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Reliable and Error-Free Transmission through Multimode Polymer Optical Fibers in House Networks

Authors : Tariq Ahamad, Mohammed S. Al-Kahtani, Taisir Eldos

Abstract : Optical communications technology has made enormous and steady progress for several decades, providing the key resource in our increasingly information-driven society and economy. Much of this progress has been in finding innovative ways to increase the data carrying capacity of a single optical fiber. In this research article we have explored basic issues in terms of security and reliability for secure and reliable information transfer through the fiber infrastructure. Conspicuously, one potentially enormous source of improvement has however been left untapped in these systems: fibers can easily support hundreds of spatial modes, but today's commercial systems (single-mode or multi-mode) make no attempt to use these as parallel channels for independent signals. Bandwidth, performance, reliability, cost efficiency, resiliency, redundancy, and security are some of the demands placed on telecommunications today. Since its initial development, fiber optic systems have had the advantage of most of these requirements over copper-based and wireless telecommunications solutions. The largest obstacle preventing most businesses from implementing fiber optic systems was cost. With the recent advancements in fiber optic technology and the ever-growing demand for more bandwidth, the cost of installing and maintaining fiber optic systems has been reduced dramatically. With so many advantages, including cost efficiency, there will continue to be an increase of fiber optic systems replacing copper-based communications. This will also lead to an increase in the expertise and the technology needed to tap into fiber optic networks by intruders. As ever before, all technologies have been subject to hacking and criminal manipulation, fiber optics is no exception. Researching fiber optic security vulnerabilities suggests that not everyone who is responsible for their networks security is aware of the different methods that intruders use to hack virtually undetected into fiber optic cables. With millions of miles of fiber optic cables stretching across the globe and carrying information including but certainly not limited to government, military, and personal information, such as, medical records, banking information, driving records, and credit card information; being aware of fiber optic security vulnerabilities is essential and critical. Many articles and research still suggest that fiber optics is expensive, impractical and hard to tap. Others argue that it is not only easily done, but also inexpensive. This paper will briefly discuss the history of fiber optics, explain the basics of fiber optic technologies and then discuss the vulnerabilities in fiber optic systems and how they can be better protected. Knowing the security risks and knowing the options available may save a company a lot embarrassment, time, and most importantly money.

Keywords : in-house networks, fiber optics, security risk, money
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