# Chapter 7 – computer

network-links 2 or more computer systems to enable them to share data and

resources

-categories of computer networks (by geography) - LAN, WAN

LAN-Local Area Network

-uses cables, radio waves, infrared signals

-Links computers in a limited geographic area (i. e. office, home, campus,

building)

-Typically managed by a single person or organization

-Can be wired or wireless

WAN-Wide Area Network

-Uses long-distance transmission media, including satellites and leased lines

-Links computer systems (thousands of) miles apart

-Usually not owned by a single organization

-Internet is the world's largest WAN

MAN-Metropolitan Area Network

-cover a city or town

-usually owned by a government or other organization (Wi-Fi Downtown

Pittsburgh)

PAN-Personal Area Network

-composed of an individual's own personal devices (bluetooth headset,

smartphone, printer)

communication devices-convert data into digital signals to transmit:

modems, routers, Switches & Hubs, wireless access points, network interface

cards (NICs)

modem-formats digital data to go over phone, cable, satellite, or cellular

connections

-Modulates signal, demodulates at other end

-Uses modulation protocol

modulation protocolstandard for how data is to be transmitted over that

medium

protocolsProtocols define: data transfer rate, data

compression, error checking, and other details

Network Interface Card (NIC)-An expansion board or adapter that provides a

connection between the computer and network

-Electronics required to connect to a network

-Wired or wireless

-Can be USB, card, or built-in

Wireless Access Point (WAP)-Receives and transmits radio signals

-Joins wireless devices within a network (shop for " wireless access point", "

wireless adapter")

-communications heart --> access point

routers-Connect 2 or more networks

-Complex; determine best route to transmit data to its destination

-traffic cop

-good for home network

Switches and Hubs-Connects devices within a single network

-Hub is inexpensive, simpler than a switch

server-High-speed computer that provides /manages network resources, (e.

g.: Shared file space, communications/Internet access, security,

authentication of users)

-Uses a network operating system (like our Fedora LINUX server)

-Also: Web servers, mail servers, media servers on Internet

Client/Server-network composed of 2 types of devices clients and servers

-Server provides data and resources to low-end client devices (most

networks)

-Relatively complex: ex: file server, print server, etc.

clientsuse network resources; relatively low speed

serversprovide network resources

Peer-to-Peer (P2P)-All computers in the network are " equals"; NO central file

server

-Devices are " peers"

-Each computer provides file services to others

-P2P file-sharing sites on Internet (piratebay, frostwire, kazaa ...)

-Easy to set up; not very efficient

-No central " server"

-Privacy and Security issues big concern: (viruses and malicious programs can easily be transferred)

advantages to networking-Reduced hardware costs

-Sharing of resources

-Sharing of information

-Centralized data management / security

-Easy to connect with others

disadvantages to networking-Loss of autonomy/control

-Reduced privacy

-Security threats

-Loss of productivity

LAN protocols-Protocols are standards used by networks to permit communications

-Network protocols define the technology used in the network (communication rules)

Ethernet-most popular LAN protocol

-For wired LANs

-Uses inexpensive common wiring and switches

Wi-Fi= most popular wireless LAN protocol

-Uses radio waves through a central access point / router

-Connects devices to the access point; does NOT connect devices directly to Internet

-Router needed to connect to Internet

Ethernet Protocol-Ethernet = WIRED technology (used by 85% of all networks)

-Used in our lab, in DUQ Living Learning Centers

-Inexpensive to superfast networks (Protocol/speeds: 100base-T, gigabit Ethernet, etc.)

Wi-Fi (Wireless Fidelity)-wireless LAN for devices in a limited area

-Needs a central Access Point

-802. 11 is the tech standard

-Up to ~300 feet

-Prone to interference - from buildings, cell phones, etc.

*Security issue - anyone can pick up radio signals

LAN Technologies-Many networks combine wireless and wired protocols (similar to DUQ net)

*NOTE roles of router, modem, access point --> KNOW THE DIAGRAM ON POWERPOINT

faster Ethernet or Wi-Fi*depends on standard of Wi-Fi and the standard of internet

-depends on too many factors, not simple

802. 11ac-latest standard

-3 times the speed of 802. 11n

~1. 35 Gbps

Wired Home Network- using Ethernet and simple twisted pair wires

- RJ-45 connectors

-Fast, efficient

-Good for gaming and transferring large files

-Speed depends upon devices, protocol setup, wiring

Wireless Home Network- using Wi-Fi and Wireless Access Point and wireless

LAN cards

Advantages of Home Networks-Shared Internet connection

-Share data (photos, music, games, etc.)

-Share devices (printers, scanners...)

-Can be basis of home entertainment system

How to Connect Wired Devices-Use Hub, Switch or Router

-Advantages / Disadvantages?

-Hub or Switch - can connect within 1 LAN

-Router - can join 2 LANs (WiFi, Internet)

Typical Home Ethernet Setup-Note positions of devices

-Must run cables throughout house

-Fast for multimedia

-Each device needs a NIC

Home Wireless Networking-WiFi - uses 802. 11

-Requires:

-Wireless Access Point

-Wireless adapter in each workstation

-Using same 802. 11x standard; if not the same, lowest standard applies

WiFi standards-WiFi - any wireless LAN that follows 802. 11 standards

-Last letter is important!

-802. 11a, b, g, n, ac (Later letters offer faster speeds)

Newest WiFi standard-802. 11ac is latest standard (NOTE: 802. 11ad just

announced)

-3X faster than 802. 11n

-For HD and multimedia

Typical Home WiFi Setup*Note devices

-No need for cables

-Can be MAC or PC

-All same 802. 11x

-Need router to join WiFi to Internet

-Router acts as access point

-Must set up security

Wired Vs. Wireless-Faster/Not as fast

-More secure/less secure (needs security set-up)

-Simple to set up/no wires to run

-Requires cabling/wires throughout home//flexiblility, mobility (limited range

and subject to interference)

-Equipment is less expensive

Setting up a Home Network1. Determine your needs; most home networks

will be peer to peer

2. Select network technology

Wired/Wi-Fi/hybrid? Which protocols (speed?)

3. Research and purchase networking hardware

Do existing devices support selected standard?

Purchase router, switch, modem, adapters...

4. Configure the network (Arrange the devices)

Configuring the Network - Ethernet1. run wiring

2. plug shared devices (including modem) into router

3. Use Operating System settings to set up network on each PC

Configuring the Network - WiFi1. locate router/access point so devices can

communicate (avoid interference)

2. Setup router: password, SSID, security

3. Connect router to modem; connect wired devices like printers, scanners

4. Use Op System settings to set up network on each PC/device

WiFi Security-SSID - WiFi network's name; use obscure name

-Use passwords on home WiFi networks

-Use security protocols

-Allow only authorized devices to access

-At a " hotspot" & in public:

-Don't transmit confidential data

-Someone may be intercepting

-Turn off WiFi access when not in use

If something goes wrong with configuring network... Trouble-shooting hints

from page 336:

-Blow lint and dust off router, adapter, modem

-Shut Down & Restart the router (wait 10 seconds)

-Unplug router from power source

-Unplug and plug back in peripheral devices (start with modem)

Future of Home Networks?-Most likely will be WIRELESS

-Will integrate OTHER devices (not just computers):

-Home entertainment systems

-Security systems / doors and access

-Lighting / temperature controls

-Household appliances

-Personal health monitors

-Will demand faster Internet connections!

ONCHAPTER 7 – COMPUTER SPECIFICALLY FOR YOUFOR ONLY$13.

90/PAGEOrder NowTags:

- Smartphone

- WiFi