

# 8 ADVANTAGES TO CHOOSING FIBER OVER COPPER CABLE

Fiber optic cable is one of the fastest-growing transmission mediums for both new cabling installations and upgrades, including backbone, horizontal, and even desktop applications. Fiber offers a number of advantages over copper.

## **1. Greater bandwidth**

Fiber provides far greater bandwidth than copper and has standardized performance up to 10 Gbps. While not currently a standard, these speeds could become a reality in future proposals and ratifications. Keep in mind that fiber speeds are dependent on the type of cable used. Single-mode cable offers far greater distance than either 62.5- or 50-micron multimode cable. In addition, fiber optic cable can carry more information with greater fidelity than copper wire. That's why telephone and CATV companies are converting to fiber.

## **2. Low attenuation and greater distance**

Because the fiber optic signal is made of light, very little signal loss occurs during transmission, and data can move at higher speeds and greater distances. Fiber does not have the 100-meter (9328-ft.) distance limitation of unshielded twisted pair copper (without a booster). Fiber distances can range from 300 meters (984.2 ft.) to 40 kilometers (24.8 mi.), depending on the style of cable, wavelength, and network.

Because fiber signals need less boosting than copper ones do, the cable performs better.

### **3. Security**

Your data is safe with fiber cable. It doesn't radiate signals and is extremely difficult to tap. If the cable is tapped, it's very easy to monitor because the cable leaks light, causing the entire system to fail. If an attempt is made to break the physical security of your fiber system, you'll know it.

Fiber networks also enable you to put all your electronics and hardware in one central location, instead of having wiring closets with equipment throughout the building.

### **4. Immunity and reliability**

Fiber provides extremely reliable data transmission. It's completely immune to many environmental factors that affect copper cable. The core is made of glass, which is an insulator, so no electric current can flow through. It's immune to electromagnetic interference and radio-frequency interference (EM/RFI), crosstalk, impedance problems, and more. You can run fiber cable next to industrial equipment without worry. Fiber is also less susceptible to temperature fluctuations than copper and can be submerged in water.

### **5. Design**

Fiber is lightweight, thin, and more durable than copper cable. Plus, fiber optic cable has pulling specifications that are up to 10 times greater than copper cable's. Its small size makes it easier to handle, and it takes up much less space in cabling ducts.

Although fiber is still more difficult to terminate than copper, advancements in connectors are making termination easier. In addition, fiber is actually easier to test than copper cable.

## **6. Migration**

The proliferation and lower costs of media converters are making copper to fiber migration much easier. The converters provide seamless links and enable the use of existing hardware. Fiber can be incorporated into network in planned upgrades.

## **7. Standards**

TIA/EIA-785, ratified in 2001, provides a cost-effective migration path from 10-Mbps Ethernet to 100-Mbps Fast Ethernet over fiber (100BASE-SX). An addendum to the standard eliminates limitations in transceiver designs. In addition, in June 2002, the IEEE approved a 10-Gigabit Ethernet (10-GbE) standard.

## **8. Cost**

The cost for fiber cable, components, and hardware is steadily decreasing. Installation costs for fiber are higher than copper because of the skill needed for terminations. Overall, fiber is more expensive than copper in the short run, but it may actually be less expensive in the long run. Fiber typically costs less to maintain, has less much less downtime, and requires less networking hardware. And fiber eliminates the need to recable for higher network performance.

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