Practicle-1

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Aim:- Write a Case study on Network topologies.
(i) Mesh topology.
(ii) Star topology.
(iii) Bus topology.
(iv) Ring topology.

Theory:-

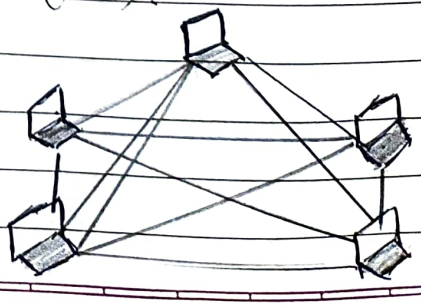
The term physical topology refers to the way in which a network is laid out physically. Two or more devices are connected through link. Two or more link connected form a topology. There are 4 basic topologies possible:

1) Mesh 2) Star 3) Bus 4) Ring.

1) Mesh topology:-

In a mesh topology, each device has a dedicated point to point link to every other device. To find the number of dedicated link we can use the formulae $(n-1)/2$, and to find the no of input/output port, we can use the formulae $(n-1)$.

Example: Connection between Telephone Regional offices with each other.



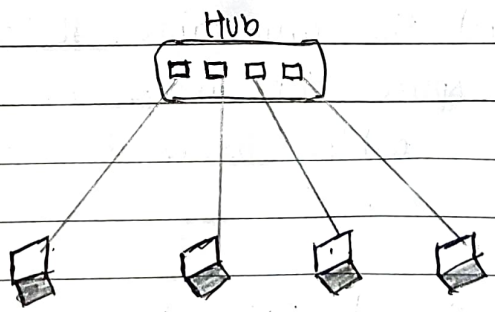
Advantages:- (1) The network can be expanded without disrupting current users
(2) No traffic problems.
(3) It is robust.
(4) It makes fault identification easy.
(5) Every system has its privacy & security.

Disadvantages:- (1) Installation is complex because every node is connected to every node.
(2) It is expensive due to use of more cables.
(3) Complicated implementation.
(4) It requires large space to run the cables.

2) Star Topology :-

In a star topology, each device has a dedicated point to point link only to a central controller called a hub. The devices are not linked to one another directly. There is no direct traffic between devices. The controller act as a exchange.

Example:- It is used in Local-Area-Network (LAN).
High speed LANs often use a star topology with a central hub.



Advantages :-

(1) Easy to troubleshoot, setup & modify.
(2) Only those nodes are affected that has failed. other nodes still work.
(3) Fast performance, Bubust
(4) It is less expensive than Mesh.
(5) It is the most used topology.

Disadvantages :-

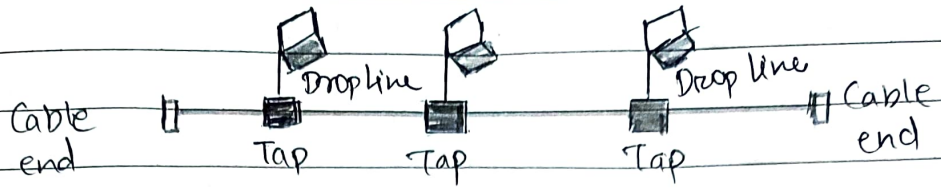
(1) If the hub fails, attached nodes also fail.
(2) Heavy Network traffic sometimes.
(3) Performance depends on hub capacity.
(4) A damaged cable may bring network down.

3) Bus Topology :-

Bus topology is Multipoint, One long cable acts as a backbone to link all the devices in a network. Nodes are connected to the bus cable by drop lines and taps.

A drop line is a connection running between the device and the main cable. A tap is a connector that either splices into main cable & punctures the sheathing of a cable to create a contact with the metallic core.

Example :- Traditional Ethernet LAN's use bus Topology.

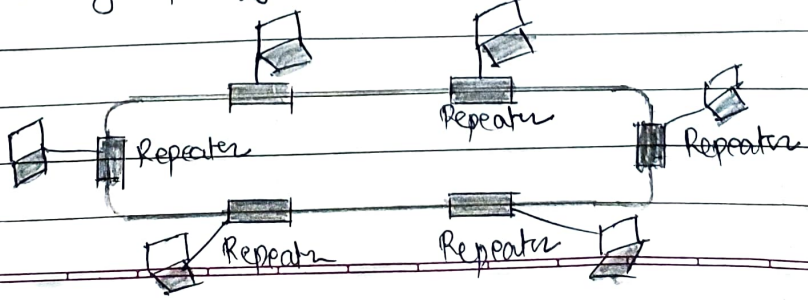


Advantages :- (1) Ease of Installation.
(2) Uses less cabling, Resulting in low cost.
(3) It is widely used when a network Installation is small, simple, or temporary.

Disadvantages :- (1) In case if common cable fails entire system crashes.
(2) Cables are always of limited length.
(3) When traffic is heavy, or too many nodes performance decreases.

4) Ring Topology :-

In a Ring topology, each device has a dedicated point to point connection with only the two devices on either side of it. A signal is passed only the ring in one direction, from device to device, until it reaches its destination. Each device in the ring incorporates a repeater, when a device receives a signal intended for another device, its repeater regenerates the bits & passes them along.
Example :- Ring topology was prevalent when IBM introduced its LAN.



Advantages :- (1) Easy to install and reconfigure.
(2) Faster Error checking and acknowledgement
(3) Adding or deleting device is easy.

Disadvantages :- (1) Unidirectional Traffic.
(2) It is difficult to troubleshoot ring network
(3) A break in ring can disable the network.

Conclusion :- According to our discussion, the type of topology to be used depends upon the Requirements of the organization/customer.

Hence, we studied various topologies.