



INDIAN SCHOOL MUSCAT



CLASS XI

INFORMATION TECHNOLOGY(802)

Chapter - 2 : Networking and Internet

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Some points to keep in mind.....



- Please avoid login from multiple systems.
- Kindly logout at the end of the session.
- Please turn off your mic and webcam
- If you have any doubt, write in the chat box
- If there is any technical problem, hold on – we will be back
- Since it is a lockdown situation you can use rough notebook or notepad or sheets of paper to take down notes. You may take screenshots during the course of delivery of topics.



Network Interface Card



Why we need a computer network?



Computer networks can be used as means of resource sharing and communication.

Resource Sharing: Connecting computers through networking allows us to share hardware and software resources.

Examples of hardware resources include peripherals (for example, printers and scanners), CPU, and memory. Examples of software resources include system and application software, and files that may include text, audio, and video content.

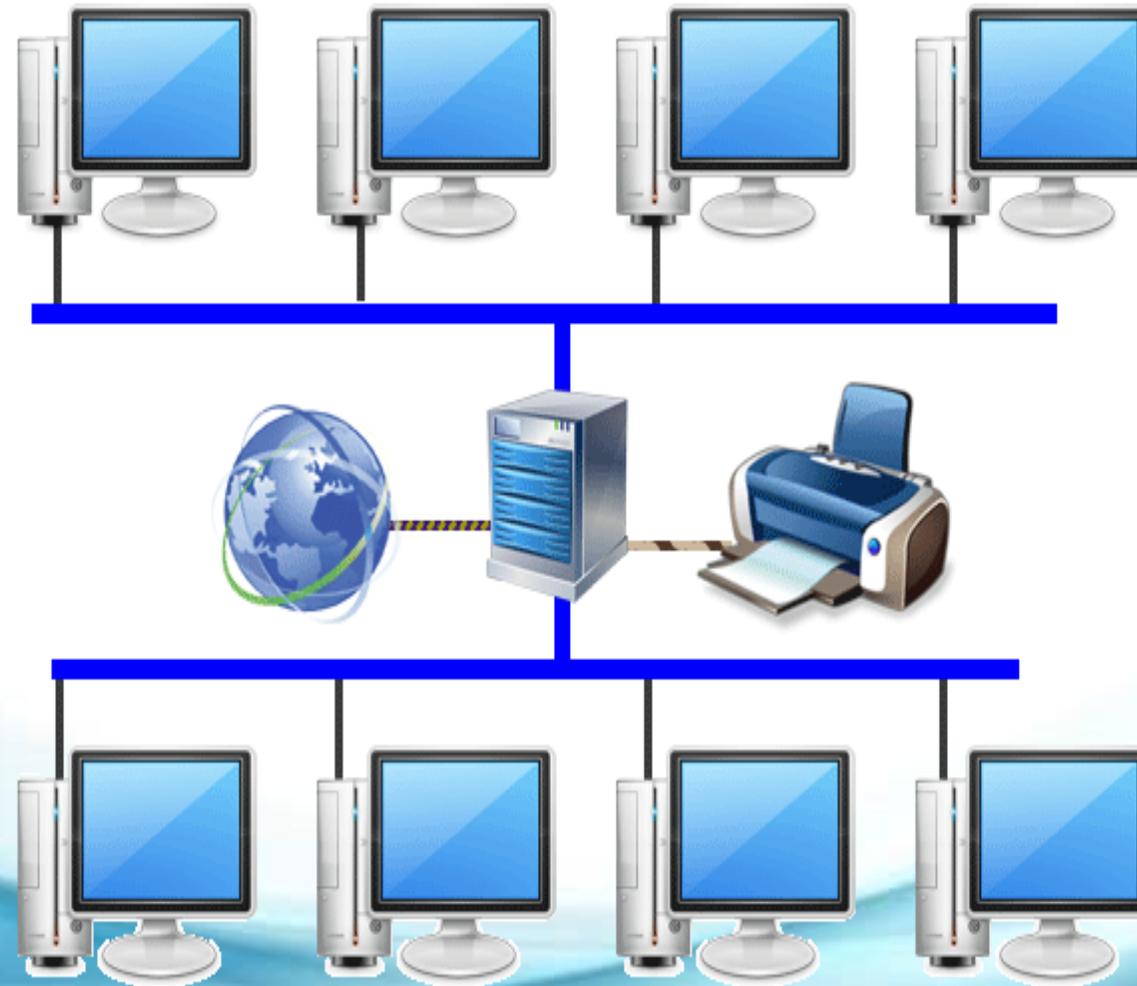


Need of network continued.....



Communication: Connecting computers through network facilitates exchange of information amongst the nodes in the network.

For example, any of the computer systems may send data to any of the computer systems in the network or the printer, as it is connected in the network.



COMPUTER NETWORK



Various network devices



Creation of a network requires various network devices such as modems, routers, switches and bridges, each of which plays a specific role in the network. Networks differ on the basis of transmission media used, arrangement of nodes in the network, their geographical span, and their purpose.



Transmission Medium



A transmission medium refers to the channel of transmission through which data can be transmitted from one node to another in the form of signal.

A signal encodes the data in a form suitable for transmission on the medium. A medium is characterized by its bandwidth defining the information carrying capacity of the medium.



A transmission medium may belong to one of the following two categories:



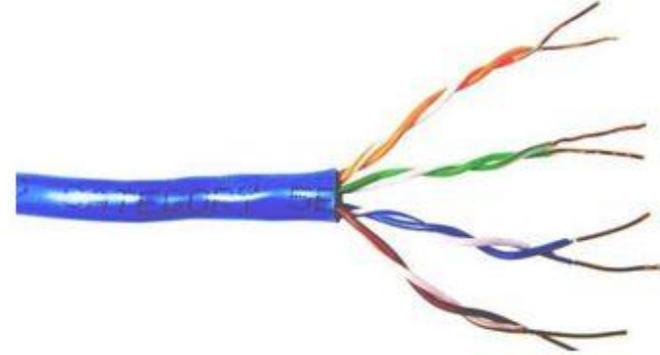
Guided Medium: The term refers to physical conductor such as twisted pair, coaxial cable, and fiber optics. In twisted pair and coaxial cable, the signal travels as voltage and current signal whereas in optical fiber, the signal is in the form of light.



Common network cable types



- Unshielded twisted pair (UTP)
- Shielded twisted pair (STP)
- Coaxial cable
- Fiber optic





Transmission medium continued.....

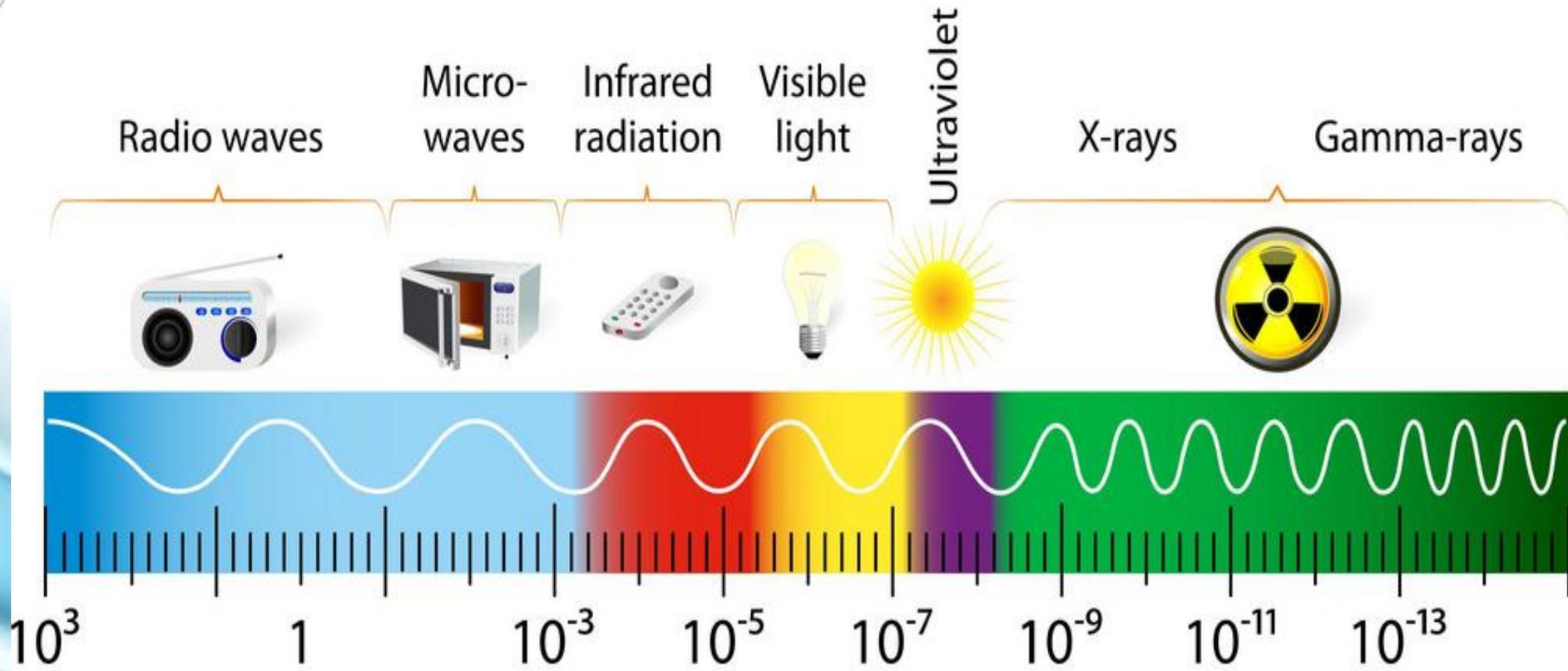


Unguided Medium: The unguided medium uses electro-magnetic waves that do not require a physical conductor.

Examples of unguided medium include infrared, radio, and microwave.



THE ELECTROMAGNETIC SPECTRUM





Topology



The arrangement (also called layout) of nodes in a network is called network topology.

There are broadly two types of topologies – broadcast and point to point.

In broadcast topology, all nodes share the same physical link. When one node transmits, all nodes receive. Collision may occur when more than one node simultaneously transmits,



Topology continued....



and there is collision resolution mechanism for handling it. Broadcast topologies are mainly bus and ring.

In point to point topology, every pair of nodes has a dedicated link. Popular point to point topologies are star and mesh.



Bus Topology

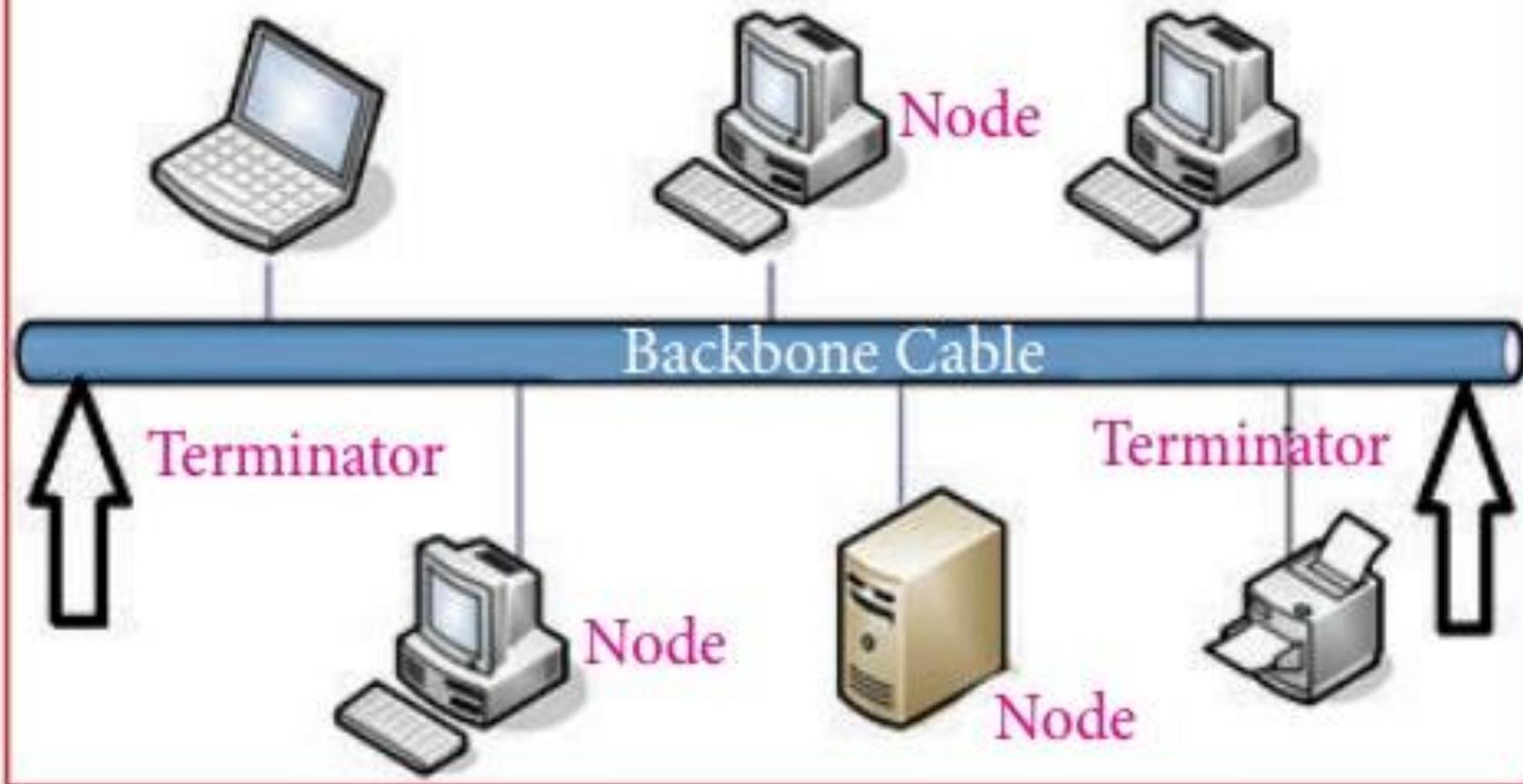


In bus topology, there is a long cable, called backbone cable (or simply backbone), that connects various nodes through connector called tap.

In this, a message sent by one is received by all devices connected to backbone cable. This topology requires less cabling and is easy to install and extend the network laid using it. However, fault detection and isolation is difficult.



Bus Topology





Ring Topology

In this, a message sent by one is received by all devices connected to backbone cable. This topology requires less cabling and is easy to install and extend the network laid using it. However, fault detection and isolation is difficult.

The message to be communicated is transmitted in one direction, thereby, relaying the message to the intended recipient.



Ring Topology continued.....

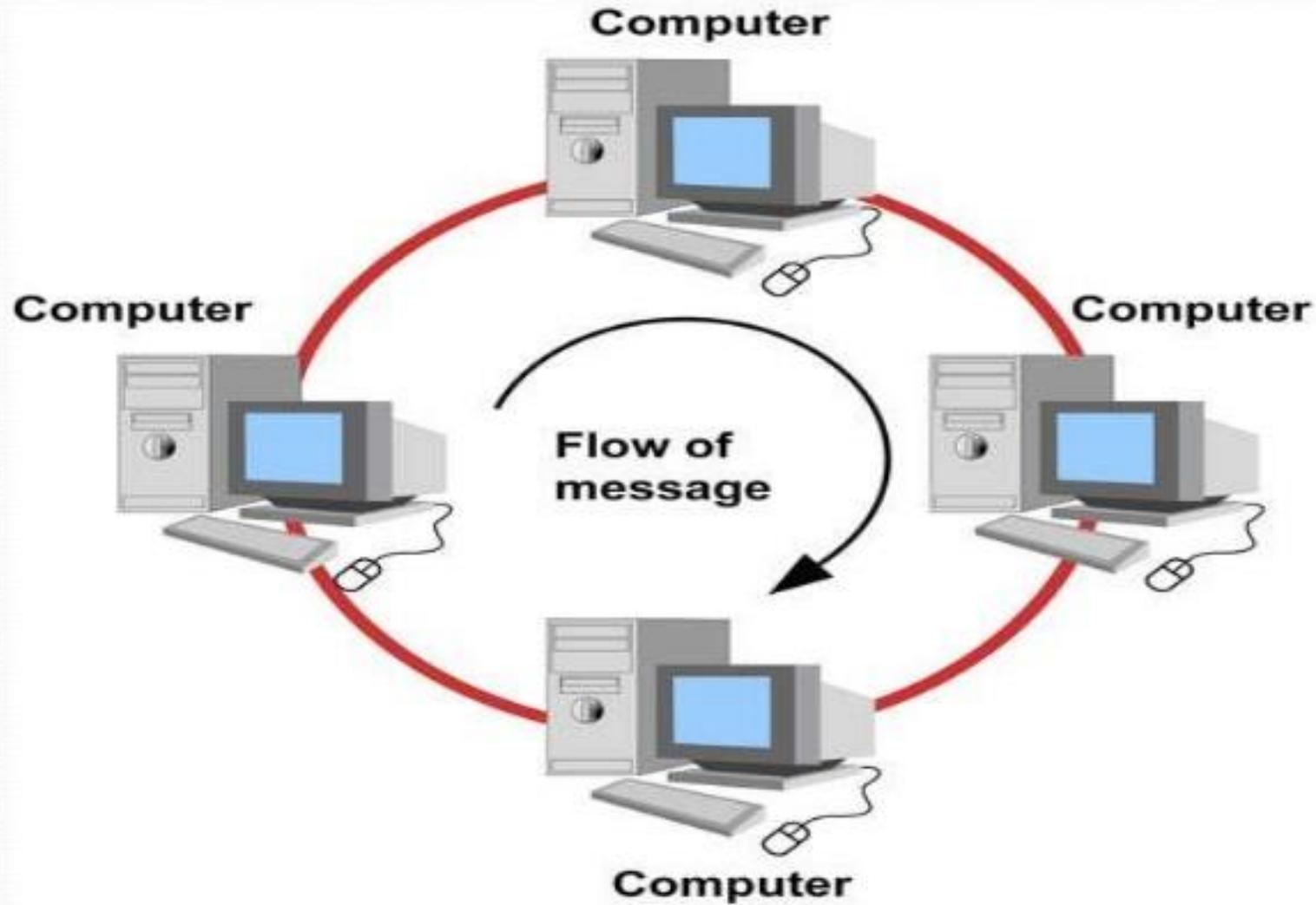


Addition and deletion of devices, and fault detection and isolation is easy.

However, the topology suffers from the limitation of single point failure leading to disruption of entire network. Sending a message from one node to another node may take more time



Ring Topology





Star Topology



In star topology, all the devices are connected to the central controller called hub.

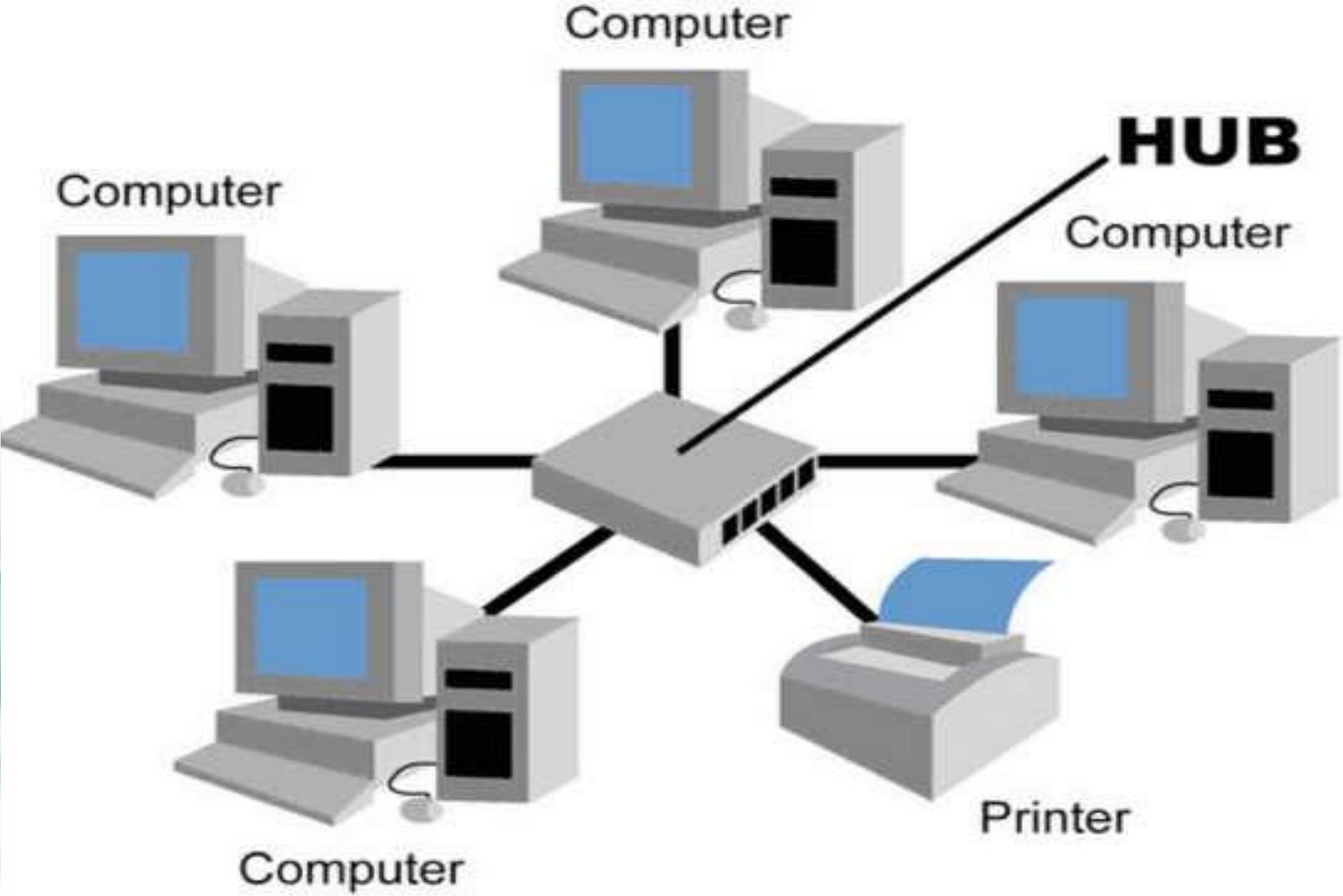
Communication between any two devices takes place through the hub responsible for relaying messages.

Star network can be easily installed and configured.

Also, fault detection and isolation is easy.

However, it requires more cabling as compared to bus and ring topology. Also, hub failure will lead to network failure.

Star Topology





Mesh Topology



In mesh topology, every node is connected with every other node in the network.

Because of dedicated point to point connection between every possible pair of nodes, the topology provides secure data transfer without any traffic problem. It requires a large number of connections establish the topology. This leads to difficulty in installation as the number of nodes grow as the network grows.



Mesh Topology





Any Questions?