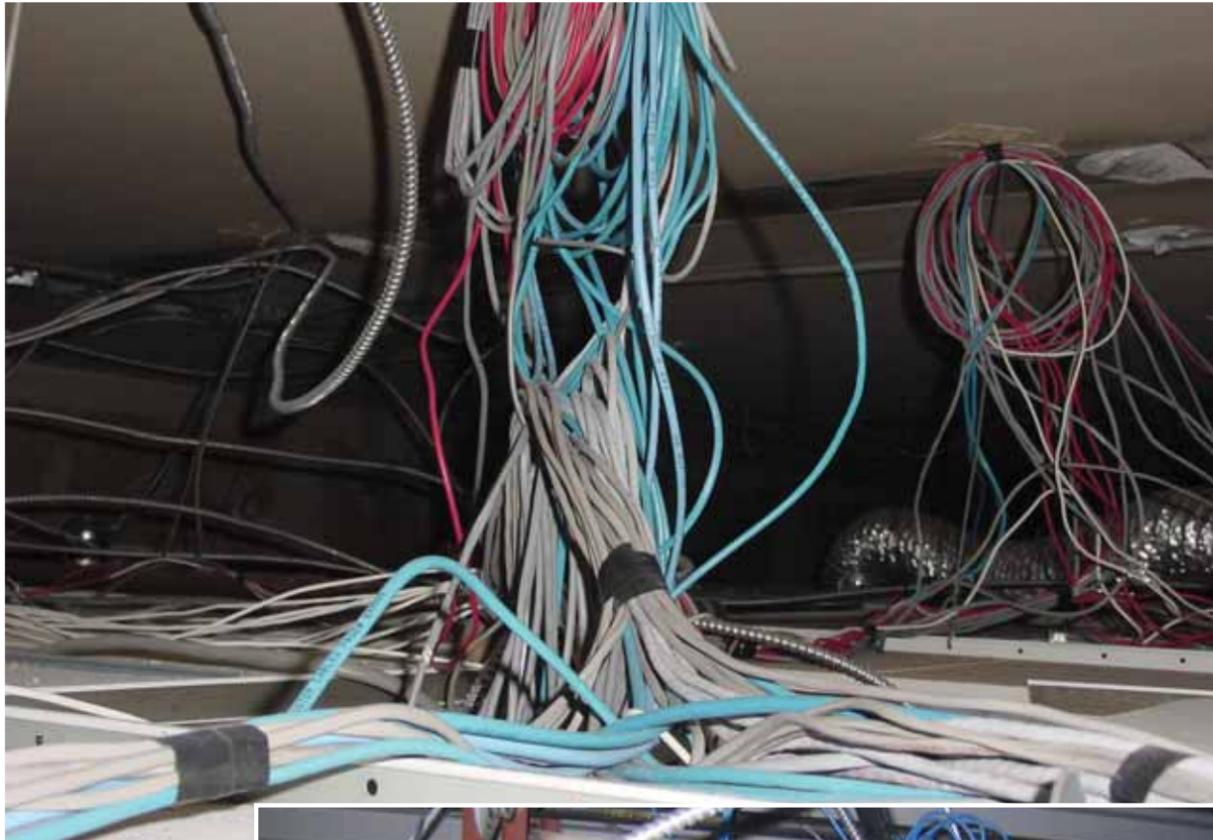
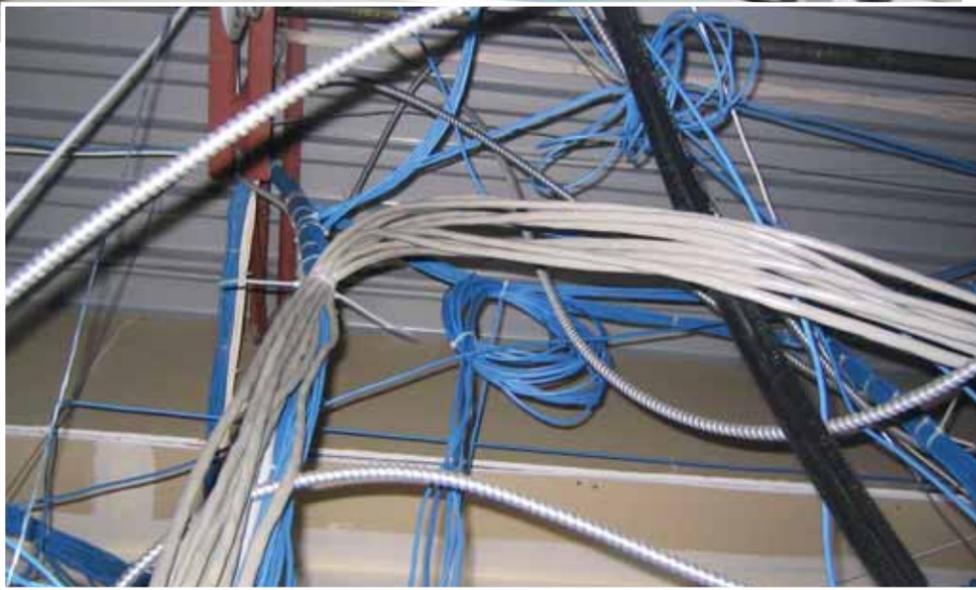


By Serge Oberoi, P.Eng.

Structured cabling for your lasting connection



Over 70% of network outages are caused by poor cabling. In addition, unprotected cables installed in building plenum spaces pose a serious risk to the health and safety of occupants in the event of a fire.



What is data worth to a company? Over 70% of network outages and hiccups are cabling related,¹ yet we fail to fully recognize the perils associated with a less-than-judicious approach to cabling selection and installation. Hidden out of sight behind walls and ceilings, data cabling often escapes the focus that it deserves. With ever-growing pressures to extract more and more bandwidth, structured cabling is left with diminishing safety margins and higher susceptibility to performance degradation.

Much has changed in the past few years. Businesses today cannot operate without the Internet, e-commerce and e-mail. Massive amounts of financial, commercial, audio, video and supply chain data criss-cross the globe every second. An interruption in the flow of this information can bring an enterprise to its knees. The success of a business, therefore, is very much tied to its ability to process and transmit information efficiently and without any latency.

The lower transmission frequencies of the 10BaseT and 100BaseT cabling of the 1980s and 1990s posed far fewer challenges than today's gigabit systems. There was always plenty of headroom to compensate for manufacturing and installation shortfalls. Talk to any installer and he'll tell you how easy it was to string Cat 3 or 5 cables. Many installers back then did not have to contend with alien crosstalk, return loss or ACR failures.

But during the past 10 years or so, the increasing demand for higher bandwidth has pushed the technologi-

cal envelope. Copper-based solutions are being propelled to work with higher and higher frequencies to maintain their competitive edge against fiber. We have moved from 100MHz to 500MHz in the space of few short years. Transmitting data at these high frequencies comes with new and daunting challenges, such as dealing with signal attenuation, alien crosstalk, impedance mismatch, EMI (electromagnetic interference) and a myriad of other hurdles. These challenges have been compounded by full-duplex communication protocols used by current transmission technologies.

The headroom of the past is no longer available to cable manufacturers and installers of today. Stretching, kinking, grazing or causing any other impairment to a cable is no longer forgivable. Cat 6 and Cat 6A (Augmented) cabling must be protected at all times to ensure uninterrupted conveyance of information over its lifetime. Many installers have been bewildered to find a cable has failed, even though they could find no physical evidence of impairment. High-speed cabling requires a new breed of highly skilled engineers and technicians that understand cable behaviour under ultra-high stresses. A little nudge or an imperfect termination can spell an instant failure.

Cable manufacturers have to develop processes and controls that can maintain uniformity and quality required for gigabit cables. Even a slight change in a process can result in variation of insulation thickness and concentricity, resulting in non-compliant product. A sudden drop in the

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outdoor temperature is enough to require process tweaking to maintain acceptable product quality. Meeting the required IEEE, TIA/EIA standards are so onerous that even a minor deviation can make a difference. An installer once asked me "not to breathe" near his Cat 6 cables. (He meant it is as a joke, but the truth is not far off.)

IT and data centre managers need to evaluate all options before picking a cabling solution that is reliable, cost effective and futureproof. Most cabling plants stay in operation for 15 years or longer. Care must be taken to ensure that cabling will fully support at least three generations of the network equipment it is expected to serve. Fortunately, the cable industry has kept pace, anticipating future needs for greater bandwidth.

Today's users have a variety of choices to exercise. Copper cabling systems are available now for speeds up to 10 Gigabit, and manufacturers are racing to produce the next generation of copper-based solutions. Unfortunately, while manufacturing has made steady progress, onsite installation practices have not kept pace with new products; the traditional approach to site installation, termination and testing of gigabit cables is simply out-of-step with the cabling technology.

Furthermore, buyers must think about the environmental issues now at the forefront of public debate; the toxicity of cable materials will force legislators to enact laws and penalties against cable abandonment. Future cabling systems will have to be scalable and modular. Cables will need to be encased in rigid piping or bendable protective armour—not only to preserve performance but also to minimize risk to occupants and the environment in the event of fire. Future cabling systems, above all, will need to be flexible, maintainable and offer rapid installation and de-installation.

Before you buy, make sure you take into consideration all these facets of cabling. And, when your operation lacks the expertise to deal with anything but legacy cabling systems, try to bring that expertise in-house, or consider partnering with a supplier who will help you make the right decisions. 

Notes

1. *Carrie Higbie, The Siemon Company.*

Serge Oberoi, P.Eng, consults for manufacturing and technology companies, and has over 30 years of national and international experience in the process design, product development, business transformation and project management fields. He has taught management resource planning at Algonquin College in Ottawa, and is skilled in JIT, LEAN and other productivity tools. He is currently a product and process development lead with Electec Ltd., an Ottawa, Ont.-based manufacturer of structured cabling solutions and power distribution systems, and can be reached at oberois@sympatico.ca.