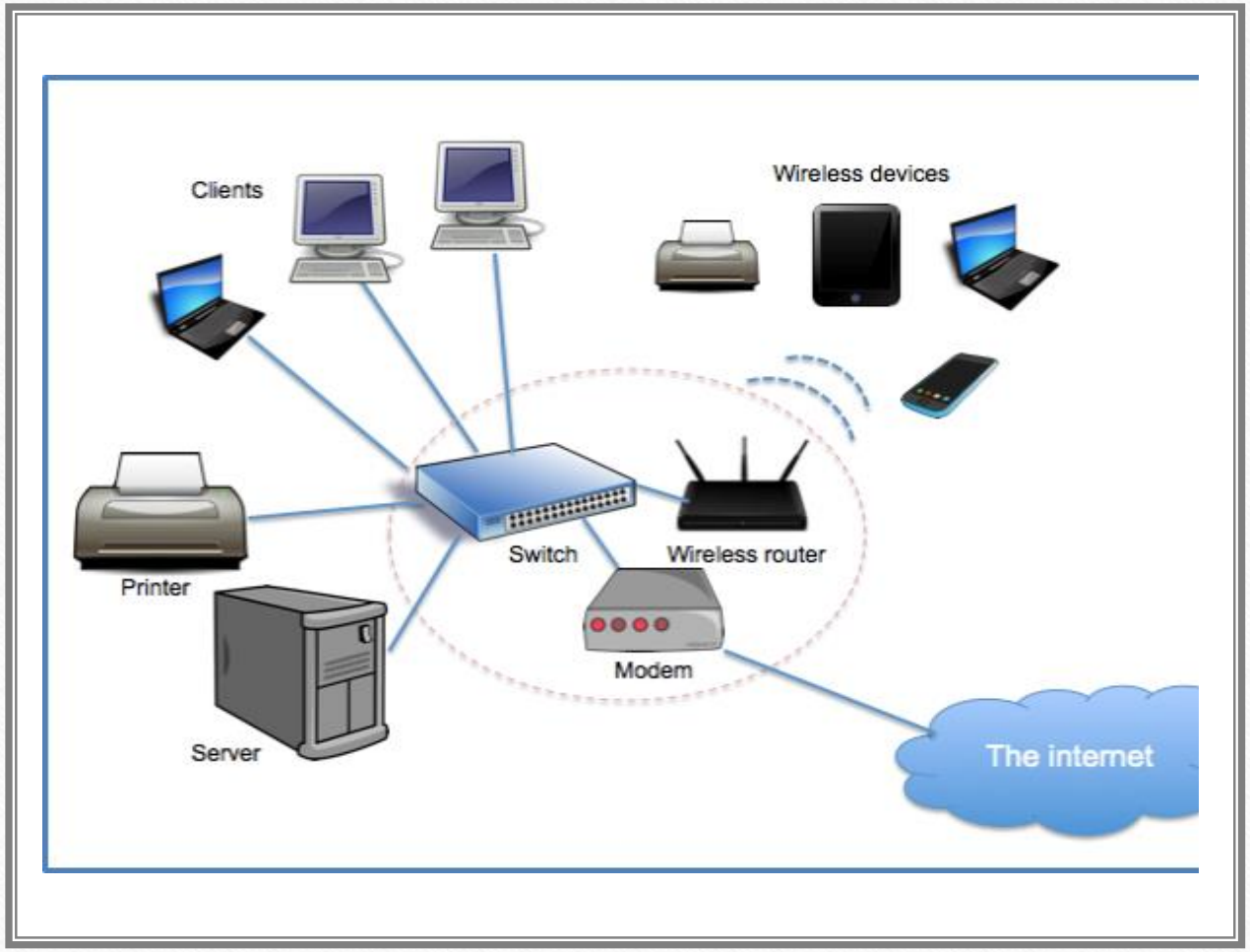
Basics of Networking

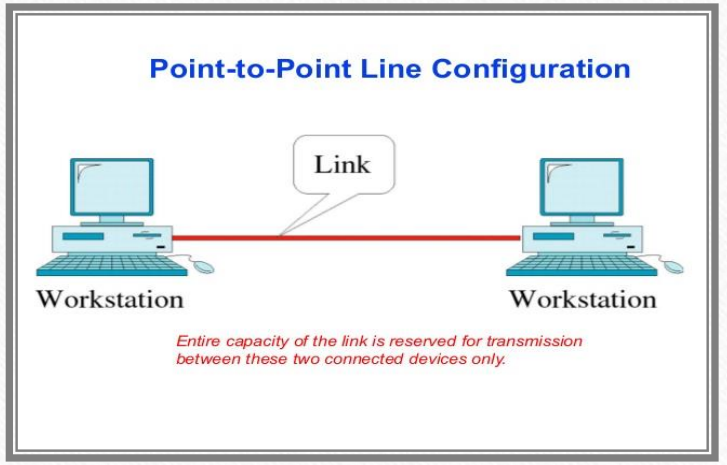


Network

- Computer Network is a group of devices connected physically/logically for communication.
- Each device in the network is known as host/node.

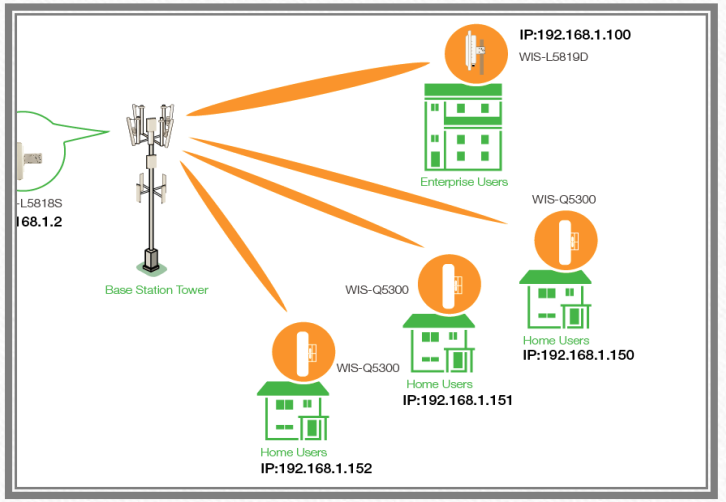
Line Configuration

It defines how the communication link is configured between the network devices



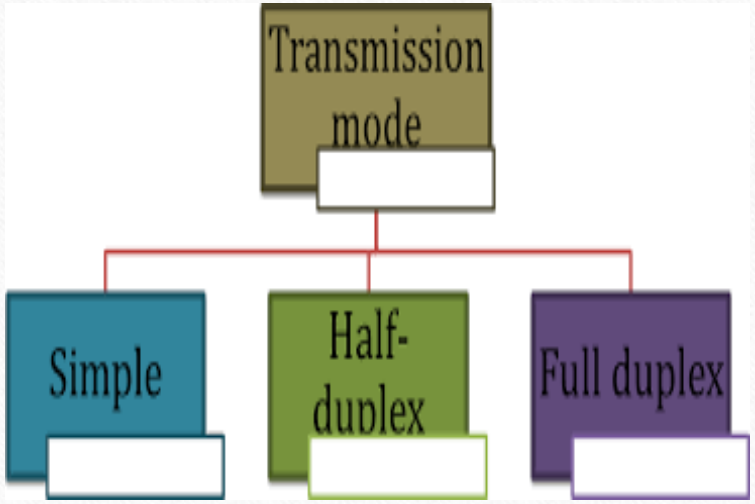
Types

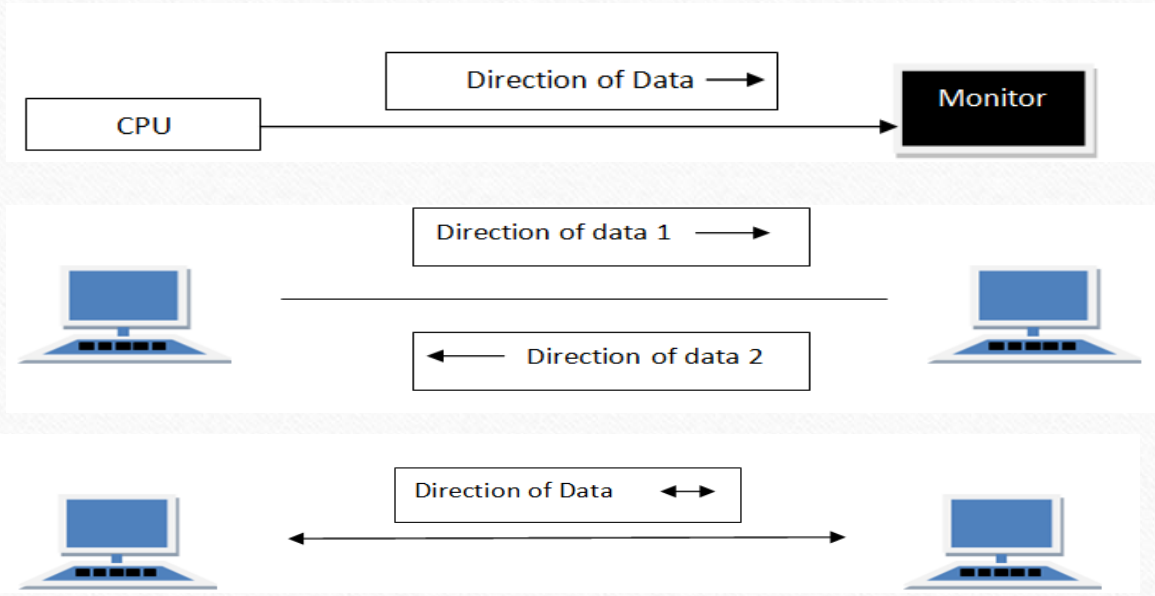
Point To Point
Point To Multi-Point



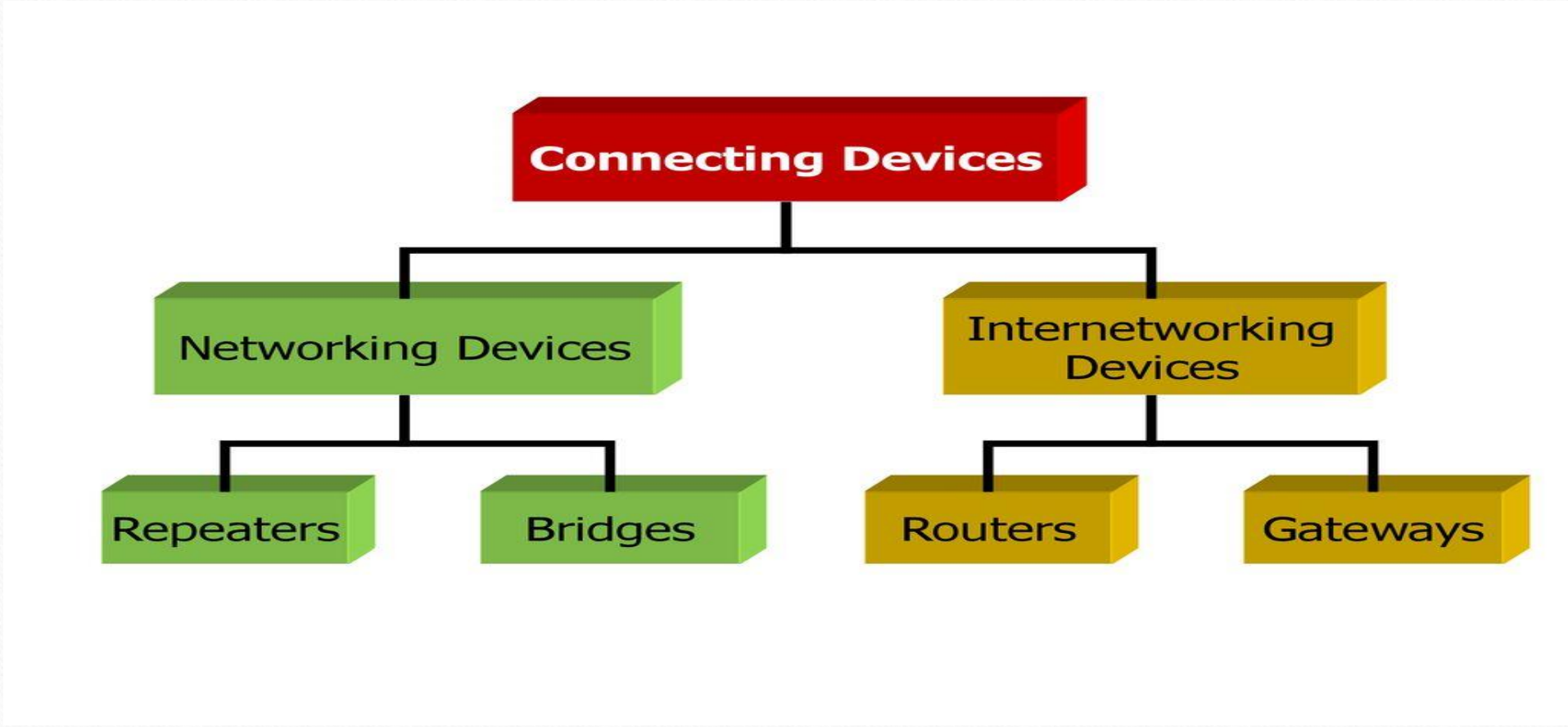
Transmission Modes

It defines the direction of flow of data between the devices in the network



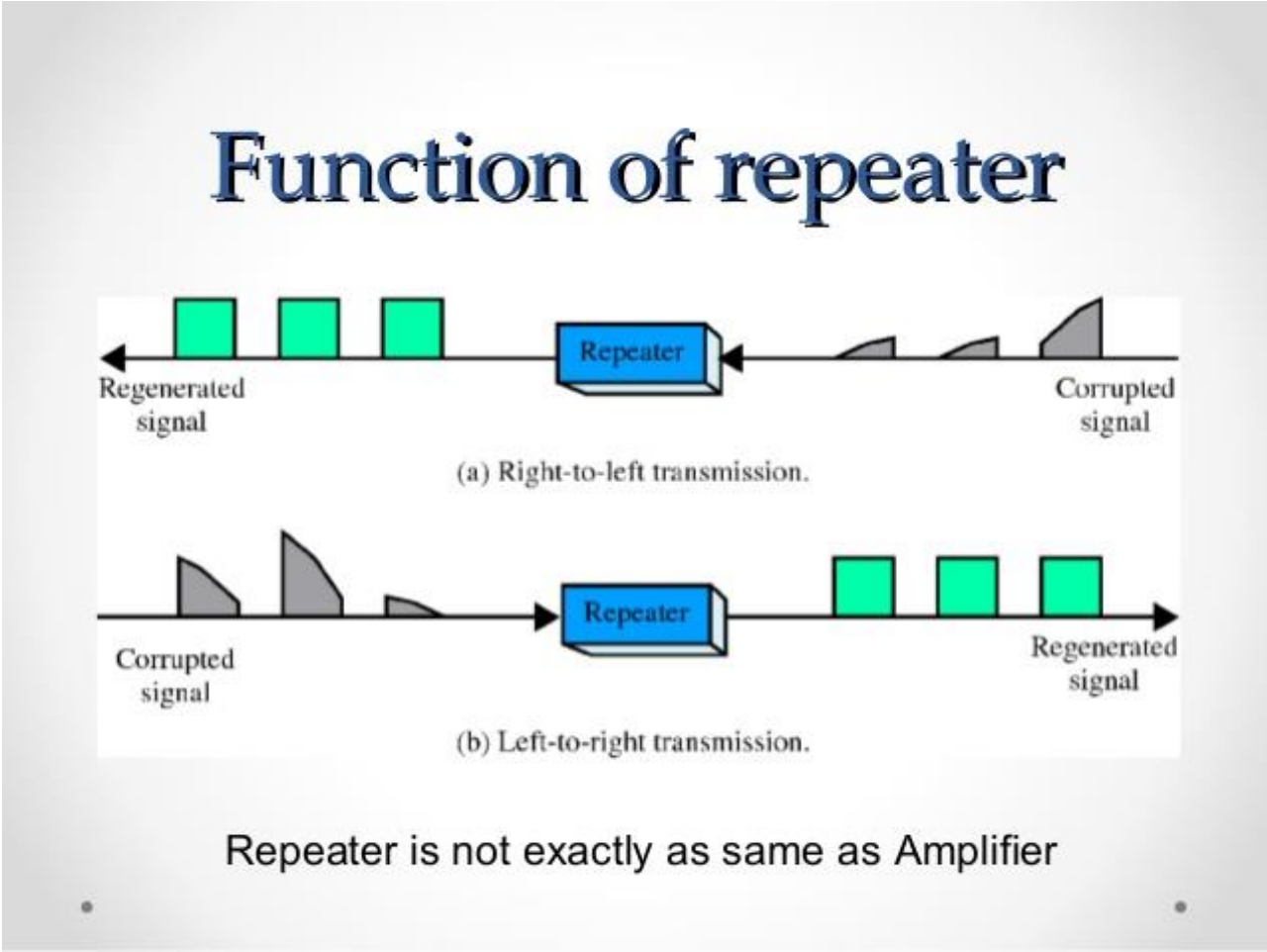


Connecting Devices



Repeater

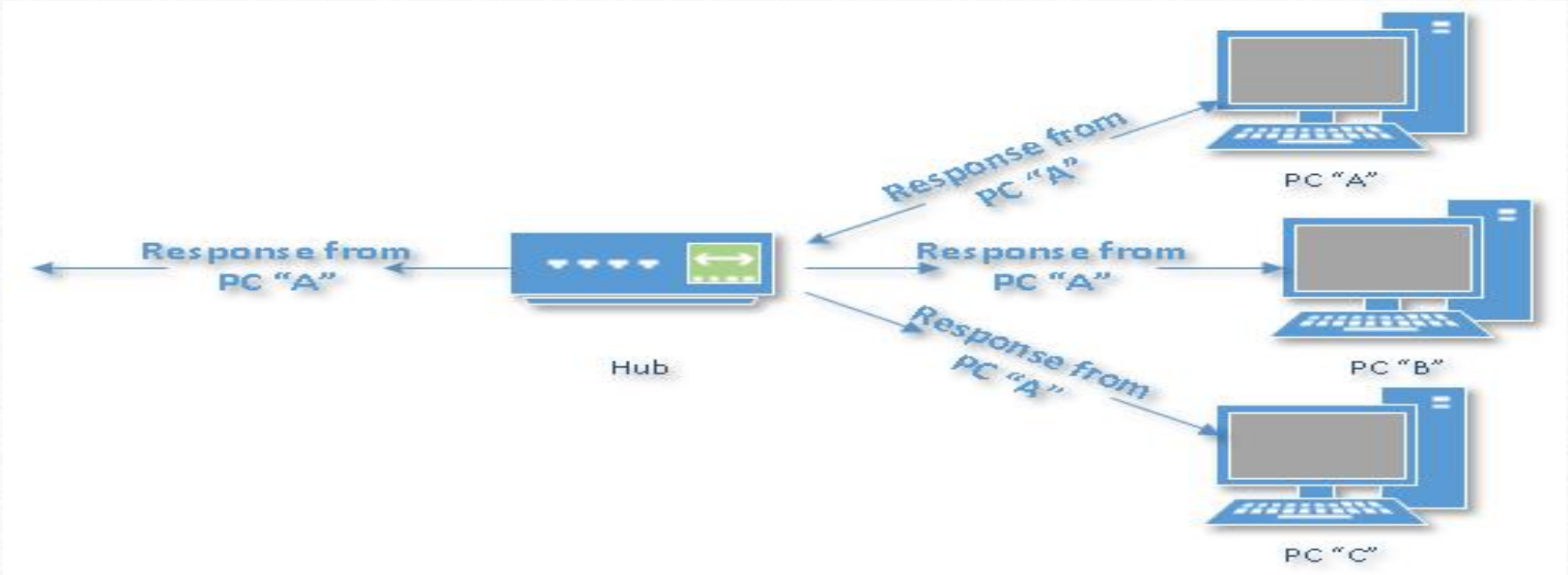
- Repeater is used to regenerate the signal in the network before it gets weak or corrupted
- It is a two port device
- They do not amplify the signals



HUB

A hub is basically a multiport repeater. A hub connects multiple wires coming from different branches.

Hub is non-intelligent device, broadcast the data and same collision domain

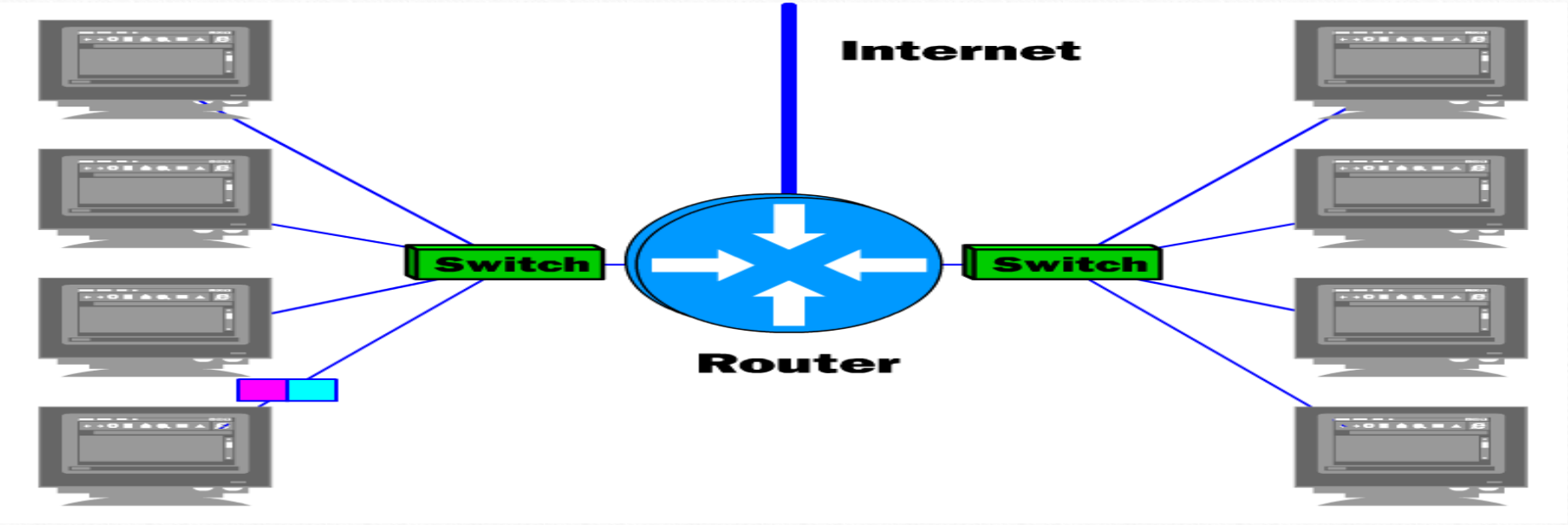


Switch

Works at Data Link Layer , intelligent and separate collision domain

Forwards the data based on MAC (media access control) Layer – no broadcasting

Error checking Mechanism



Router

Routes the data packets from one network to other network based on IP address

Works at Network layer and Connects LANS,WANS etc

Bridge

Works at data link layer and forwards the packets based on MAC address

No segmentation, no filtration and two port device

Gateway

They basically works as the messenger agents that take data from one system, interpret it, and transfer it to another system.

Gateways are also called protocol converters and can operate at any network layer.

Topology

It defines the physical and logical arrangement of the devices in the network

Types

Peer to peer

In this relationship, all the devices in the network have equal status in sharing the link. For example, Ring & Mesh topology

Primary secondary

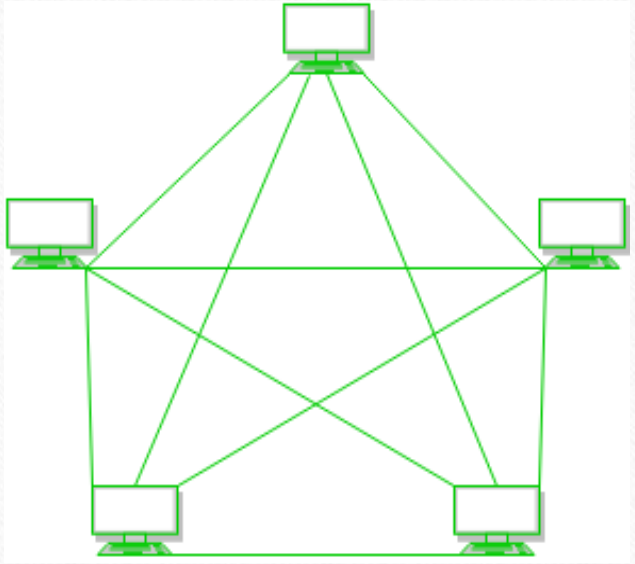
In this, one device controls the traffic and all other devices transmit through primary device. e.g. Star topology.

Mesh Topology

each node has a dedicated point to point link to every other node

For N devices n-1 input/output ports are required

N(N-1)/2 links are required



Advantages:

Reliable

Security and Privacy

Disadvantages

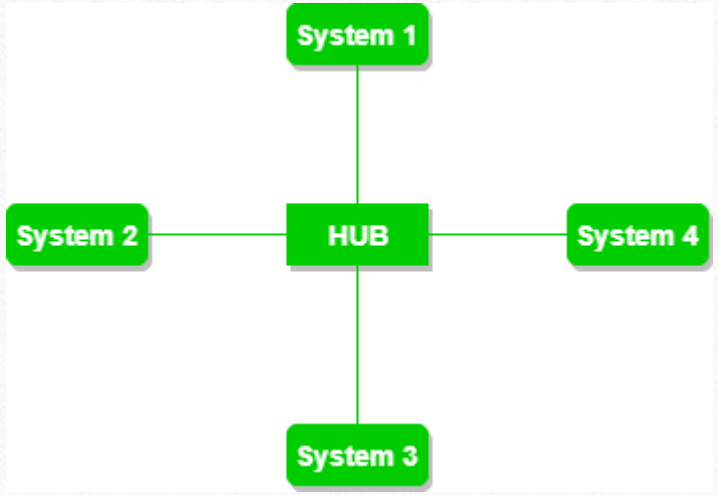
Installation and configuration is difficult

Cost of maintenance is very high

Star Topology

All the devices are connected to a single hub through a cable.

This hub is the central node and all others nodes are connected to the central node



Advantages.

If N devices are connected to each other in star topology, then the number of cables required to connect them is N. So, it is easy to set up.

Each device require only 1 port for connecting to the hub.

Disadvantages.

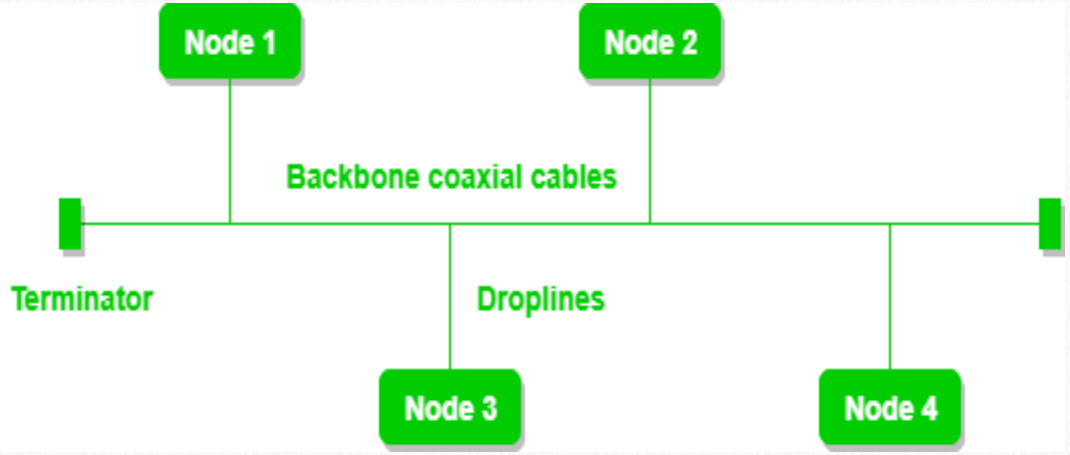
If the hub fails whole system will crash down.

Performance is based on the single concentrator(hub).

Bus Topology

In this computer and network device is connected to single cable.

It transmits the data from one end to another in single direction. No bi-directional feature is in bus topology.



Advantages

Cost of maintenance is easy

Easy configuration

Dis advantages

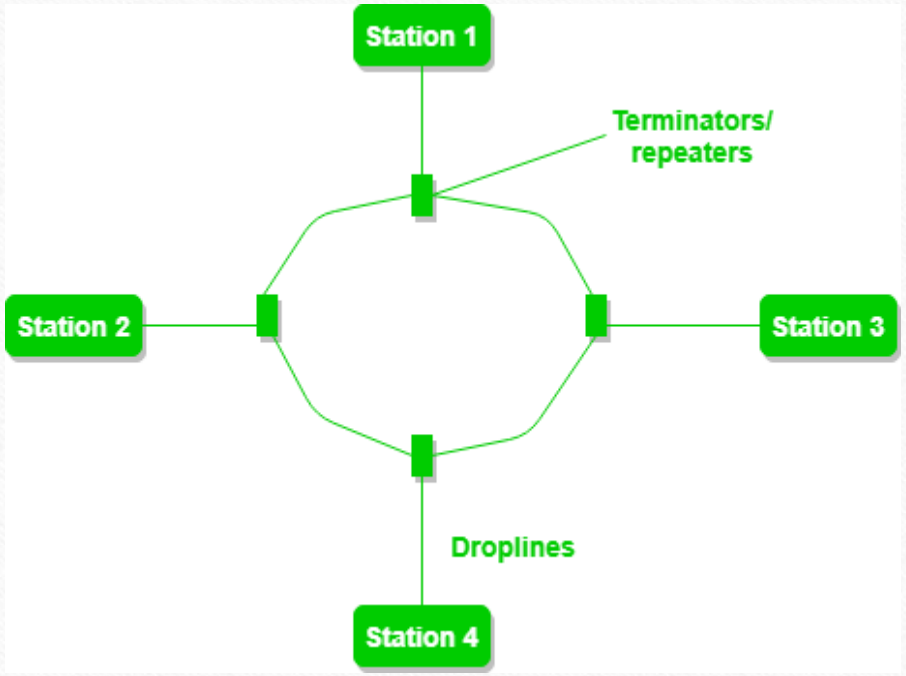
if the common cable fails, then the whole system will crash down.

If the network traffic is heavy, it increases collisions in the network

Ring Topology

All devices are connected in the form of ring

Data transmission is based on the tokens



Advantages

The possibility of collision is minimum in this type of topology.

Cheap to install and expand.

Disadvantages

Troubleshooting is difficult in this topology.

Addition of stations in between or removal of stations can disturb the whole topology.

Hybrid Topology

Combination of two or more topologies

More scalable and easy to expand

It is reliable and more costly

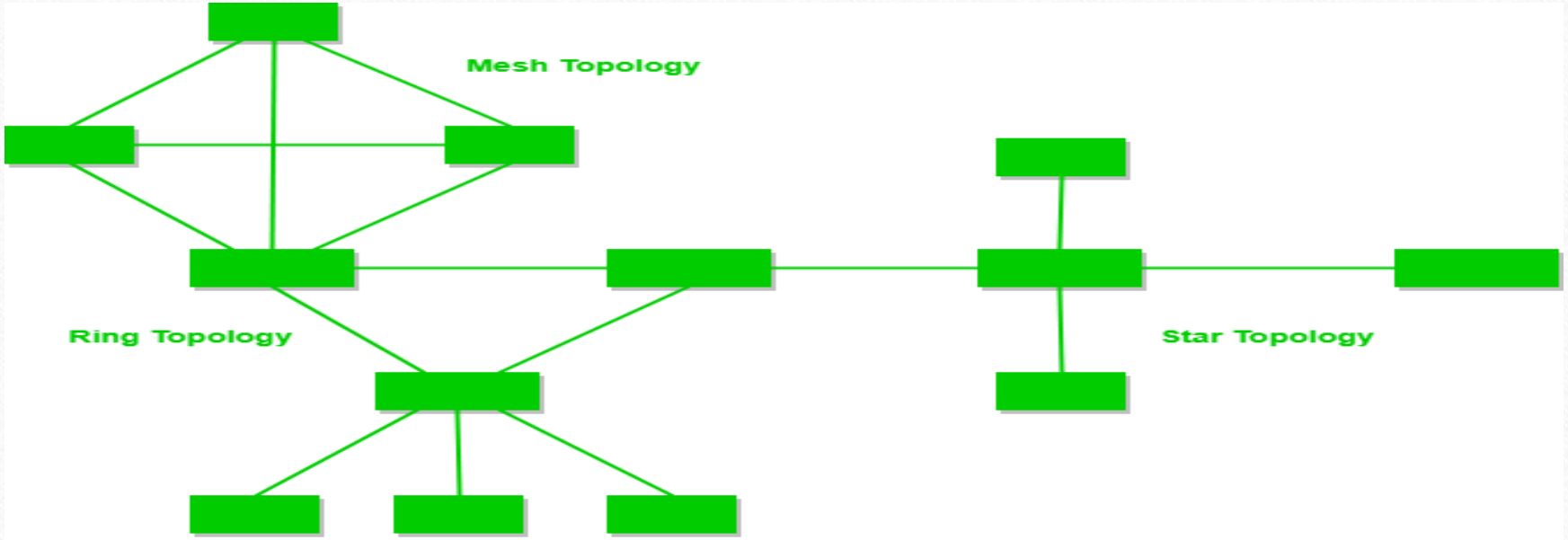


Figure - A Hybrid Topology