

# Leveraging fiber to optimize hospitality networks

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## Introduction

As network connectivity plays an increasingly important role in an intelligent converged infrastructure, hospitality owners and brands are challenged to find ways to leverage technology in order to improve their guest experience.

Historically, most hotel networks weren't designed from the ground up. Instead, they slowly evolved to support a hodgepodge of existing technologies such as DSL (digital subscriber line), DOCSIS (Data Over Cable Service Interface Specification), and G.hn (data transmission over telephone wiring, coaxial cables, power lines). While these technologies were adequate at the time and maximized the life-span of the current cabling infrastructure, guests continue to demand more from their hospitality network. Today, guests expect a modern hospitality network to offer power, wired and wireless connectivity, and an increasing number of new technologies such as internet of things (IoT) as part of their guest experience.

## The benefits of fiber

With these rapid changes in the industry, many have turned to fiber optics as a solution to provide a viable roadmap to not only sustain guests' growing needs for bandwidth but also support new devices that enhance guests' experience throughout their stay. As such, the investment into the network that is deployed at a property becomes as important as any other amenity owners and brands use to provide customer service to their guests. Since fiber has long been used to provide high-bandwidth, low-latency connectivity across many verticals and applications, it only makes sense to consider fiber for these services within a property.

Moreover, deploying fiber simplifies future growth needs. Instead of pulling multiple cables (coaxial and Category) to each guest room, owners and brands can simply install a two-strand passive fiber that can accommodate guest needs for years. With a properly designed network, fiber to the room can offer scalability; enable multi-gigabit, flexible design options; and eliminate the need to re-wire during refresh periods—thus lowering the total cost of ownership (TCO) and maximizing the investment for decades.

## Fiber to the room

When we talk about this networking shift, it is important for us to make a distinction between a network architecture and a network technology. Fiber to the room is an architecture choice—one that brings considerations as to the network technology that will come into play to deliver applications or content to each guest room. The choice of architecture is a foundational decision that will drive the ability to adopt and deploy technologies and infrastructures at any given property. What owners and brands need to keep in mind when it comes to fiber to the room is choosing a network architecture first—not a network technology or application.

Given that the choice of architecture should be fiber to the room, what technologies are available to enable high-bandwidth, low-latency connectivity to guest rooms?

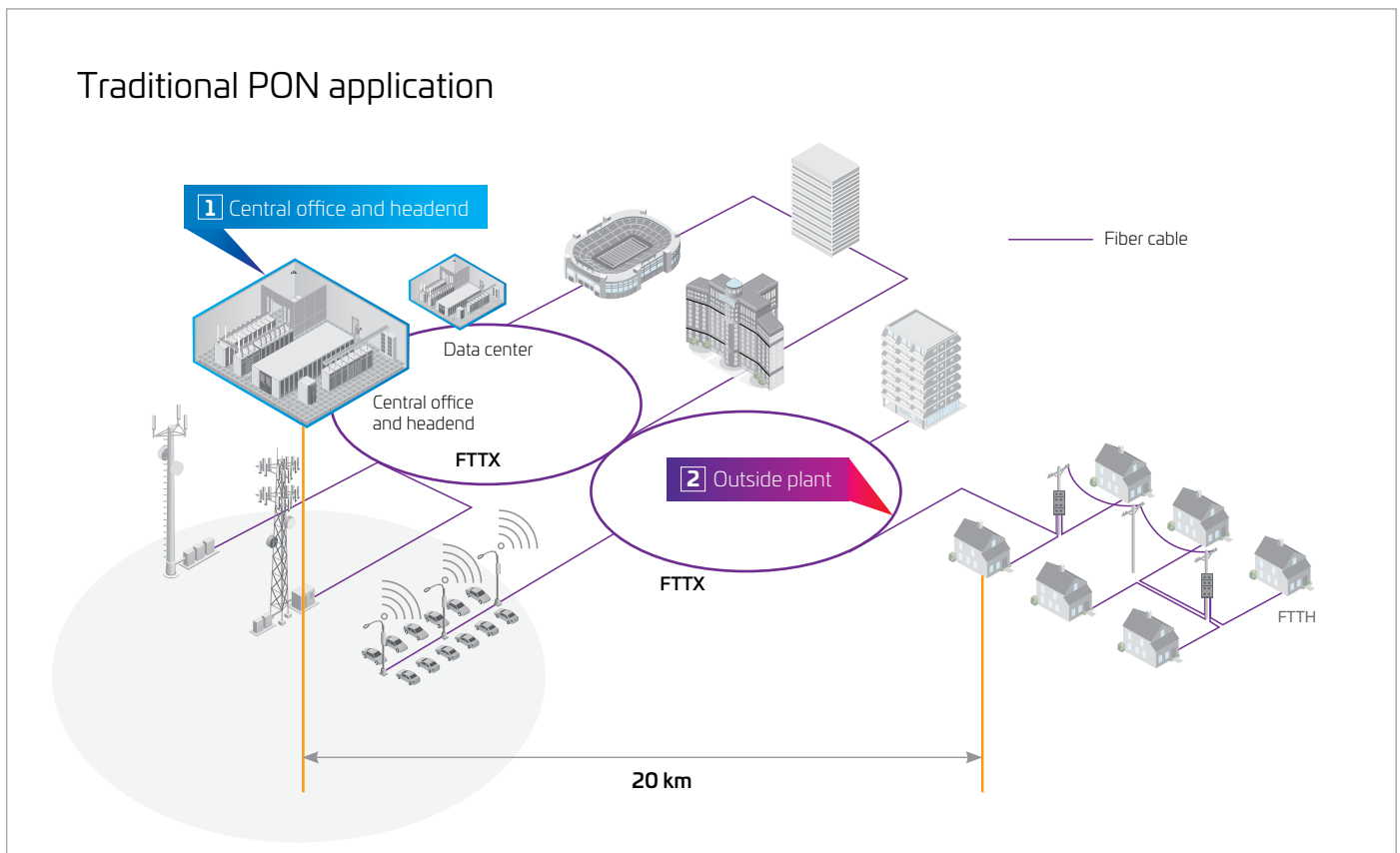
## Ethernet vs passive optical network

Two technologies that have been in the market for consideration are Ethernet (sometimes referred to as active Ethernet) and passive optical network (PON). While both technologies leverage fiber optics and, at first glance, have some architectural similarities, there are some particularly significant differences between the two that owners and brands need to consider when choosing the right network for their properties.

Ethernet as a network technology has been (and continues to be) a core part of the network. Ethernet transmission, be it over copper or fiber, is well known and is readily available from any number of manufacturers. This allows multiple price points and a rich, well-tested feature set to be available to property owners and operators to deploy best-in-class solutions to fit their needs. The available support for these networks is widespread, meaning local support for network issues is readily available—resulting in less downtime.

PON as a network technology was created to solve a specific problem for telecoms and service providers: Provide broadband service to all homes within a 15- to 20-kilometer range of a central office or headend without having to install new distribution fibers and without having to source power at the cabinet where the fiber terminates closest to the end user. The cost and effort to dig trenches, pull new fiber, and distribute connectivity in the outside plant (OSP) is time consuming and costly. PON technology allowed service providers to take advantage of older fiber that had already been run to help provide network distribution.

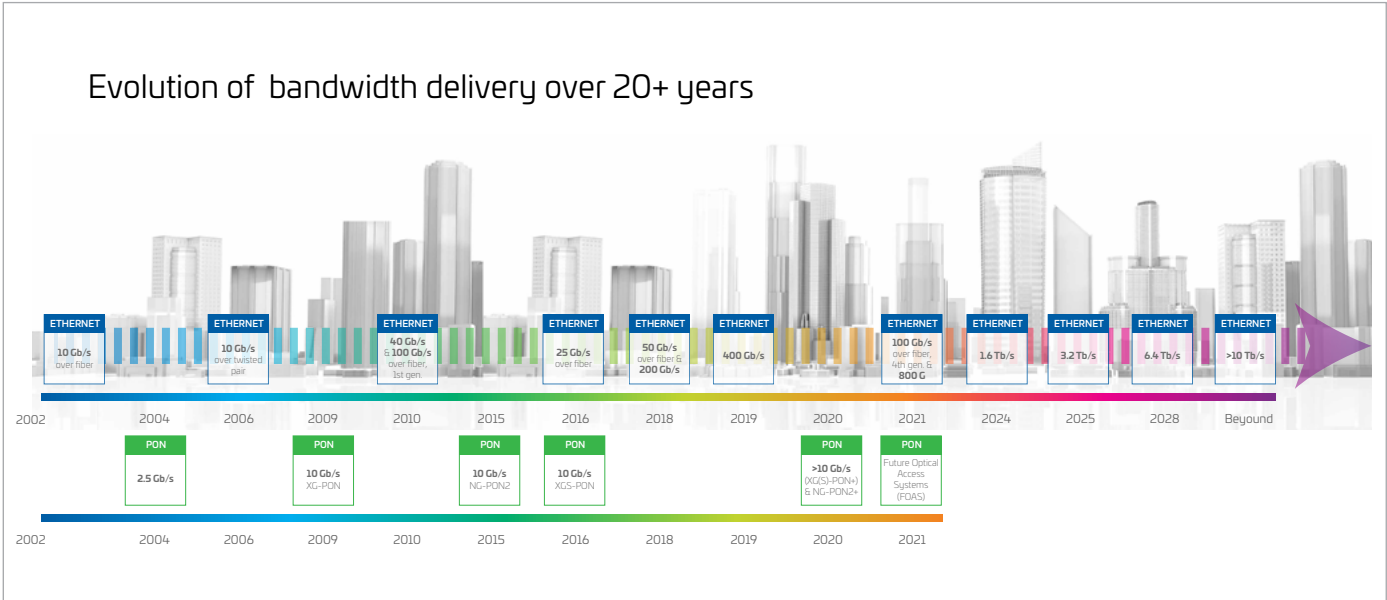
- PON was designed for telco/service providers to utilize existing fiber plant while minimizing the need to deploy new fiber runs from the Central Office or Head End to reach more end-users
- PON addresses a service provider requirement of a 15- to 20-km service area where split points may not have power delivery



With inside plant (ISP) applications such as hotels or office spaces, the limitations that PON was designed to overcome are not applicable. Existing accessible pathways for telecommunications, readily available power and much shorter distances between the core of the network to the end point open up a lot of options, from the types of fiber to use along with the type of technology and optics used—again allowing for more diverse selection of manufacturers and the ability to deploy best-in-class solutions. While PON is used across the globe by many service providers, support for the technology in enterprise application is not as widely available as is traditional IT support for Ethernet networks.

### Rate of technology development

The question of choosing the right technology for your property is a critical one as this decision can impact the realities of deploying new bandwidth and latency-intensive applications to each guest room. With that in mind, consider that some of the operational applications for your property may require much lower latency than the legacy high-speed internet access (HSIA) experience for guests. What has been evident is that the pace of technological development continues to accelerate with no sign of slowing. Knowing that more devices will be on the network than ever before, with even more coming in the future, the network technology that gets deployed needs to be able to keep pace to support the ever-growing need for capacity and responsiveness.



Fiber in the horizontal space is not new at all. In fact, fiber-to-the-desk standards (first applications for fiber to the endpoint) were released not long after the first Category cables standards. Fiber’s intrinsic value of nearly unlimited bandwidth to the workstation has been documented for about 30 years now. So why didn’t all networks bring fiber to endpoints?

Initially, fiber-optic terminations were more complex and time consuming and left little room for error. And, while fiber-optic cables can be pulled with quite a bit of force since their tensile strength is unmatched, fiber cables are more sensitive to crushing—and some fiber cables don’t respond well to sharp bends. Ultimately, these traits made installation more difficult than with copper cabling and caused upskilling to become an issue for the industry.

Secondly was the electronics. Fiber network interface cards (NICs) were available but they were expensive and not nearly as available as RJ45 copper NICs, which were shipped standard with PCs. SFPs for switches were also more expensive than copper PHYs, and this made fiber-to-the-desk implementation costlier—even if you weren’t pushing that much bandwidth to the desk.

But the fatal wound to fiber to the desk was power over Ethernet (PoE). Once we could use copper cables to provide both bandwidth and power to devices, fiber was no longer the “nice to have” at the desk level. In some ways PoE made fiber to the desk a legacy or antiquated technology. So, what changed?

## The emergence of hybrid cables

Hybrid cables that bundle fiber and copper power conductors have also reinvigorated fiber deployment. By addressing the power and data in a single medium, these cables have helped fiber to the desk/room technologies grow in adoption. Although you can't switch out a fiber cable directly for a PoE cable—because powered fiber does require different hardware and special design considerations—hybrid cables present a viable solution for bandwidth, power and sustainability needs as we architect our networks for the future. It is crucial here to note that these hybrid cables can and will support both PON and active Ethernet technologies. Hybrid fiber as part of your overall network deployment strategy is an architecture choice that will need to support your network and applications for multiple generations.

## Conclusion

With today's guests demanding easy access, lightning-fast performance, and absolute security from their hospitality networks, owners and brands are incentivized to upgrade their network in the most cost-effective manner. With fiber now being easier to deploy and manage, the toughest choice becomes whether establishments should migrate to Ethernet or PON to optimize their guest experience.

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