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Experiment-1

Study of Network devices in detail and connect the computers in Local Area Network
a) Aim: Study of Network Devices in Detail

The following are the various Network Devices used in Computer Networks:
- Repeater
- Hub
- Switch
- Bridge
- Router
- Gate Way
- Brouter
- NIC

1. Repeater:
Functions at Physical Layer. A repeater is an electronic device that receives a signal and retransmits it at a higher level and/or higher power, or onto the other side of an obstruction, so that the signal can cover longer distances. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted to extend the length to which the signal can be transmitted over the same network. Repeaters not only amplify the signal but also regenerate it Repeater has two ports, so cannot be used to connect more than two devices.

2. Hub:
An Ethernet hub, (active hub, passive hub, intelligent hub, network hub, repeater hub, hub) or concentrator is a device for connecting multiple twisted pair or fiber optic Ethernet devices together and making them act as a single network segment. Hubs work at the physical layer (layer 1) of the OSI model. The device is a form of multiport repeater. Repeater hubs also participate in collision detection, forwarding a jam signal to all ports if it detects a collision. Hubs cannot filter data, so data packets are sent to all connected devices. In other words, the collision domain of all hosts connected through Hub remains one. Also, they do not have the intelligence to find out the best path for data packets which leads to inefficiencies and wastage.

3. Bridge:
A bridge is a repeater, with add on the functionality of filtering content by reading the MAC addresses of the source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2 port device. A network bridge connects multiple network segments at the data link layer (Layer 2) of the OSI model. In Ethernet networks, the term bridge formally means a device that behaves according to the IEEE 802.1D standard. Bridges can analyze incoming data packets to determine if the bridge is able to send the given packet to another segment of the network.

4. Switch:
A network switch or switching hub is a computer networking device that connects network segments. A switch is a multiport bridge with a buffer and a design that can boost its efficiency (a large number of ports imply less traffic) and performance. The term commonly refers to a network bridge that processes and routes data at the data link layer (layer 2) of the OSI model. The switch can perform error checking before forwarding data, which makes it very efficient as it does not forward packets that have errors and forward good packets selectively to the correct

port only. Switches that additionally process data at the network layer (layer 3 and above) are often referred to as Layer 3 switches or multilayer switches.

5. Router:

A router is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them. Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another. Where multiple routers are used in a large collection of interconnected networks, the routers exchange information about target system addresses, so that each router can build up a table showing the preferred paths between any two systems on the interconnected networks.

6. Gate Way:

In a communications network, a network node equipped for interfacing with another network that uses different protocols is called a gateway.
• A gateway may contain devices such as protocol translators, impedance matching devices, rate converters, fault isolators, or signal translators as necessary to provide system interoperability. It also requires the establishment of mutually acceptable administrative procedures between both networks.
• A protocol translation/mapping gateway interconnects networks with different network protocol technologies by performing the required protocol conversions.

7. Brouter:

It is also known as the bridging router is a device that combines features of both bridge and router. It can work either at the data link layer or a network layer. Working as a router, it is capable of routing packets across networks and working as the bridge, it is capable of filtering local area network traffic.

8. NIC:

NIC or network interface card is a network adapter that is used to connect the computer to the network. It is installed in the computer to establish a LAN. It has a unique id that is written on the chip, and it has a connector to connect the cable to it. The cable acts as an interface between the computer and the router or modem. NIC card is a layer 2 device which means that it works on both the physical and data link layers of the network model.
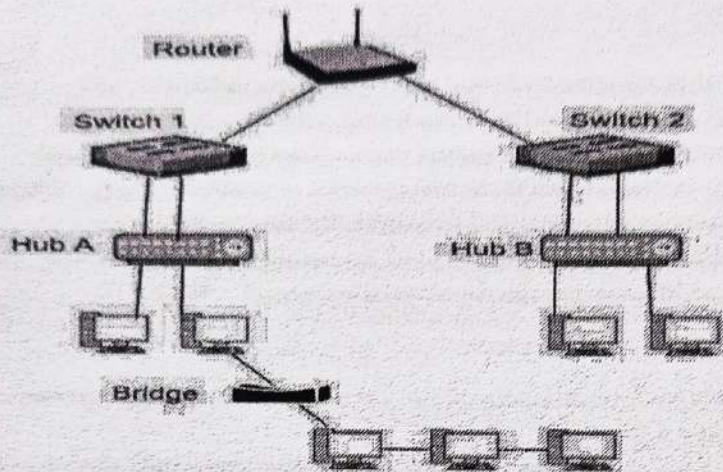
Different Network Devices:

Diagram shows you how to prepare Cross wired connection

RJ45 Pin # (END 1)	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Wire Color	Diagram End #2
1	White/Orange		1	White/Green	
2	Orange		2	Green	
3	White/Green		3	White/Orange	
4	Blue		4	White/Brown	
5	White/Blue		5	Brown	
6	Green		6	Orange	
7	White/Brown		7	Blue	
8	Brown		8	White/Blue	

Diagram shows you how to prepare straight through wired connection

RJ45 Pin # (END 1)	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Wire Color	Diagram End #2
1	White/Orange		1	White/Green	
2	Orange		2	Green	
3	White/Green		3	White/Orange	
4	Blue		4	White/Brown	
5	White/Blue		5	Brown	
6	Green		6	Orange	
7	White/Brown		7	Blue	
8	Brown		8	White/Blue	

b) Aim: Connect the computers in Local Area Network.

Procedure: On the host computer

On the host computer, follow these steps to share the Internet connection:
1. Log on to the host computer as Administrator or as Owner.
2. Click Start, and then click Control Panel.

3. Click Network and Internet Connections.
4. Click Network Connections.
5. Right-click the connection that you use to connect to the Internet. For example, if you connect to the Internet by using a modem, right-click the connection that you want under Dial-up / other networks available.
6. Click Properties.
7. Click the Advanced tab.
8. Under Internet Connection Sharing, select - Allow other network users to connect through this computer's Internet connection check box.
9. If you are sharing a dial-up Internet connection, select - Establish a dial-up connection whenever a computer on my network attempts to access the Internet check box if you want to permit your computer to automatically connect to the Internet.
10. Click OK. You'll receive the following message:

When Internet Connection Sharing is enabled, your LAN adapter will be set to use IP address 192.168.0. 1. Your computer may lose connectivity with other computers on your network. If these other computers have static IP addresses, it is a good idea to set them to obtain their IP addresses automatically. Are you sure you want to enable Internet Connection Sharing?

11. Click Yes. The connection to the Internet is shared to other computers on the local area network (LAN).
The network adapter that is connected to the LAN is configured with a static IP address of 192.168.0. 1 and a subnet mask of 255.255.255.0

On the client computer
To connect to the Internet by using the shared connection, you must confirm the LAN adapter IP configuration, and then configure the client computer. To confirm the LAN adapter IP configuration, follow these steps:
1. Log on to the client computer as Administrator or as Owner.
2. Click Start, and then click Control Panel.
3. Click Network and Internet Connections.
4. Click Network Connections.
5. Right-click Local Area Connection and then click Properties.
6. Click the General tab, click Internet Protocol (TCP/IP) in the connection uses the following items list, and then click Properties.
7. In the Internet Protocol (TCP/IP) Properties dialog box, click Obtain an IP address automatically (if it is not already selected), and then click OK.
Note: You can also assign a unique static IP address in the range of 192.168.0.2 to 254. For example, you can assign the following static IP address, subnet mask, and default gateway:
- IP Address 192.168.31.202
- Subnet mask 255.255.255.0
- Default gateway 192.168.31.1
8. In the Local Area Connection Properties dialog box, click OK.
9. Quit Control Panel.