7) GATEWAY:-

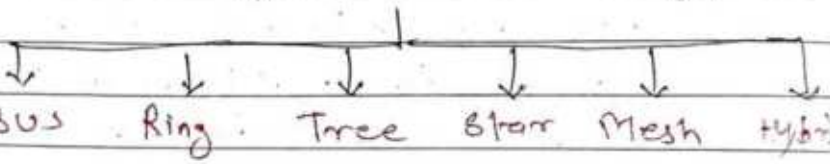
It is a device which operates at all 7 layers. It can be used to connect two different dissimilar nlw. eg like ethernet, token ring & FDDI.

They provide conversion bet^n technologies Also they can execute all functionalities of Routers.

* NETWORK TOPOLOGY

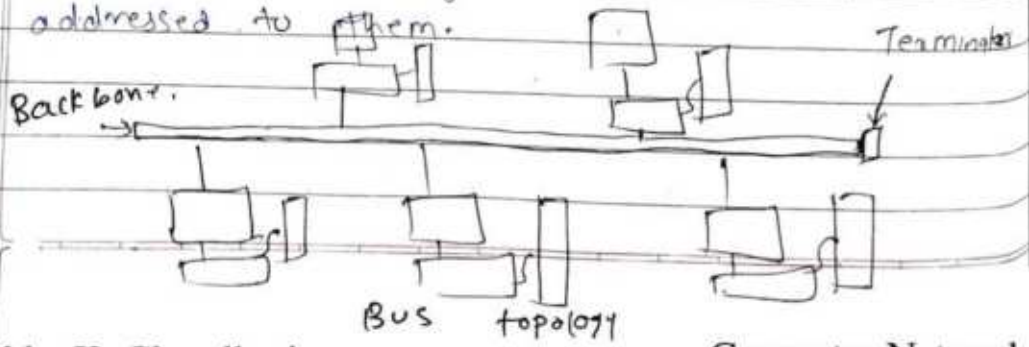
Def^n : Network topology is a map of nlw. It defines how all components are connected with each other.

Types of nlw Topology



1) Bus topology:-

Bus topology is designed in such way that all stations are connected through a single cable. Known as Backbone When node wants to communicate it sents a message over nlw. (broadcast msg) all the stations avaible in network receives message even though it has been not addressed to them.



Advantages

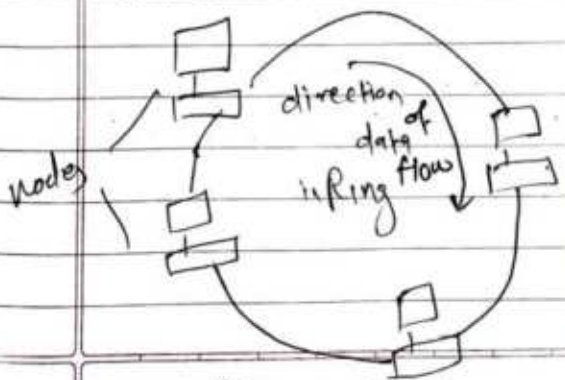
1) low cost cabling
2) Moderate data speed
3) Easy to install & configure
4) if single node fails ~~doesnot effects entire nw.~~ will not have effect on other nodes

Disadvantages

1) It requires lots of cable
2) Troubleshooting is difficult in this topology
3) Sig attenuation - ie loss of sig : need to use repeaters

e) Ring Topology :

- It is designed same as bus only difference is last station is connected to first station so as to create circular Ring.
- In this data flows in single direction
- In ring topology, token is moved; it passes from computer to computer. If station wants to communicate it grabs token & updates it with dest^n address.
- How token is passed to next stations until it reaches dest^n station.
- Once it reaches dest^n it acknowledges receiver



Ring Topology

Advantages

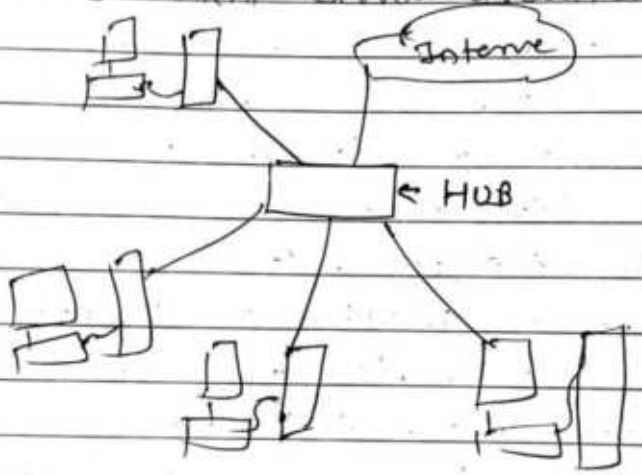
1) N/w mgmt
2) less costly
3) Reliable
4) ~~if~~

Disadvantages

1) Difficult to troubleshoot
2) If one station fails it will cause entire Ring to breakdown
3) Adding & removing station is difficult
4) Communication delay is introduced and is directly proportional to no of nodes.

3) Star Topology :

It is designed in a such way that every node is connected to central HUB/switch
commonly used topology
Suitable for all types of nlw.
It follows client Server architecture



Star Topology

Advantages

- efficient troubleshooting
- Adding or removing nodes is easy.
- If one node fails doesn't affect entire nlw
- Easy to install & configure.
- High speed
- Cost effective

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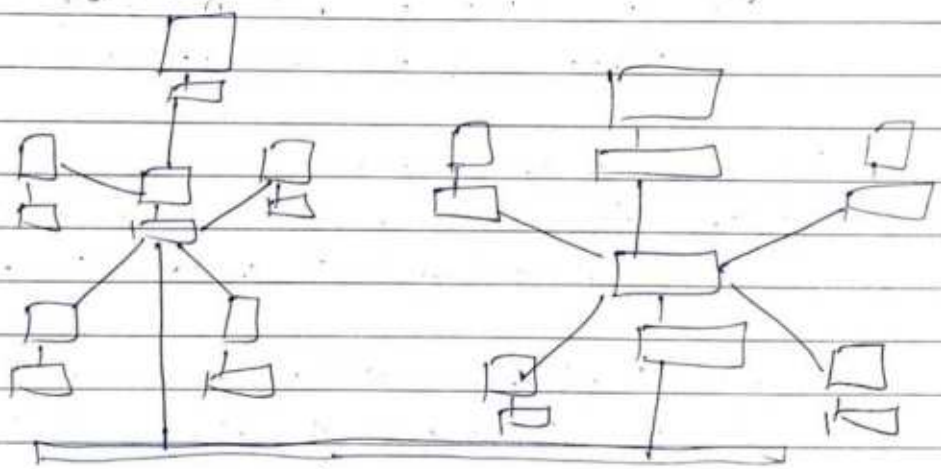
Disadvantages
- Excessive cables are required.
- If central HUB fails causes entire nw to break down

4) Tree Topology
It combines characteristics of bus topology & Star topology.
It is a type of structure in which all nodes are connected with each other in hierarchical manner. Top most node is called as root node, & all other node are descendents of root node.
There exists only one path between two nodes for data transmission. Thus it forms parent-child hierarchy.



Tree Topology

Advantages
- Supports broad band transmission
- Easily expandable
- Easily manageable
- Error detection easy
- Limited failure

Disadvantages
- Troubble shooting is difficult.
- High cost
- If backbone cable fails entire nlw will be broken down.
- Reconfiguration difficult in adding / Removing Node

5) Mesh Topology :-

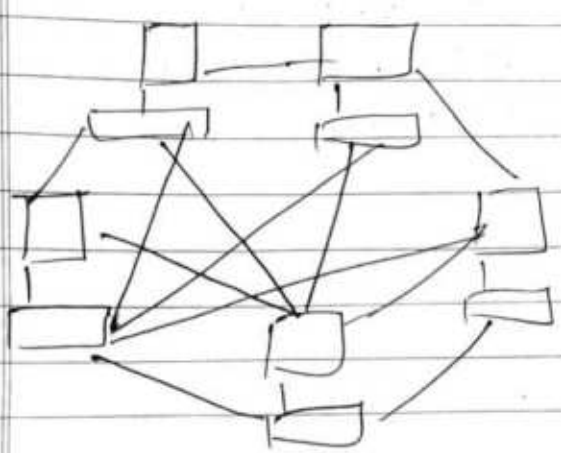
- In this topology each node is connected to other node via a seperate cable.
- It creates multiple path forom one cont node to another node.

Internet is example of Mesh topology
It is mainly used for wireless nlw.
No of cables = (n * (n-1)/2);
where n is no of nodes in nlw.

It has two types
Fully Mesh - In this one node is connected to all nodes in nlw

Partial Mesh :- In this one node is not connected to all nodes but certain node through which they can can have connected path (direct or indirect).

Advantages	Disadvantages
1) Reliable	1) cost
2) fast Communication	2) Mgmt is difficult
3) Easy to Reconfigure.	3) Efficiency is reduce beer of redundant path

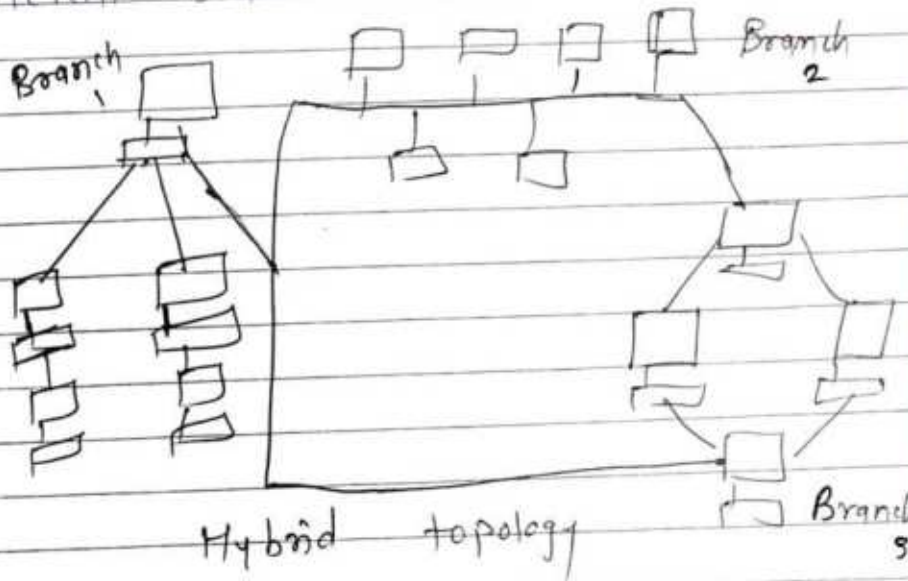


Fully Mesh NIW

b) Hybrid Topology :-

Combination of various topologies is termed as Hybrid topology.

Eg When we have multiple branches of an organisation they may use different topologies at different branch



Hybrid topology

Advantages
1) Reliable
2) Scalable
3) flexible

Disadvantages
1) Complex design
2) Costly