NETWORK MAINTENANCE AND TROUBLESHOOTING GUIDE 2ND ED pdf

1: TROUBLESHOOTING ELECTRONIC EQUIPMENT: Includes Repair And Maintenance, Second Edition

Network Maintenance and Troubleshooting Guide Field-Tested Solutions for Everyday Problems, Second Edition Neal Allen The % practical, real-world guide to anticipating, finding, and solving network problems-fast!

Words and phrases such as attenuation, crosstalk, twisted pair, modular connectors, and multimode optical-fiber cable may be completely foreign to you. The Golden Rules of Data Cabling Listing our own golden rules of data cabling is a great way to start this chapter and the book. What follows is our list of rules to consider when planning structured-cabling systems: Those extra outlets will come in handy someday. Use high-quality cabling and cabling components. Cabling is the foundation of your network; if the cabling fails, nothing else will matter. Even quality components and cable must be installed correctly; poor workmanship has trashed more than one cabling installation. If you wait, more pressing concerns may cause you to ignore it. Two recent studies vindicated our evangelical approach to data cabling. Cabling is likely the second most long-lived asset you have the first being the shell of the building. If you have installed the proper Category or grade of cable, the majority of cabling problems will usually be related to patch cables, connectors, and termination techniques. The permanent portion of the cable the part in the wall will not likely be a problem unless it was damaged during installation. Of course, these were facts that we already knew from our own experiences. We have spent countless hours troubleshooting cabling systems that were nonstandard, badly designed, poorly documented, and shoddily installed. We have seen many dollars wasted on the installation of additional cabling and cabling infrastructure support that should have been part of the original installation. Regardless of how you look at it, cabling is the foundation of your network. It must be reliable! The Cost of Poor Cabling The costs that result from poorly planned and poorly implemented cabling systems can be staggering. One company that had recently moved into a new office space used the existing cabling, which was supposed to be Category 5 cable. Almost immediately, Mbps Ethernet network users reported intermittent problems. These problems included exceptionally slow access times when reading e-mail, saving documents, and using the sales database. After many months of network annoyances, the company finally had the cable runs tested. Many cables did not even meet the minimum requirements of a Category 5 installation, and other cabling runs were installed and terminated poorly. Cabling can cause intermittent problems. Is the Cabling to Blame? Can faulty cabling cause the type of intermittent problems that the aforementioned company experienced? Contrary to popular opinion, it certainly can. In addition to being vulnerable to outside interference from electric motors, fluorescent lighting, elevators, cellular phones, copiers, and microwave ovens, faulty cabling can lead to intermittent problems for other reasons. These reasons usually pertain to substandard components patch panels, connectors, and cable and poor installation techniques, and they can subtly cause dropped or incomplete packets. These lost packets cause the network adapters to have to time-out and retransmit the data. Drop-rate magnification describes the high degree of network problems caused by dropping a few packets. Metcalfe estimates that a 1-percent drop in Ethernet packets can correlate to an 80 percent drop in throughput. When data is lost on the wire, the data is transmitted properly but, due to problems with the cabling, the data never arrives at the destination or it arrives in an incomplete format. They were designed and installed for mainframes and were a combination of thicknet cable, twinax cable, and terminal cable RS Because no cabling standards existed, an MIS director simply had to ask the vendor which cable type should be run for a specific type of host or terminal. Frequently, though, vendor-specific cabling caused problems due to lack of flexibility. Unfortunately, the legacy of early cabling still lingers in many places. PC LANs came on the scene in the mids; these systems usually consisted of thicknet cable, thinnet cable, or some combination of the two. These cabling systems were also limited to only certain types of hosts and network nodes. As one company prepared to install a 1,node PC LAN, they were shocked to find all the different types of cabling systems needed. Each system was wired to a different wiring closet or computer room and included the following: Due to the cost of cabling each location, the locations that needed certain terminal types were the only ones that had cables that supported those terminals. If users movedâ€”and they frequently didâ€”new cables often had to be pulled. Due to budget considerations, when the LAN cabling was installed, this

company often used spare pairs in the existing phone cables. When extra pairs were not available, additional cable was installed. Companies deploying twisted-pair LANs had little guidance, to say the least. Much of the cable that was used at this company was subâ€”Category 3, meaning that it did not meet the minimum Category 3 performance requirements. Unfortunately, because the cabling was not even Category 3, once the 10Base-T specification was approved, many of the installed cables would not support 10Base-T cards on most of the network. If you are like me, you think of an application as a software program that runs on your computer. However, when discussing cabling infrastructures, an application is the technology that will take advantage of the cabling system. Proprietary Cabling Is a Thing of the Past The company discussed in the last section had at least seven different types of cables running through the walls, floors, and ceilings. Each cable met only the standards dictated by the vendor that required that particular cable type. As early as , the computer and telecommunications industry yearned for a versatile standard that would define cabling systems and make the practices used to build these cable systems consistent. Many vendors defined their own standards for various components of a cabling system. Communications product distributor Anixter www. It was an attempt to create a standard by which cabling performance could be measured. The Need for a Comprehensive Standard Twisted-pair cabling in the late s and early s was often installed to support digital or analog telephone systems. Early twisted-pair cabling Level 1 or Level 2 often proved marginal or insufficient for supporting the higher frequencies and data rates required for network applications such as Ethernet and Token Ring. The Anixter Cables Performance Levels document only described performance standards for cables. A more comprehensive standard had to be developed to outline not only the types of cables that should be used but also the standards for deployment, connectors, patch panels, and more. Cabling and the Need for Speed The past few years have seen some tremendous advances not only in networking technologies but also in the demands placed on them. The average number of nodes on a network segment has decreased dramatically, while the number of applications and the size of the data transferred has increased dramatically. Applications are becoming more complex and the amount of network bandwidth required by the typical user is increasing. Is the bandwidth provided by some of the new ultra-high-speed network applications such as 1Gb Ethernet required today? Maybe not, but networks and applications will no doubt require such throughput in the future. The Increasing Demands of Modern Applications A perfect example of the increasing demands put on networks by applications is a law firm that eight years ago was running typical office-automation software applications on its LAN. The average document worked on was about four pages in length and 12KB in size. This firm also used electronic mail; a typical e-mail size was no more than bytes. The size of transferred data files was relatively small, and the average 10Base-T network-segment size was about nodes per segment. Today, the same law firm is still using its 10Base-T and finding it increasingly insufficient for their ever-growing data processing and office-automation needs. The average document length is still around four pages, but, thanks to the increasing complexity of modern word-processing software and templates, the average document is nearly 50KB in size! Even simple e-mail messages have grown in size and complexity. An average, simple e-mail message size is now about 1. The average second voice mail message is about KB. The firm also implemented an imaging system that scans and stores many documents that previously would have taken up physical file space. Included in this imaging system are litigation support documents, accounting information, and older client documentation. Even with these small segment sizes, many segments are congested. Although the firm would like to begin running BaseTX Ethernet to the desktop, it is finding that its Category 3 cabling does not support Base-TX networking. When this firm installs its new cabling system to support the next-generation network applications, you can be sure that it will want to choose the cabling infrastructure and network application carefully to ensure that its needs for the next 10 to 15 years will be accommodated. Does the fact that software applications and data are putting more and more of a demand on the network have anything to do with data cabling? You might think that the issue is more related to network-interface cards, hubs, switches, and routers, but, as data rates increase, the need for higher levels of performance on the cable also increases. Types of Communications Media Four major types of communications media cabling are available for data networking today: An additional variety of twisted-pair cable called screened twisted pair has recently appeared; it is a hybrid of shielded and unshielded twisted pair.

It is important to distinguish between backbone cables and horizontal cables. Backbone cables connect network equipment such as servers, switches, and routers and connect equipment rooms and communication closets. Horizontal cables run from the communication closets to the wall outlets. For new installations, multistrand fiber-optic cable is essentially universal as backbone cable. For the horizontal, UTP reigns supreme. Much of the focus of this book is on UTP cable. Twisted-Pair Cable By far the most economical and widely installed cabling today is twisted-pair wiring. Not only is twisted-pair wiring less expensive than other media, Cabling and the Need for Speed 13 installation is also simpler, and the tools required to install it are not as costly. Unshielded twisted pair UTP and shielded twisted pair STP are the two primary varieties of twisted pair on the market today, but screened twisted pair ScTP is emerging and may become more common. UTP is cost effective and simple to install, and its bandwidth capabilities are continually being improved. NOTE An interesting historical note: Alexander Graham Bell invented and patented twisted-pair cabling and an optical telephone in the s. UTP cabling typically has only an outer covering jacket consisting of some type of nonconducting material. This jacket covers one or more pairs of wire that are twisted together. In this chapter, as well as throughout much of the rest of the book, assume unless specified otherwise that UTP cable is a four-pair cable. Fourpair cable is the most commonly used cable in network installations today.

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2: IP Communications/VoIP Store

The second edition is a real-world guide to help anticipate, find and solve network problems fast and is a follow up to the book's popular first edition, which was a sought after resource for network and system administrators.

In some instances the " crossover " form receive to transmit and transmit to receive may still be required. Cables for Ethernet may be wired to either the TA or TB termination standards at both ends of the cable. Since these standards differ only in that they swap the positions of the two pairs used for transmitting and receiving, a cable with TA wiring at one end and TB wiring at the other results in a crossover cable. An infrastructure node a hub or a switch accordingly uses a connector wiring called MDI-X, transmitting on pins 3 and 6 and receiving on pins 1 and 2. These ports are connected using a straight-through cable so each transmitter talks to the receiver on the other end of the cable. Nodes can have two types of ports: Hubs and switches have regular ports. Routers, servers and end hosts e. When two nodes having the same type of ports need to be connected, a crossover cable may be required, especially for older equipment. Connecting nodes having different type of ports i. Thus connecting an end host to a hub or switch requires a straight-through cable. Some older switches and hubs provided a button to allow a port to act as either a normal regular or an uplink port, i. Many modern Ethernet host adapters can automatically detect another computer connected with a straight-through cable and then automatically introduce the required crossover, if needed; if neither of the adapters has this capability, then a crossover cable is required. Most newer switches have auto MDI-X on all ports allowing all connections to be made with straight-through cables. If both devices being connected support BASE-T according to the standards, they will connect regardless of whether a straight-through or crossover cable is used. With the way that BASE-T implements signaling, how the cable is wired is immaterial in actual usage. The standard on copper twisted pair is IEEE Category 5 cable has since been deprecated and new installations use Category 5e. This was done in anticipation of using 10BASE-T in existing twisted-pair wiring systems that may not conform to any specified wiring standard. Some of the specified characteristics are attenuation , characteristic impedance , timing jitter , propagation delay , and several types of noise. Cable testers are widely available to check these parameters to determine if a cable can be used with 10BASE-T. These characteristics are expected to be met by meters of gauge unshielded twisted-pair cable. However, with high quality cabling, cable runs of meters or longer are often obtained and are considered viable by most technicians familiar with the 10BASE-T specification. When two linked interfaces are set to different duplex modes, the effect of this duplex mismatch is a network that functions much more slowly than its nominal speed. Duplex mismatch may be inadvertently caused when an administrator configures an interface to a fixed mode e. Then, when the autonegotiation process fails, half duplex is assumed by the autonegotiating side of the link.

3: Cabling - The Complete Guide to Network Wiring, 2nd Ed - www.enganchecubano.com

The indispensable hands-on complement to every other network primer or certification guide, Network Maintenance and Troubleshooting Guide, Second Edition, covers all the technologies network professionals are likely to encounterâ€”including fiber optic cabling and up to a TCP connectionâ€”all in a helpful handbook format for easy reference.

4: Second Edition of Popular 'Network Troubleshooting Guide' Released

Network Maintenance and Troubleshooting Guide Field-Tested Solutions for Everyday Problems, Second Edition Neal Allen The % practical, real-world guide to anticipating, finding, and solving network problems--fast!

5: Ethernet over twisted pair - Wikipedia

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6: TaoSecurity: Review of Network Maintenance and Troubleshooting Guide, 2nd Ed Posted

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