

# [Chapter 7 – computer](https://assignbuster.com/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!

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