

Category 8: Unraveling Fact from Fiction

Written by Sarah McElroy
21 March 2014

By Sarah McElroy, IHS Analyst, Data Centers, Cloud & IT Infrastructure



In the few months that I have been researching the network cabling market, I have heard a wide variety of perspectives and opinions about the pending introduction of the category 8 copper cable which will support 40Gb/s Ethernet. Never have I encountered a topic where I have heard such opposite viewpoints expressed. In the case of cat 8, the “facts” I hear from one supplier have completely contradicted the “facts” I hear from another, especially when relating it to a comparable fiber offering. For this reason, I have set out to clear up some misperceptions associated with cat 8 copper cable.

Cat 8 is even larger in diameter than cat 6a: TRUE

While it is true that cat 8 is slightly bigger than cat 6a cables, the difference in size is far less than what is often claimed. A source close to the standards creation has stated that cat 8 cables will only be a few hundredths of a millimeter larger in diameter. When looking at the two cables side by side, the naked eye would not recognize the difference in size.

Compared to fiber however, there is certainly no contest with regard to size. Fiber optic cables are often anywhere between one fourth to one half the size of a copper cable. One fiber is about the same size as a human hair, so these cables will inevitably be only a fraction of the size of copper cables, especially since they do not require shielding.

Size is a concern due to the limited space available in a patch panel or switch, especially as

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densities increase. For example there are now 48-port patch panels, and with the current size of copper cables and connectors, there is barely room to fit all those cables. There is really no room for cable or connector size to expand if high densities are to be achieved. Airflow is also a concern because it becomes increasingly difficult to get adequate airflow to switches with higher densities of cords attached to them.

The increased weight of cat 8 cable will cause problems for cable management and switches:
FALSE

Cat 8 cable will indeed be slightly heavier than cat 6a cable. However, a source involved with standards creation claims that the increased weight amounts only to a couple more pounds per reel of cable. This small amount of extra weight is not anticipated to cause problems for cable management or to create a dangerous amount of weight pulling on switches. Fiber optic cable by comparison is much lighter than copper cable and, additionally, will never suffer from the added weight of shielded layers.

Cat 8 requires more power to run at 40Gb/s speeds than fiber optic cable: **TRUE**

It is true that it requires more power to run at high speeds over copper cable than fiber optic cable. The power required by a cat 8 cable to run at 40Gb/s can be depicted as a U-shaped graph with power on the vertical axis and frequency on the horizontal axis. Thus, there is a certain range of ideal frequencies (at the bottom of the "U") at which the power needed is the lowest. While it is possible to optimize the power used by the cat 8 cable, it will still always exceed that required by a fiber optic cable.

When thinking about power usage, heat becomes an additional consideration. Because cat 8 cables (and copper cables in general) require more power, they also generate more heat than fiber optic cables and contribute to the need for increased data center cooling efforts.

Cat 8 cables will be standardized for a shorter length: **TRUE**

The Telecommunications Industry Association (TIA) did a survey which showed that cable

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lengths of 50m or less will cover 90% of the cabling needs in a data center. However, to make absolutely sure that they did not run into the same problems that prolonged the cat 6a standards, the Institute of Electrical and Electronics Engineers (IEEE) decided that the standards be created for 30m. This may be completely adequate for some data centers; however, those needing cables longer than 30m will be limited by this and may find fiber optic cable to be the most viable option.

Cat 8 does not have as much longevity as fiber optic cable: TRUE and FALSE

It is true that fiber optic cable lasts for more than one cycle of install, and because of this, it usually lasts much longer than the typical copper installment. Therefore, when looking purely at the length of time a deployment will last, fiber usually wins. However, cat 8 copper (along with all other category cables) has another type of longevity in that it has the ability to auto-negotiate. Therefore, it has the ability to endure a multistage deployment. Because of the auto-negotiation capabilities, customers are able to upgrade electronics gradually instead of installing an entire new deployment all at once in order to implement a 40Gb/s system.

Copper is easier and better understood than fiber: ...let's be honest, this is subjective.

People don't like change and that is just a fact. It is frequently claimed that copper is easier to install and all installers can do it. You do not need any extra training or certifications to install or maintain a copper infrastructure. Proponents of cat 8 will continue to cite this as a compelling reason to stick with a copper infrastructure to satisfy 40Gb/s needs as opposed to switching to fiber optics. To be fair, there are many differences, and terminating fiber cables is definitely a bit trickier. However, fiber has been around long enough by this point that there are many skilled installers, the fiber isn't as fragile as it used to be, and many of the concerns surrounding installation difficulties no longer apply.

While fiber continues to become more competitive, copper continues to strive to achieve the quality and speeds that fiber handily provides. Will contractors and customers stick with what they know or try something new? We will have to wait and see. Hopefully we won't have to wait too long. The TIA will likely have standards completed by the end of 2015 while the IEEE standards are predicted to be completed shortly after, perhaps by the beginning of 2016.

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Sarah authors an annual rack power distribution report and will be publishing a first edition report on the structured cabling market in 2014. Since joining IHS in 2013, she has also taken on the role of producing the rack power distribution quarterly tracker.