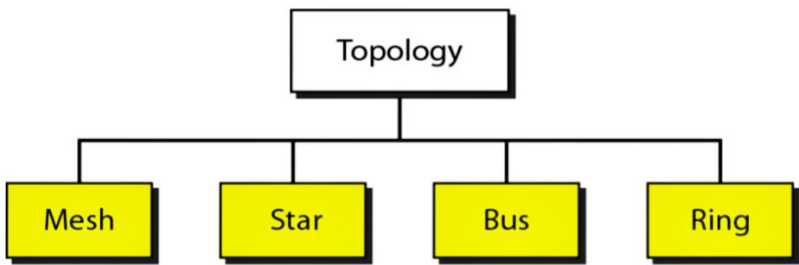


- The way in which a network is laid out physically.

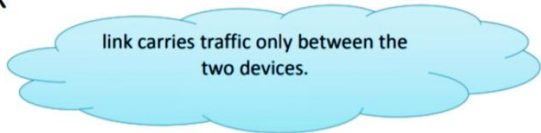


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Mesh Topology



- Every device has a *dedicated point-to-point* link with every other device on the network.
- How many links do we need in a network with N nodes?
 - Half duplex
 - Full duplex

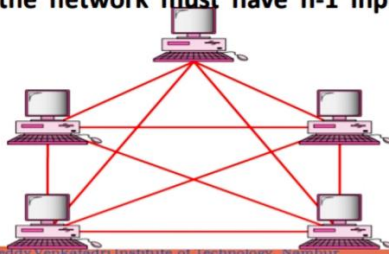


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Fully connected mesh topology (for five devices)



- Every device has a dedicated point-to-point link to every other devices
- Fully connected mesh network has $2n(n-1)$ physical connection to link n devices.
- Every device on the network must have n-1 input/output (I/O) ports



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Advantages of a Mesh topology



- **Privacy or security** (every message travels along a dedicated line, only the intended recipient sees it. Physical boundaries prevents other user from gaining access the message)
- **eliminating the traffic problems** The use of dedicated links guarantees that each connection can carry its own data load; that can occur when links must be shared by multiple devices.

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Advantages of a Mesh topology

- **A mesh is robust.** If one link becomes unusable, it does not incapacitate the entire system.
- **Fault identification and fault isolation easy.** This enables the network manager to discover the precise location of fault and aids in finding its cause and solution.

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Disadvantages of a Mesh topology

Related to the amount of cabling devices and the amount of I/O ports required:

- Every device must be connected to every other device, **installation and reconnection are difficult**
- The sheer bulk of the wiring can be greater than the available space can accommodate.
- The H.W required to connect each link (I/O ports and cable) expensive.

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Disadvantages of a Mesh topology

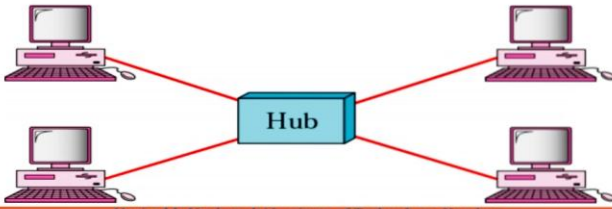
So a mesh topology is usually implemented in a limited fashion(as a backbone connecting the main computers of a hybrid network that can include several other topology

Star topology

VVIT

Each device has a dedicated point-to-point link only to a central controller (hub)

Unlike a mesh, a star topology **does not allow direct traffic between devices**, if one device want to send data to another, it send it to the hub, which send it to other device



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- The **star** pattern connects everything to a **host c**, a **network switch**, or a **hub**, which handles the tasks.
- All communications between computers go through the host/switch/hub.



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Advantages of a Star topology

VVIT

1. Easy to install and reconfigure and less expensive

- each device need only one link and I/O port to connect it to any other devices.)

2. Robustness:

- if one link fails, only that link affected and other links remain active.

3. Identification and fault isolation

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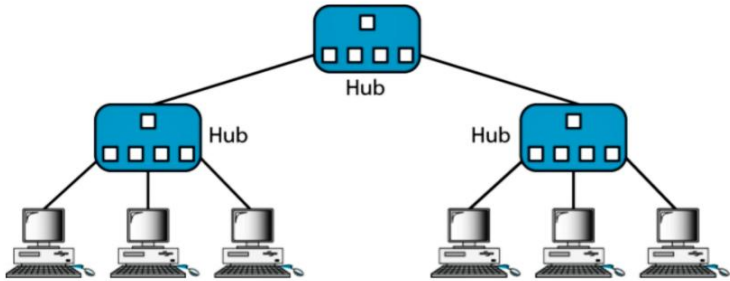
Disadvantages of a Star topology

VVIT

- The dependency of the whole topology on one single point, the hub. **If the hub goes down, the whole system is dead.**

Tree topology : Is a variation of star

- Not every device plugs directly into the central hub. The majority of devices connect to **secondary hub** that in turn is connected to the central hub.

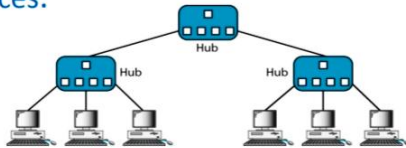


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Tree topology : Is a variation of star

The advantages and disadvantages of tree topology are generally the same as those of star .

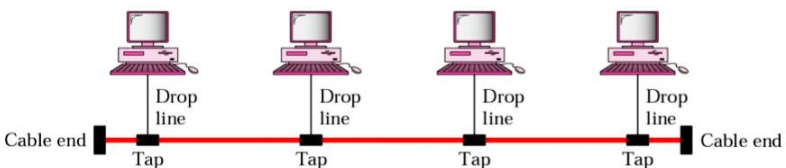
- The addition of secondary hubs bring more advantage: allows for more devices to be attached to a single central hub, therefore increase the distance a signal can travel between devices.



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Bus topology

- **Multipoint connection.** Acts as a backbone to link all the devices in a network.

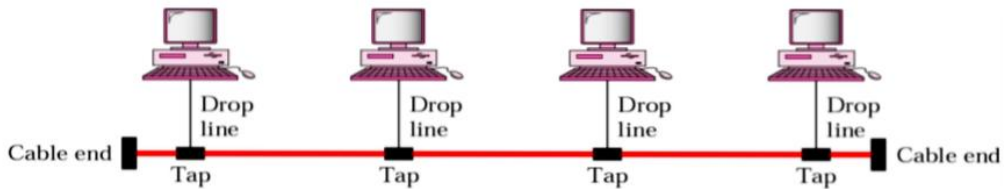


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- The **bus** pattern connects the computer to the same communications line. Communications goes both directions along the line. All the computers can communicate with each other without having to go through the server.



Bus topology



There is a limit on the number of taps a bus can support and on the distance between those taps

- *As a signal travels along the backbone, it becomes weaker*

Advantages of a Bus topology

Ease of installation, use less cabling than mesh or star.

Disadvantages of a Bus topology

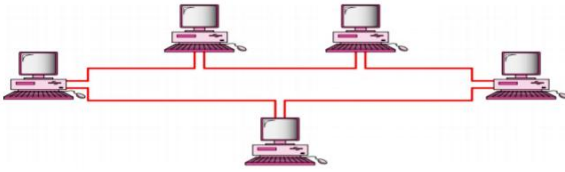
1. A fault in bus cable (break) stops all transmissions even between devices on the same side of the problem. The damaged area reflects signals back the direction of origin, creating noise in both directions

2. Reconnection

It can difficult to add new devices (adding more require modification or replacement of the backbone).

Ring Topology

- Each device has a *dedicated* point-to-point connection only with the two devices on either side of it
- A signal is passed along the ring in one direction from device until it reaches its destination.

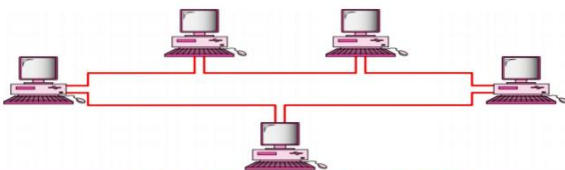


- The **ring** pattern connects the computers and other devices one to the other in a circle.
- There is no central host computer that holds all the data.
- Communication flows in one direction around the ring.



Ring Topology

- Each device in the ring incorporate as repeater
- **Repeater : regenerates the signal**
- **it receives a weakened signal, creates a copy, bit for bit, at the original strength**



Advantages of a Ring Topology

- **Easy to install and reconfigure.**

Each device is linked only to its immediate neighbors. To add or delete a device requires hanging only 2 connections

- **Fault isolation is simplified :**

A signal is circulating at all times (token) if one device does not receive a signal within specified period, it can issue an alarm. The alarm alerts the network operator to the problem and its location

Disadvantages of a Ring Topology



- **Unidirectional traffic.**

A break in the ring (such as disabled station) can disable the entire network. This can be solved by use dual ring