

# [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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