

COMPUTER NETWORK  
LECTURE-23  
16/01/21

## Topologies -

Physical Types of Arrangement of network/wires and system -  
Topology -

1. Mesh
2. Bus
3. Star
4. Ring
5. Hybrid
6. Tree

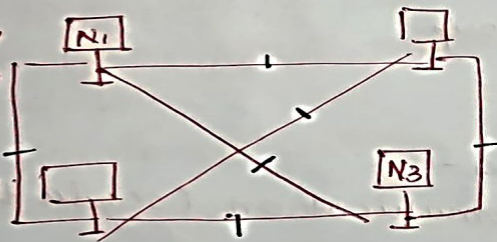
### Mesh Topology -

$n$  no. of nodes

$$= \frac{n(n-1)}{2}$$

$$= \frac{4 \times 3}{2} = 6 \text{ (No. of wires)}$$

$N_1$  has made dedicated node with  $N_3$  only in mesh topology.



### Links -

- (1) connection oriented  
↓  
I connection then data transfer
- (2) connection less -  
I data transfer then connection.

## Dropline - Bus Topology

We have different routes / links to reach any system and that is called Robust network - even if link fails, entire N/W does not fail.

- (1) Dedicated node is made.
- (2) Point to point connection is made.
- (3) Fault identification or fault isolation is made easily.
- (4) Speed is high.
- (5) Connection complexity is high.
- (6) Data loss is less and high privacy.
- (7) ~~Use~~ establish

### Disadv.

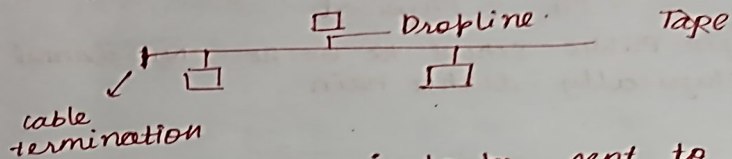
- (1) Long amount of cables & I/O ports are required.
- (2) Difficult in configuration

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## Bus Topology -

We cannot connect more systems on single network backbone. If there is disturbance at any point, entire network fails. Concept of pool selection is used. (Priority)



Advantage - If data is to be sent to less distance, it is fruitful. Header-source dest<sup>n</sup>

Resources limited -  
less maintenance  
less error  
less time delay, etc.

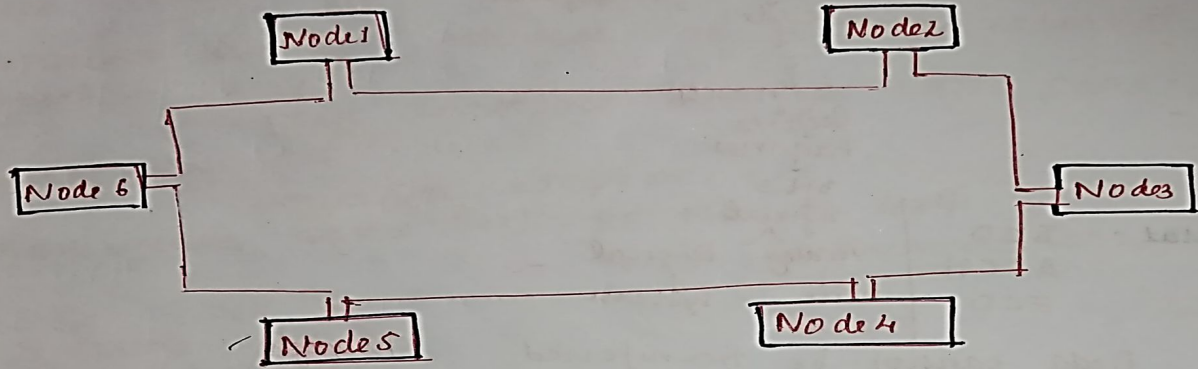
H | D | T

Drawback -

- ① If backbone cable disturbs, entire network fails.
- ② If more no. of systems are connected to network, (If heavy network is used) speed of data transfer decreases.
- ③ Difficult to add new node.
- ④ Signal reflection at the tapes can cause degradation in quality.
- ⑤ Error detection is tough. (Difficult in trouble shooting)

Coaxial cable is used.

## Ring Topology



- In ring Topology, each device is connected by a dedicated point to point connection to its adjacent device & forming a ring structure.
- Data transfer is in one direction.
- No termination is needed.

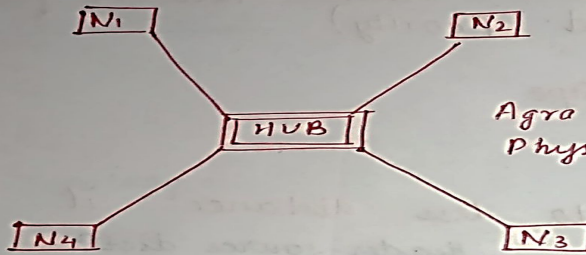
### Disadvantage.

- (1) Maximum ring length and no. of devices is limited.
- (2) Addition & removal of nodes is difficult.

### Advantage

If this topology fails, it behaves like bus topology.

## Star Topology



A - Application  
P - Presentation  
S - Session  
T - Transport  
N - Network  
D - Data  
Ph - Physical.

Agra Public School ke bache TND channel  
Physically dekhte hain.

- Network should be Robust but their is less connection complexity. So less I/O requirement
- consist of no. of devices connected by point to point link to central hub. It means devices are not connected directly to one another.

### Drawback -

- (1) More time delay.
- (2) If server fails, entire network fails.
- (3) There is privacy issue.
- (4) Configuration & installation is difficult.

### Advantage

- (1) Data can be managed in centralised way.
- (2) Error detection is easy.

(f) **Hybrid Topology:** It is a mixture of above mentioned topologies. Usually, a central computer is attached with sub-controllers which in turn participate in a variety of topologies.

### **Advantages of a Hybrid Topology**

- It is extremely flexible.
- It is very reliable.

### **Disadvantages of a Hybrid Topology**

- Expensive

- Talk. Token Ring uses a star topology.
- (c) **Tree Topology:** Tree topologies are comprised of the multiple star topologies on a bus. Tree topologies integrate multiple star topologies together onto a bus. As in a star topology, nodes in a tree are linked to a central hub that controls the traffic to the network. Not every computer plugs into the **central hub**, majority of them are connected to a *secondary hub*. The central hub is an active hub which contains repeater. The secondary hubs may be active or passive. Only the hub devices can connect directly with the tree bus and each Hub functions as a root of a tree of the network devices. This bus/star/hybrid combination supports future expandability of the computer networks, much better than a bus or star.

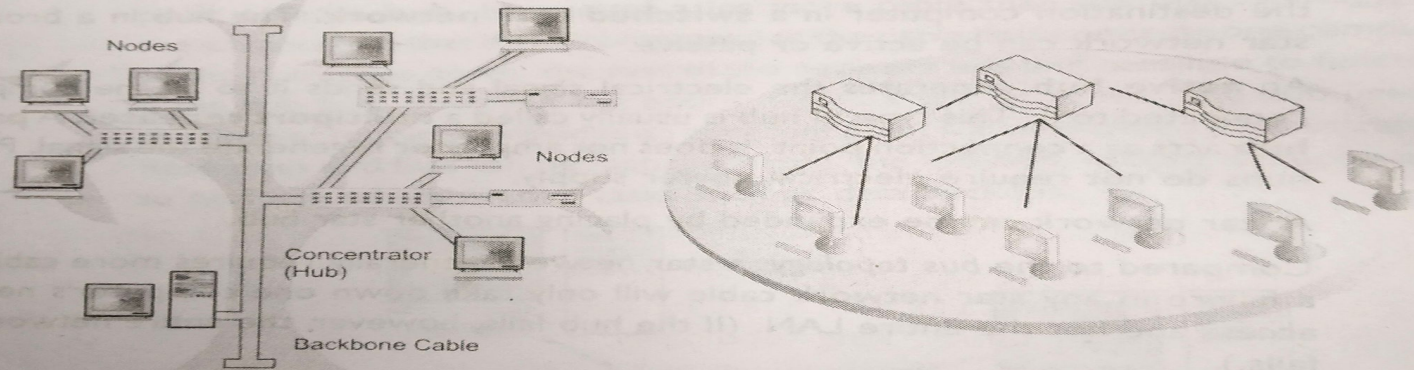


Fig. 1.12

### Advantages of a Tree Topology

- ❑ Point-to-point wiring for individual segments.
- ❑ Supported by several hardware and software vendors.