SNS College of Engineering
Coimbatore - 641107

UNIT II

LINK LAYER

Services, ARP, DLC Protocols, HDLC, PPP, Media Access

Control, Wired LANs: Ethernet, Wireless

LANs: IEEE 802.11, Bluetooth, Connecting devices: Hubs,

Routers, Switches.

- Switch

- Hub

- Routers

Switch

A switch is a multicast networking device that works under the Datalink layer of the OSI model and connects a bunch of computers or devices in a network.

Advantages

- Secure

- Lowers the chances of frame collisions

- Increases the bandwidth

- increases the number of ports

- It operates under full-duplex.

Disadvantages

- More expensive

- Proper planning is required

- Problems may arise when broadcasting traffic.

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- K.Revathi,AP/IT

Hub

- A Hub is a simple and cheap networking device that works under the physical layer of the OSI model and connects a bunch of computers in a Local Area Network(LAN).

Advantages

- Having the ability to connect to the network using different physical media

- Used to increase the network distance

- Hubs are relatively cheap compared to switches and other devices

Disadvantages

- It increases the chances of collision

- Hubs operate under half-duplex

- Less security

- It wastes lots of bandwidth

Switch vs Hub

S.No	HUB	SWITCH
1	It is a broadcast device that sends data from one node to all nodes	is a multicast device that can send data to a particular node
2	It supports half-duplex (only one device can send or receive data at a time)	It supports full-duplex (both devices can send and receive data at the same time.)
3	It is located on the first layer.	It is located on the second layer of the OSI model

Router

- It is a device that establishes a common link between networks to enable data flow between them.

Advantages

- It can choose the best path on the internetwork

- It creates collision domains to reduce network traffic

- It provides connections between different network architectures.

Disadvantages

- Expensive

- Need to analyze data

- Low bandwidth

Functions of each device Switch

- **Learning** - This is the process of collecting the MAC address of linked devices.

- **Forwarding** - This is the process of transferring network traffic

- **Preventing Layer 2 Switching Loops**

Router

- To connect many types of networks at the same time

- It decides how to deliver each data packet

- The router bounces it back

Hub

- It allows a bunch of computers to be connected to a single network

- When a hub receives a data packet from a network device at one of its ports, it broadcasts the packet to all of its ports

Applications Switch

• It is commonly used in local area networks for connecting many nodes.

•Forwards a message to a specific host

•Increase LAN bandwidth

Router

- It is commonly used in LAN & MAN.

- **It manages traffic** by forwarding data packets to their proper IP addresses.

- It determines the best path to send packets.

Hub

• It is commonly used in LAN

• It is used for network monitoring.

• It is used in organizations to provide connectivity

• It can be used to create a device that is available throughout the network.

Modes of data transmission

- **Simplex** - data can only move in one direction

- **Half-Duplex** - only one device can send or receive data at a time

- **Full-Duplex** - a device that can send and receive data at the same time.

Addresses used in each device

- A **switch** stores and uses the MAC address of a device

- A **router** uses the IP address of the device

- A **hub** on the other hand does not store any MAC/IP address to transfer data.

Transmission of data

- A **switch** transmits data from one device to another in form of [frames](#)

- A **router** transmits data from one network to another in form of [packets](#).

- A **hub** transmits data from one device to another in form of binary bits.