Networking: Getting Fiber to the Desktop *

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Besides the complex data being transmitted over today's networks, the network requirements of large companies are increasingly demanding. The requirements may include R & D laboratories, administrative offices, expanding data storage requirements, telecommunications rooms and thousands of workstation outlets. The need for sufficient bandwidth and reliability are critical factors in pulling fiber to the desktop.

Cost-Factor Delays

Prohibitively-priced connectivity and fiber optic devices were enough to deter some from considering a fiber network; but the number one reason for delay in getting fiber to the desktop was the high labor cost for installation and termination.

Hopefully, fiber-optic trained technicians will become readily available through technical high school and college programs. The Fiber Optic Association offers a Train-The-Trainer program for teachers that will lead to a new certification for fiber optic instructors. This program includes both the classroom and laboratory sessions and is geared for instructors at professional training organizations, company trainers and educators from university level down to technical high schools.

With the cost of training, the expense of higher wages, and the longer time frame needed to install fiber networks, the networking industry used fiber optics primarily for connecting wiring centers (closets) together, creating a network backbone. This application applied to both intra- and inter-building networks including campus environments.

Downtime Costs Big Bucks

Several years ago Infonetics produced a study regarding the cost of network downtime. The study reported that for every hour the data network is inoperable, a Fortune 1000 company would lose approximately $30,000 in productivity. The study also indicated that companies experience from 10 to 25 network outages per year. (Ref: Data Communications Magazine 1990). If we extend the numbers as stated they relate to a loss of productivity costing from $300,000 to $750,000 per year. The revenue loss is based on an average outage of less than one hour per month over the course of a year. Regardless of company size or use of its network, downtime is a costly matter.

Besides the dollar cost factor is the aggravation factor. We don’t know how to operate without our network. We cannot check purchase prices on the Internet; nor can we place the online order. E-mails requesting our product information are left unopened and sales are delayed or lost. Electronic transfer of funds is not possible. Downtime is crippling!

There are many reasons for network downtime. A new improperly configured PC can cause downtime. A PC with the configuration inadvertently changed can make the network inaccessible to a single user. A defective network component can render an entire network unusable.

Uptime: Getting There

Ideally, a network should be available 100 percent of the time; however, a more realistic goal is phrased as the “five nines of reliability” which means 99.999 percent uptime. This level equates to a total downtime for a year of five minutes.

To achieve this level, consideration must be given to the design and implementation of the fiber optic network infrastructure. Decisions regarding components, both active and passive, will also have a major effect in achieving maximum uptime.

Today's Fiber Is a Bargain

Innovations in the fiber industry fabrication processes have contributed to decreases in the cost of fiber cable and components such as network interface cards (NIC), connectors, and accessories. Besides costing less, these products have been improved and the installation process is now faster and better. System integrators are reviewing a new 50-Micron Multimode cable for use with 10 Gbps Ethernet applications. A new 50 :µm, 10 Gbps Multimode optical fiber for LAN, SAN (Storage Area Networks) and backbone applications for distances of up to 300 meters has recently been introduced. New small form factor, connector products such as the LC connector and the more popular MTJR connector have reduced the labor time required to terminate fiber strands.

Products are also available that allow fiber cables to connect with existing copper NIC cards making use of devices currently installed and operational. New devices have been introduced that provide functionality previously associated only to copper cabling systems.

System Redundancy

We can approach our goal of 99.999 percent uptime by building redundancy into the network. Installing a UPS for major network resources; implementing disk mirroring on file servers; performing daily tape backups and confirming that they are valid backups are all ways to improve uptime percentages. The ability to “hot swap” components, replacing components without taking the entire network off-line, aids in increasing uptime. An additional wiring connection to key network resources provides a redundant path if or when the primary is damaged. Spare components on hand to recover from a defect again increases network uptime.

Today’s fiber optic switches provide both workstation and fallback applications. Fiber Optic A/B switches designed by Electro Networks operate in either of two modes, as an A/B switch or as a Fallback Switch. In the Fallback mode, the switch monitors its environment for SD (signal detect) to determine its switch position. If the primary link is lost, the unit sends an alarm notification message; when the fiber link is restored, an acknowledgment message is also sent. The switch will maintain connection from the Common port to port A while SD is present on port “A.” If SD is absent or lost, the unit automatically switches to the fiber link connected to port “B.” Once SD has been restored and is sensed at port “A” the switch automatically returns to the “A,” position. This type of Fallback switch provides network security and reliability.

New products have facilitated the installation of fiber to the desktop, making it affordable. Expertise in installing fiber networks has been gained by training and experience. With the security and reliability of automatic fallback switches fiber network failure fears have been alleviated. Is this the right time for fiber time at your desktop?

Electro Networks offers Network Engineering Services. For more information, call us at 401-943-1164 or log onto our website at http://www.electro-networks.com.

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