Unit 5: Networking: Connecting Computing Devices

Networking Fudamentals

7.1

A computer network is simply two or more computers that are connected using software and hardware so they can communicate
- Advantages include allowing users to share an Internet connection, share printers, share files, & communicate
- Disadvantages for larger networks are that they require administration and that they may require costly equipment

Network Architectures

7.2

Networks can be defined by the distance between nodes
- A personal area network (PAN) is used for communication among personal mobile devices using Bluetooth or Wifi technologies.
- A local area network (LAN) connects nodes that are located in a small geographic area
- A home area network (HAN) is a specific type of LAN in your home
- A metropolitan area network (MAN) is a large network in a specific geographic area
- A wide area network (WAN) spans a large physical distance

7.3

Central: A client/server network contains two types of computers: a client computer on which users perform specific tasks and a server computer that provides resources to the clients and central control for the network. Most networks that have 10 or more nodes are client/server networks

Local: Peer-to-peer (P2P) networks enable each node connected to the network to communicate directly with every other node. Most home networks are P2P networks

Ethernet networks are the most common networks used in homes
↳ Most Ethernet networks use a combination of wired and wireless connections, depending on the data.
- Wired Ethernet home networks use the gigabit Ethernet standard.
7.4
- Wireless Ethernet networks are identified by a protocol standard: 802.11 a/b/g/n/ac. 802.11ac is the newest standard. WiGig (802.11ad) is a new wireless link betweens devices.

Network Components

Wired networks use various types of cable to connect nodes, including twisted-pair cable, coaxial cable, and fiber-optic.
7.5 The type of network and distance btw nodes determines the type of cable used.
↳ Wireless networks use radio waves

- All devices must have a network adapter. All devices sold today contain an integrated network interface card.
7.6 - Network navigation devices, such as routers and switches, are necessary for computers to communicate in a network.

- Home networks need operating system software that supports peer-to-peer networking (Windows, OS X, Linux)
7.7 - Servers on client/serve networks use network operating system

Connecting to the Internet

7.8 Broadband connections include the following:
- Cable transmits data over coaxial cable, which is also used for TV
- DSL uses twisted-pair wire, similar to that used for telephones
- Fiber Optic cable uses glass or plastic strands to transmit data via light signals
- Satellite is a connection option for those without broadband technologies

7.9 Wifi allows users to connect to the Internet wirelessly but is not as fast as a wired connection
- Mobile broadband is a 3G or 4G service delivered by cell networks

7.10
- Dial-up is the cheapest means of accessing the Internet but it is also the slowest

Your Home Network

- Most home network routers should support both wireless and wired access to the Internet
- For a home network to run efficiently, all nodes such as NICs and routers should use the same Ethernet standard.

7.11 The Device Manager utility in Windows lists all adapters installed on your computer.

- All devices are connected to your router, either wirelessly or with a wired connection. Wired connections deliver better throughput than wireless.

7.12
- To add additional ports to your network, you can connect a switch to your router.

- Network-Attached Storage (NAS) devices let you store and share files such as movies and music, as well as provide a central place for file backups.
Home network servers can be used instead of an NAS device if your needs require more sophisticated functionality than NAS devices.

7.13
- Devices such as gaming consoles each have their own setup procedures for connecting to wireless networks but usually require the same information as that needed for connecting a computer to a secured wireless network.

7.14 The latest versions of Windows make it easy to set up networks

7.15

- You may not get the throughput you need through a wireless connection. Therefore, you may need to consider a wired connection for certain devices.
- Distance from the router, as well as walls, floors, and large metal objects, can interfere with wireless connectivity.
- To solve connectivity problems, dual-band N routers allow for simultaneous support for devices running on both the 2.4 and 5 GHz frequency bands for 802.11n and earlier standards.
- Wireless range extenders can amplify signals to improve connectivity.

Wireless networks are even more susceptible to hacking than wired networks since the signals of most networks extend beyond your home.
↳ (neighbors could connect to your Internet)

To prevent unwanted intrusions, you should change the default password on your router to make it tougher for hackers to access, use a hard to guess SSID (network name), or enable security protocals such as WPA or WEP