Computer Network Topologies and Their Types

Network Topologies – A Topology define the arrangement of nodes, cables and connectivity devices that makeup the network. In order words can say topology is the geometric arrangement of workstation and the links among them. Computer Network Topologies and Their Types such as Bus Topology ,Star Topology ,Ring Topology ,Tree Topology and Mesh Topology. Topology can be considered as the following types –

1. **Physical Topology** – it describes the actual layout of the network transmission media, means the way the network looks.
2. **Logical Topology** – It describes the logical pathway a single follows as it passes among the network nodes, means the way the data passes among the nodes.

Physical & logical topologies can take several forms .The most common are:

1. Bus Topology
2. Star Topology
3. Ring Topology
4. Tree Topology
5. Mesh Topology

1. **Bus Topology-** If the computers are connected to one single cable then we call cable as broadcast bus broad casting messages in done computer transmits and all other computer can receive to the broad cast message. In a bus network the computers are connected by a cable called a bus and messages are sent along to bus. The connected computer can receive the massage and determine whether it in for them or not A bus network is commonly used in LAN where the data is stored in the center computer. in a bus network the failure of a single computer does not effect the performance of the rest of the network.

We can add a workstation to this network at any time. It is the topology used in Ethernet LAN (CSMA /CD).


2. **Star Topology-** When all communication must go through a central point, we called that topology a star topology. A star networks has a server at its center and all messages must go through the server. When we want to send message from one computer to another, It is first send to the server which then retract the massage to the distention computer.

The disadvantage of star network is the if the server fails the entire network doesn't work a good e.g. of star network is telephone switching computer in the telephone exchange which is used to connect computers as well as telephones.
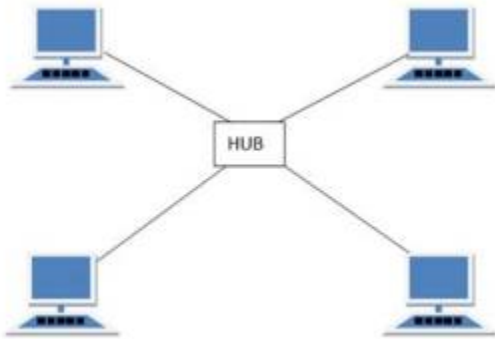

3. **Ring Topology-** In a ring network the computer devices are arranged so that the communication connects the computer in a ring like structure. In this structure any computer can communication with any other computer by sending a signal around the ring. Each message consists of its distension address and the data to be transmitted as the message proceeds around the ring each computer determines whether it is the recipient of the message .if it is not the message is send to the next computer. Each station takes an active role in transferring the message. It a single computer fails at least a portion of the network. Will not work.

Ring Topology
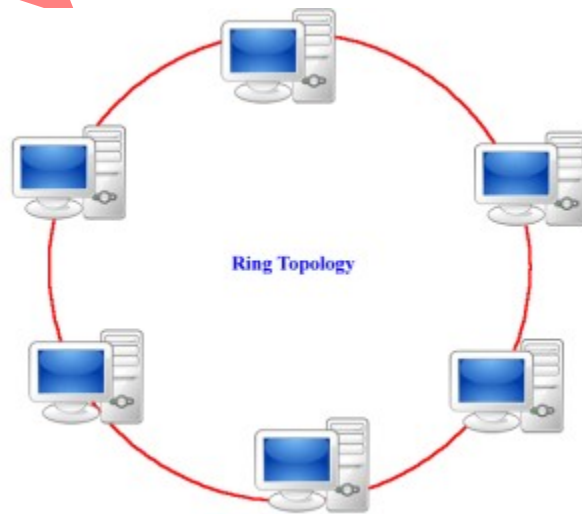
4. **Tree Topology-** The tree topology - also called a "hierarchical "or "star of stars" topology, tree topology is a combination of bus and star topologies. Nodes are connected in groups of star configured workstation that branch out from a single "root". The root node usually controls the network and sometimes network traffic flow. This topology is easy to extend when new users need to be added, it is simply a matter of adding a new hub. It also is easy to control because the root provides centralized management and monitoring.

The principal disadvantage is obvious when the entire network depends on one node, failure of that node will bring the whole network down.
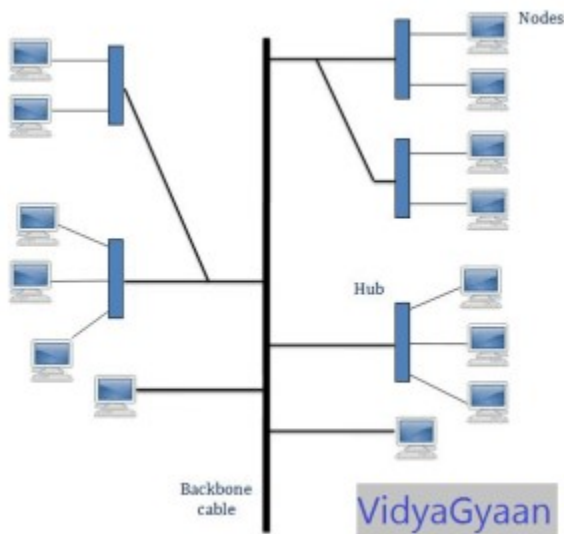
5. **Mesh Topology-** Every device has a dedicated point to point link to every other device. Dedicated means that the link carries traffic only between the two devices it connects. Mesh topology is really a hybrid model representing an all channel topology. A fully Connected mesh network therefore has *n(n-1)/2* physical channels to link n devices. Every device on the network must have *n-1* input/output ports.

The advantage of mesh topology it has very much fault tolerance capacity. In case of a media failure the single can be bypassed through the other routers. Dedicated links guarantees that each connection can carry its own data load, thus eliminating the traffic problems. It is privacy or security is very high.

 The disadvantage is installation and reconfiguration is very difficult. It is the most expense.