the more than 5 billion internet users today — and that unfortunately means they likely included smaller amounts of fiber.

The lower fiber count makes it hard for enterprise networks to quickly scale to handle the growth of data transmission that today's data-intensive applications require.

What About Security?

In addition to being ill equipped to deliver the volume needed for modern enterprises, legacy networks are also inherently less secure. Why?

Dark fiber networks enable private access to unused infrastructure. In terms of control, it has no equal, giving the user full control over the network equipment and connection; the type of transmission technology, protocols and features they prefer for their network, unlike public internet infrastructure, for example. And, because no other equipment can intercept the data being transmitted across the optical fiber, it can reduce security risks.

While the solve for each of these factors is distinct and based on individual circumstances, at the macro level, where traditional fiber optic networks fall short of today's demand for digital transformation, dark fiber networks provide secure, reliable connectivity to and between mission-critical data centers, cloud computing sites and the enterprises that rely on them.

How Emerging Markets Are Influencing Dark Fiber Adoption

Emerging markets – those areas with exceptional proximity and access to infrastructure where economic development is prized – also demonstrate the need for new dark fiber becoming a vital element for metros throughout North America.

For example, we recently announced we've constructed new dark fiber connectivity solutions for the Greater Portland area in Hillsboro, Oregon, one of the fastest growing U.S. data center markets on the West Coast.

The Greater Portland area's proximity to trans-Pacific subsea

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cables, tax incentives, and low-cost renewable power is contributing to the city's reputation as one of the fastest-growing data center markets in the Pacific Northwest. Recent reports indicate current investments in greater Portland have resulted in nearly 100 MW of commissioned power with land to add more. As a result, the increasing demand for data center connectivity throughout Hillsboro and Greater Portland will require more dark fiber services to empower the area's growing IT networks.

Even customers in metros perceived as saturated with terrestrial fiber networks have expressed the need for truly diverse routes at competitive price points, which is driving the development of new dark fiber networks. Businesses operating around the San Francisco Bay area, like in San Jose, Sunnyvale, Santa Clara and even

San Francisco, continue to invest in new fiber routes that prove last mile connectivity is still as much a need in these markets as it is in emerging markets such as Greater Portland.

Notwithstanding emerging or established markets, metros or routes, it's not a stretch to call data centers the key point of origination or intersection for all applications and dark fiber as the optimal access medium with an open-ended capacity for growth.

Future Fit

Today's data centers require reliable, secure, nimble and fast fiber networks to provide connectivity between their locations and data-driven enterprises, but as we've established, the legacy networks serving them can't always deliver for today's needs, let alone tomorrow's. Whatever the next big

technological advancement is, it will likely require even more bandwidth. With existing fiber already struggling to keep pace, the need for newly built dark fiber routes is as high as ever.

For businesses, including enterprises and data center operators that want to remain relevant, digital transformation is a must. To maximize those networks, not only is dark fiber a key component for established and emerging markets today, it is also the only way to make sure their networks (and yours) can handle future demands.

Or, for those still depending on existing fiber to get the job done, as Mr. Byrne recounted in his lyrics to a Talking Heads classic, "Life During Wartime," "Transmit the message, to the receiver, hope for an answer some day…"

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