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Experiment - 1

Familiarization of Network Devices

Aim: Study of following network devices in detail:

- → Repeater
- → Hub
- → Switch
- → Bridge
- → Router
- → Gateway

Apparatus (Software): No software or hardware needed

Theory:

1) **Repeater:** A Repeater operates at the Physical layer. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which the signal can be transmitted over the same network. They do not amplify the signal.

Advantages: Cost (relatively inexpensive), Network performance, Enhance Signal, Network extend, Physical Barriers, etc.

Disadvantages: Restriction in no. of repeaters, Network segmentation not possible, etc.

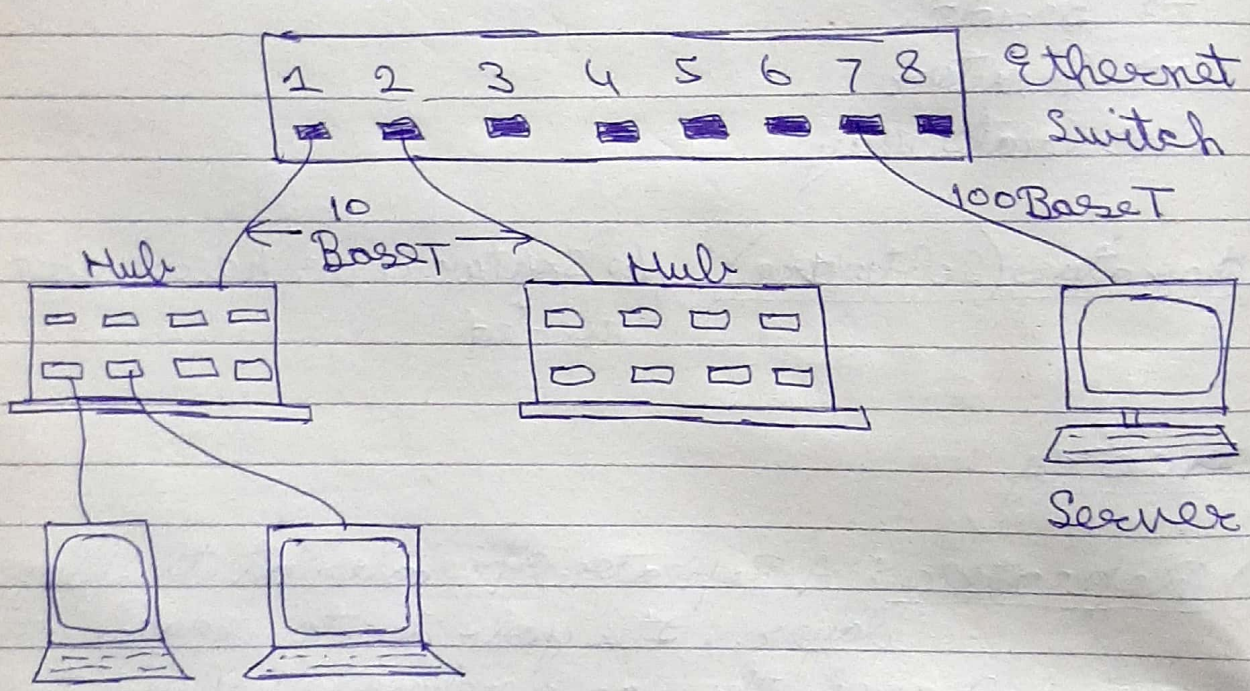
2.) Hub: It is a networking device used to connect multiple ethernet devices using twisted pair or fibre optic cable. It operates at physical layer.

Types of Hub:

(i) Active Hub

(ii) Passive Hub

(iii) Intelligent Hub



Advantages: It is cheaper, can connect diff. media types, uses network protocol analyzer, etc.

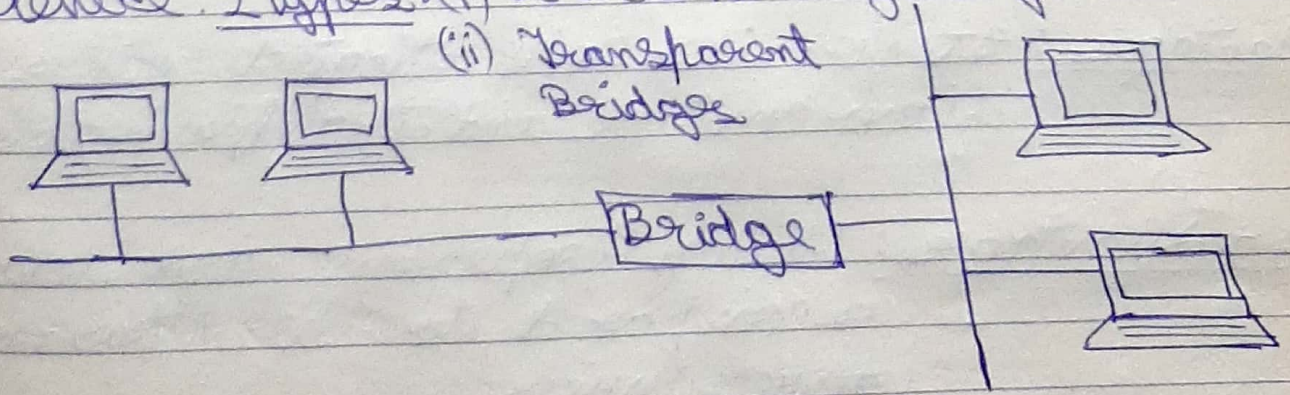
Disadvantages: It cannot filter information, does not operate in full duplex mode, it does not have mechanism to reduce the network traffic.

3) **Switch:** It is networking device which transfers data only to the host where it is being addressed. It checks the destination address to route the packet appropriately. It is a data link layer device.

Advantages: They increase the available bandwidth of the network, help in reducing workload on individual host PC's, etc.

Disadvantages: Highly expensive, have many network connectivity issues, Broadcast traffic may be troublesome, etc.

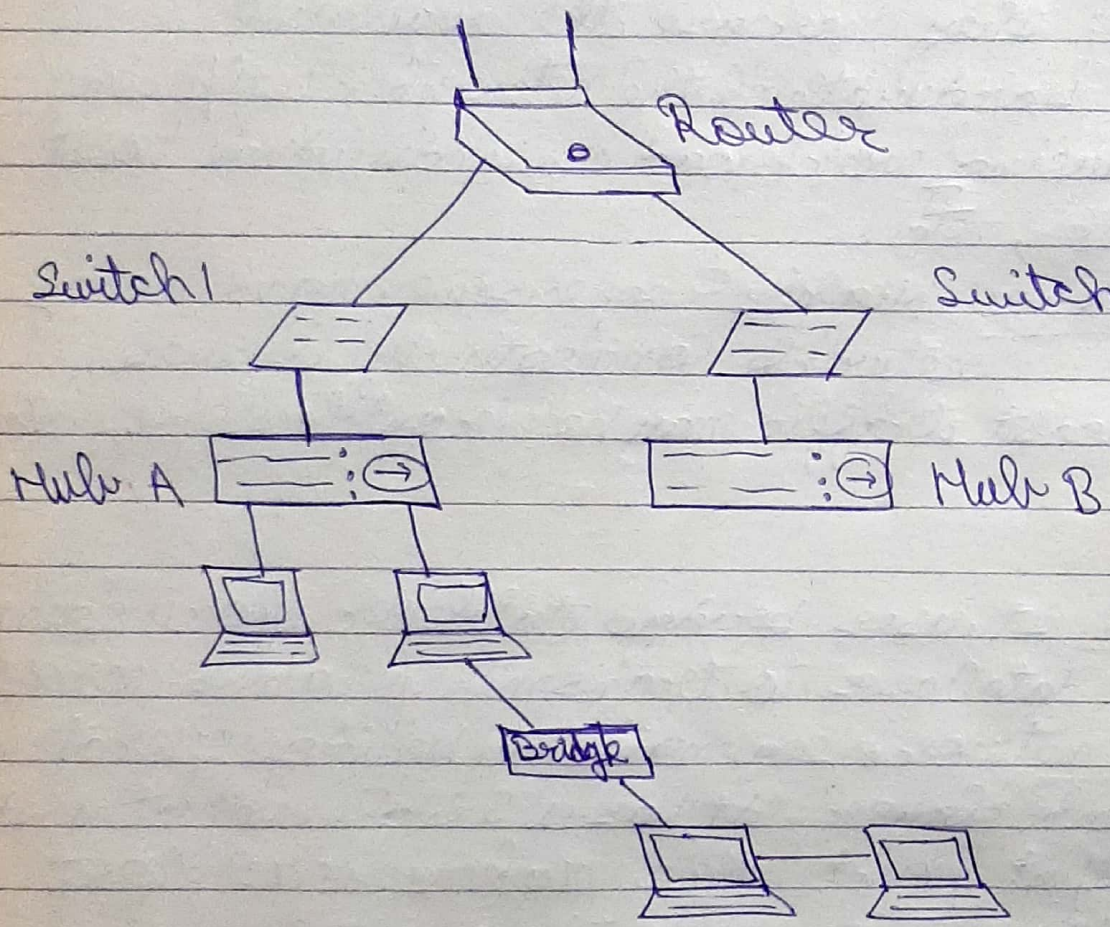
4) **Bridge:** It uses bridge table or forwarding database to transmit frames across various network segments. A bridge operates at data link layer. It has a single input and single output port, thus making it a 2 port device. **2 Types:** (i) Source Routing Bridges (ii) Transparent Bridges



Advantages: Reduces network traffic, creates seperate collision domain and reduces collision.

Disadvantages: It does not filter broadcasts, slower and more expensive compared to repeaters.

5.) **Router**: It provides interconnection b/w two dissimilar networks. Router is mainly a Network layer device. It uses IP address for routing the Packets. The IP address of each host contain 2 parts viz. network address and host address.



Advantages: It provides sophisticated routing, flow control and traffic isolated.

Disadvantages: Highly expensive and slower as compared to other networking devices.

6.) Gate way : It is a passage to connect two networks together that may work upon different networking models. Gateways are also called protocal converters and can operate at any network layer. Gateways are generally more complex than Switch or router.

Advantages: Better Connectivity, higher security, provides Filter process and has better bandwidth.

Disadvantages: Causes Time delay, its implementation and configuration is quite difficult, it causes many connection failures, etc.