Cabling the Data Revolution

Making the Right Choice for Data Center Fiber

Whether its Artificial Intelligence (AI) and cloud-based productivity tools or social media, Virtual and Augmented reality (VR / AR) and the Internet of Things (IoT), global demand for data processing is growing at an unprecedented rate. Bloomberg[1], for example, cites a 42% CAGR for generative AI (GenAI), while Fortune Business Insights[2] expects that the IoT will expand at a CAGR of 24.3% - and neither is coming from a small base.

Figure 1: Modern data centers rely heavily on huge amounts of cabling for connectivity

While these sectors are diverse, they share a common need for data to be transmitted quickly and reliably to, from and within data centers. This means that robust, long-term cable performance is critical to ensure quality and integrity of links and, with data speeds reaching 50G and beyond, fiber is the only realistic option. However, not all fiber is born equal and choice of the right cable technology at the outset not only goes a long way to preventing costly and time-consuming problems during installation and operating life but can deliver many other benefits ranging from implementation flexibility to dramatic space savings.

Addressing Data Center Cabling Challenges

The fact is that for data center operators, cable can be a major headache.

While flexible and light, standard non-armored cable is easily damaged during installation (it dislikes being pulled) and operational life as a result of factors ranging from bends and twists, the closing of cabinet doors on the cable itself, corrosion, moisture, heat, or even rodents. Armored cable provides enhanced levels of physical protection to prevent damage but, until recently, has been physically much larger and heavier than its non-armored counterparts – a challenge that is significant when success is measured by computing throughput-per-square foot.

What's more, tight spaces can make install difficult, particularly with bulkier cable types that can't support tight bend radii. And once installed, multiple, larger cables can impede airflow to servers, leading to excessive heat and costly cooling or unscheduled shutdowns.

But now, TiniFiber's patented Micro Armor Fiber™ Optic Cable, which is 65% smaller and 75% lighter than convention Aluminum Interlock Armor (AIA), is helping operators and installers address these challenges in the congested data center environment without compromising performance or reliability.

Figure 2: TiniFiber's Micro Armor cable[3]

The tightly wrapped Micro Armor tubular stainless-steel coil combined with Kevlar® makes it significantly stronger yet more flexible than other cables. This crush-proof armor shields fragile glass fiber optic strands against damage from pinching, twisting or being slammed by closing cabinets or doors.

Data center operators can have confidence that TiniFiber cable will not have latent defects from installation, nor will there be data corruption from EMI. And, naturally, as all data is transmitted as light in the fiber, within the armored shell, data security is at least as high as any other cable.

The small diameter of the cable provides for tighter bend radii and allows the cable to be used in smaller conduits. And when deployed in larger conduits, more space will remain for future upgrading of the system. Installers prefer TiniFiber's cable because it is easier to pull and, as it is significantly stronger, they can have confidence it can be routed first time without any need to repeat due to breakages or damage.

But the benefits don't end there.

Installers notice that TiniFiber cable reels are smaller and lighter – saving space in warehouses, allowing longer lengths to be carried in a small van and saving effort when on site. Furthermore, if the cable is installed by an organization that is registered under the TiniFiber Certified Installer (TCI) Program, then a 25-year connector-to-connector TiniFiber warranty is offered, ensuring unparalleled reliability and peace of mind.

The TiniFiber Range

TiniFiber offer a range of cables that are suited to indoor, outdoor, or mixed use as well as tools such as fusion splicers. All of the fiber cables in the range are armored using a patented, tightly wrapped stainless steel coil combined with Kevlar, making them smaller than any other cable with comparable performance. All common environmental cable jackets (including LSZH) are available.

Figure 3: TiniFiber cable dramatically reduces space taken and weight in data center applications[4]

Inside each cable is modern bend-insensitive glass (Corning LBL G.657.A2) available in 250 µm and 900 µm sizes (with coating). The 900 µm tight buffer cables contain up to 24 strands while the gel-free sub-unitized 250 µm breakout style cables are available with up to 12, 24, 36, 48, 72, 96 or 144 strands.

As well as being smaller, lighter, more durable, more flexible, and more adaptable that other cables, such as AIA, TiniFiber's Micro Armor cable offers significant cost savings during installation and over its lifetime, reducing the total cost of ownership. The size of the cable allows for smaller cable ducts, installation times / costs are reduced, and the inherent strength makes it more reliable – all backed by a 25-year warranty.

Summary

Data centers are pivotal to the modern world, supporting all the online content and cloud-based services that we have come to rely on in our daily lives. Ensuring that the rapidly growing levels of data are transmitted reliably without error requires a quality cable. TiniFiber's patented Micro Armor cable is leading the way, providing a highly reliable, high-throughput cable that is lighter and occupies a fraction of the space than comparable cables alongside a host of other benefits during installation and operational life.

Notes/References

1. https://www.bloomberg.com/company/press/generative-ai-to-become-a-1-3-trillion-market-by-2032-research-finds/
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