

NETWORKING MEDIA AND TOPOLOGIES

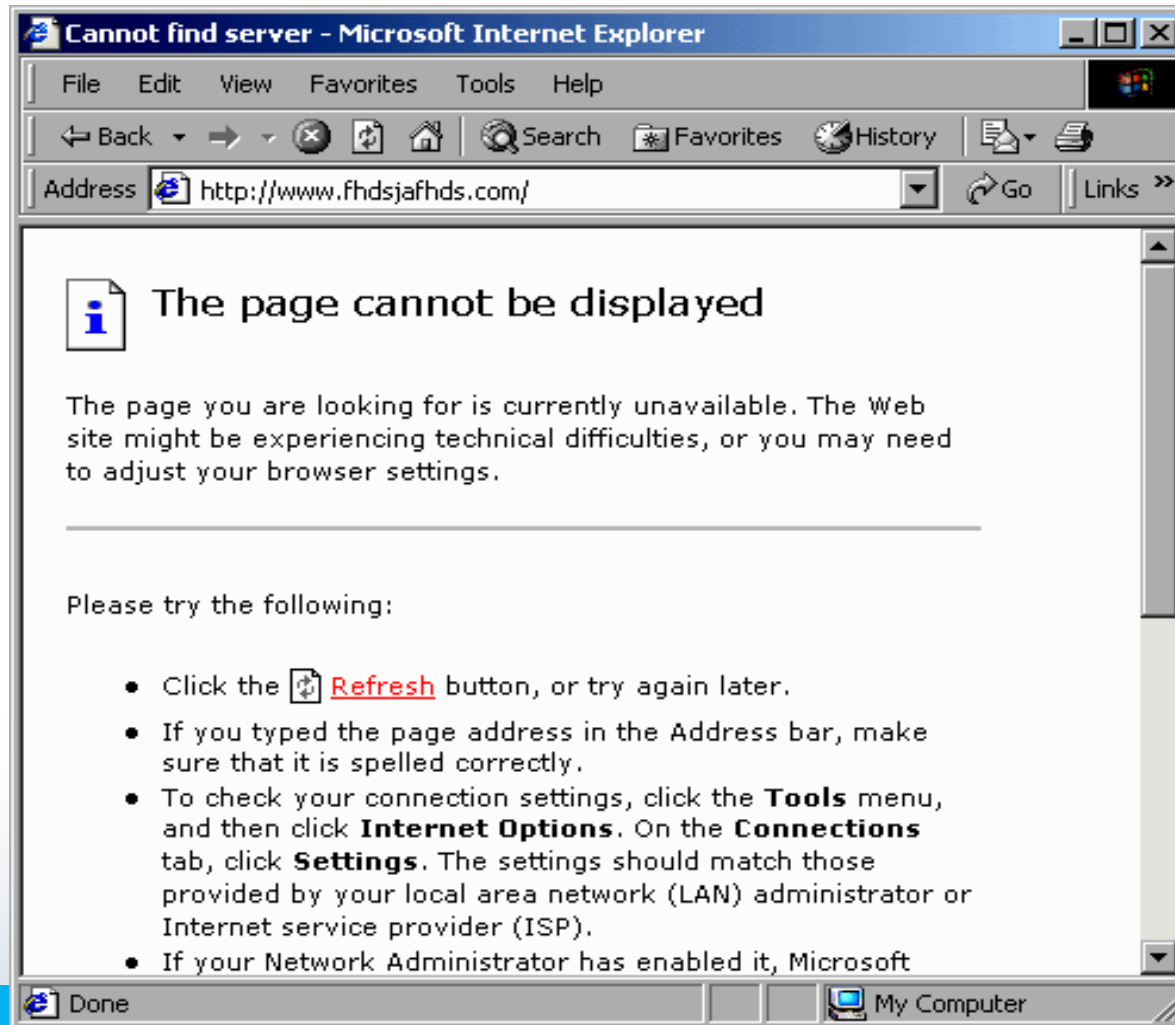
3.6 Given a scenario, troubleshoot common physical connectivity problems.

- Introduction to network troubleshooting
- Incident administration
- Gathering information
- Possible causes
 - Internet router problem
 - Internet communication problem
 - Domain Name System (DNS) failure
 - Local area network (LAN) communication problem
 - Computer configuration problem
 - User error

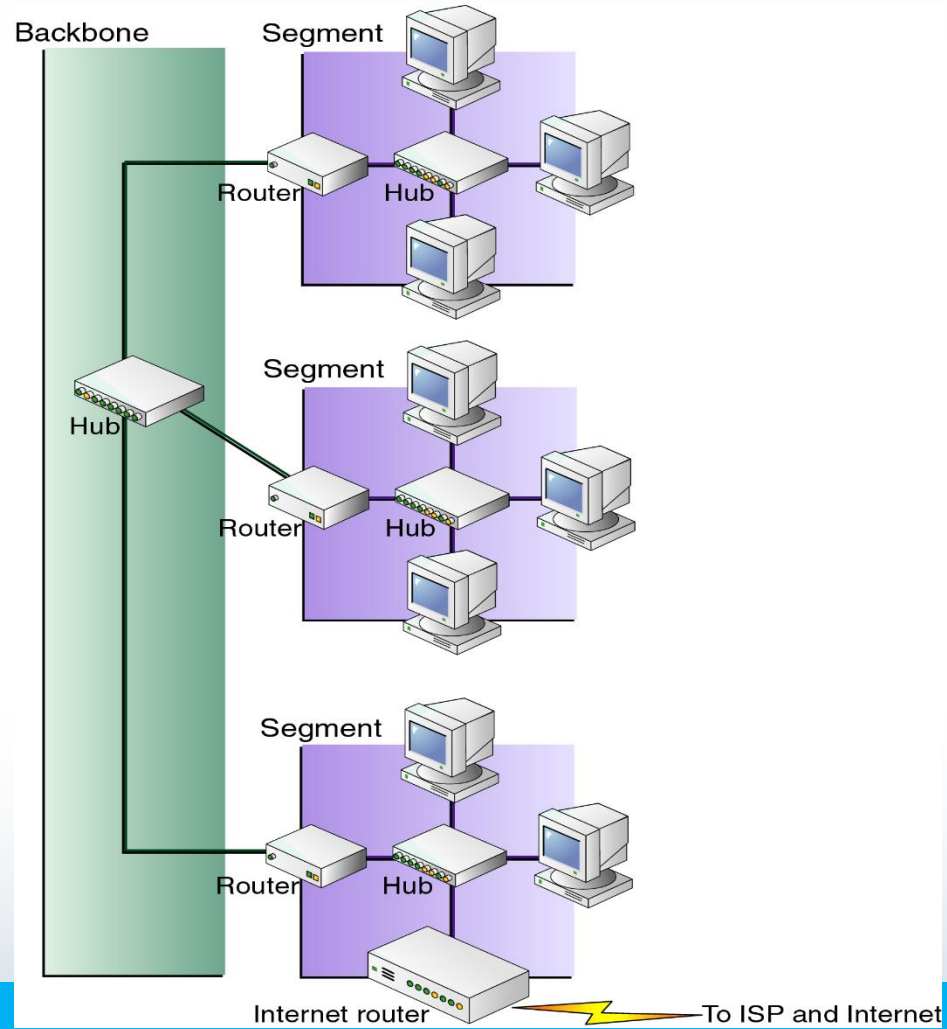
- A user named Alice reports that she has been trying to access a particular Web site for several hours and keeps receiving an error message.
- Based on the information provided, and knowing nothing about Alice's level of expertise, the help desk technician has no way of knowing whether the problem is caused by
 - User error
 - A computer configuration problem
 - A faulty network connection
 - A malfunction of the router that provides Internet access

- The first step is to begin to document the incident.
 - Many help desks use software that lets technicians document calls and store them in a database.
- Because the technician has little information about Alice's problem at this point, he cannot accurately assign a priority to this call yet.
- Many organizations separate technicians into two or more tiers.
 - First-tier technicians typically take help desk calls.
- If the problem is serious or complex, the

- The next step is to ask the user about the exact circumstances under which the problem occurred.
- In this scenario, Alice has been trying to open a Web site in Microsoft Internet Explorer, one that had always worked before, and she receives an error message.
 - She tried again several times over an hour and received the same error message every time.
 - She did not write down the error message but was able to re-create the error by trying again to access the site.



- For an organization with more than a few users, setting up a router that connects to an Internet service provider (ISP) is the easiest and most economical way of providing users with Internet access.
 - The alternative is to equip all users with their own modems, telephone lines, and Internet access accounts, which is expensive and labor intensive.
- The router could be
 - A stand-alone unit connected to an ISP with a leased telephone line, such as a T-1 line
 - A computer with a modem that connects to



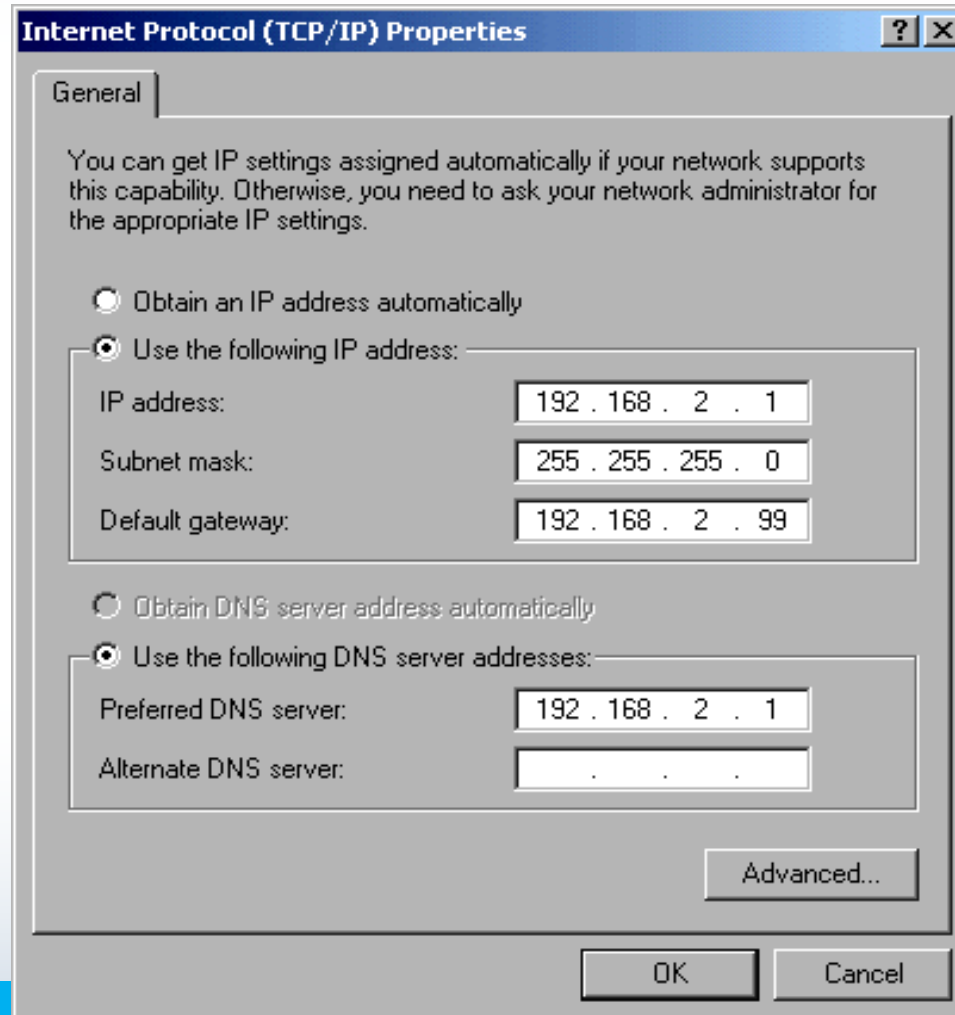
- Many things can go wrong with a router that connects to an ISP.
 - The router's connection to the ISP or the ISP's connection to the Internet might malfunction.
 - The router device or computer might have a hardware or power failure.
 - A problem with the network might prevent access to the router.
 - The client computer might be misconfigured and unable to send Internet access requests to the router.

- In Alice's case, if the router were malfunctioning, the help desk would probably receive calls from many different users with the same problem.
- However, router problems are easy to check for, and the potential seriousness of a router problem makes checking the router a high priority.
- To test the router, try to access an Internet site by using a computer that shares the same routed Internet connection.
 - In Alice's organization, all of the users on the network share a single Internet connection,

- If your computer also fails to access the Internet, the problem could be
 - A component that both you and the user use to access the router
 - The router itself
 - The connection between the router and the ISP
- If neither a component nor a connection is causing the problem, the problem is the ISP's network or the Internet.

- The next step is to determine what kinds of network communications are affected.
- First, ask the user to try connecting to a different Web site.
 - If the browser can connect to other Web sites, the network, the router, and the Internet connection are functioning properly.
 - If the browser cannot connect to other sites, determine if any other network communications are possible.

- A common cause of Internet access problems is the failure of the user's computer to resolve Domain Name System (DNS) names into Internet Protocol (IP) addresses.
- The address of the DNS server that a computer uses to resolve names is supplied as part of the system's TCP/IP client configuration.
- If the addresses in the Preferred DNS Server and Alternate DNS Server fields do not point



**Pinging www.microsoft.com [38.144.95.172]
with 32 bytes of data:**

Reply from

38.144.95.172: bytes=32 time=320ms TTL=238

**Reply from 38.144.95.172: bytes=32
time=280ms TTL=238**

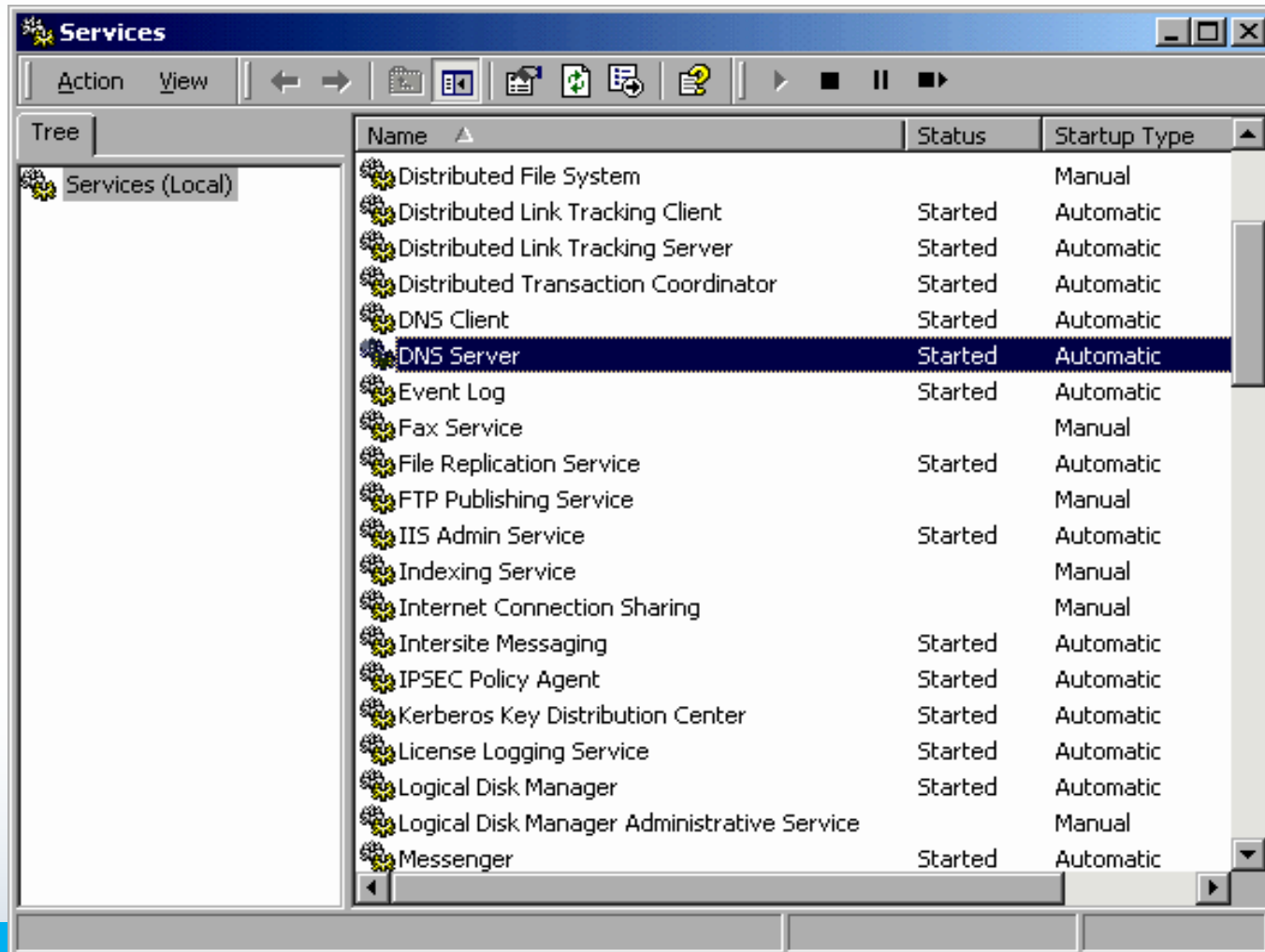
**Reply from 38.144.95.172: bytes=32
time=381ms TTL=238**

**Reply from 38.144.95.172: bytes=32
time=280ms TTL=238**

Ping statistics for 38.144.95.172:

**Packets: Sent = 4, Received = 4, Lost = 0 (0%
loss)**

- If the DNS server addresses in the user's TCP/IP client configuration are correct, the problem might be the DNS servers or the computer's network connection to the DNS servers.
 - If the DNS servers belong to the ISP, all you can do is test to see if they are available.
 - If the DNS servers belong to your organization, you can check them more thoroughly.
- A ping test can determine if the DNS server is functioning, but checking the status of the DNS server software itself depends on the operating



Microsoft Network Monitor - [Capture: 1 (Summary)]

File Edit Display Tools Options Window Help

Protocol	Description	Src Other Addr	Dst Other Addr
DNS	0x1:Std Qry for www.microsoft.com. of ty...	192.168.2.3	CZ1
DNS	0x3DF6:Std Qry for www.microsoft.com. of...	CZ1	192.36.144.133
DNS	0x3DF6:Std Qry Resp. Auth. NS is MICROSO...	192.36.144.133	CZ1
DNS	0x3DF6:Std Qry for www.microsoft.com. of...	CZ1	207.46.138.11
DNS	0x3DF6:Std Qry Resp. for www.microsoft.c...	207.46.138.11	CZ1
DNS	0x1:Std Qry Resp. for www.microsoft.com....	CZ1	192.168.2.3
DNS	0x2:Std Qry for www.msn.com. of type Hos...	192.168.2.3	CZ1
DNS	0x1DFE:Std Qry for www.msn.com. of type ...	CZ1	207.46.138.11
DNS	0x1DFE:Std Qry Resp. for www.msn.com. of...	207.46.138.11	CZ1
DNS	0x2:Std Qry Resp. for www.msn.com. of ty...	CZ1	192.168.2.3
DNS	0x3:Std Qry for msimg.com. of type Host ...	192.168.2.3	CZ1
DNS	0x2600:Std Qry for msimg.com. of type Ho...	CZ1	192.36.144.133
DNS	0x2600:Std Qry Resp. Auth. NS is msimg.c...	192.36.144.133	CZ1
DNS	0x2600:Std Qry for msimg.com. of type Ho...	CZ1	207.46.138.11
DNS	0x2600:Std Qry Resp. for msimg.com. of t...	207.46.138.11	CZ1
DNS	0x3:Std Qry Resp. for msimg.com. of type...	CZ1	192.168.2.3
DNS	0x4:Std Qry for www.zacker.com. of type ...	192.168.2.3	CZ1
DNS	0x4:Std Qry Resp. for www.zacker.com. of...	CZ1	192.168.2.3
DNS	0x5:Std Qry for c.microsoft.com. of type...	192.168.2.3	CZ1
DNS	0x260F:Std Qry for c.microsoft.com. of t...	CZ1	207.46.138.11
DNS	0x260F:Std Qry Resp. for c.microsoft.com...	207.46.138.11	CZ1
DNS	0x5:Std Qry Resp. for c.microsoft.com. o...	CZ1	192.168.2.3

Internet Domain Name System Packe F#: 4/46 Off: 42 (x2A) L: 35

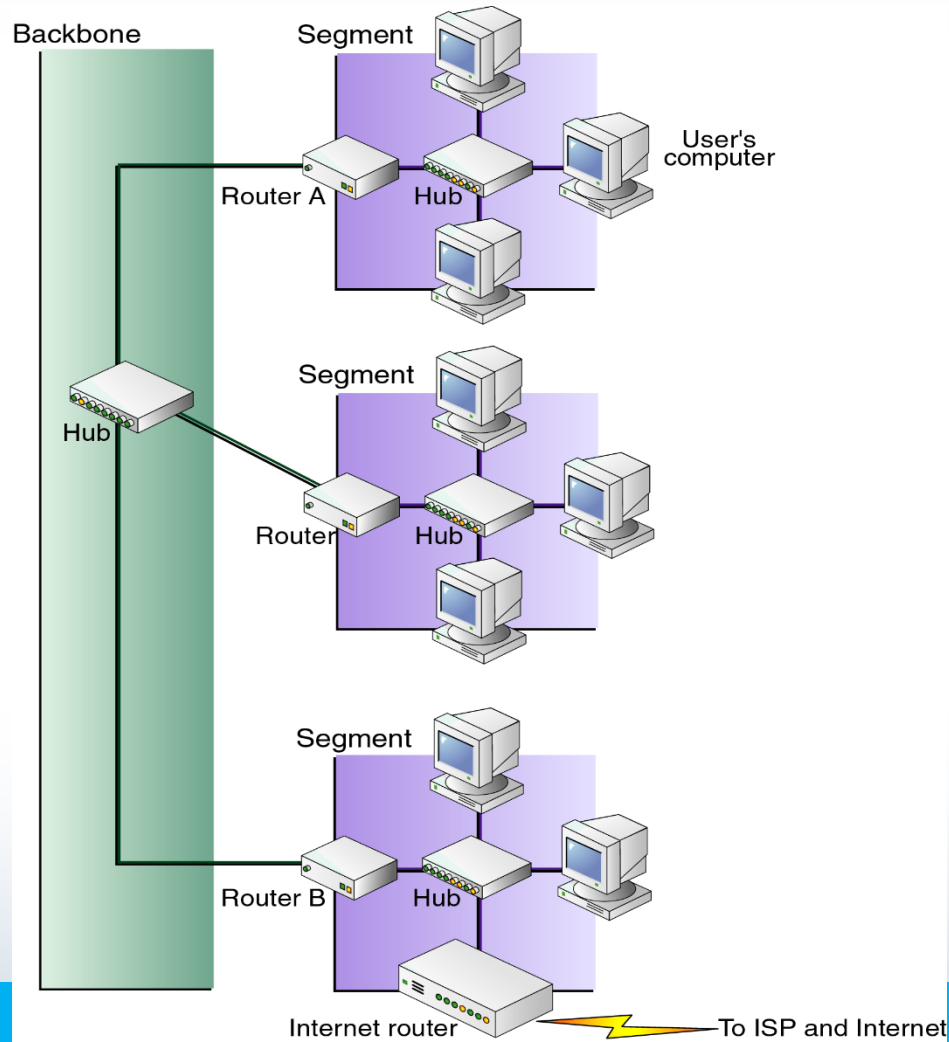
- If the problem is not caused by an Internet communications problem or a DNS name resolution problem, examine the computer's general network communication capabilities.
- Ask the user to try to access resources on the local network.
 - Local network resources can include shared server drives, internal network applications (such as e-mail or database servers), and Windows Explorer (when it is used to browse the network).
- Have the user try to access nearby resources

- Have the user open My Network Places in Windows Explorer and see if computers belonging to nearby users are visible.
- If there is an internal network communications difficulty, narrow down where it might be.
- You should have access to information about which computers are connected to specific hubs and LANs.
- If you and the user are still working together over the telephone at this point, explain carefully what must be done, without introducing unnecessary technical details.
- Consider traveling to the user's site.

- If the user cannot see the other computers connected to the same hub, the problem might be the user's connection to the hub, the computer hardware or software, or the user's procedures.
- If the computer is connected to the hub with a prefabricated network cable, replace the cable with one that you know is functioning properly.
- If the computer is connected to the hub with an internal cable run, swap the network cable plugged into the user's computer with a cable from a nearby computer that is working properly.

- If the user's computer can see and access other computers connected to the same hub, try to access other computers on the same LAN but connected to different hubs.
- If the user can access computers attached to the same hub but cannot access other computers on the LAN connected to different hubs, the problem might be the connection between the user's hub and the rest of the network.

- If the user can access other computers on other segments of the LAN, test connections to other LANs.
- Test the computer's connectivity by using Windows Explorer to access computers located on other networks.
 - If the user's computer can access resources in all of the LANs in the internetwork, the problem is not network connectivity; look at the computer itself.
 - If the user's computer can access resources in some LANs but not others, the problem might be one of the routers.



- If the user's computer cannot access the network and neither the network nor the cable connecting the computer to the network is at fault, look at the computer.
- A problem that prevents any network access would eliminate the need to troubleshoot the hub and router.
- You might even proceed to this point as soon as you determine that no network communication is possible.

- If the cable that connects the computer to the network is functioning properly, the problem might be the computer's network interface adapter.
 - If the network interface card (NIC) is not secured in the slot, a tug on the network cable can loosen the card and break its connection to the computer.
 - If the NIC is completely disconnected, most operating systems report that the device is not functioning.

- The network interface adapter and the network adapter driver implement the data-link layer protocol in the computer.
- The driver and the adapter must be configured with the same hardware settings so that they can communicate.
 - Incorrect configuration settings are a common reason a computer cannot communicate with the network.
- If the adapter or driver configuration parameters have been changed manually
 - Use Device Manager in Microsoft Windows 2000 to delete the device from the system

- The TCP/IP client configuration is one of the chief causes of network communication problems.
- Incorrect Windows Internet Name Service (WINS) server addresses can prevent the computer from accessing some of the other computers on the network.
- An incorrect IP address or subnet mask can completely prevent all network communications, and—even worse—an IP address duplicated on a second computer can prevent both computers from accessing the network.

- User errors are a common cause of help desk calls.
 - Discussing user errors last does not imply that you should go through all of the testing procedures first before checking for user error.
 - In fact, you can often quickly determine that the user's equipment and the network are functioning properly, and that the problem must be user error.
 - Incorrectly entering URLs into the browser causes many common Internet access problems.

- Record keeping, call prioritizing, and call escalation are essential in a professional technical support organization.
- The first step in troubleshooting any networking problem is to gather information from the user.
- For an Internet access problem, checking the router that connects the network to the ISP is fast and easy.
- DNS name resolution problems are a common cause of Internet access failures.
- Solving a network communications problem is a matter of isolating the malfunctioning



THANK YOU
