Setting up a client/server network is easier then you might think. There are several basic components, some of which are optional.

1) Desktop computers
Identify the desktops or workstations you would like to network.

2) Server
Purchase a server with the writing processing power as well as expendability and availability and features you meet business and number of users.

3) Cables/Transmission
Connect workstation together and to the server with cables. The cable serves as the conduit along with data is send between devices, cables can range from a twisted pair, coaxial wire and a fiber optic cable.

4) Network Interface Card
A "NIC" or Network Interface Card is a broad level product that fits to a PC, workstation, or server that allows the computer to talk to the rest of the network. A NIC is the most common component in the network. At least one NIC must be installed in every system attached to the network. The NIC is an expansion board that allows the workstation or server to attach to a common connection types are RJ45, BNC and SC connectors.

NIC also called network adapters. Include a cable socket allowing computer to be connected to the computer. NIC's are part of both the physical and data link layer and include a unique data link layer and include a unique data link layer address (some times called a MAC address) place in them by their manufacturer. Before sending data on to the network the network card also organizer data into frames and then sends them out on the network.

5) Software (Network Operating System)
Some type of networking software is required to facilitate to communicate among the workstation. A network operating system runs on the server And allows user to share information and peripherals that are attached to the network. In addition each workstation must run client software in order to communicate with the server.

6) Hubs
In general, a hub is the central part of a wheel where the spokes come together. The term is familiar to frequent fliers who travelled through hubs to make connecting from one point to another. In data communications a hub is a place of converence where data arrives from one or more other directions. The distinction seems to be that the hub is the place where data comes together and

the switch is what determines how and where data is forwarded from the place where data comes together. **Hub** works at **Layer 1**, the **Physical** layer.

7) Switch

In a telecommunication network, a switch is a device that channels incoming data from any one multiple input ports the specify output port that will be take the data toward its intended destination. On the Ethernet local area network, a switch determine from the physical device address in each incoming message frame which output port to forward it to and out of. Switch works at **Layer 2**, the Data link layer.

8) Repeaters

Repeater is a signal amplification device. As an electronic signal travels down a wire it weakens in strength. In electronic jargon this is known as attenuation. Repeaters are place at pre determined points along the cable and act to boost and retransmit to signal. This is like giving a runner a bower bar or drink to crucial points in a race.

9) Bridges

A network bridge, also known as an Ethernet bridge, connects two segments of a network together. The segments are not independent entities, but are owned and managed by the same organization.

The bridge will either pass network traffic or deny network traffic based on the destination address. On the other hand if the destination address is one another segment the bridge will allow the traffic to pass through in order to reach its destination.

10) Routers

The router is considered to be an intelligent network device. It performs basically 02 functions. First, it provided the physical connection between two or more different network. The second and major function is to route packets of network information between different networks. Hence the name "Router" the router also has the intelligence build into dynamically adapt to changes in the network configuration and to route traffic around downed links.

By implementing a number of routers to connect several smaller networks together. A larger entity known as an integer network is created. When a computer located on one network wants to sent data to a device located on a remote network, the data is post to a router located on the local segment. The local router will then forward the data packet to the destination device on the network.

11) Brouter

A brouter is a hybrid device, as its name would imply, combines the both a bridge and a router into one device. It will function as a router in most cases.

12) CSU/DSU(Channel Service Unit/Data Service Unit)

A CSU/DSU is a hardware device about a size of external modem. That converts digital data frame from the communication technology used on a LAN in to a frame appropriate to a WAN and Voice Versa. A channel service unit and receives and transmit signal from and to the WAN line and provides a barrier for electrical interference from either site of the unit. The DSU manages timing errors and signal generation.

Networking models
LAN (Local Area Network)

A LAN is a group of computers and associated devices that share a common communication lines or wireless link and typically share the resources of a single processor or server within a small geographic area (for an example within an office building) usually, the server has applications and data storage that are shared in common by multiple computer users. A LAN may serve as two or more users.

MAN (Metropolitan Area Network)

A MAN is a network that inter connects users with computer resources in a geographic area or region larger than that convert even a large local area network but smaller than the area covered wide area network. The term is apply to the inter connection of networks in a city into a single lager network. It is also used to mean the inter connection of several LANs by bridging then with backbone lines. The later usage this also sometime referred to as a campus network.

WAN (Wide Area Network)

A WAN is a geographically dispersed telecommunications network. The term description a browder telecommunication structure from a LAN. A WAN may be privately owned or rented, but the term usually connects of inclusion of public network. An intermediate from network is an MAN.

Computer networks also differ in their design. Two types of high level network design are called "Client – Server" and "Peer – to – peer".

Peer-to-peer

Peer to Peer networks, also called workgroups were the first type of network to be used. In this type of network there is no centralized management or security and each computer is in charge of its own local users and file and folder permissions. Since there is no centralized user management, any user who wants access to resources on another computer will need to have an account on that specific computer. So if a user wants access to files on 10 different computers then that user will need 10 separate user accounts.
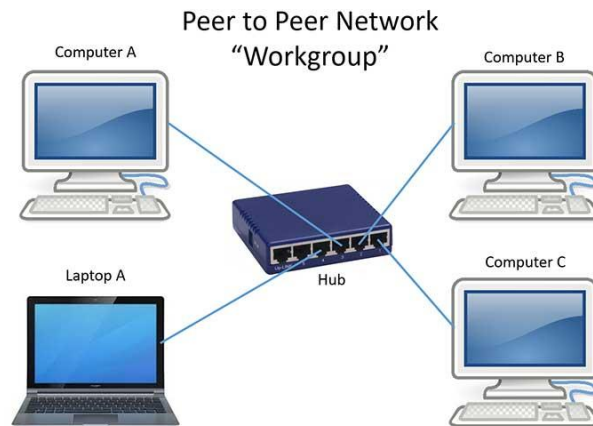
The main advantage of Peer-to-peer networking is lower cost since there is no dedicated server, generally the most expensive network component.

Client-server design

In a client-server networking environment certain systems are setup as a server, which means that they serve resources to other systems. Servers can provide various functions.

For an example, a server might be setup as a print server in order to manage the printing on a network. Or a server might play the role of a file server, hosting files on a network so that users can share and access files were the network.
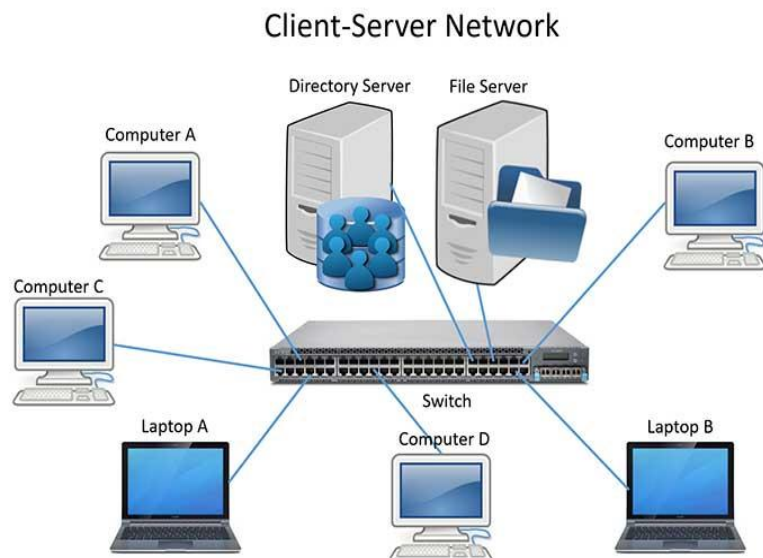
Servers may also act as applications that are used on the network. Another important role that is frequently performed by servers is to control security on the network to ensure that only authorized users are able to access network resources. It is important to note that the typically servers are the bigger, faster machine on the network and are often dedicated servers that perform very specific functions, there are instances, however when a server may act as both a server and a client.

Network topologies

Topology refers to the shape of a network, or the network's layout. How different nodes in a network are connected to each other how they communicate is determined by a networks topology. Topologies are either physical or logical. There are following types of topologies, generally,
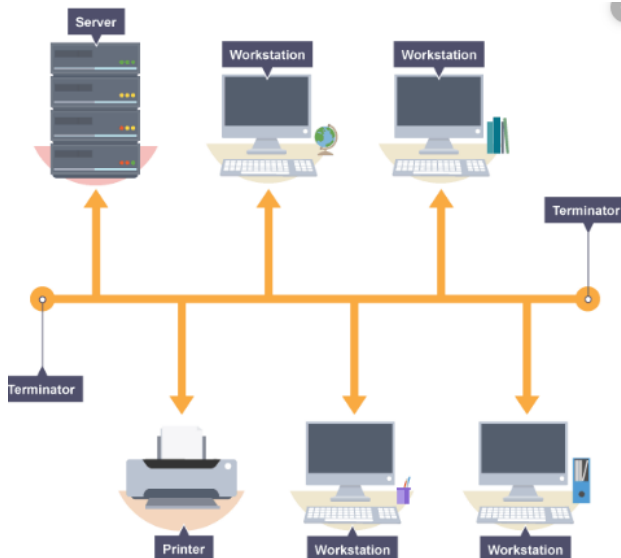

PHYSICAL TOPOLOGIES

- ➤ Bus topology
- ➤ Star topology
- ➤ Ring topology
- ➤ Mesh topology
- ➤ Tree topology
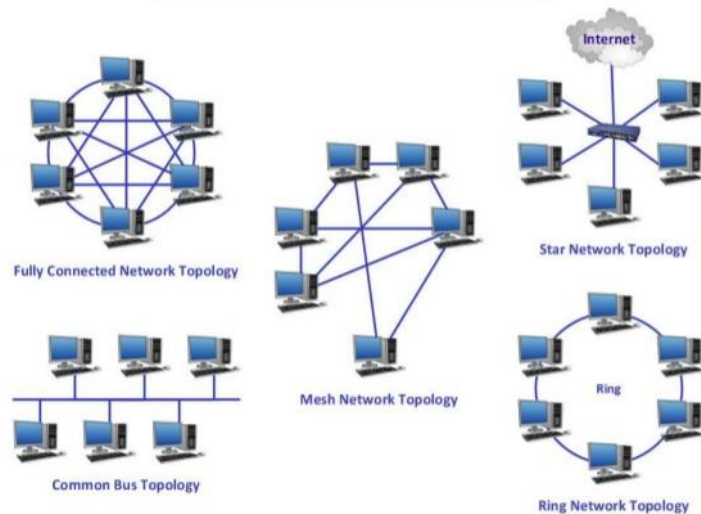
Bus topology

The bus topology consists of a long liner cable also called liner trunk or backbone. In this type of topology all the computers are connected to this main cable. The data signal travels across the cable medium from one end to another and if not absorbed at the other end, it will keep on bouncing back and fourth across the medium and therefore will stop any further communication on the network.

A device called Terminator is used at one end of the medium that absorbs the signal and hence restricts it's from effecting the overall network communication.

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Star topology

In star topology, there is a central network traffic management device called hub/switch. All the nodes are connected directly to the hub and are thereby inter connected with each other.
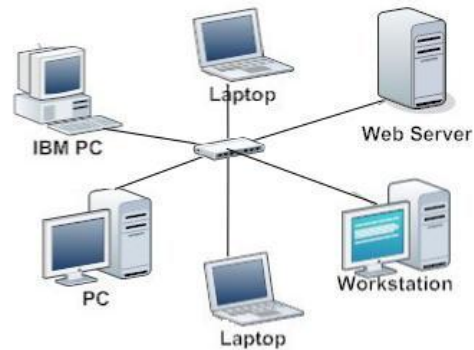
Ring topology

In ring topology the computers connected with each other via a single cable run constitute a logical ring. Ring is an active topology and also that every computer on the ring act as a repeater.
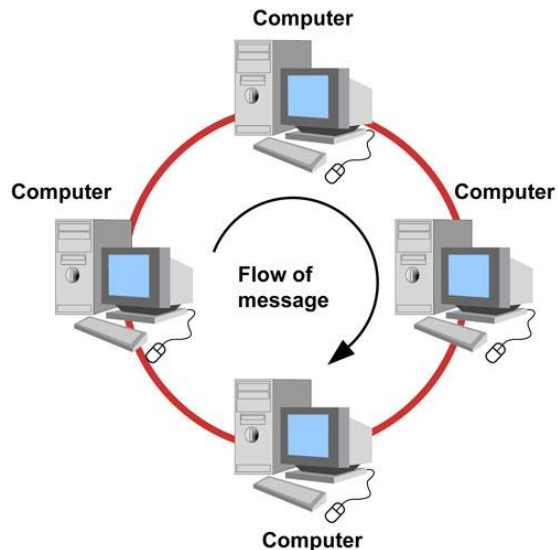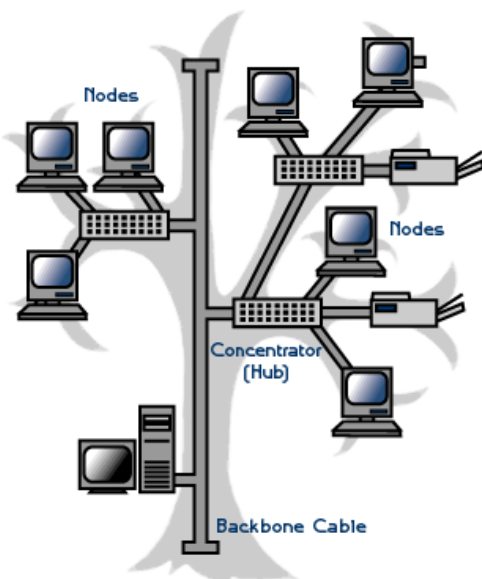
Malfunction is workstation and cables create problems for the entire network. Changes made when adding or removing a device effect either network.

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Tree topology

A tree topology combines characteristics of liner bus and star topologies. It consists of groups of stars configure work station connected to a liner bus backbone cable.

Mesh Topology

Mesh topology

The mesh topology provides the highest level of faculty tolerance. It uses separate cable to connect each device to other device every other device on the network, providing a straight communication path.