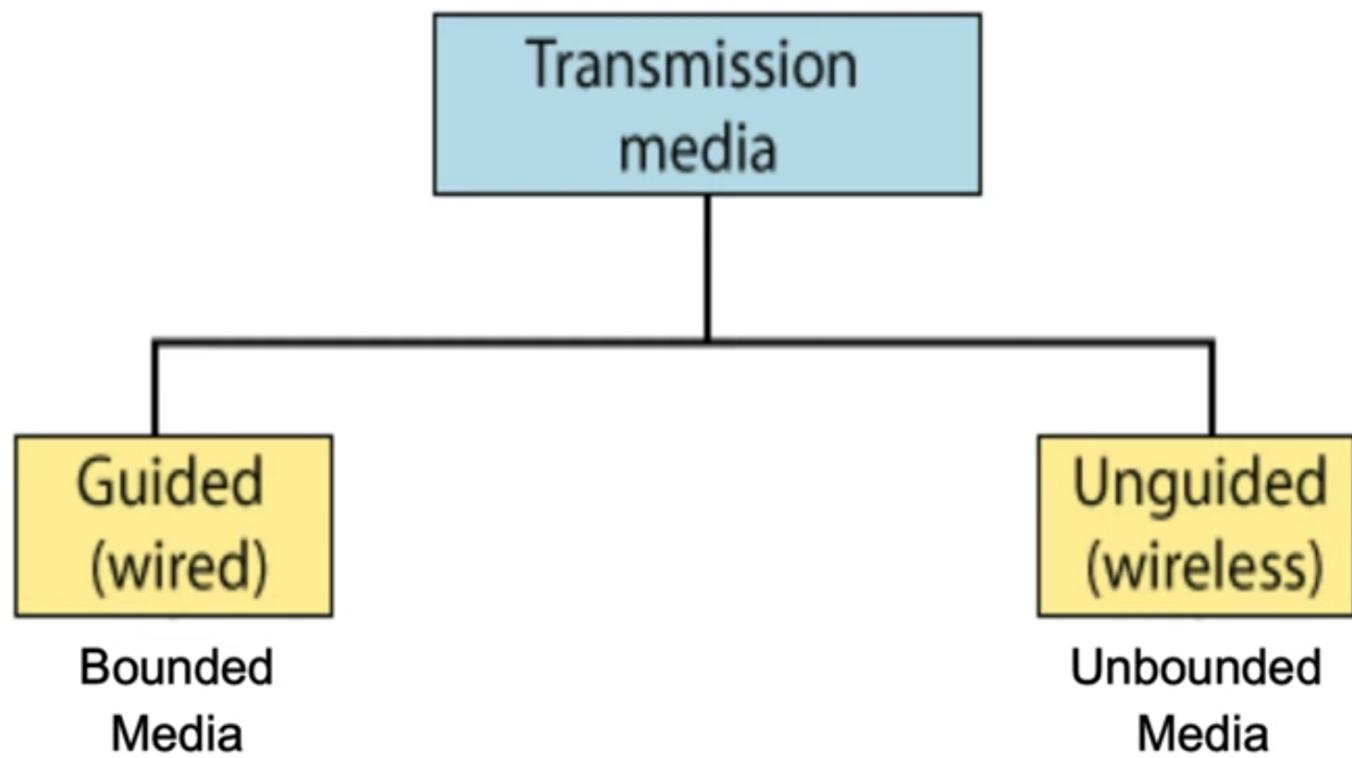
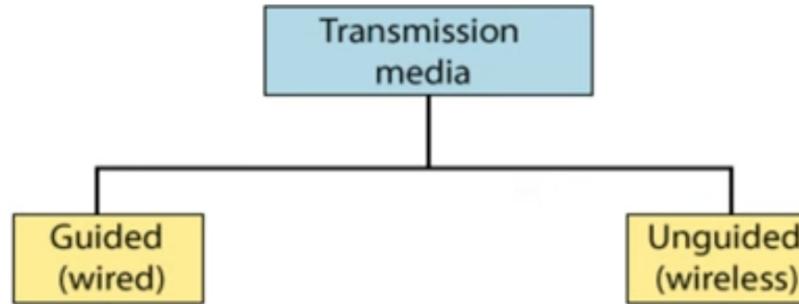


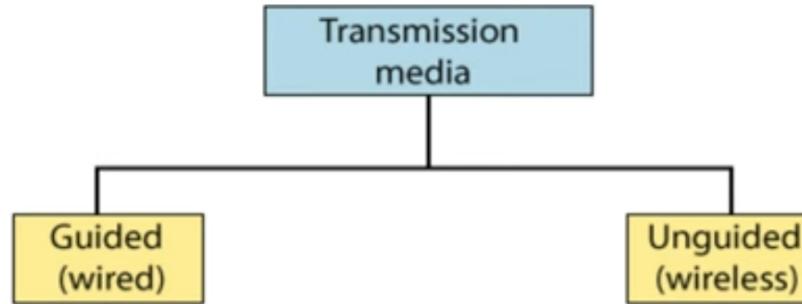
## Transmission Media

Transmission media, also known as a communication channel, is the physical path between the sender and receiver through which data bits are transmitted from the source to the destination. In simple words, when data is transferred from one device to another, it is transmitted through a medium or communication channel to reach its destination. This communication channel is referred as transmission media.



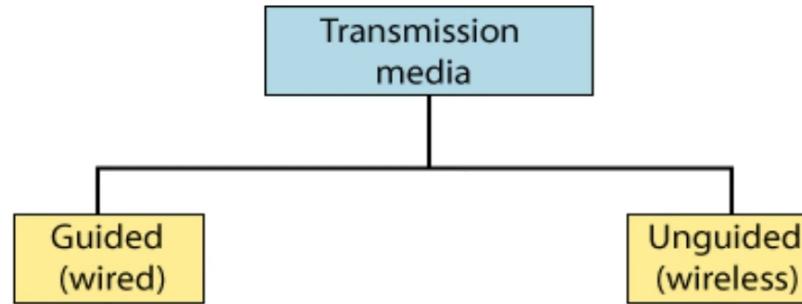


**Guided Media:-** Transmission media in which the connection between two devices is established through a physical method, such as a **cable or wire**, is referred to as wired transmission media or guided media. Wired media is also known as **bounded media** because it has a specific limit. Guided media enables the fast and secure transmission of data over short distances.



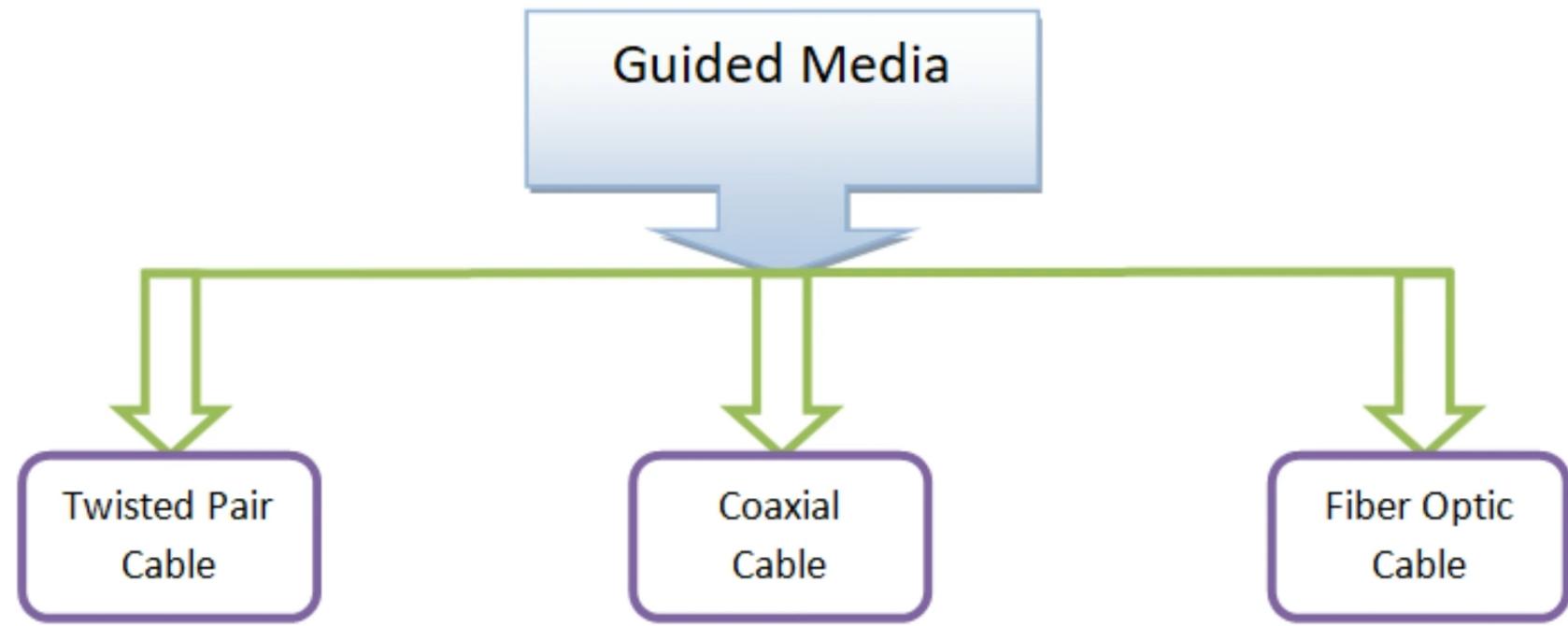
### Advantages of Guided Media:-

- Guided media facilitates the transmission of data at high speeds.
- Setting up and installing guided media is very easy.
- The cost of guided media is relatively low, and it is readily available.
- It is highly flexible and lightweight.

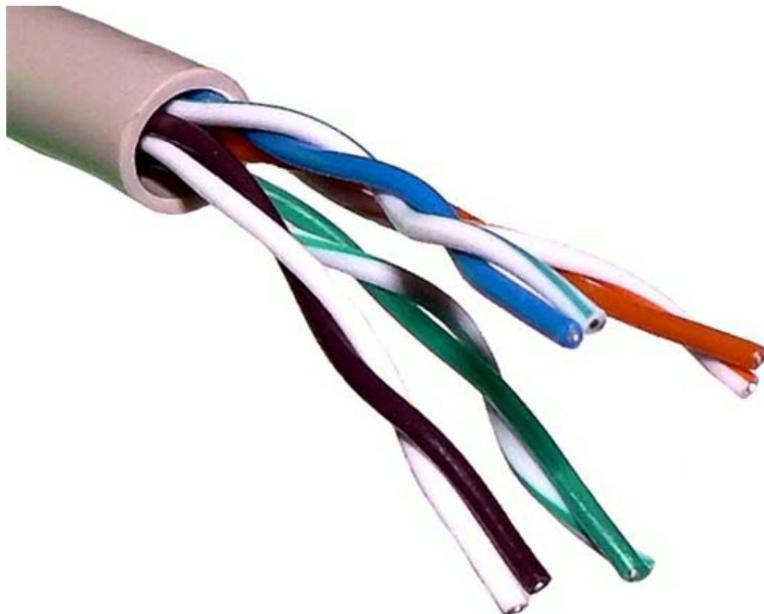


## Disadvantages of Guided Media:-

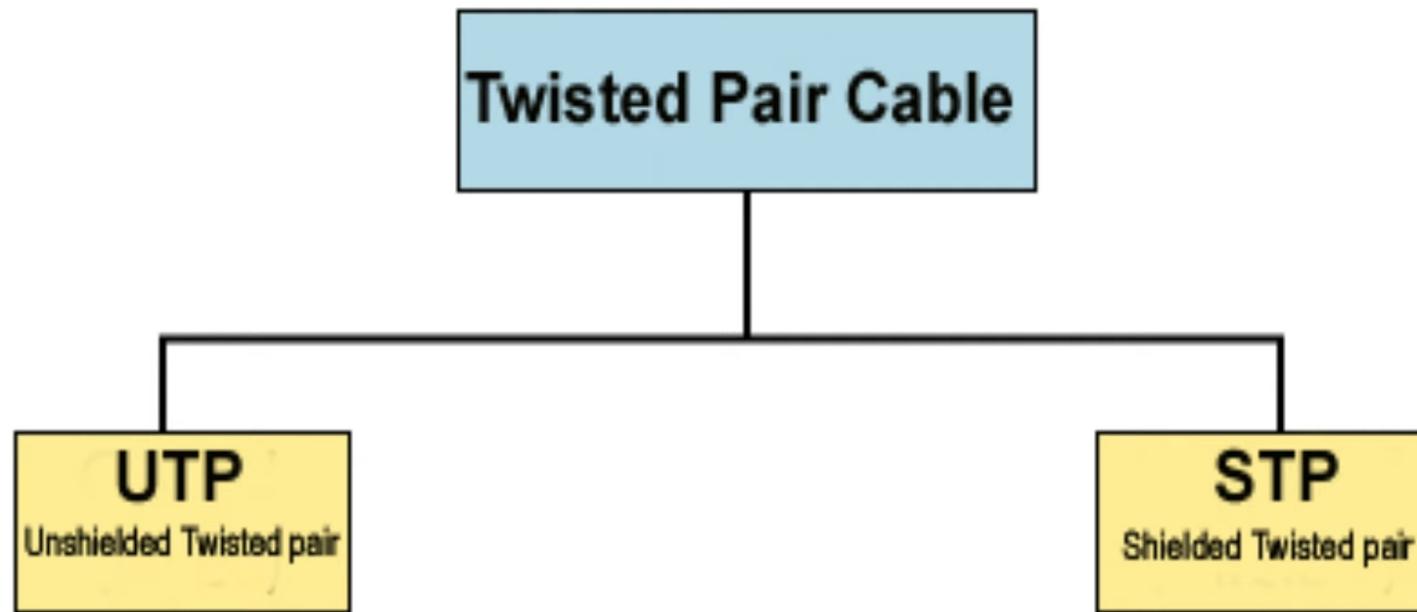
- Bandwidth is quite limited in guided media.
- Its maintenance and installation are expensive.



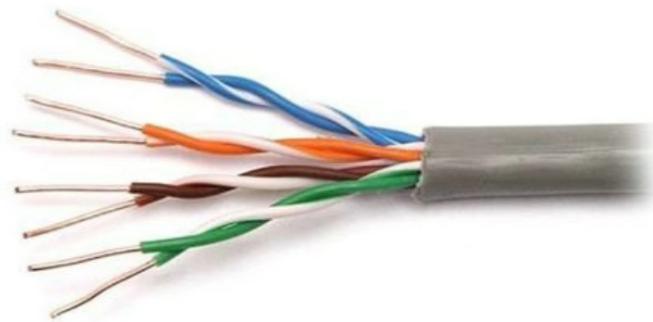
## 1. Twisted Pair Cable



A **Twisted Pair Cable** is a type of wire in which two wires are twisted together. This cable contains 4 pairs of wires encased in plastic, with each pair consisting of two wires twisted around each other. Each pair has a distinct color code. Twisted Pair Cable is the most widely used cable in LAN networks.



**UTP (Unshielded Twisted Pair)** - This is an Unshielded Twisted Pair Cable, which means it does not have any separate shielding or cover, as you can see in the image. This cable can typically transfer data from 1 Gbps to 10 Gbps over distances up to 100 meters.

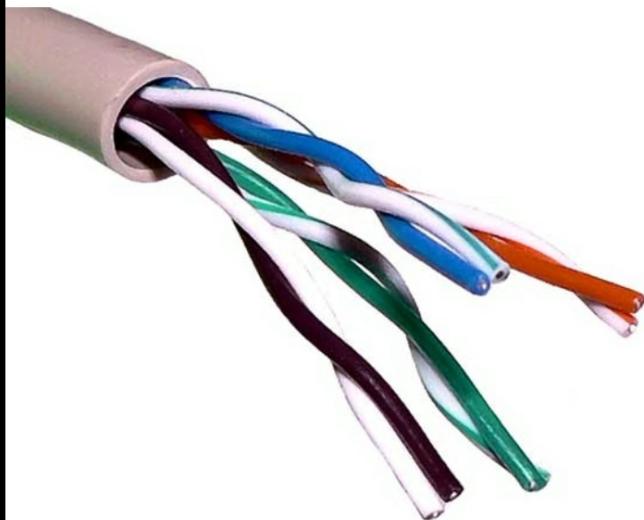


Unshielded Twisted Pair (UTP)

**STP (Shielded Twisted Pair)** - This is a Shielded Twisted Pair Cable. It includes an additional shield that enhances data security and increases data transfer speed.

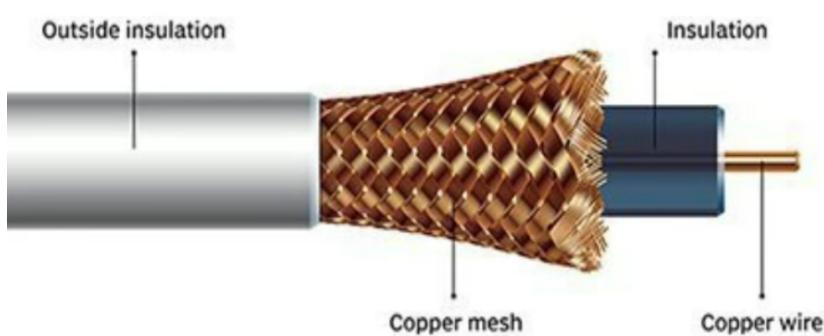


Shielded Twisted Pair (STP)



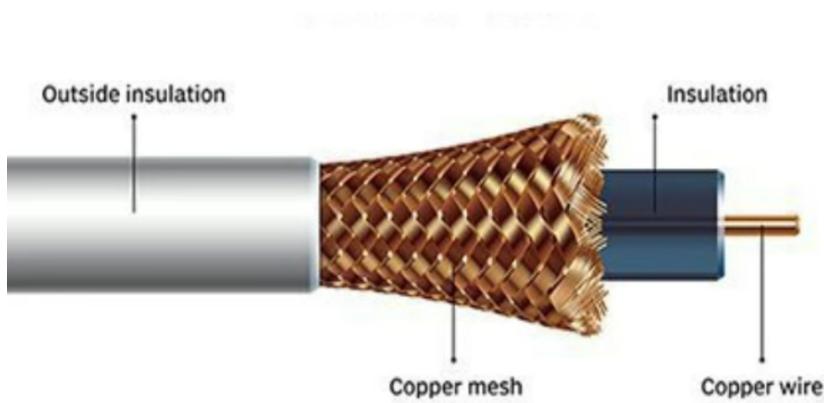
The Twisted Pair Cable is the most commonly used and cost-effective transmission medium compared to coaxial cable or optical fiber cable. However, with this cable, data transmission is limited to distances of no more than 100 to 150 meters.

## 2. Coaxial Cable



The **Coaxial Cable** is made from copper wire. It has insulation on top of the copper wire, and above that, there is a copper mesh made of brass. The data transmission range for this cable is up to 185 meters. Installing Coaxial Cable is easy, but it is quite flexible and relatively fragile, making it more prone to breakage. **Coaxial cable** is used for Cable TV, analog TV networks, and CCTV applications.

## 2. Coaxial Cable



Generally, two types of coaxial cables are commonly used. One is the **50-ohm cable**, which is used for digital transmission. The other is the **75-ohm cable**, which is used for analog transmission.

## Categories of Coaxial Cable

Coaxial cables are categorized by their Radio Government(RG) ratings.

<i>Category</i>	<i>Impedance</i>	<i>Use</i>
RG-59	75 $\Omega$	Cable TV
RG-58	50 $\Omega$	Thin Ethernet
RG-11	50 $\Omega$	Thick Ethernet

# Coaxial cables

## Connectors

### BNC Type connectors



BNC Connector

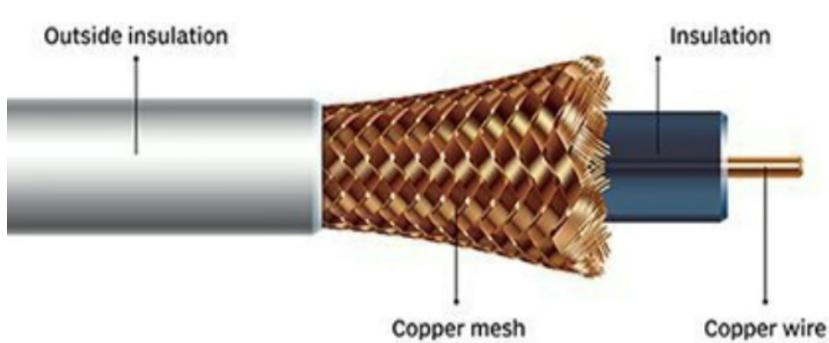


BNC-T Connector



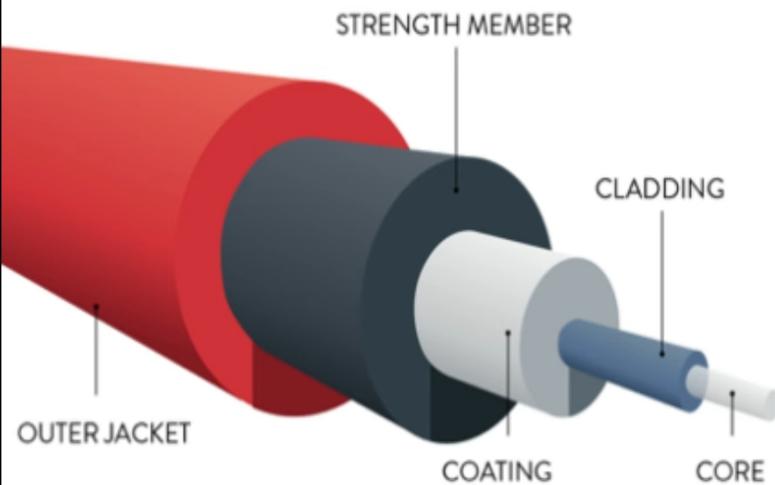
BNC Terminator

## 2. Coaxial Cable



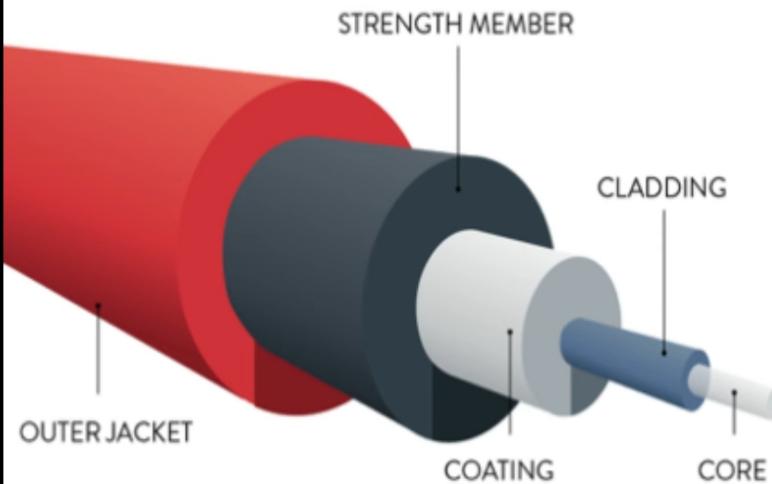
Coaxial cables are heavy in weight and, compared to other cables, they are the most expensive.

### 3. Optical Fiber Cable



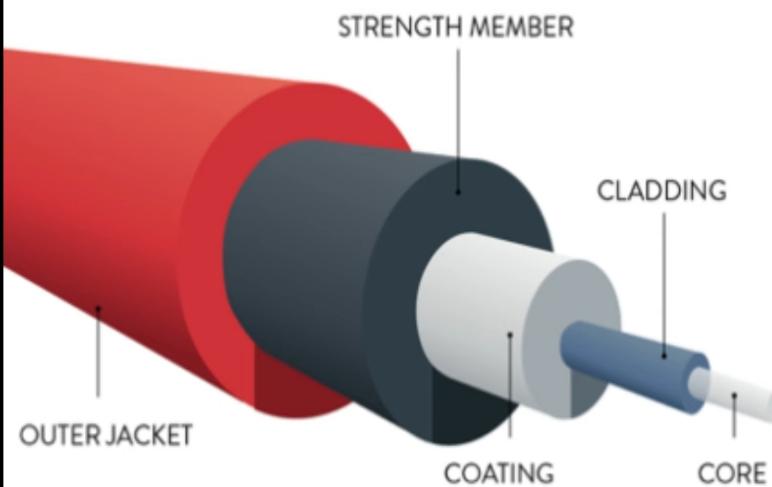
The Optical Fiber Cable is the fastest data-transferring medium. It is made from pure silica glass and was developed in 1970. Fiber optic cables have brought revolutionary changes to the world of the Internet. Today, all countries are interconnected through the Internet, where fiber optic cables play a significant role. Fiber optic cable is an advanced transmission medium used for high-speed and long-distance transmission of data.

### 3. Optical Fiber Cable

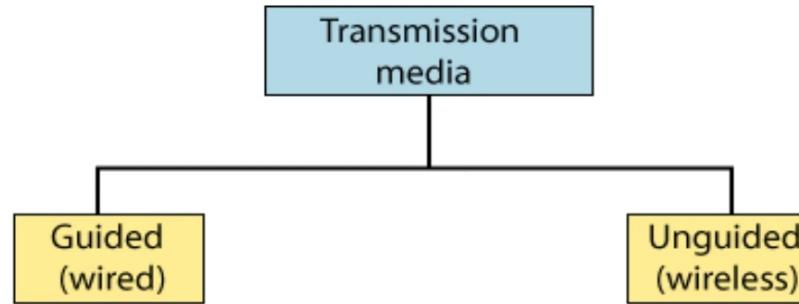


Until now, it remains the fastest cable in the world of networking for transferring data at high speeds. Another major feature of this cable is that it can transmit data at a 90-degree angle. The construction of this cable is such that it has a plastic jacket on the outside, and inside it, there are three different insulators: **strength member, coating, and cladding**. Inside these layers, there is high-quality glass or plastic that sends the signal to the d

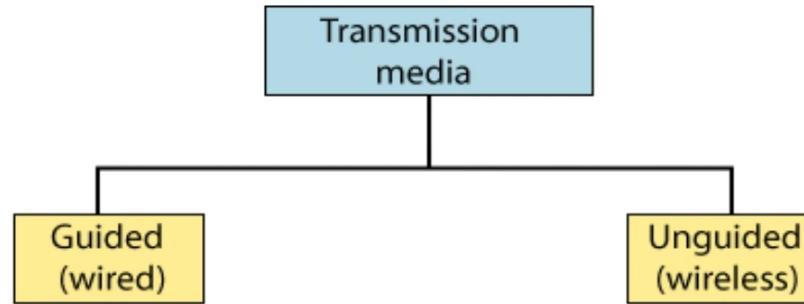
### 3. Optical Fiber Cable



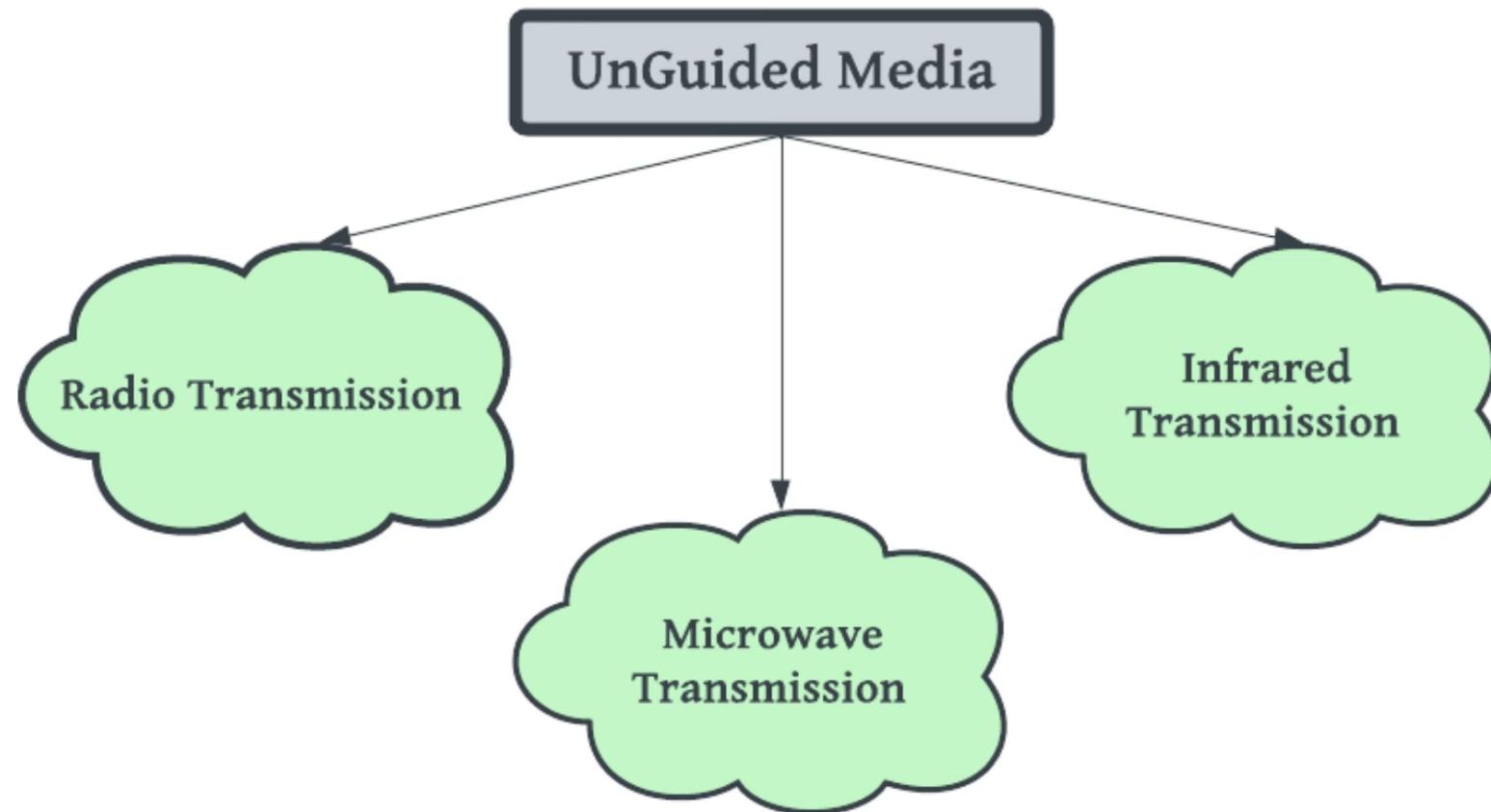
In this cable, data travels in the form of a light signal, and upon reaching the data destination, the light signal is converted into a digital signal. It is extensively used in submarine communications, meaning that Fiber Optic Cable is employed to connect the network of one country with that of another country, facilitating international network connectivity.

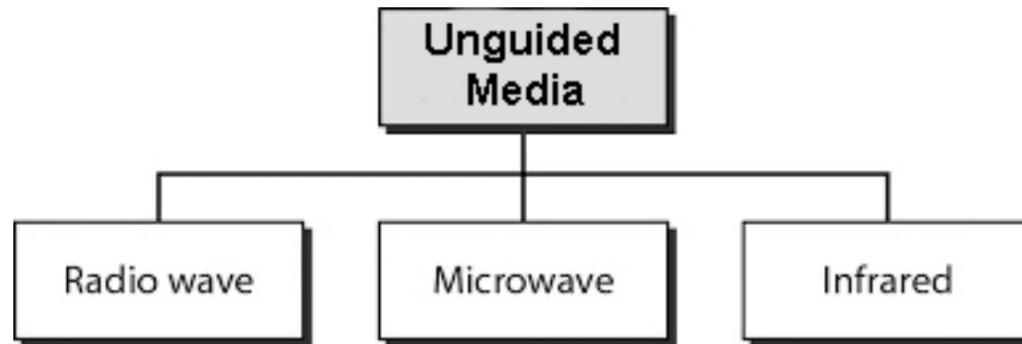


**Unguided Media:-** Transmission media in which no cable or wire is used for connection between two devices, meaning data is sent wirelessly from one device to another, is called unguided or wireless media. Wireless media is commonly used to send signals in all directions. It broadcasts electromagnetic waves without the use of any physical medium. It does not have any specific range, so it is also called **unbounded transmission media**.

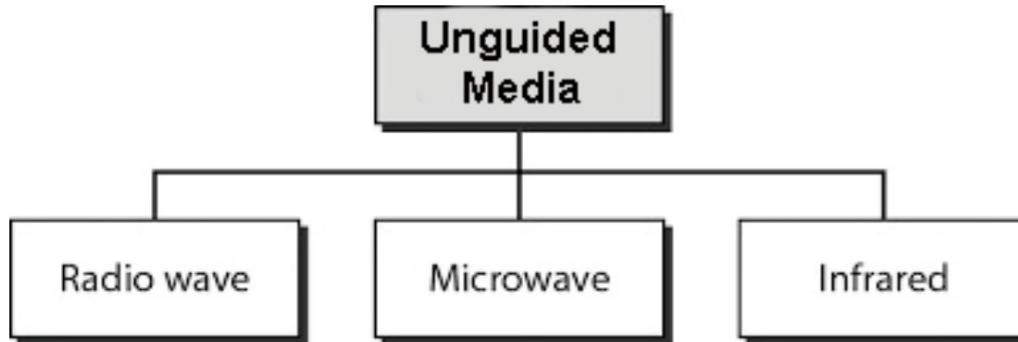


In unguided transmission, electromagnetic energy easily flows through the medium of air. Signals can be sent over **long distances** using this method, but the signal sent through it is **less secure**.

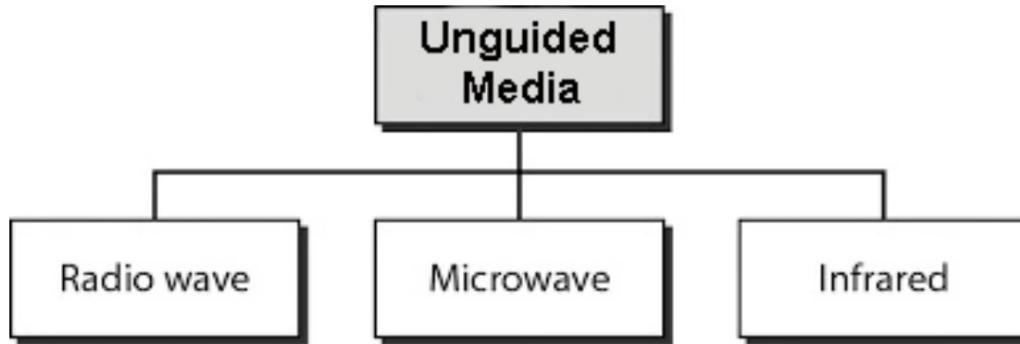




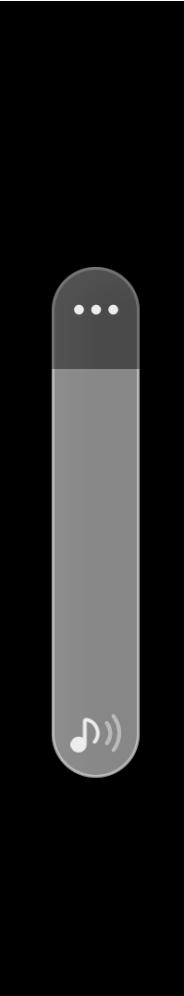
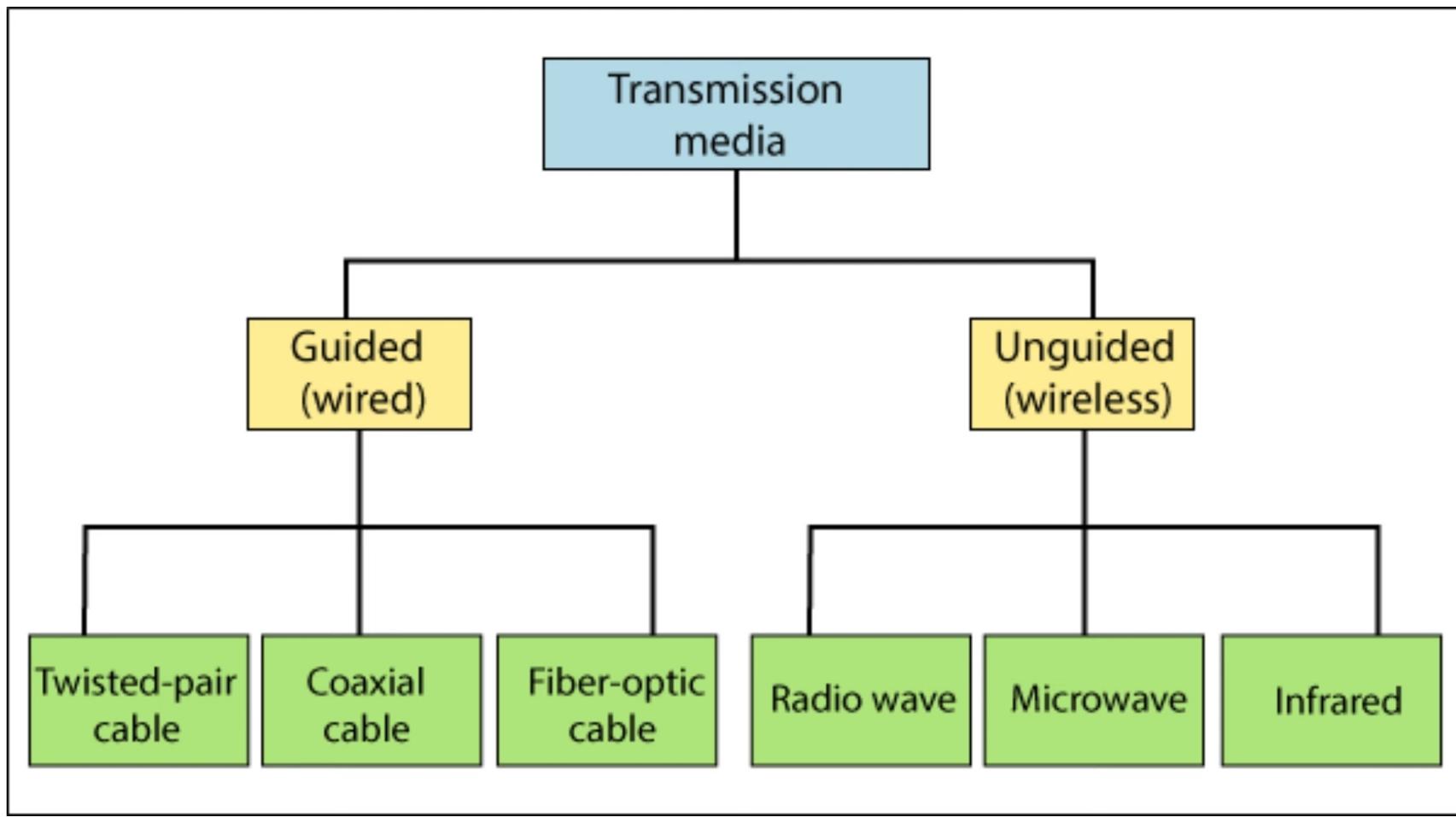
**Radio Waves:-** Generating and using radio signals is very easy. Radio waves are the electromagnetic waves that are transmitted in all the directions of free space. Its frequency range is typically 3KHz to 1GHz. Signals of this type are used in **radio and wireless phones**.



**Micro Waves:-** This type of signal is used in **mobile phone** communication and **TV networks**. The frequency range of microwave signals is up to 1GHz to 300GHz. The range of its signals also depends on the height of the antenna used in it. In microwaves, it is necessary to align the sender and receiver signals properly so that the signal can be transmitted correctly.



**Infrared Waves:-** Infrared waves are used for short distances, but the signal is hindered if there is any obstruction between two devices. The frequency range of infrared waves is up to 300GHz to 400THz. It is used in TV remotes, wireless mouse, keyboard, printer, etc.





## OSI Model

**OSI stands for Open System Interconnection.** It was developed by ISO – ‘International Organization for Standardization’, in the year 1984. It is a reference Model that explains the process of transmitting data between computers. In simple words, the OSI model provides a standard for different computer systems to be able to communicate with each other.

The OSI model is a reference model, meaning it is not used in real life but is only used as a reference.

## OSI Model



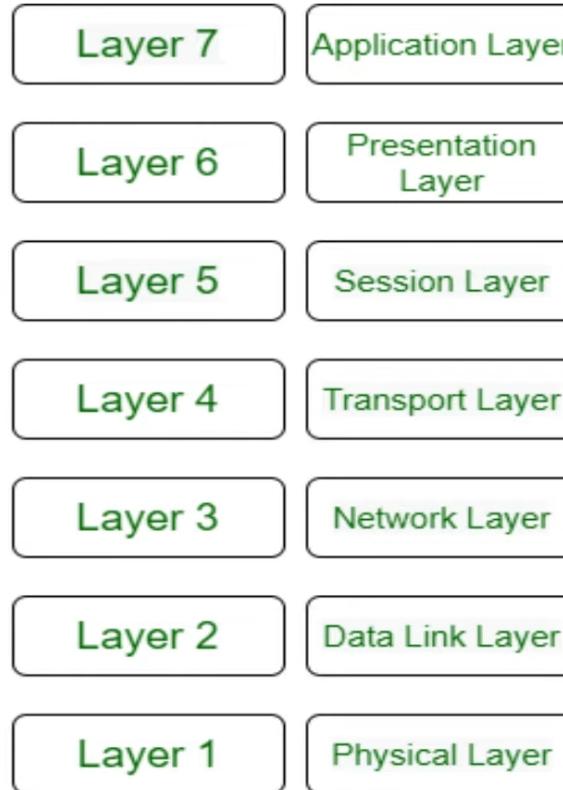
In the OSI model, there are 7 layers that work independently of each other when sending and receiving data. Each layer in the OSI model does not depend on the others, but data transmission occurs from one layer to another. Each layer in this model has its own specific function, making it possible for data to be easily transmitted from one system to another.

## OSI Model

The model is called the Open System Interconnection (OSI) because it allows communication between two different systems, making it possible for them to interact with each other.

# OSI Model

The OSI model consists of 7 layers, and each of these layers has its own function. These layers are not interconnected with each other; data transmission occurs from one layer to another.



In Hindi



## 7. APPLICATION

This layer provide the services to the user.



## 6. PRESENTATION

It is responsible for translation and compression.



## 5. SESSION

It is used to establish, manage and terminate the sessions.



## 4. TRANSPORT

It provides reliable message delivery from process to process.



## 3. NETWORK

It is responsible for moving the packets from source to destination.



## 2. DATA LINK

It is used for error free transfer of data frames.



## 1. PHYSICAL

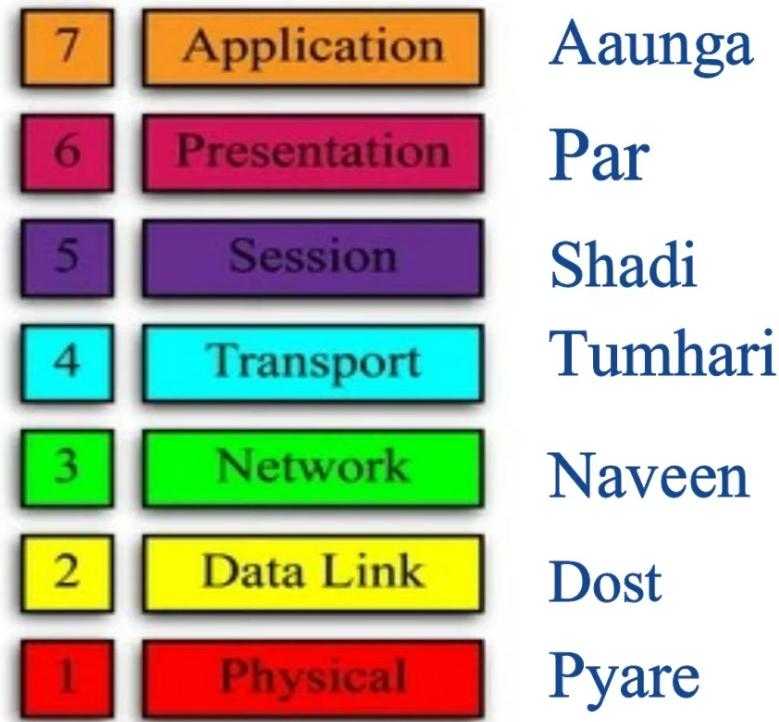
It provides a physical medium through bits are transmitted.

# OSI Model



Each of these layers has its specific functions, and within these layers, various protocols like **Data Encryption, HTTP, Logical Addressing, Ethernet, Binary Transmission** and many others work. These protocols are used to securely send and receive data from one system to another within a network.

## OSI Model



## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

### 1. Physical Layer

Physical layer is the bottom-most or the first layer of the OSI Model. It is responsible for the actual physical connection between the devices. This layer is responsible for converting digital signals into electrical signals and transforming data into its binary form (0 & 1). That's why this layer is also referred to as the Bit Unit Layer. This layer is also known as the Bit Unit Layer. This layer determines whether communication between two devices will be wired or wireless.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Physical Layer

- The physical layer explains how two or more devices are physically connected to each other.
- The physical layer also specifies which transmission mode will be used between two devices in the network. i.e. simplex, half-duplex, or full duplex
- This layer completes the task of network topology.
- This layer indicates the data rate, specifying how many bits will be transferred in one second.



## OSI Model



## 2. Data Link Layer

Data Link Layer is the second layer, and it is also known as the Frame Unit. In this layer, data packets sent by the Network Layer are decoded and encoded, and it also ensures that there are no errors in the data packets. In this layer, two protocols are used for data transmission.

1. HDLC (High level Data Link Control)
2. PPP (Point to Point Protocol)

The Data Link Layer is divided into two sublayers:

1. Media Access Control (MAC)
2. Logical Link Control (LLC)

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Data Link Layer

- This layer encodes and decodes data packets, these data packets are known as frames.
- It is responsible for adding headers and trailers to these frames.
- The primary function of the Data Link Layer is to perform flow control, maintaining a specific data rate from both the sender and receiver to prevent data corruption.
- This layer also manages error control.
- It handles access control when two or more devices are connected to a communication channel, determining which device is granted access.

## OSI Model



### 3. Network Layer

The Network Layer is the third layer in the OSI model, and it is also known as the Packet Unit. In this layer, switching and routing techniques are employed. The primary function of this layer is to assign IP addresses, to devices. In the Network Layer, the data is in the form of data packets, and the task of this layer is to facilitate the delivery of these data packets from one device to another.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Network Layer

- Its primary task is to provide IP addresses to devices.
- The main function of the Network Layer is to facilitate the delivery of data packets from one device to another.
- It adds the source and destination addresses to the header of data packets. These addresses are used to identify devices on the Internet.
- This layer is also responsible for routing. It determines the best path for data packets to travel.
- It also performs switching.
- The Network Layer is primarily responsible for inter - networking.

## OSI Model



### 4. Transport Layer

The Transport Layer is the fourth layer of the OSI model, and it is also known as the "Segment" layer. This layer is responsible for transferring data across the network correctly. It ensures that there are no errors in the data. It also makes sure that the data sent in a particular order is received in the same order. The Transport Layer is also known as the "end-to-end layer" because it provides a point-to-point connection for transferring data.

This layer offers two types of services:

1. Connection-oriented
2. Connectionless.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## 4.Transport Layer

Protocol used in Transport Layer:-

1. Transmission Control Protocol
2. User Datagram Protocol

## OSI Model



### 5.Session Layer

The Session Layer is the fifth layer of the OSI model, which controls connections between many computers. The Session Layer provides session management for communication between two devices. In simple terms, whenever a user opens a website, a session is established between the user's computer and the website's server. In other words, the main function of the Session Layer is to oversee how connections are established, maintained, and terminated.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Session Layer

- The primary function of the Session Layer is to establish, maintain, and terminate sessions between two devices.
- It also fulfills the task of synchronization, meaning that whenever an error occurs during transmission, the transmission is repeated.



## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

### 6. Presentation Layer

The Presentation Layer is the sixth layer of the OSI model and is also known as Translation Layer. The Presentation Layer presents data in a unified format between different systems that may have different data formats. It is also known as the syntax layer because it correctly maintains the syntax of the data.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Presentation Layer

- The Presentation Layer is used for encrypting and decrypting data.
- Its primary function also includes compression. Compression is crucial because it allows us to reduce the size of data.
- It also performs the task of translation.

## OSI Model



### 7. Application Layer

The Application Layer is the seventh and highest layer of the OSI model. Its primary function is to provide an interface between our real applications and the other layers. The Application Layer is closest to the end-user. Within this layer, protocols such as HTTP, FTP, SMTP, and NFS are used. This layer controls how applications access the network.

## OSI Model



7 APPLICATION



6 PRESENTATION



5 SESSION



4 TRANSPORT



3 NETWORK



2 DATA LINK



1 PHYSICAL

## Functions of Application Layer

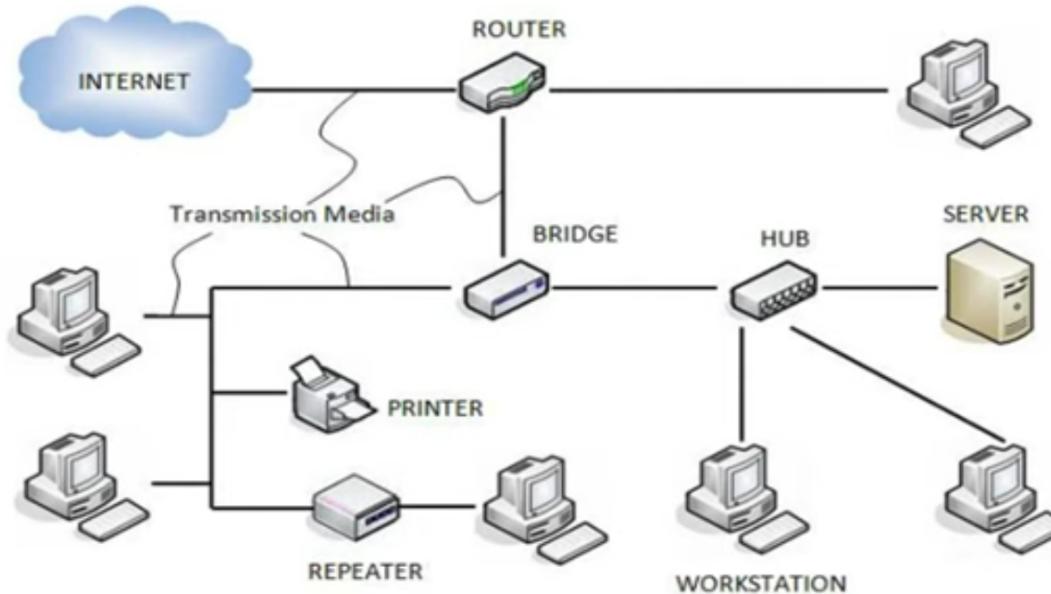
- Through the Application Layer, a user can access files from their computer.
- It also provides the capability to forward and store email.
- It allows us to access directories from a database

## Computer Network Components



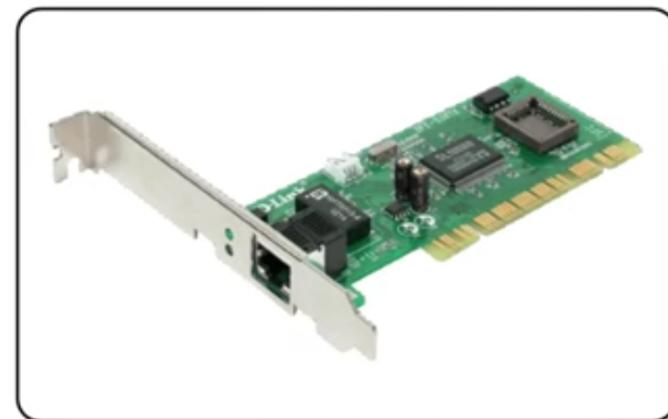
## Computer Network Components

Computer networks components comprise both physical parts as well as the software required for installing computer networks, both at organizations and at home.



## 1. Network Interface Card

NIC is a hardware component used to connect a computer with another computer onto a network. NICs are essential for computers to access and communicate with other devices on a network, including other computers, servers, routers, and switches. Without which a computer cannot be connected over a network. Even switches and routers use NICs to connect to the network.



**NIC**

MAC (**Media Access Control Address**) is known as a physical address is a unique identifier of each host and is associated with the NIC. With this MAC address, Computers connected to NIC can be recognized on the Internet.

## 1. Network Interface Card

### Types of NIC

1. Wired NIC
2. Wireless NIC

**1. Wired NIC:-** The Wired NIC is present inside the motherboard. Cables and connectors are used with wired NIC to transfer data.



**2. Wireless NIC:-** The wireless NIC contains the antenna to obtain the connection over the wireless network. Laptop, computer contains the wireless NIC.



## 2. Hub

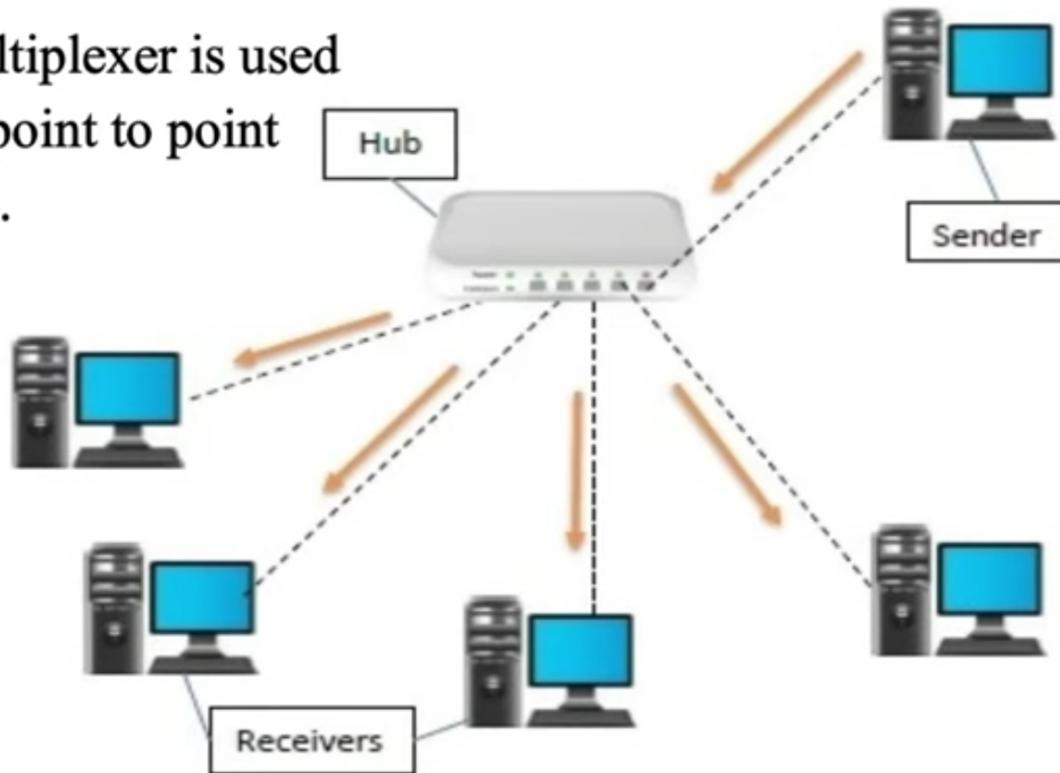
A hub is a hardware device in networking that is used to connect multiple computers. Hub is networking device that works on the first layer of OSI model i.e. physical layer. A hub has many ports in it. They are generally used to connect computers in a Local Area Network.



HUB

## 2. Hub

Digital multiplexer is used to make a point to point connection.



## 2. Hub

There are mainly three types of hubs:  
**Passive, Active, and Intelligent.**

**1. Passive Hub:-** A passive hub simply connects all devices together, without any signal amplification or regeneration. It has no power source and does not boost the signal.



HUB

**2. Active Hub:-**An active hub, also known as a powered hub, has a power source and can regenerate and amplify the signal.

## 2. Hub

There are mainly three types of hubs:  
**Passive, Active, and Intelligent.**

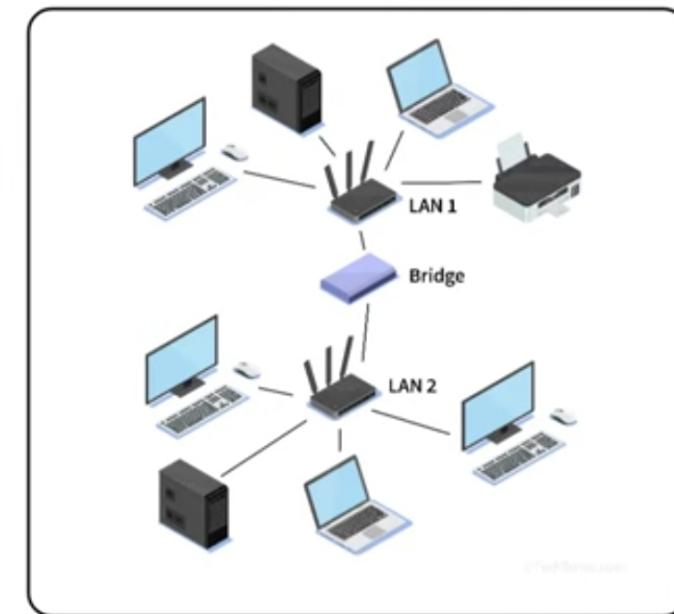
**3. Intelligent Hub:-** An intelligent hub, also known as a managed hub, provides additional features and capabilities beyond those of a passive or active hub. It can monitor and manage network traffic, prioritize data transmission, and provide network security features



HUB

### 3. Bridge

A bridge is a networking device or Components of computer network that connects two or more network segments together. A bridge operates at the Data Link layer of the OSI model. It is also known as Layer-2 Switch. The bridge has one input port and one output port. Bridge checks the destination address before sending the data, if the bridge finds the destination address then it sends the data otherwise it does not transmit the data.

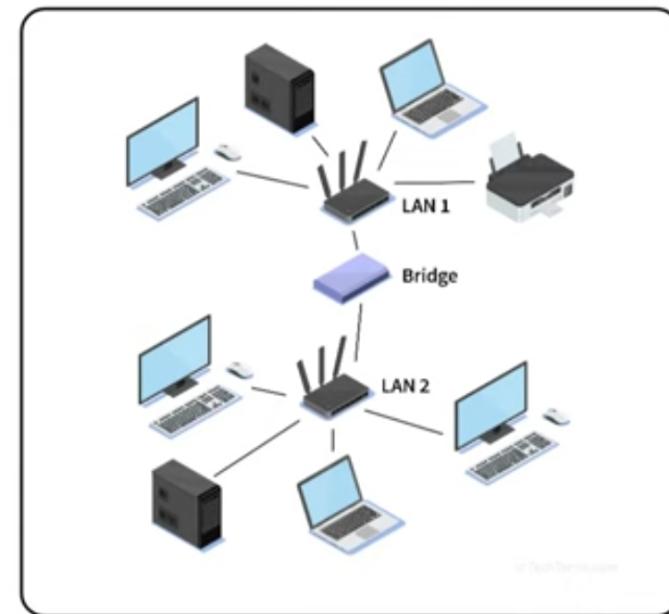


**BRIDGE**

### 3. Bridge

Types of Bridge:-

1. Local Bridge
2. Remote Bridge
3. Wireless Bridge



**BRIDGE**

## 4. Switch

A switch is a hardware device and It mainly resembles a Bridge. A Switch contains more advanced features than Bridge. Switch is a device that connects multiple devices on a computer network. A switch is a data link layer device. It operates at layer 2 or a data link layer of the OSI model.



**SWITCH**

When a data frame arrives at any port of a network switch, it examines the destination address, performs necessary checks and sends the frame to the corresponding device.

## 5. Router

A router is a hardware networking device of computer network that operates at the Network layer of the OSI model. It is used to receive, analyze and forward the incoming packets to another network. Router determines the best path from the available paths for the transmission of the packet. It is used to connect a LAN with an internet connection. Router uses Routing Protocol to transfer data in the network.



Router

Router is quite expensive as compared to other networking devices like switches and hubs.

## 5. Router

### Types of Router:-

- Wireless (Wi-Fi) router
- B-router
- Core router
- Edge router
- Virtual router



Router

## 6. Modem

Modem stands for Modulator-Demodulator. A modem is a networking device of computer network that is used to convert digital signal to analog signal and analog signal to digital signal. A modem converts digital signals from a computer or network into analog signals that can be transmitted over the telephone or cable line. When the analog signals reach the other end of the line, the modem on the other end converts the analog signals back into digital signals that can be understood by the receiving computer or network.



**Modem**

Modulation is the process of encoding information in a transmitted signal, while demodulation is the process of extracting information from the transmitted signal.

## 6. Modem

In simple words, A modem converts data into signals so that it can be easily sent and received over a telephone line, cable or satellite connection.

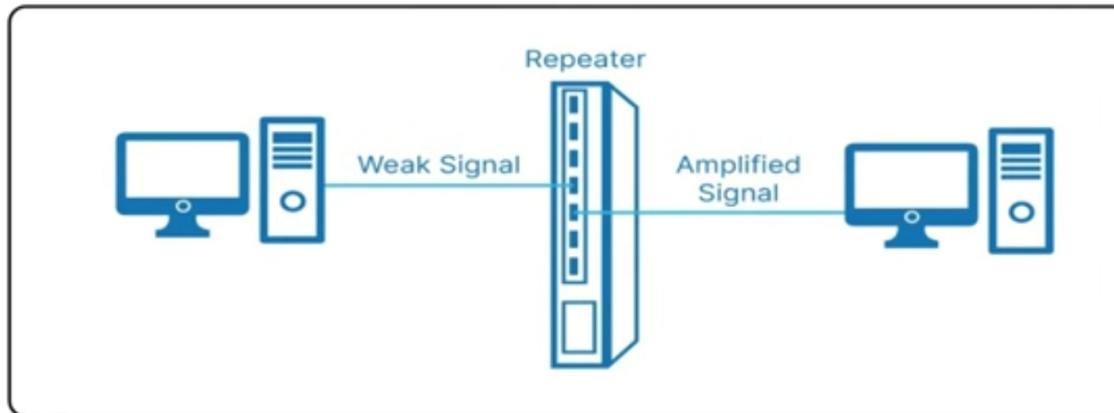
### Types of Modem:-

- 1. Internal Modem:-** As the name suggests internal modem is an internal part inside a computer.
- 2. External Modem :-**The external modem is an external part of the computer. It can be used when a computer is unable to fit an internal modem inside of it.



Modem

## 7. Repeater

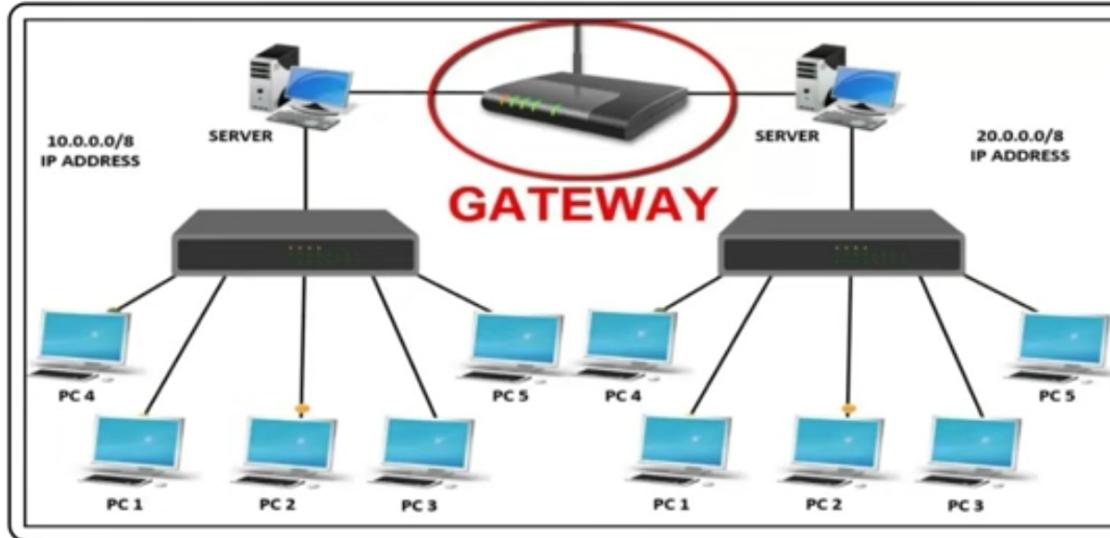


Repeater

A repeater is a network device that is used to boost up weak signals. Its function is to regenerate weak signals. If a signal travels for some distance, its intensity starts to drop. Here, a repeater can regenerate the same signal by copying it bit by bit.

A repeater does not amplify the signal, it simply copies and regenerates it.

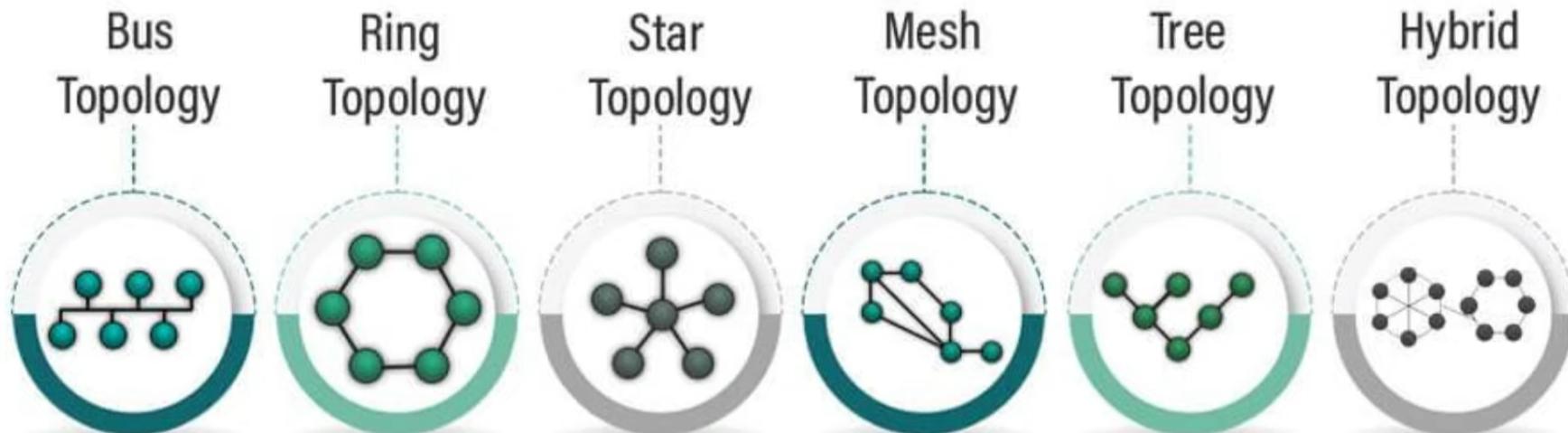
## 8. Gateway



Gateway

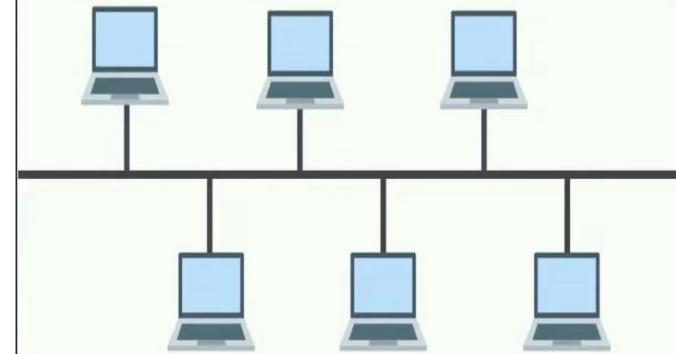
Gateway is located at the boundary of a network and it is one of the important network device. A gateway is used in telecommunications that connects two networks with different transmission protocols together. Gateways serve as an entry and exit point for a network as all data must pass through or communicate with the gateway prior to being routed.

# Types of Network Topology



## Network Topology

**Network Topology:-**The shape and layout of the network is called Topology. A Network Topology is the arrangement with which computer systems or network devices are connected to each other. The geometric arrangement of computers in any network is also known as Topology.



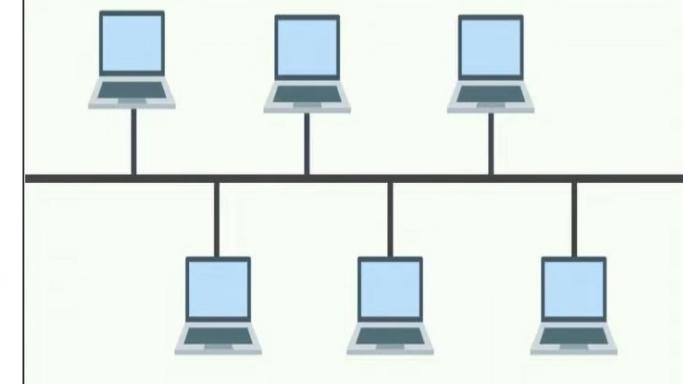
The word Topology is actually made up of two Greek words 'topo' and 'logy', where 'topo' means place and 'logy' means study.

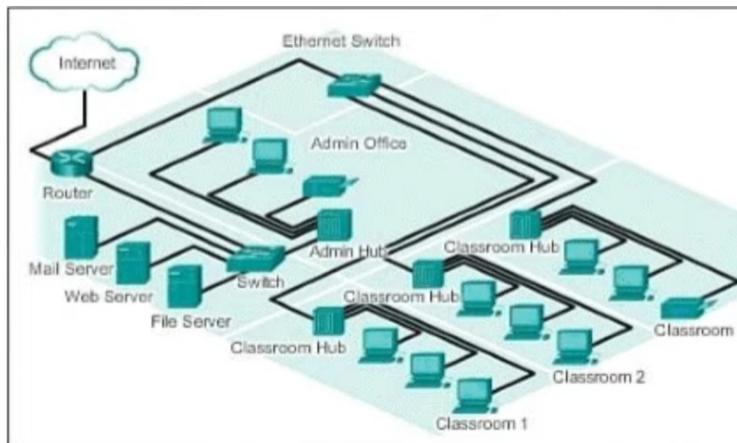
# Network Topology

Network topology refers to how various nodes, devices, and connections on your network are physically or logically arranged in relation to each other. There are two kinds of computer network topologies: physical and logical.

**Physical Topology:**- As the name suggests, refers to the physical connections and interconnections between nodes and the network the wires, cables, etc.

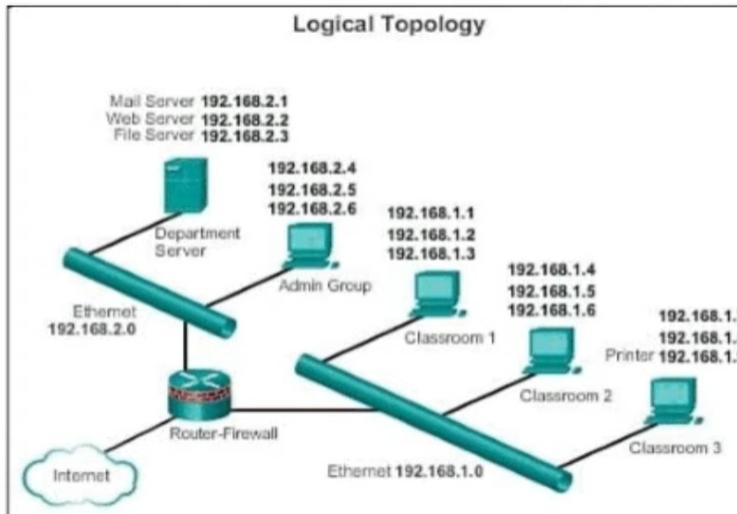
**Logical Topology:**- The process of data flow in the network is called logical topology. This is the way in which devices communicate internally.





## Physical Topology

is the physical layout of the components on the network

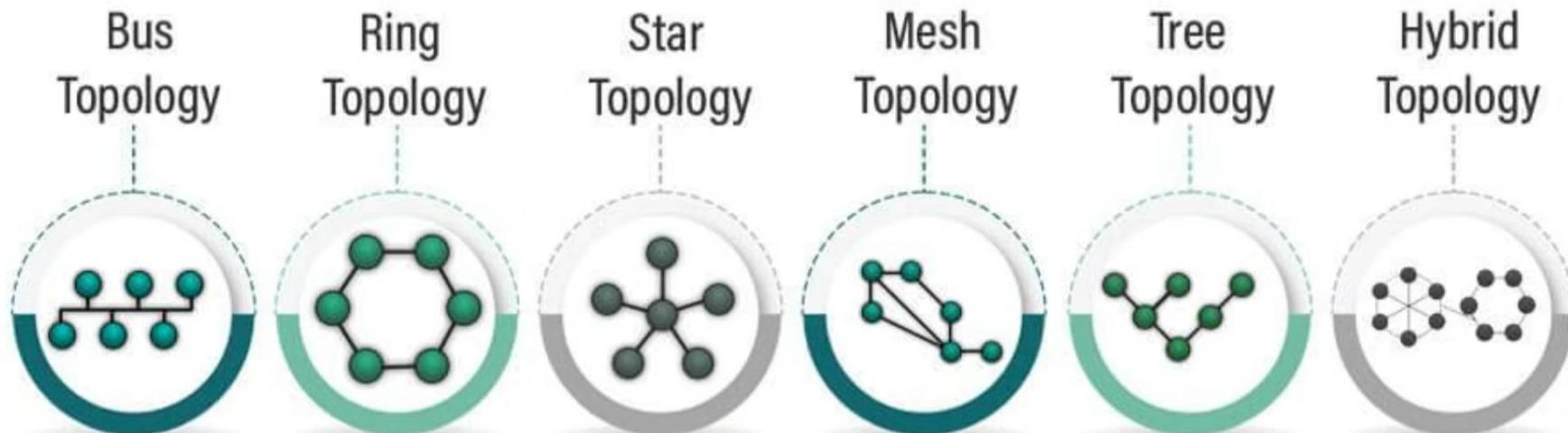


## Logical Topology

determines how the hosts access the medium to communicate across the network

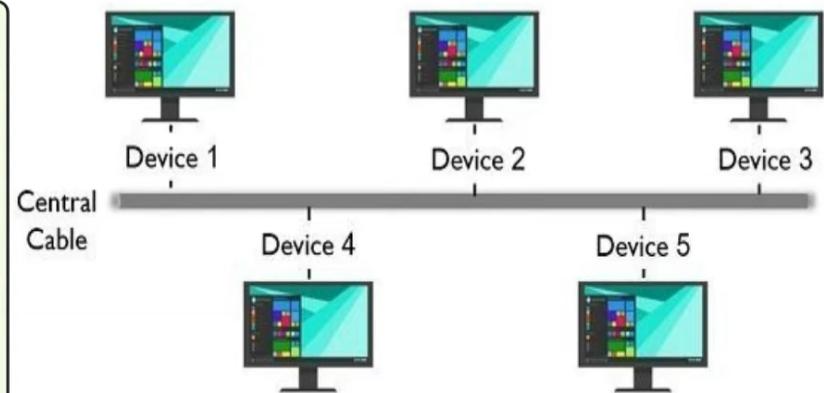


# Types of Network Topology



## 1. Bus Topology

Bus Topology is a network type in which every computer and network device is connected to a single cable. The backbone cable can be a coaxial cable or a twisted pair cable. All the nodes are linked using a single cable with a terminator on both ends. The main function of terminator is to control the signals.

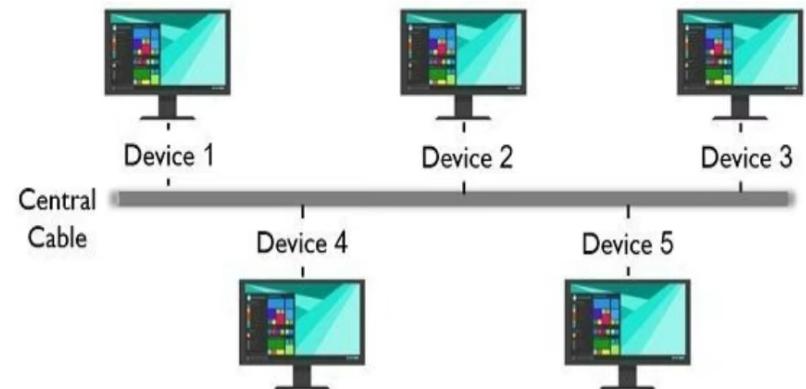


Bus Topology is also called linear topology and it is mostly used in small networks.

## 1. Bus Topology

### Advantages of Bus Topology

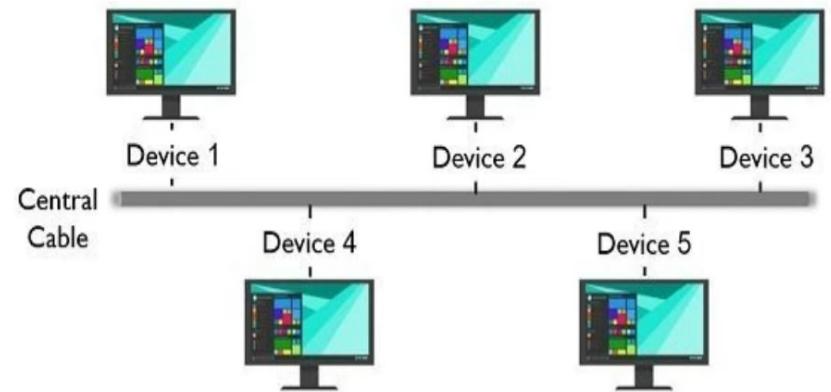
1. Bus topology is easy to install and cost-effective to set-up.
2. The cost of the cable is less compared to other topologies.
3. It is very easy to connect computers to the network.
4. A failure in one node will not have any effect on other nodes.



## 1. Bus Topology

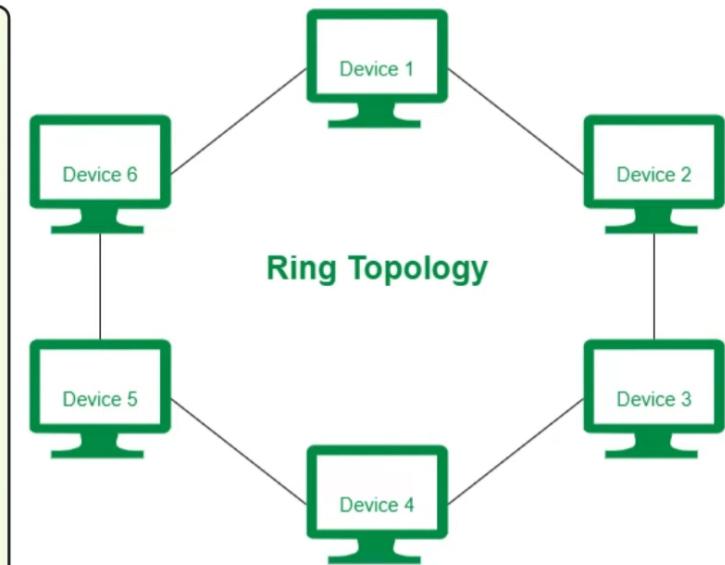
### Disadvantages of Bus Topology

1. If the common cable fails, then the whole system will crash down.
2. As the number of devices increases, the network performance can slow down.
3. It is not suitable for big networks.
4. The data is sent in only one direction.



## 2. Ring Topology

Ring Topology is a topology in which each computer is linked to another in a circular or ring-like pattern, which forms a closed loop. The last computer is linked to the first, forming a ring. This topology enables each computer to have exactly two neighbors. If someone wants to send some data to the last node in the ring topology , then the data will have to pass through all nodes to reach the last node. Hence to prevent data loss repeaters are used in the network.

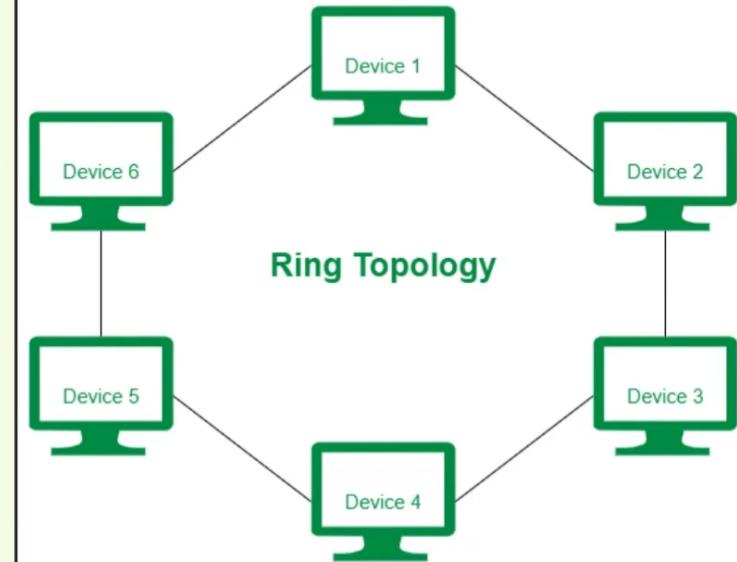


Ring topology is like a bus topology, the data flows in one direction. Ring topology has no end because every computer in it is connected to each other.

## 2. Ring Topology

### Advantages of Ring Topology

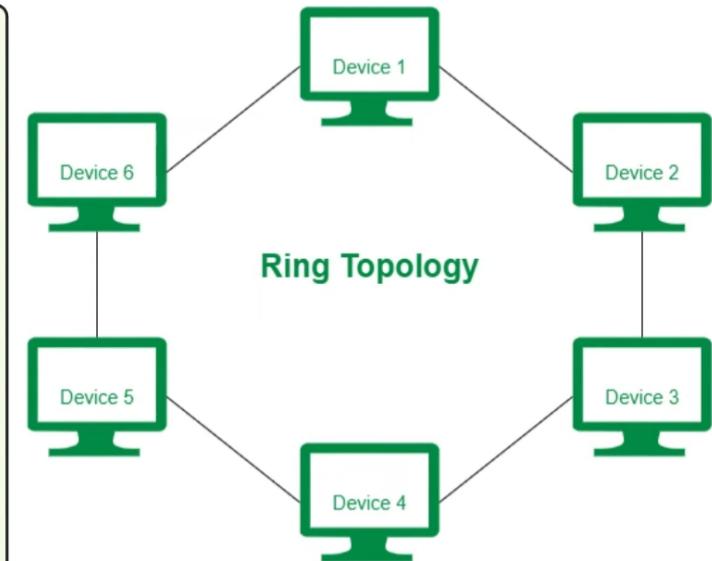
1. Twisted pair cabling is inexpensive and easily available.
2. Faulty devices can be removed from the network without bringing the network down.
3. A dual ring topology has two rings instead of a single ring. The secondary ring provides redundancy in case of a failure in first ring.
4. It is a more reliable network because the communication system is not dependent on the single host computer.



## 2. Ring Topology

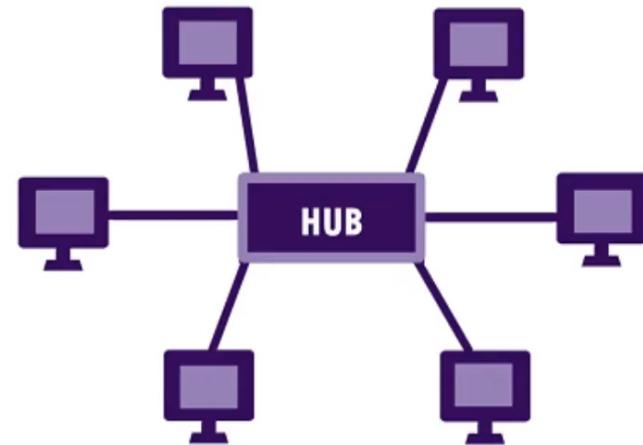
### Disadvantages of Ring Topology

1. The breakdown in one computer leads to the failure of the overall network.
2. Troubleshooting is difficult in this topology
3. Adding new devices to the network would slow down the network. Its speed depends on the computer connected to the network.



### 3. Star Topology

In this type of topology all the computers are connected to a central device known as hub through a cable. Star topology is the most popular topology in network implementation. The central computer is known as a server, and the peripheral devices attached to the server are known as clients.

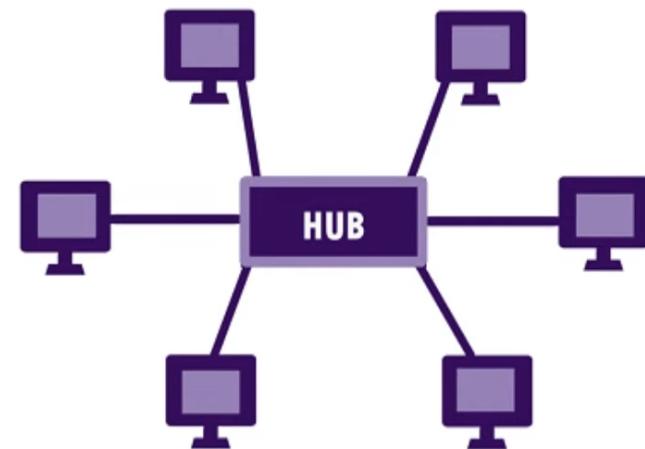


If the central hub or switch goes down, then all the connected nodes will not be able to communicate with each other.

### 3. Star Topology

#### Advantages of Star Topology

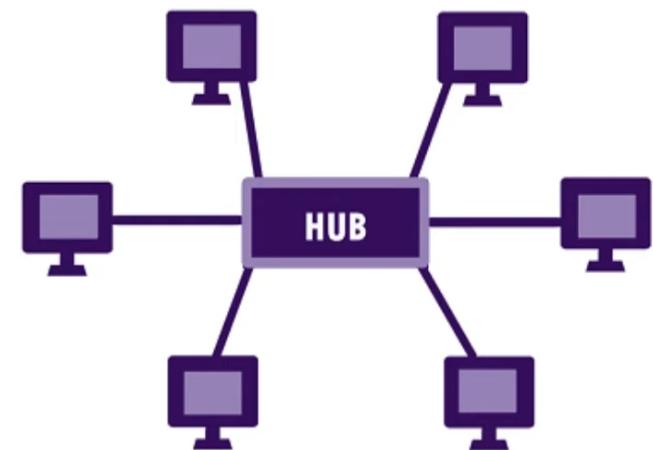
1. Star Topology is easy to install and manage.
2. Each device in a star topology connects to the central hub with a separate cable, which means that if one cable or device fails, it will not impact the rest of the network.
3. This topology makes adding, deleting, and moving devices simple. This does not affect its speed.



### 3. Star Topology

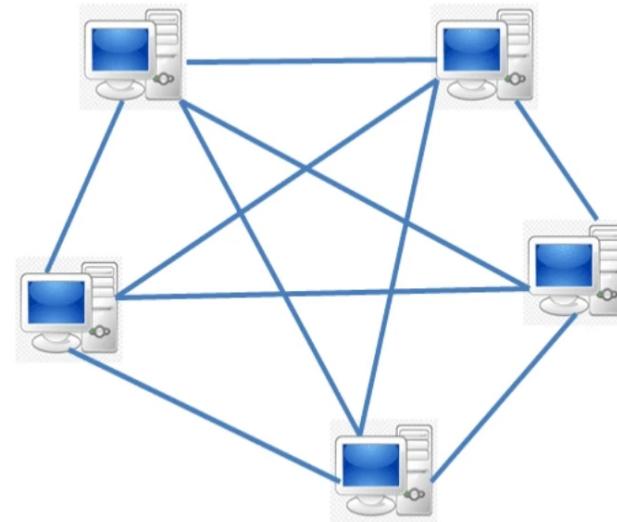
#### Disadvantages of Star Topology

1. If the hub on which the whole topology relies fails, the whole system will crash down.
2. The cost of installation is high.



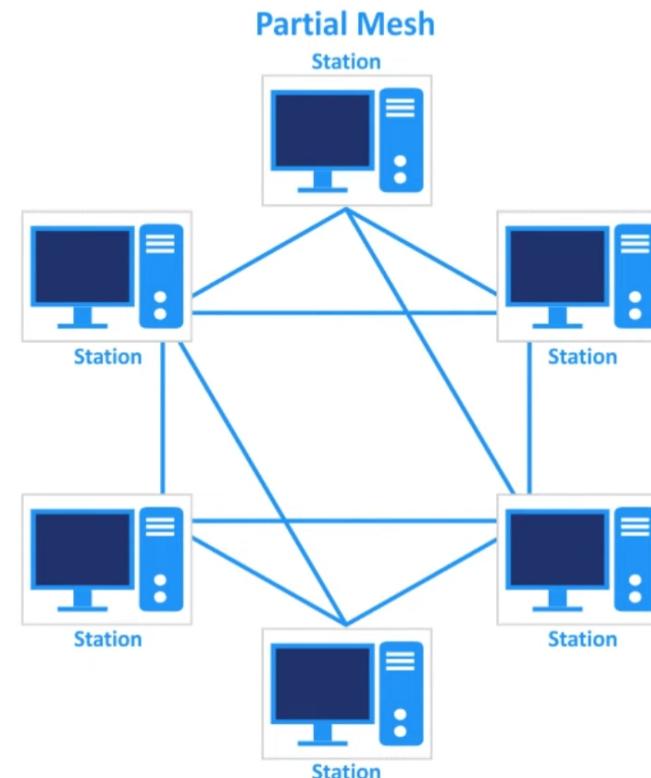
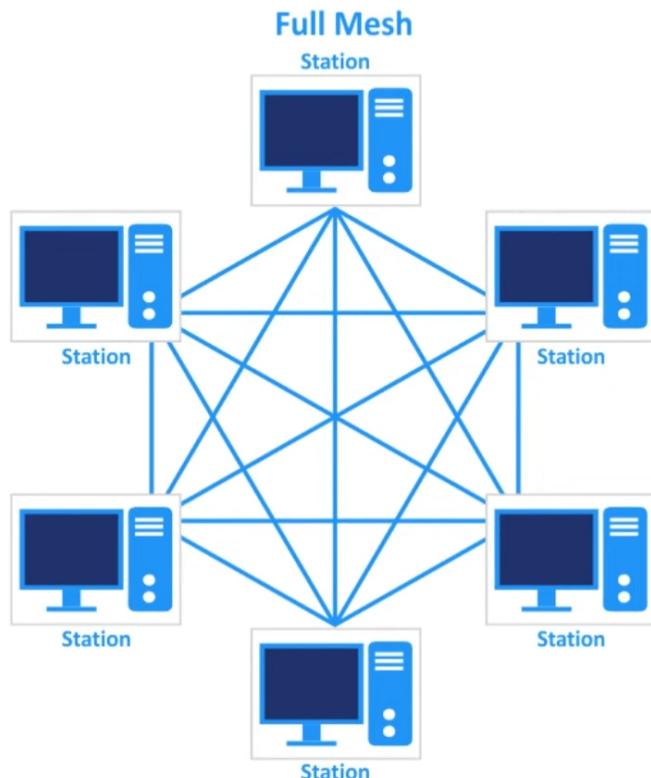
## 4. Mesh Topology

Every Computer in a mesh topology is linked to every other computer. There are multiple paths from one computer to another computer. In this, two computers can communicate directly with each other. It does not contain the switch, hub or any central computer which acts as a central point of communication.



Mesh Topology is of Two Types: 1. Full Mesh    2. Partial Mesh

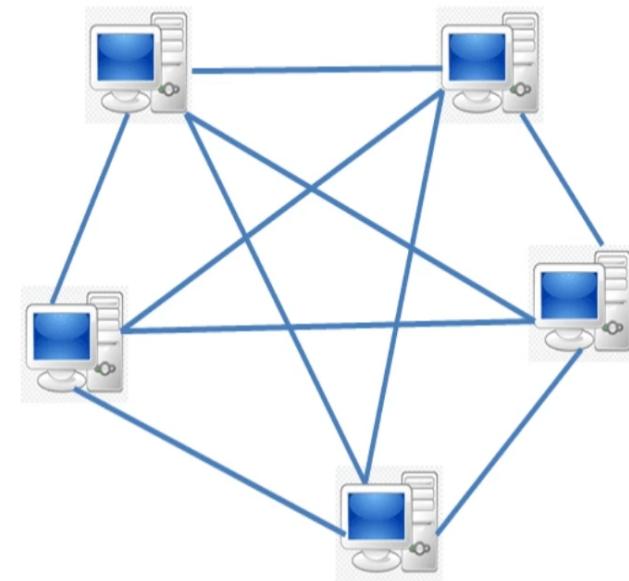
## 4. MeshTopology



## 4. Mesh Topology

### Advantages of Mesh Topology:-

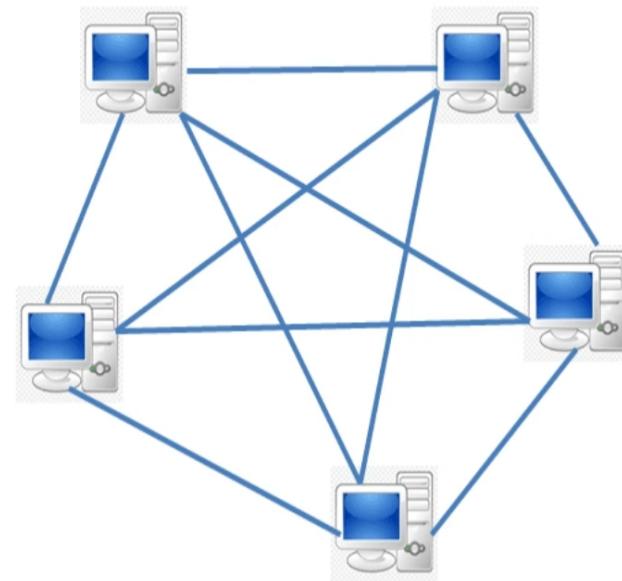
1. The mesh topology networks are very reliable.  
It Provides security and privacy.
2. If any link breakdown will not affect the communication between connected computers.
3. Communication is very fast between the nodes.
4. Communication is easy in this topology.



## 4. Mesh Topology

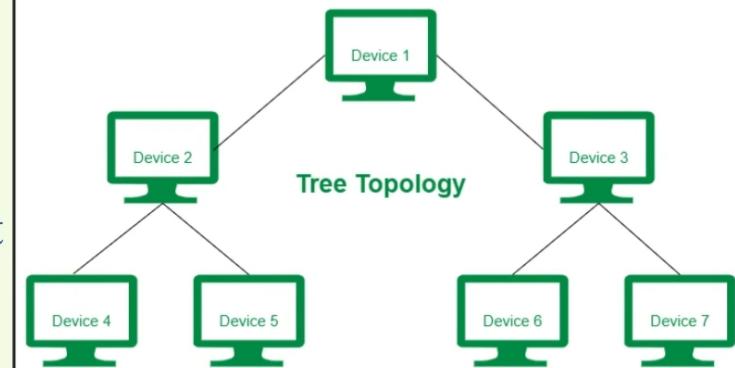
### Disadvantages of Mesh Topology:-

1. Mesh topology networks are very large and very difficult to maintain and manage.
2. The cost of maintenance is high.



## 5. Tree Topology

A tree topology is a type of structure in which all the computers are connected with each other in hierarchical fashion, that resembles a tree. The top-most node in tree topology is known as a root node, and all other nodes are the descendants of the root node. Tree topology combines the characteristics of bus topology and star topology.

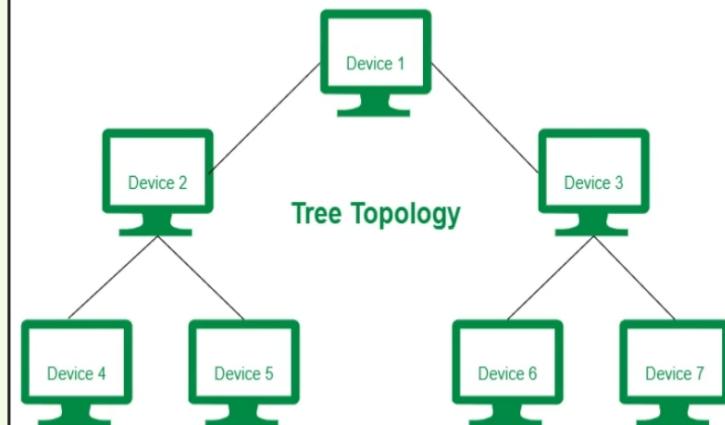


In this topology, there is a main host computer like star topology and all the local computers are connected to the same cable like bus topology.

## 5. Tree Topology

### Advantages of Tree Topology:-

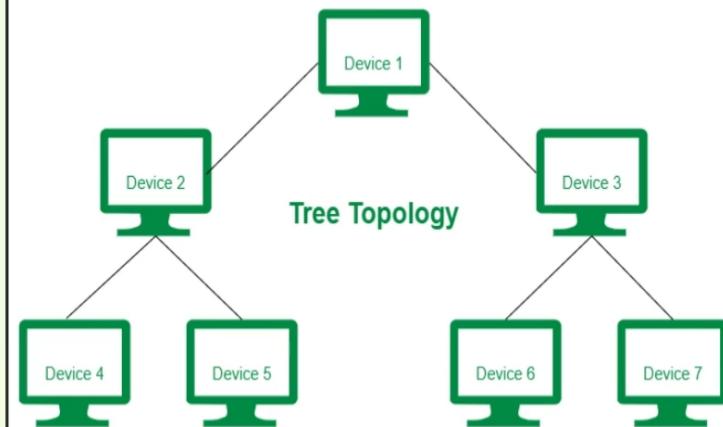
1. It is very easy to manage and maintain the network.
2. Error detection and error correction are very easy in a tree topology.
3. This topology is reliable and secure and it is very easy to expand this topology.
4. The breakdown in one station does not affect the entire network.



## 5. Tree Topology

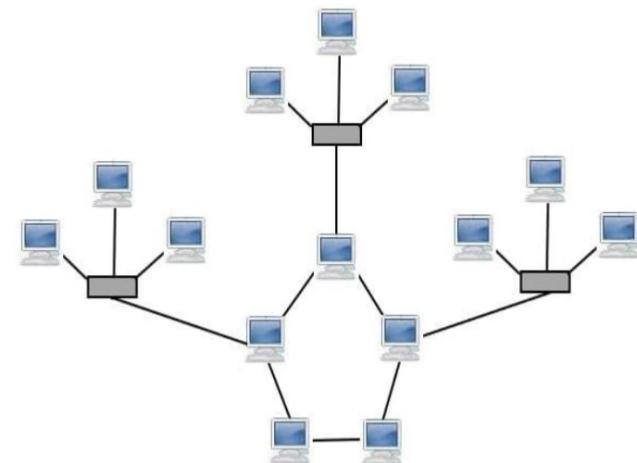
### Disadvantages of Tree Topology:-

1. The cost is high because of the cabling.
2. Maintaining and troubleshooting a tree topology can be more challenging than other topologies
3. A tree topology mainly relies on main bus cable and failure in main bus cable will damage the overall network.



## 6. Hybrid Topology

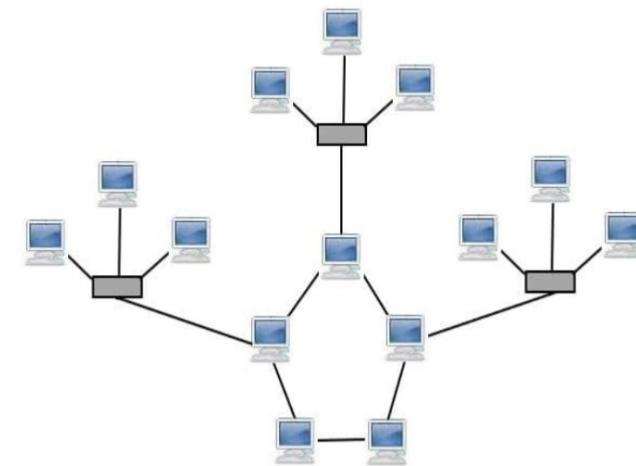
The combination of various different topologies is known as Hybrid topology. It includes the features of all other topologies. It combines the advantages of each topology to create a more robust and flexible network infrastructure. It is used in schools, colleges, corporate offices, businesses and other places as per the requirement.



## 6. Hybrid Topology

### Advantages of Hybrid Topology:-

1. The size of the network can be easily expanded by adding new devices. It is suitable for large networks.
2. Hybrid topology is very reliable.
3. These types of network topology can handle a high traffic volume.
4. If computers are added to this topology, its speed does not slow down.
5. It is easy to detect errors in Hybrid topology.



## 6. Hybrid Topology

### Disadvantages of Hybrid Topology:-

1. It is very difficult to design the architecture of the Hybrid network..
2. Hubs used in this topology are very expensive.
3. The infrastructure cost is very high as a hybrid network requires a lot of cabling and network devices.
4. Hybrid topology requires regular maintenance to ensure all network segments function correctly.

