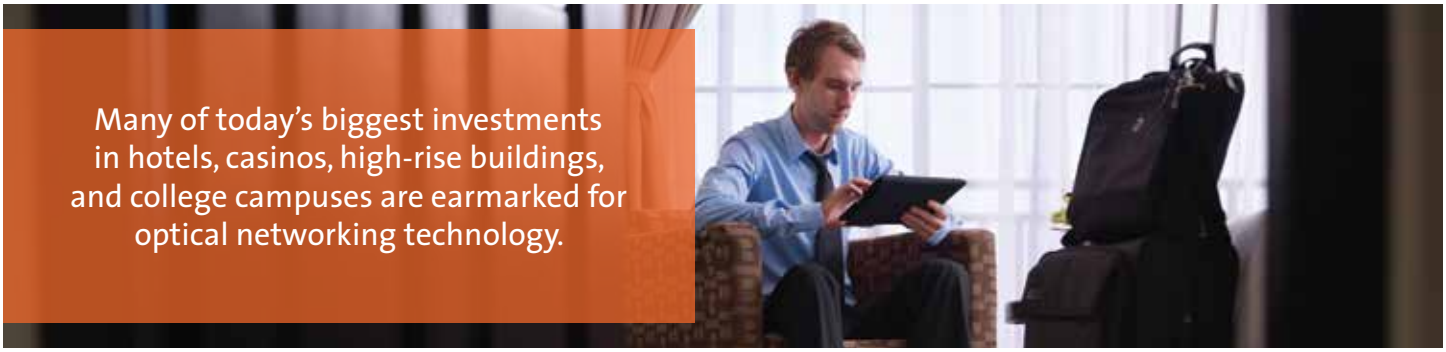
Why Fiber in the Horizontal?

Where optical networking has been, where it's going, and why this time it's different.

CORNING



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Fifty years ago, hospitals ran on tongue depressors and surgical masks. Today, they run on data.

Considering the number of networks, connected devices and data-rich applications now integral to patient care, is it any wonder hospital systems like Guthrie Health and Lake Nona Medical City are at the center of an optical telecom renaissance?

And it's not just hospitals. Many of today's biggest investments in hotels, casinos, high-rise buildings and college campuses are earmarked for optical networking technology.

Consumers want fast access to cellular service, on-demand video streaming and a bevy of personalized applications. And all that voice-data-Internet convergence takes bandwidth – a lot of it.

Hence, more businesses are turning to fiber optics, with its virtually unlimited bandwidth potential and easy-to-install, lightweight composition.

But – haven't we tried this before?

What a Difference a Decade Makes

In the late '90s, carriers invested close to $100 billion in a nationwide fiber optic infrastructure. In 2000, nearly 20 million miles of optical fiber was installed in the U.S. Upstart telecom carriers – the "fiber barons" – came out of the woodwork to feed an explosion of dot-com demand.

Everyday businesses were asked to make an investment, too.

Connecting an office building to this fiber infrastructure meant simply running fiber cables vertically, from floor to floor. But getting fiber in the horizontal (from the vertical to the desk) meant converting inventories of legacy hardware. And that required swapping hundreds – sometimes thousands – of RJ-45 ports on desktop computers with optical ports.

The cost-benefit equation didn't add up for most companies. For less money, they could tackle their bandwidth problems by running additional lines of CAT 5 or CAT 6 copper.

But the day has come when that's no longer cost-effective, and space is limiting these additional copper runs.

Look inside a modern telecom closet and you'll see. The equipment plugged into dozens of copper-based network connectors has increased the size of the average closet by a factor of three – meaning three times the space, energy use and HVAC costs.

Even if installers could continue adding copper indefinitely, it is a wasteful way to satisfy the nation's appetite for data, which according to Cisco's latest visual networking index (VNI) forecast, has barely been whetted. (One figure suggests a busy hour of North American Internet activity will reach 259 terabytes per second in 2017, the equivalent of 215,650,000 people streaming high-definition video simultaneously.)

To meet that kind of growth, businesses will be ripping and replacing their copper cables every two years – a never-ending capital expenditure. And it's worth mentioning that copper is heavy and cumbersome to install.

Fiber, on the other hand, is stronger, lighter, more flexible and easier to pull. And thanks to advances in preterminated fiber cabling, optical installations are efficiently designed and cost-efficient.

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Fiber to the Edge

But what of those expensive hardware conversions that derailed fiber in the horizontal over a decade ago?

Cisco's latest VNI forecast contains interesting figures on a technology in decline–fixed wired computing devices. By 2017, for instance, fixed wired devices will account for just 30 percent of North American Internet traffic.

Combine the decline in wired connectivity with the rise of mobile smart devices (more than half a billion new mobile devices and connections in 2013) and Bring-Your-Own-Device policies (according to Gartner, 38 percent of global companies will stop providing devices to workers by 2017), and the "tethered" office–beholden to RJ-45 port conversions – disappears.

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Furthermore, the copper-based Ethernet links left unconverted in horizontal networks are far from benign. Unlike fiber, copper Ethernet is susceptible to electromagnetic interference (EMI) that can corrupt, degrade or even derail data transmission. So businesses are using fiber optic converters to interconnect copper-Ethernet devices over fiber to ensure optimal data transmission.

This is important in large facilities – like retail stores and distribution centers – where attenuation (loss in signal strength as cable length increases) limits copper-Ethernet network coverage to 100 meters or less. Fiber has two benefits here: 1) low attenuation, meaning network coverage of kilometers instead of meters, and 2) no rise in attenuation as bandwidth increases, which means gigabit and 10-gigabit Ethernet connections are possible over greater distances, with lower-power transmitters.

Businesses are converting to fiber in the horizontal for another reason – security. Because optical fiber is dielectric (doesn't transmit an electronic signal), it can't be monitored remotely – whereas spying on a copper-based local area network (LAN) requires nothing more than a sensitive antenna. The design of fiber cabling also makes it quite difficult to tap into, and quite simple for a tap to be detected.

And, unlike copper, fiber is non-flammable – which may improve public safety in sensitive environments like hotels and hospitals.

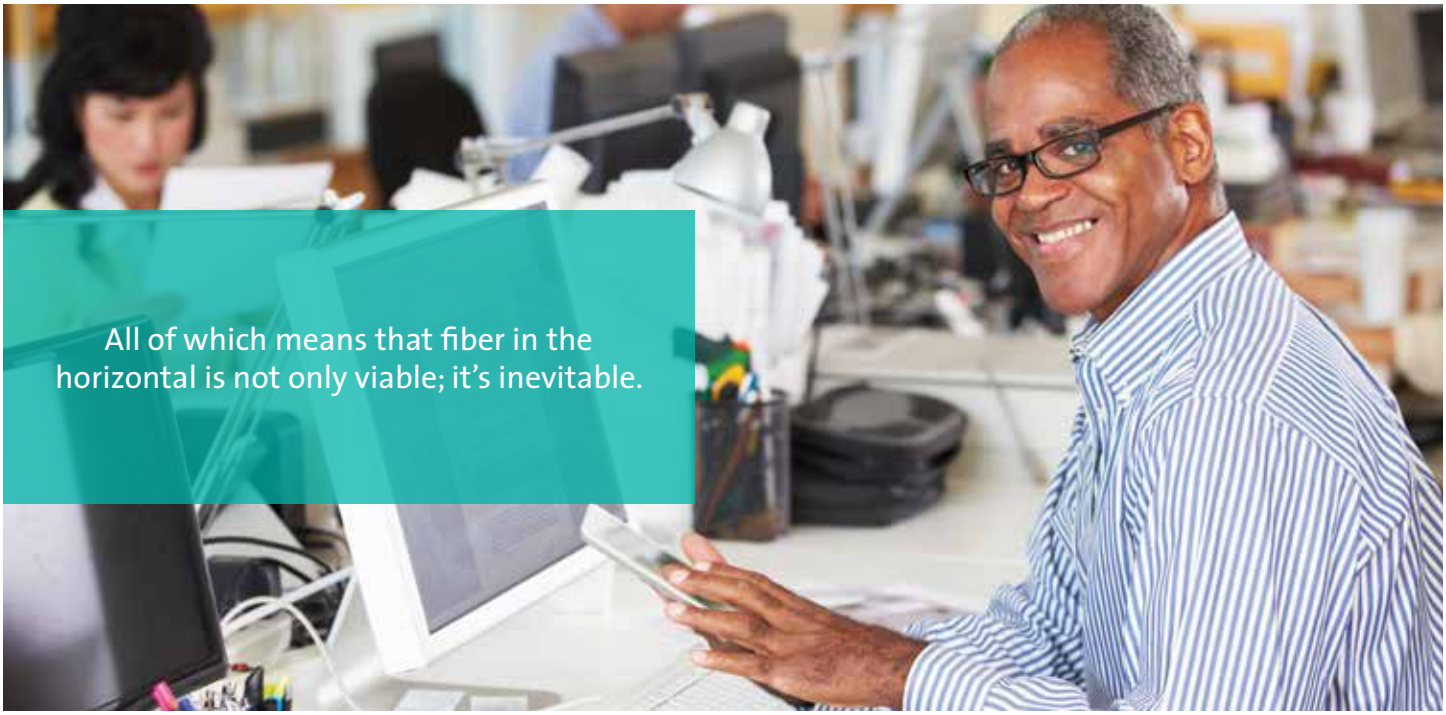
An All-Optical Future

With passive optical networking (PON), businesses can take a single fiber "to the desk" or even opt for purely wireless optical backhaul.

Guthrie Health, for instance, recently found that a converged gigabit PON and distributed antenna system (DAS) was the ideal solution for supporting its flagship hospital's entire IT infrastructure – including numerous wireless applications, wireless LAN, and cellular coverage for multiple operators.

Better yet, the passive optical architecture drove substantial cost savings for Guthrie, while the converged deployment of PON and DAS shaved an additional 30 percent off the cost of the project. Perhaps best of all, the scalable fiber backbone ensures cost efficiency (and complete future readiness) in the years ahead.

And more facilities are turning to composite cabling – offering a combination of fiber and power in the same cable. That's power to run phones, surveillance cameras, wireless access points, and thousands of other devices–or to provide back-up power for critical devices in emergency situations.



While we can't say for certain what future requirements will look like, they'll likely pertain to cellular enhancements and multiple in-building applications–including Wi-Fi, monitoring, video surveillance, building automation, and other IP services – many targeting a host of networked devices, the so-called "Internet of Everything."

The Time Is Now

It's not merely performance, security and reliability that are driving fiber's resurgence. This carrier-class technology is easier to adopt and less expensive to implement, operate, and manage than the copper-Ethernet LANs found in most corporate environments. An all-fiber enterprise has gone from cost-prohibitive and technically cumbersome to technically advantageous and – when factoring in return on investment and total cost of lifecycle operations – more cost-effective.

All of which means that fiber in the horizontal is not only viable; it's inevitable.

About Corning ONE™

Built on an all-optical backbone, the Corning ONE Wireless Platform enables convergence of cellular services, Wi-Fi, Ethernet applications, and more . The Corning ONE solution can be deployed in the time and space of the multiple systems required to deliver cellular, Wi-Fi, and Ethernet-based service and can save Enterprise up to 50 percent* on service upgrade costs.

*Blended average of multicarrier and multiband scenarios in multiple use cases.

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