

Cabling 101

Avoid Getting All Tied Up In Cabling Decisions

When network cables are out of sight in the small to midsized enterprise, they are sometimes out of mind, as well. We generally don't think about cabling until it's time to upgrade and purchase new cables. But buying cables for the enterprise is a different story from buying them for networks with only a few computers on them. For example, there tends to be a good deal of confusion between different cabling categories, such as CAT 5, 5e, 6, and so on. So what do IT and data center managers need to know when purchasing network cabling? And an equally important question is: What should they avoid when looking for the right cables?

In Or Out?

Sebastien Hoffmann, IT engineer at CableOrganizer.com, says the majority of the time, cabling is one of his lowest priorities. Hoffman notes, "We have so many projects to complete and so much support to provide each day that cabling is rarely at the forefront of my mind. But as our company continues to grow, dealing with our cabling infrastructure becomes more and more of a reality. This is where you reach a decision-making point: Do you run cable yourself or hire someone else to take care of it for you?"

Hoffmann says one potential problem with the first solution (running the cable yourself) can be a lack of experience. "If you've never introduced new cable into a network before, chances are you won't even know where to start," he says. "There are a lot of questions to be answered. What's the difference between CAT 5 and CAT 5e, aside from that letter 'e'? How do I terminate the cable? Which tools do I use? The list goes on and on, and sometimes the answers can be confusing." On the other hand, Hoffmann says hiring someone else to do the job can become very expensive, depending on how many cables you need to run and how far they have to go. Money-wise, it can turn into a real problem for a small company.

Brian Duval, marketing communication manager for Siemon (www.siemon.com), says some SMEs are moving far more than Gigabit on today's networks. He says we are being driven to higher-speed applications such as 10Gbps. He explains, "Moving to 10Gbps requires a more robust cabling plant. Category 6 supports 10Gbps only in distance-limited (under 37m [about 121 feet]) legacy installations and is not recognized for new 10Gbps installations. Category 6A, previously known as Augmented Category 6, is now a ratified standard that supports 10Gbps at the full 100m distance." However, even within the Category 6A standard, Duval says there are performance and configuration considerations.

Duval says both UTP (unshielded twisted pair) and F/UTP (screened, or foil over

UTP) options are available. He says because of the many challenges involved in defeating alien crosstalk in a 10Gbps UTP system, there has been a resurgence in the adoption of screened and shielded cabling. He adds, "And the options do not end at Category 6A. A Category 7 standard has been commercially available since 1999. In fact, Category 7A is nearing completion. These fully shielded options are capable of performance well beyond 10Gbps and offer an exceptionally long life cycle."

Purchasing Power

Duval says there are a number of things to keep in mind when thinking about buying network cabling. "The most important piece of information," he says, "is that the higher-performing and more robust the system, the longer it will last. If you put in a system today because it is the least expensive (as in 5e), you will have to replace it when your network requirements exceed the system's capacity." Duval says this can happen when copper costs rise and installation costs rise (due to rising fuel prices). He says the best thing to do is to predict the actual need and implement a cabling system that will last you for 10, 15, or in some cases, even 20 years. Duval adds, "Revisiting systems that are supposed to last long-term is far most costly than putting in the right system from the start."

Hoffmann says when you are thinking about purchasing cable, it's crucial to have a good knowledge of the network you'll be expanding. "Find out what degrees of speed and bandwidth are required so that the proper category of cable and equipment can be purchased," he says. "Always remember to purchase cables and other network components that meet specs that are equal to or above the specs of existing equipment. A network is only [as] good as its weakest part. If your network is currently running at CAT 6 standards but you try to expand it with CAT 5 cable, you'll limit the expanded section's performance to CAT 5."

In Hoffmann's opinion, it is also good to be aware of where you'll be installing the cable. "If it will be running through above-ceiling air-handling spaces, always opt for plenum-rated," he says. "It's safer in the event of fire because it emits only very small amounts of toxic smoke and fumes and resists spreading flames."

Shielded vs. Unshielded

According to Hoffman, when you shop for copper (or category) cable, you'll be faced with two options: shielded or unshielded. "Shielded cable provides an extra measure of protection against interference between the cable's twisted wire pairs, but it's only widely used in Europe; it's not likely to be required for a network in the U.S.," he notes. "In the United States, you'll most likely be shopping for standard unshielded twisted pair (UTP) network cable." He says it's important to always look for cabling that meets both industry and safety standards. Category cabling, for example, should be compliant with TIA/EIA 568-B.2 (a crosstalk-

limiting standard), as well as UL-listed for safety.

Hoffmann says avoid anything that doesn't comply with basic industry standards.

Duval says, "Watch out for installers with poor credentials, out-of-date credentials, or unskilled technicians." He says installers should be properly trained and have the credentials to prove it. He adds, "While choosing the best cabling system is important, ensuring that it is installed properly is equally critical. Just because it says 'category 6a' on the cable jacket doesn't mean you're getting Category 6A performance. And avoid minimally compliant systems that will just get you by for now, as replacing them in the future will be far more expensive."

by Chris A. MacKinnon

Cabling Basics

When it comes to networking with category cables, there are a few useful details to keep in mind. First of all, go into the project knowing that whether CAT 5, CAT 5e, or CAT 6 cable is being used, it's only good for a run of 328 feet (100m) maximum; that distance includes everything from start to end (computer to network switch, or vice versa). Beyond 328 feet, the signal is lost, and you risk the loss or collision of data packets. If you absolutely must exceed 328 feet, you'll need to use a signal repeater every 300 feet or so to keep the data stream strong between point A and point B.

The speed and bandwidth specs on category cabling are as follows:

CAT 5: 10 to 100Mbps

CAT 5e: Up to 1Gbps

CAT 6: Up to 10Gbps

A Fiber Diet

Sebastien Hoffmann, IT engineer at CableOrganizer.com, says fiber-optic cabling has its advantages.

“Don’t be afraid to integrate fiber-optic technology into an existing copper-based network. Fiber cable is cheaper and more accessible than ever, and it has the ability to transmit more data further in less time and using fewer cables,” he says. “Multiplexors and demultiplexors (otherwise known as media converters) are placed wherever copper meets fiber; they translate CAT cable digital signals into light pulses to be sent through the fiber and vice versa when the fiber run transitions back to copper. One of the beauties of fiber-optic cable is that it can transmit data for miles without signal loss. If you simply need to expand the reach of an existing copper cable network, the addition of fiber optics at strategic points is a great way to do that without building a new network entirely from scratch.”