

# Network topology/configuration

## and its types

# Internet

The **Internet** is a global network of computing devices communicating with each other in some way, whether they're sending emails, downloading files, or sharing websites.

The Internet is an **open** network: any computing device can join as long as they follow the rules of the game. In networking, the rules are known as **protocols** and they define how each device must communicate with each other. The Internet is powered by many layers of protocols.

# Who controls Internet?

The answer is nobody and maybe another answer is everybody. The real answer is the internet is made up of a large number of independently operated networks. The system is fully distributed. There is no central control that is deciding how the pieces of the network are built or even who interconnects with whom.

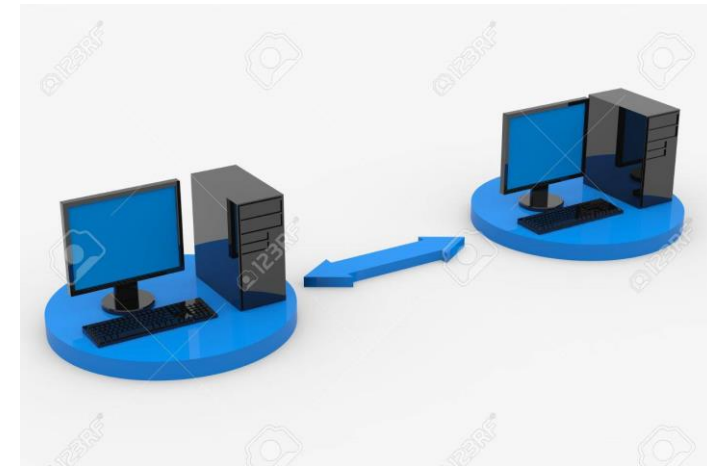
# Computer network

A computer network is any group of interconnected computing devices capable of sending or receiving data.

## Building a network

The simplest computer network is two devices:

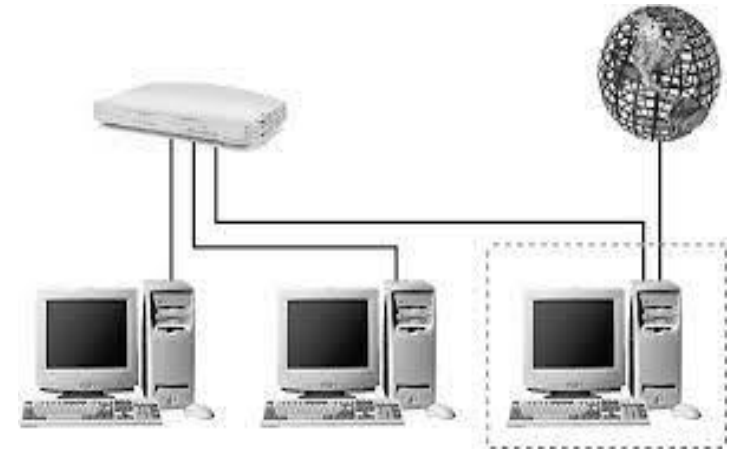
A network like that only has to worry about a few things, like how to physically connect the two devices and how to send data over the physical connection in a format they both understand.



Connection between two devices

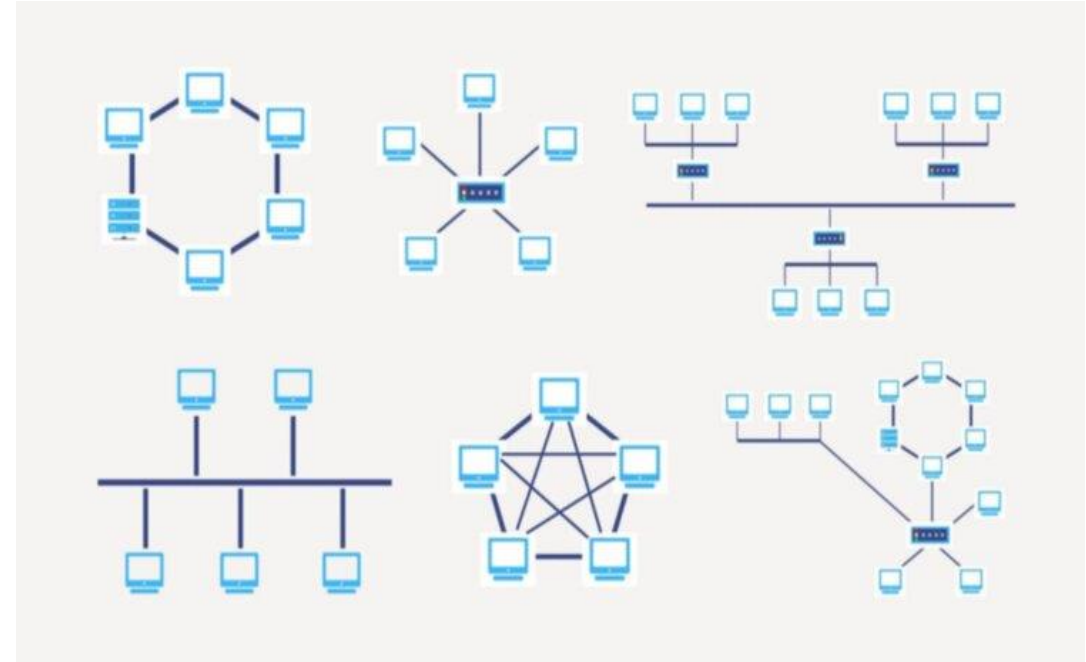
Let's add one more device:

Now there's additional complexity. How can each device know whether incoming data is meant for them or for their neighbor? This simple network will need an addressing scheme.



Lets connect more devices:

There are actually many ways we can connect more devices together in a computer network. The arrangement of those networks is known as **network topology/configuration**



# Network Topology/configuration

The configuration, or topology, of a network is key to determining its performance. Network topology is the way a network is arranged, including the physical or logical description of how links and nodes are set up to relate to each other. There are many network topology and each topology has its advantage and disadvantages.

Some of the network topology are:

- Star topology
- Switched topology
- Ring topology
- Bus/Ethernet

# Star topology

A **star topology** is a **topology** in which every node connects to a central network device, like a hub, switch, or computer. The central network device acts as a server and the peripheral devices act as clients. In a star topology setup, either a coaxial or RJ-45 network cable is used, depending on the type of network card installed in each computer.

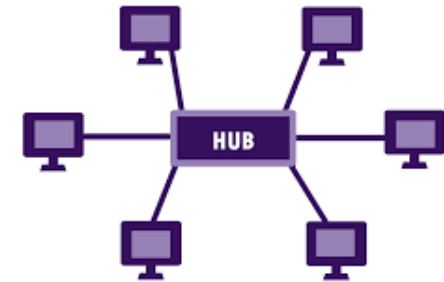
The advantage of star topology are as follows

It is very reliable – if one cable or device fails then all the others will continue to work.

It is high-performing as no data collisions can occur.

The disadvantages of star topology are as follows:

If a hub or switch fails, all the devices connected to it will have no **network** connection.



Star topology



# Switched topology

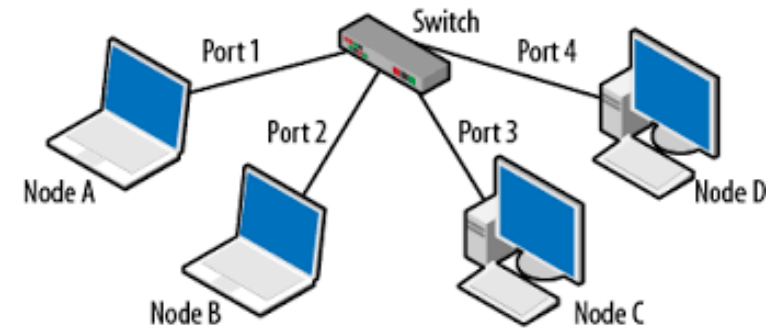
A switch topology is an organizational representation of the channels and relays in a switch module. The topology establishes the default states for all relays in a module and defines the channel names. Some switches can use multiple topologies or variations of each topology type. Some terminal blocks or accessories may force the switch to use a given topology or set of topologies

The advantage of switched topology are :

- They increase the available bandwidth of the network.
- They help in reducing workload on individual host PCs
- They increase the performance of the network.

The disadvantages of switched topology are:

- They are more expensive compare to network bridges.
- Network connectivity issues are difficult to be traced through the network **switch**.

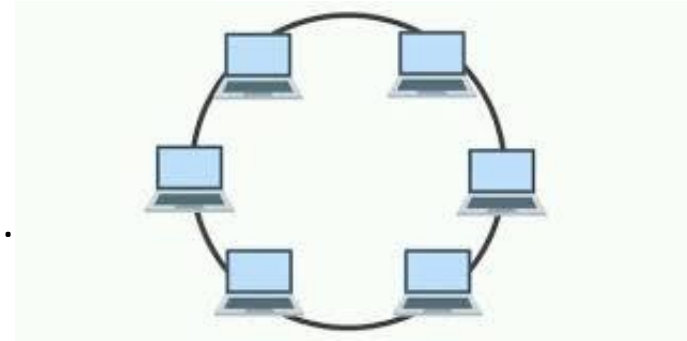


# Ring topology

A ring topology is a network configuration where device connections create a circular data path. Each networked device is connected to two others, like points on a circle. Together, devices in a ring topology are referred to as a ring network.

The advantages of ring topology are:

- All data flows in one direction, reducing the chance of packet collisions.
- A network server is not needed to control network connectivity between each workstation.
- Data can transfer between workstations at high speeds.



The disadvantage of ring topology are :

- Due to the Uni-directional **Ring**, a data packet (token) must have to pass through all the nodes.
- If one workstation shuts down, it affects whole **network** or if a node goes down entire **network** goes down.
- It is slower in performance as compared to the bus **topology**.
- It is Expensive.

# Bus topology

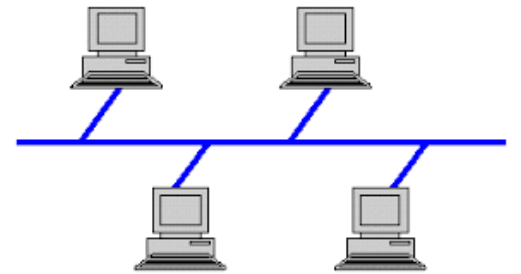
A **bus topology** is a **topology** for a Local Area Network (LAN) in which all the nodes are connected to a single cable.

The advantage of bus topology are :

- Easy to connect a computer or peripheral to a linear **bus**.
- Requires less cable length than a star **topology**.

The disadvantage of bus topology are:

- **Bus topology** is not great for large networks.
- Identification of problem becomes difficult if whole **network** goes down.



# Conclusion

In **computer** networks, a **topology is used** to explain how a network **is** physically connected and the logical flow of information in the network. A **topology** mainly describes how devices **are** connected and interact with each other **using** communication links.

Helps us better understand the networking concepts. Plays a crucial role in performance. Helps reduce the operational and maintenance costs such as cabling costs. A network **topology** is a factor in determining the media type to be used to cable a network.

Thank you