COURSE TECHNOLOGY
CENGAGE Learning

A+ Guide to Software: Managing, Maintaining, and Troubleshooting, 5e

Chapter 9
Networking Practices

Objectives

- Learn how to connect a computer or small network to the Internet using a broadband, satellite, or dialup connection
- Learn how to configure a SOHO router and set up a wireless network
- Learn about tools and utilities used to troubleshoot problems with network and Internet connections
- Learn how to troubleshoot connectivity problems with networks and client applications

Connecting to the Internet

- Connections
  - Single PC and multiple PCs
- Connection types
  - Cable modem, DSL, satellite, dial-up, ISDN
- Cable modem or DSL connection setup
  - Connect PC to cable modem, DSL box
    - Connect cable modem to TV jack or DSL box to phone jack, plug in the power, turn on broadband device
  - Configure TCP/IP settings
  - Test the connection

Connect to the Internet Using Cable Modem

- Requirements
  - Internet service, computer with network/USB port, cable modem, cable, TCP/IP settings

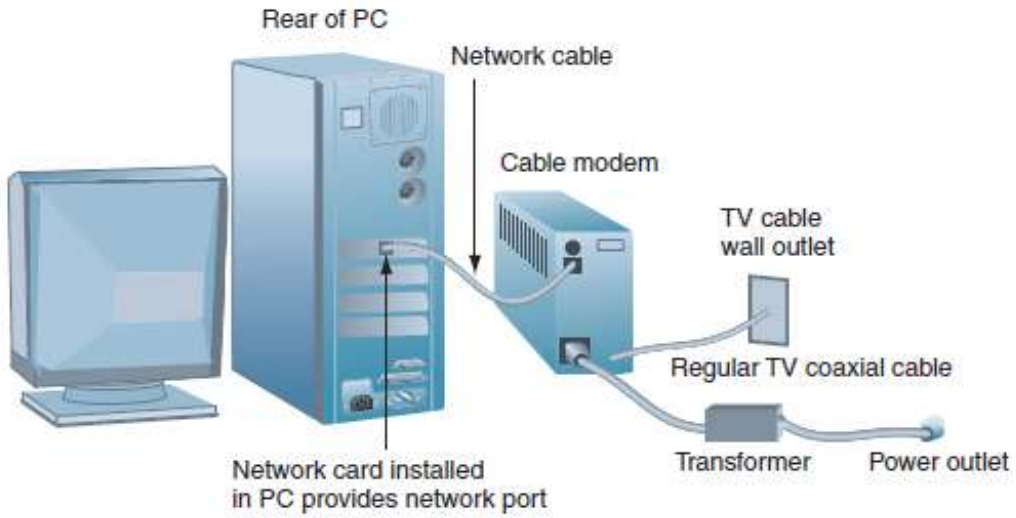

Figure 9-1 Cable modem connecting to a PC through a network card installed in the PC
Courtesy: Course Technology/Cengage Learning

Connect to the Internet Using Cable Modem (cont'd.)

- Instructions: Ethernet cable and dynamic IP addressing
  - Select TV wall jack
    - Connect cable modem to TV wall jack
    - Plug power cord into the cable modem
    - Connect PC network port to cable modem port
  - Vista: creates new always-up network connection
    - Displays the Set Network Location window
  - XP: right-click My Network Places
    - Select Properties from shortcut menu
    - Network Connections window opens

Connect to the Internet Using Cable Modem (cont'd.)

- Instructions: Ethernet cable, dynamic IP addressing (cont'd.)
  - New Connection Wizard opens
    - Click Next to skip the welcome screen
    - Select Connect to the Internet
    - Click Next
  - Select Set up my connection manually, click Next
    - Select Connect using a broadband connection that is always on
    - Click Next
    - Wizard creates the connection

Connect to the Internet Using Cable Modem (cont'd.)

- Instructions: USB cable and dynamic IP addressing
  - Read cable modem installation directions
  - Connect USB cable to PC and cable modem
    - Plug in, turn on cable modem
    - Windows automatically detects new USB device
    - Found New Hardware Wizard launches
    - Click Locate and install driver software, respond to UAC box, insert USB driver CD
  - Configure Vista or XP connection

Connect to the Internet Using Cable Modem (cont'd.)

- Activate service and test the connection
  - Ensure ISP has cable modem MAC address
  - Test Internet connection using a Web browser
  - Problem solving:
    - Vista: use Diagnose and repair in the Network and Sharing Center window
    - XP: click Repair this connection in the Network Connections window
    - Turn off PC and cable modem, then wait five minutes
    - Call cable company help desk

Connect to the Internet Using DSL

- DSL and ISDN service
  - Provided by local telephone company
  - Second-generation DSL: Fiber in the Loop [DFITL]
- Steps
  - Install DSL modem and drivers
  - Use telephone filters
  - Connect DSL modem in conjunction with phone
  - Use similar steps to configure DSL connection
  - Use similar steps to test the connection
  - Use similar steps to troubleshoot connection

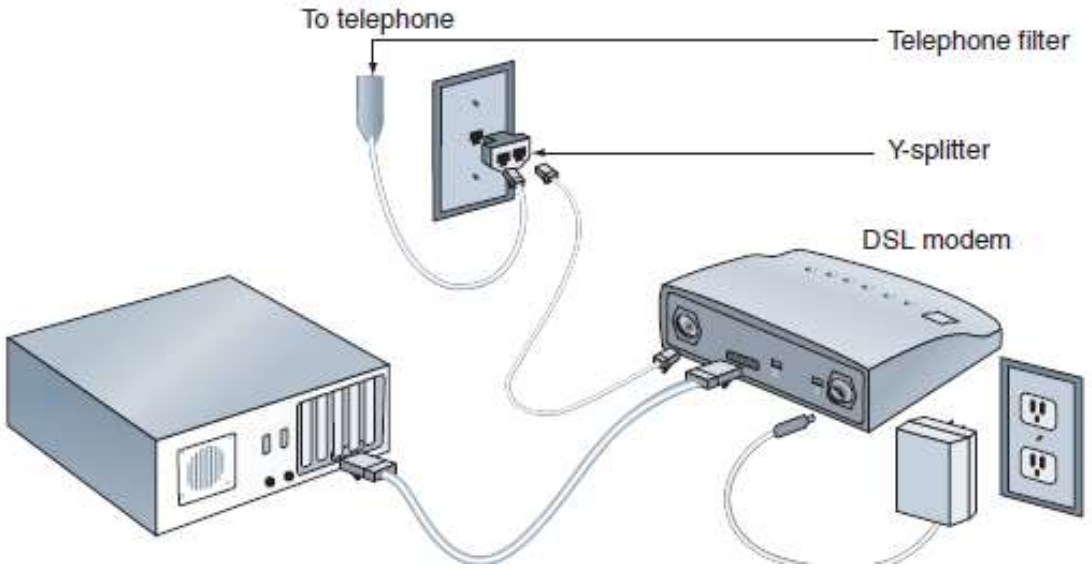

Figure 9-8 Sample setup for DSL
Courtesy: Course Technology/Cengage Learning

Connect to the Internet Using an On-Demand Broadband Connection or Static IP Addressing

- General steps
  - Connect modem PC, modem to wall jack
  - Open the Network and Sharing Center window
  - Click Set up a connection or network
    - Select Connect to the Internet and click Next
    - Select No, create a new connection and click Next
    - Click Broadband (PPPoE)
    - Complete connection information, click connect
  - Vista: configure an on-demand connection
  - XP: configure an on-demand connection

Connect to the Internet Using an On-Demand Broadband Connection or Static IP Addressing (cont'd.)

- Configure network connection
  - Vista Network and Sharing Center window
    - Click Manage network connections
    - Right-click Broadband Connection, select Properties
    - Select the Networking tab
    - Select Internet Protocol Version 4 (TCP/IPv4)
    - Click Properties
    - Select Use the following IP address
    - Enter static IP information
    - Close dialog boxes and Network Connections window

Connect to the Internet Using Satellite

- FCC requires trained technician
- General installation steps:
  - Install dish facing south for an unobstructed view
  - Use double coaxial cables from dish to satellite modem
  - Plug coaxial cables into two modem ports
    - Sat In and Sat Out
  - Connect Ethernet cable to RJ-45 modem port and RJ-45 PC port
  - Configure connection in Windows

Connect to the Internet Using a Dial-Up Connection

- Bare-bones installation steps
  - Install internal or external dial-up modem
  - Plug phone line into PC modem port and wall jack
  - Vista
    - Open Network and Sharing Center window, click Set up a connection or network, select Set up a dial-up connection, click Next, enter information
  - Windows XP
    - Click Create a new connection in the Network Connections window, follow wizard steps

Connect to the Internet Using a Dial-Up Connection (cont'd.)

- Use the connection
  - Vista: Network and Sharing Center
    - Click Connect to a network
    - Select dial-up connection, click Connect, click Dial
    - Hear modem dial up the ISP and make the connection
  - XP: Network Connections window
    - Double-click the connection icon
    - Click Dial
    - Hear modem dial up the ISP and make the connection

Connect to the Internet Using a Dial-Up Connection (cont'd.)

- View or change configuration
  - Open Connection Properties box
    - Use tabs to view or change configuration

Figure 9-19 Configure an Internet connection using the Properties window of the connection icon
Courtesy: Course Technology/Cengage Learning

Connect to the Internet Using a Dial-Up Connection (cont'd.)

- Troubleshooting techniques
  - Verify phone line and modem are working
  - Check Dial-up Connection Properties box for errors
  - Dial the number manually from a phone
  - Try another phone number
  - Listen for number being dialed
  - Verify TCP/IP configured correctly
  - Reboot PC and try again
  - Try another port if possible
  - Remove and reinstall dial-up connection

Connect to the Internet Using ISDN

- Essential tips
  - ISDN phone line connection support
    - One or two ISDN connections
    - ISDN connection and regular telephone call
  - ISDN modem may serve as a router for a small LAN
  - ISDN modem logical equipment contained in the modem box
    - NT1 (Network Terminator 1) and TA (terminal adapter)
    - RJ-11 jack for telephone line
    - RJ-45 jack for the network

Connect to the Internet Using ISDN (cont'd.)

- Essential tips (cont'd.)
  - Charges based on per-minute use
    - Verify e-mail or browser do not automatically connect
  - Setting up ISDN
    - Connect modem box
    - Configure ISDN connection

Implement Windows Firewall and Vista Network Security

- Three important tasks
  - Keep Windows updates current
  - Use a software and/or hardware firewall
  - Run antivirus software and keep it current
- Software firewalls
  - Appropriate when protecting a single personal computer
    - Connected directly to Internet and part of a local network
- Hardware firewall
  - Protects all computers on the network

Implement Windows Firewall and Vista Network Security (cont'd.)

- Hardware/software firewall functions
  - Filter data packets, filter ports, filter information
  - Block activity initiated from inside the network
- Examples:
  - ZoneAlarm by Check Point Software
  - Firewall Software Blade by Check Point Software
  - Windows Firewall
  - Norton 360 by Symantec
  - McAfee VirusScan Plus by McAfee

Implement Windows Firewall and Vista Network Security (cont'd.)

- Windows automatic Firewall configuration
  - Based on network type it believes the user is connected to
    - Public profile, private profile, domain profile
- Viewing firewall protection or configuration
  - Vista: use Network and Sharing Center window

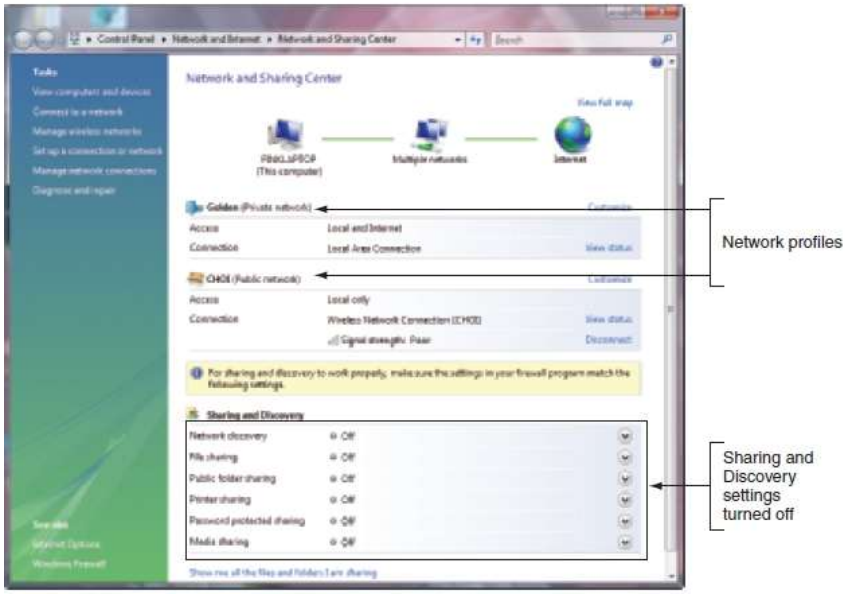

Figure 9-21 Security is high when connected to a public network
Courtesy: Course Technology/Cengage Learning

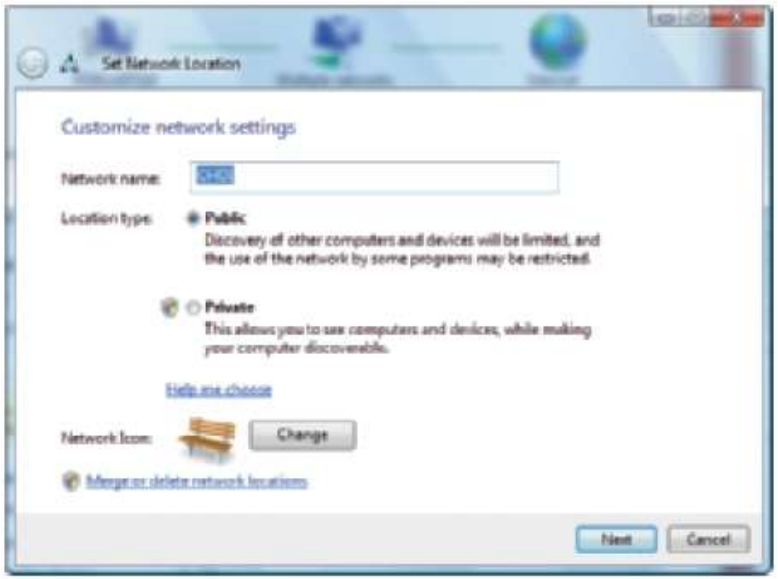

Figure 9-22 Change the security settings for a network
Courtesy: Course Technology/Cengage Learning

Implement Windows Firewall and Vista Network Security (cont'd.)

- Configuring Windows Firewall for Vista
  - Open Network and Sharing Center window
    - Click Windows Firewall
  - View details by clicking Change settings

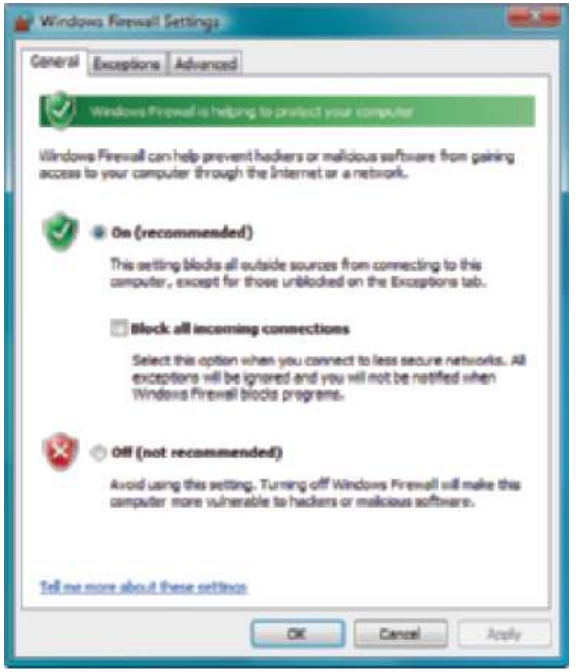

Figure 9-25 Windows Firewall is on but not working at its highest security level. Courtesy: Course Technology/Cengage Learning

Implement Windows Firewall and Vista Network Security (cont'd.)

- Configuring Windows Firewall for Vista (cont'd.)
  - View allowed incoming connections
    - Click Exceptions tab
  - Change individual settings on this Exceptions tab

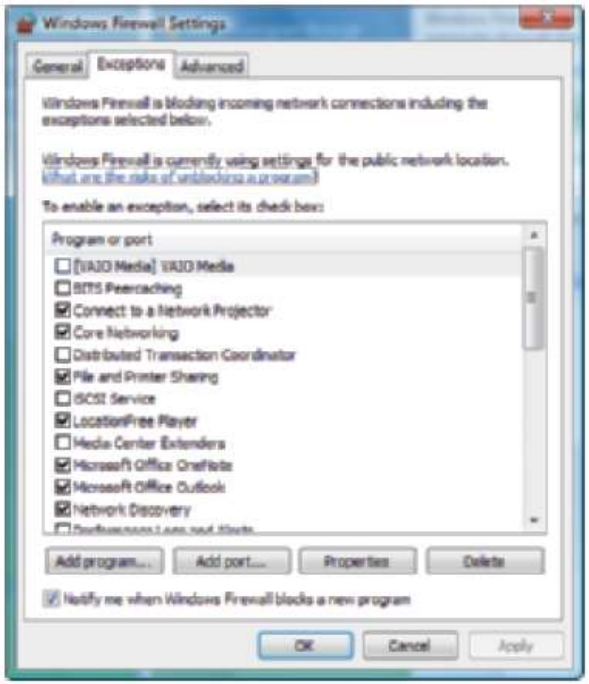

Figure 9-26 Exceptions allowed for incoming connections. Courtesy: Course Technology/Cengage Learning

Implement Windows Firewall and Vista Network Security (cont'd.)

- View and change Windows Firewall: Windows XP
  - Open Network Connections window
    - Click Change Windows Firewall settings

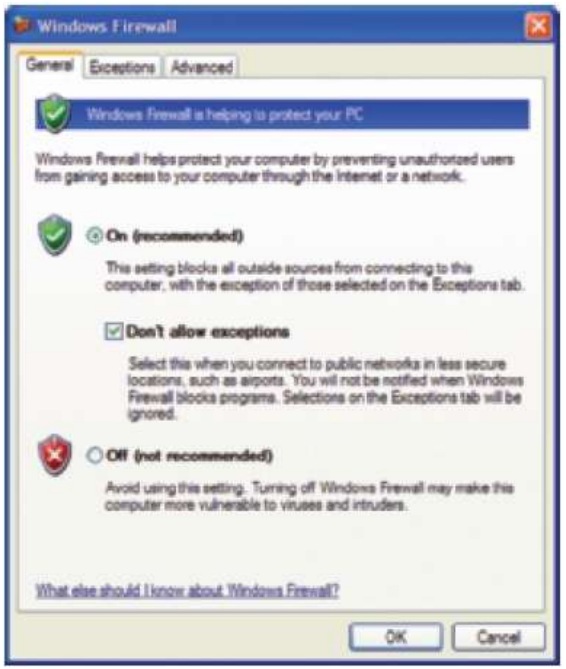

Figure 9-27 Windows Firewall for Windows XP is set for maximum protection. Courtesy: Course Technology/Cengage Learning

Setting Up a SOHO Network

- Skills required:
  - Knowledge of how to physically connect computers to a network
  - Knowledge of how to install and configure a multipurpose router
    - Standing between network and the Internet
  - Knowledge of how to set up and secure a wireless access point

Physically Configure a Small Network

- Necessary items:
  - Computers, switches, network cables, a router, device providing Internet access
- Considerations:
  - Switch use and placement
  - Cable selection
  - Router planning and placement

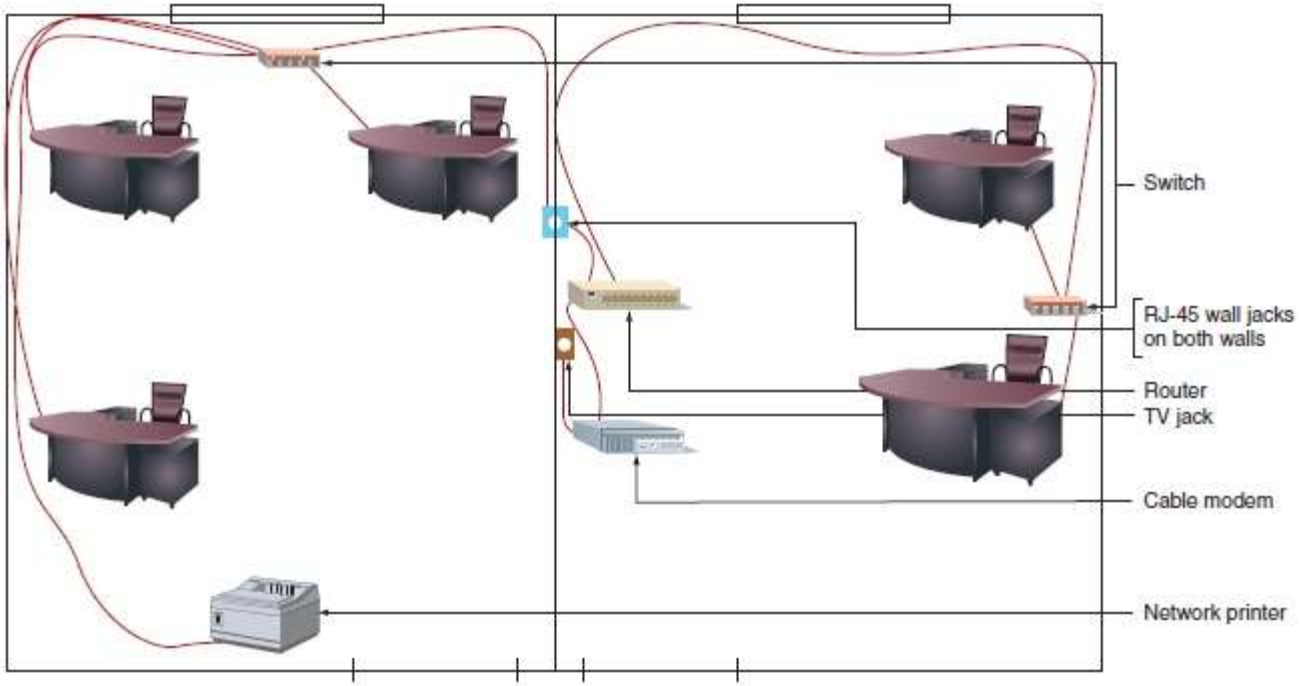

Figure 9-28 Plan the physical configuration of a small network
Courtesy: Course Technology/Cengage Learning

Install and Configure a Router for a Small Network

- Router with a setup CD
  - Run setup program on a computer
  - Follow setup screen instructions
    - Disconnect cable modem or DSL modem from host
    - Connect host computer to the router
    - Connect network computers to the router
    - Optional switch/hub provides multiple ports
    - Plug in router and power on
    - Sign in to router utility using a default password
    - Reset password
    - Configuring the router

Install and Configure a Router for a Small Network (cont'd.)

- Router configuration changes
  - Change router firmware password
  - Disable ability to configure router from over the wireless network
  - Enter host/domain names if necessary
  - Enter static IP address, subnet mask, IP addresses of the default gateway, DNS servers if necessary
  - Configure the DHCP server
  - Provide static addresses for local PCs if necessary
  - Update firmware if necessary

Install and Configure a Router for a Small Network (cont'd.)

- Configure hardware firewall router feature
  - Enable stateful packet inspection (SPI) Firewall Protection
    - Examines each data packet
    - Rejects those unsolicited by the local network
  - Set policies to define how/when users can access the Internet
- Port forwarding and port triggering
  - Used to allow legitimate Internet access to local computers
    - NAT redirection protects network using ports
    - Port filtering, port forwarding, port triggering

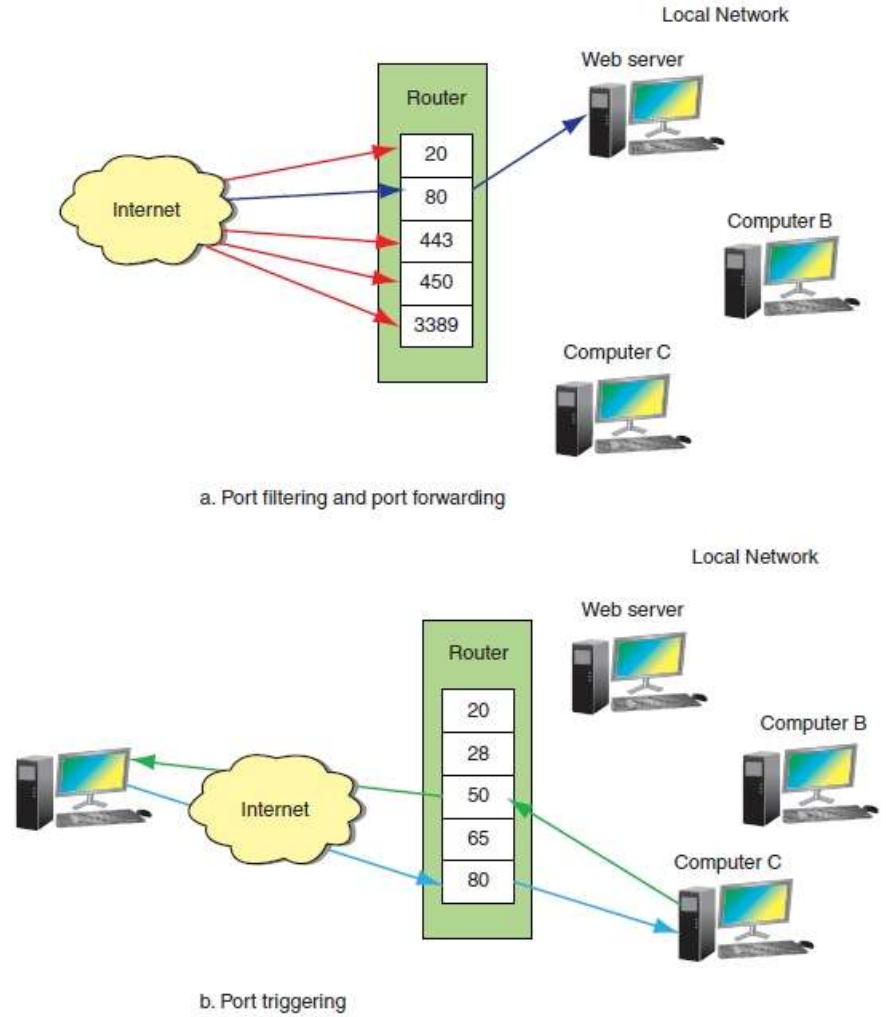

Figure 9-37 Port filtering, port forwarding, and port triggering
Courtesy: Course Technology/Cengage Learning

Install and Configure a Router for a Small Network (cont'd.)

- Tips for using port forwarding or port triggering
  - Must lease a static IP address from an ISP
  - For port forwarding:
    - Local network computer must have a static IP address
  - If computer using port triggering stops sending data:
    - Router might close triggered port before communication complete
  - If two network computers trigger the same port:
    - Router will not pass data to either computer
  - Turn on port forwarding only when being used
  - Install security software on PC receiving communication

How to Set Up a Wireless Network

- Wireless adapter required
  - Standalone or built-in to PC
- Considerations
  - 802.11 and security standards supported
- Installation
  - Position in center of hotspot
  - Connect ports and run installation CD
- Configure and test
  - Select channel, disable SSID broadcasting, encryption, MAC filtering, dynamic or static IP addressing

Tools and Utilities for Supporting and Troubleshooting Networks

- Cable testers
  - Tests physical network connections
- TCP/IP utilities
  - Tests TCP/IP connectivity
- Remote Desktop and Remote Assistance
  - Helpful when supporting networks and their users

Cable Testers

- Determine if the cable is good
- Find out cable type if it is not labeled
- Trace a network cable through a building

Figure 9-47 Use a cable tester pair to determine the type of cable and if the cable is good
Courtesy: Course Technology/Cengage Learning

TCP/IP Utilities

- Most common:
  - Ping and Ipconfig
- Others:
  - Nslookup, Tracert, Netstat, Netuse
  - Reverse lookup
  - Net utilities
    - Net pause, Net print, Net session, Net share, Net start, Net statistics, Net stop, Net time, Net use, Net user, Net view
- Most are found in the \Windows\System32 folder

Utility	Description
Getmac	Displays the NIC's MAC address (not available in Windows 2000).

Ipconfig	Displays the IP address of the host and other configuration information. (A command used by UNIX similar to Ipconfig is ifconfig.)
	◢ To display all information about connections:
	`ipconfig /all`
	◢ To release the current IP address:
	`ipconfig /release`
	◢ To request a new IP address:
	`ipconfig /renew`
	◢ To display information about Ipconfig:
	`ipconfig /?`

Net /?	Get information about the Net command.
Net use	Displays a list of network connections.
Netstat	Displays information about current TCP/IP connections.
Nslookup	Displays information about domain names and their IP addresses.

Ping	Verifies that there is a connection on a network between two hosts. Here are variations of Ping:
	◢ To test for name resolution:
	`ping -a 69.32.142.109`
	◢ To continue testing until interrupted:
	`ping -t 69.32.142.109`
	◢ To test with a data packet that is 1000 bytes in size:
	`ping -l 1000 69.32.142.109`

Telnet	Allows you to communicate with another computer on the network remotely, entering commands to control the remote computer. The connection is not secured.
Tracert	Traces and displays the route taken from the host to a remote destination; Tracert is one example of a trace-routing utility.

Table 9-1 TCP/IP utilities available with Windows

Remote Desktop

- Gives a user access to Windows desktop from anywhere on the Internet
- Using Remote Desktop
  - Open Remote Desktop Connection window
  - Enter IP address or host name of the computer
  - Configure options as necessary
  - Log in using Windows security box
  - Desktop of remote computer appears
- Preparing a computer to serve up Remote Desktop
  - Configure computer for static IP addressing
  - Configure Remote Desktop for service

Figure 9-58 The desktop of the remote computer is available on your local computer
Courtesy: Course Technology/Cengage Learning

Remote Assistance

- Allows user support from a distance
  - User requiring assistance sends an invitation by e-mail or chat to connect to her computer
  - Technician responds to the invitation
    - Can see the user's desktop
    - With permission, can take control
- Provides virtual desk-side support

Remote Assistance (cont'd.)

- Ways to initiate Remote Assistance session
  - User saves an invitation file (easiest)
    - Sends that file to the technician
  - User initiates session using Windows Messenger
    - Useful if user behind a firewall
  - User sends e-mail message to corporate help desk
    - Technician uses attached file to respond
    - Good if both people belong to same domain
  - Technician can initiate a session (most difficult)
    - Requires Group Policies on the technician's computer

Figure 9-66 The user's desktop can be viewed by the support technician
Courtesy: Course Technology/Cengage Learning

Troubleshooting Network and Internet Connections

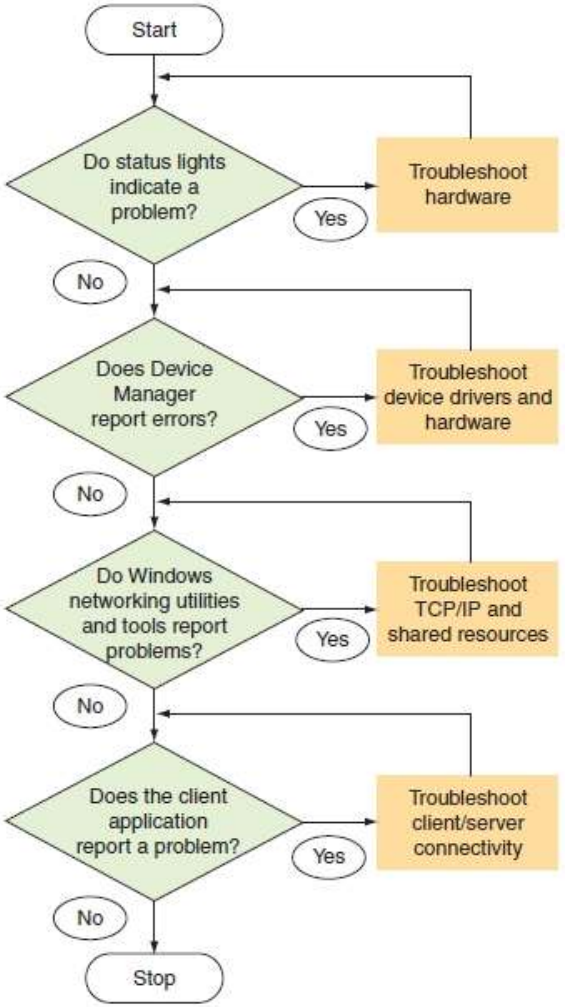

Figure 9-67 Flowchart to troubleshoot network connections. Courtesy: Course Technology/Cengage Learning

Problems with Hardware and Device Drivers

- Hardware troubleshooting steps
  - Check NIC or motherboard Ethernet port status lights
  - Check network cable connection at both ends
  - Verify laptop wireless switch turned on
  - Check if other network computers having trouble
  - Check network cable for damaged
  - Consider wall network cabling
    - Might be bad
  - Verify NIC securely seated in the expansion slot

Problems with Hardware and Device Drivers (cont'd.)

- Device driver troubleshooting
  - Verify network adapter and its drivers installed
  - Try updating the device drivers
  - Try uninstalling/reinstalling network adapter drivers
  - Run network adapter diagnostic programs
  - Update or reinstall onboard network port drivers
  - If Device Manager still reports errors:
    - Run antivirus software, and update Windows
    - Installing a known-good network adapter
    - Problem might be a corrupted Windows installation

Problems with TCP/IP, the OS, and ISP Connectivity

- Troubleshooting steps:
  - Try to release current IP address
    - Lease a new address
  - Look for problems with the TCP/IP configuration
  - Try the loopback address test
  - For slow network performance suspect a process hogging network resources
  - Verify PC software firewall not the problem source

Problems with TCP/IP, the OS, and ISP Connectivity (cont'd.)

- Troubleshooting reaching another network computer
  - Open Vista Network window or XP My Network Places window
    - Verify network computer icon visible
  - Ping the host computer
  - Reach a local network computer
    - Ping command with IP address of remote computer
    - Ping command remote computer name
    - Check Hosts file on the local computer if necessary

Problems with TCP/IP, the OS, and ISP Connectivity (cont'd.)

- Troubleshooting reaching another network computer (cont'd.)
  - Solve problems with local network host names
    - Nslookup command to find computer's IP address
    - Net view \\computername command
  - If ping or Net view successful, but cannot access it in Network window or My Network Places windows:
    - Verify computer is in same domain or workgroup as the local computer
    - Verify remote computer File and Printer Sharing on
    - Verify user account and password are the same on both

Problems with TCP/IP, the OS, and ISP Connectivity (cont'd.)

- Troubleshooting reaching another network computer (cont'd.)
  - Verify shared resources on a remote computer
  - Verify name resolution
    - Issue net view using a computer name
    - Issue net view using remote computer's IP address
  - Use net use command to access a drive map
    - Use net use command to disconnect a drive map

Problems with TCP/IP, the OS, and ISP Connectivity (cont'd.)

- Troubleshooting: local network resources seen and cannot access the Internet
  - Ping default gateway using its IP address
  - Eliminate DNS as the problem
  - Use Tracert command to show delays
  - Check router MAC address filtering
  - Verify firewall settings
  - Recycle ISP connection
  - Verify cable service working and router settings
  - Contact the ISP

Problems with Client-Side Applications

- Firewall settings must allow the communication
  - Verify Windows Firewall settings
    - Vista: Ensure Windows Firewall on and Block all incoming connections not checked
    - XP: Ensure Don’t allow exceptions not checked
  - Verify service or program is checked in the exceptions list

Problems with Client-Side Applications (cont'd.)

- Router settings must allow the communication
  - Verify correct NAT redirection settings
  - Verify port forwarding
    - Set to correct IP address on the network
  - Ensure restriction policies are not applied
  - Verify the content or site is not being blocked
  - Verify router is not the problem with communication
    - Connect a PC directly to the cable modem, DSL box, or other device
  - Security settings at the ISP might be a problem

Problems with Client-Side Applications (cont'd.)

- Proxy server connections
  - Intercepts client server requests
    - Caches Web pages and files
  - Sometimes acts as a gateway, or a firewall to restrict users Internet access
  - Transparent proxy server
    - User is not aware a proxy server is in use
    - Most common
  - You can configured Web browser to use a proxy server

Problems with Client-Side Applications (cont'd.)

- HTTPS secured connection
  - Verification in Internet Explorer version 7
    - Look for HTTPS in browser address and a lock icon
  - Troubleshoot secure Web site connection
    - Verify network proxy server
- SSH secured connection
  - More secure than Telnet
    - Uses secure tunneling connection
  - Windows requires third party software

Problems with Client-Side Applications (cont'd.)

- SSH secured connection (cont'd.)
  - Troubleshooting
    - Verify router port forwarding is enabled
    - SSH uses port 22
    - Add port 22 to firewall exceptions list
    - Ping the server with IP address and verify connectivity
    - Verify correct permissions on remote SSH server
    - Check SSH software web site for troubleshooting tips
- E-mail connections
  - Troubleshoot by verifying client settings
    - Verify outgoing/incoming e-mail servers, protocols

Problems with Client-Side Applications (cont'd.)

- FTP connections
  - Transfer files between two computers
    - Can use the same or different operating systems
  - Initiating FTP session
    - Click a FTP website link
    - Enter a URL beginning with ftp
    - Login anonymous or secured
  - Troubleshooting
    - Add ports 20 and 21 to firewall exceptions list
    - Verify connectivity with Ping command
    - Verify permissions to access site

Problems with Client-Side Applications (cont'd.)

- VOIP connections (Internet telephone)
  - Voice converted to digital data
    - Transmitted over the Internet
  - Connects to Plain Old Telephone Service (POTS)
    - People without VoIP can make/receive calls from VoIP subscribers
  - Service requirements
    - Digital phone or Analog Telephone Adapter (ATA)
    - VOIP service provider supplies phone number
    - Ferrite clamp prevents interference

Summary

- There are many ways to connect to the Internet
  - Cable modem, DSL, satellite, dial-up, ISDN
- Security (e.g., firewalls and encryption)
  - Keeps others from hacking into data
  - Prevents unauthorized use of LAN
- Small Office Home Office (SOHO) considerations
  - Switches, cables, and router placement
- There are many tools available for troubleshooting
  - Cable tester and TCP/IP utilities