

EXPERIMENT- 2

Objective: a) Study of types of connection links

b) Introduction of Hub, switch,routers.

Resources Required:

Laptop, Cisco packet tracer

Theory:

a) **Study of types of connection links**

Types of Connections:

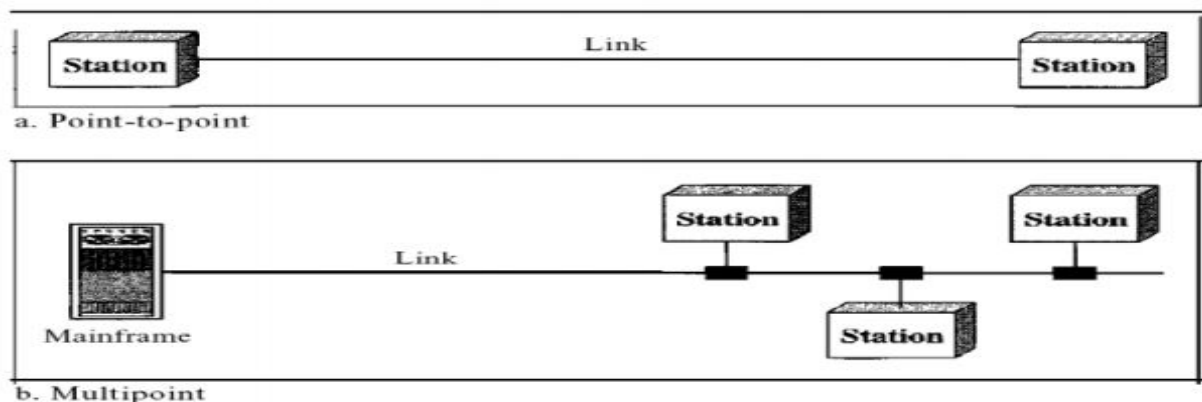
A network is two or more devices connected through links. A link is a communications pathway that transfers data from one device to another.

Point-to-Point connection:

A point-to-point connection provides a dedicated link between two devices. The entire capacity of the link is reserved for transmission between those two devices. Most point-to-point connections use an actual length of wire or cable to connect the two ends, but other options, such as microwave or satellite links, are also possible. When you change television channels by infrared remote control, you are establishing a point-to-point connection between the remote control and the television's control system.

Multipoint connection:

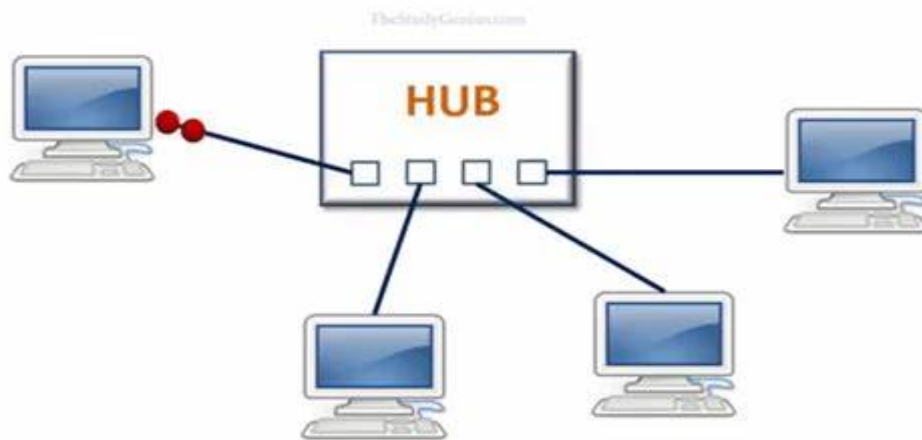
A multipoint (also called multidrop) connection is one in which more than two specific devices share a single link. In a multipoint environment, the capacity of the channel is shared, either spatially or temporally. If several devices can use the link simultaneously, it is a spatially shared connection. If users must take turns, it is a timeshared connection.



b) **Introduction of Hub, switch,routers.**

1. Hub:

Hub is a very simple network connecting device. In Star/hierarchical topology, a Repeater is called Hub. It is also known as a **Multiport Repeater Device**. **A Hub is a layer-1 device and operates only in the physical network of the OSI Model.** Since it works in the physical layer, it mainly deals with the data in the form of bits or electrical signals. A Hub is mainly used to create a network and connect devices on the same network only. A Hub is not an intelligent device, it forwards the incoming messages to other devices without checking for any errors or processing it. It does not maintain any address table for connected devices. It only knows that a device is connected to one of its ports. A Hub uses a half-duplex mode of communication.



Following are the advantages of using a Hub:

1. It is simple to implement.
2. The implementation cost is low.
3. It does not require any special system administration configuration. We can just plug and play it.

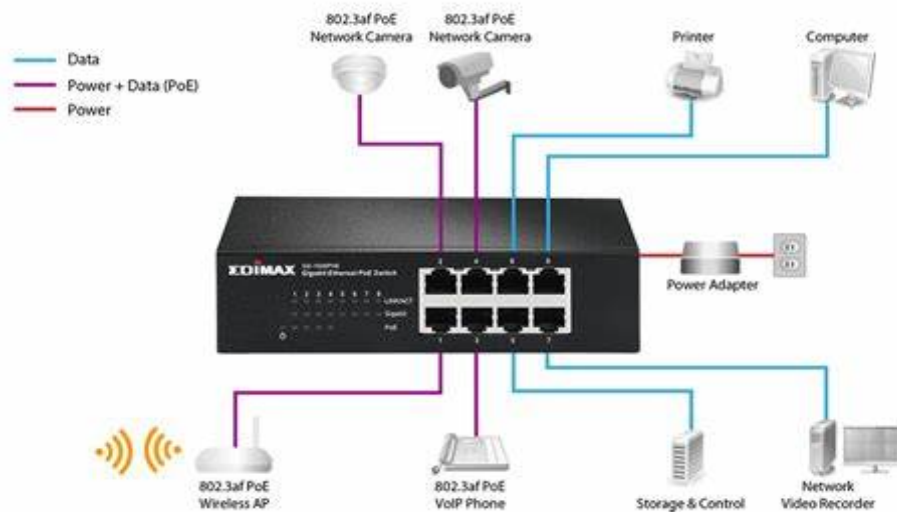
Following are the disadvantages of using a Hub:

1. It can connect devices of the same network only.
2. It uses a half-duplex mode of communication.
3. It is less secure, as it broadcasts the data packets.
4. It can be used in a limited network size only.
5. Broadcasting induces unnecessary traffic on the channel.

2.Switch:

A switch is a layer-2 network connecting device, i.e., it works on the physical and data-link layer of the OSI model. It interprets data in the form of data frames. A switch acts as a multiport bridge in the network. It provides the bridging functionality with greater efficiency. A switch

maintains a Switch table which has the MAC addresses of all the devices connected to it. It uses the full-duplex mode of communication and saves bandwidth.



Following are the advantages of using a Switch:

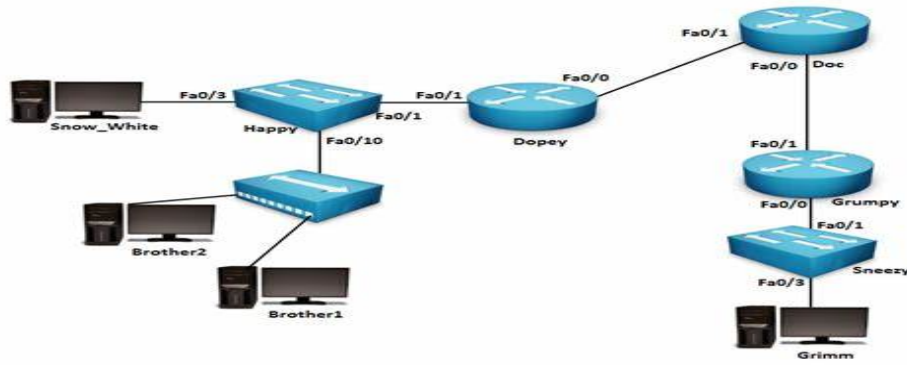
1. The implementation cost is medium.
2. It does not require any special system administration configuration. We can just plug and play it.
3. Improves security by limiting the scope of data frames.
4. It has the filtering capability.
5. It can be used in a large network.
6. It uses full-duplex mode of communication
7. It has multiple collision domains, so there are least or no collisions in the channel.

Following are the disadvantages of using a Switch:

1. It can connect devices of the same network only.
2. There is a delay in forwarding the frames due to error checking.
3. There is a need to maintain a Switch table.

3. Router

A Router is a layer-3 network connecting device, i.e., it works on the physical, data-link and network layer of the OSI model. It interprets data in the form of data packets. It is mainly an internetworking device, which can connect devices of different networks (implementing the same architecture and protocols). In other words, it can connect two physically and logically different network devices with each other. A Router is used to connect the networks or it routes traffic between the networks. **In other words, a Router is the Gateway of a network.**



Following are the advantages of using a Router:

1. It can connect devices and provides routing facilities over different networks implementing the same protocol and structure.
2. Improves security by limiting the scope of data packets.
3. It has the filtering capability.
4. It can be used in a large network.
5. It uses full-duplex mode of communication
6. It has control over both the collision and broadcast domain.

Following are the disadvantages of using a Router:

1. It is very complex to implement.
2. The implementation cost is quite high.
3. There is a need to maintain a Routing table.
4. There is a delay in forwarding the packets due to error checking.
5. It requires a special system administration configuration

Conclusion: We have studied types of connection links and about Hub, switch, routers