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Lab Practical #03:

Study of different network devices in detail.

Practical Assignment #03:

1. Give difference between below network devices.
 - Hub and Switch
 - Switch and Router
 - Router and Gateway
2. Working of below network devices:
 - Switch
 - Router
 - Gateway

Hub and Switch

No.	Hub	Switch
1	Speed of original hub 10Mbps and modern internet hub is 100Mbps.	Maximum speed is 10Mbps to 100Mbps.
2	Cheaper as compared to switch	Expensive as compared to HUB.
3	Hacking of systems attached to hub is complex.	Hacking of systems attached to switch is little easy.
4	Hub cannot be used as a repeater.	While switch can be used as a repeater.
5	In hub, Packet filtering is not provided.	While in switch, Packet filtering is provided.
6	Hub have 4/12 ports.	While switch can have 24 to 48 ports.

Switch and Router

No.	Switch	Router
1	While the main objective of switch is to connect various devices simultaneously.	The main objective of router is to connect various networks simultaneously.
2	While works in data link layer.	It works in network layer.
3	While switch is used by only LAN.	Router is used by LAN as well as MAN.
4	While through switch data is sent in the form of frame.	Through the router, data is sent in the form of packets
5	Switch needs at least single network is to connect.	Router needs at least two networks to connect.

Router and Gateway

No.	Router	Gateway
1	It is a hardware device which is responsible for receiving, analyzing and forwarding the data packets to other networks.	It is a device that is used for the communication among the networks which have a different set of protocols.

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2	It supports the dynamic routing.	It does not support dynamic routing.
3	A router operates on layer 3 and layer 4 of the OSI model.	A gateway operates up to layer 5 of the OSI model.
4	It is hosted on only the dedicated applications.	It is hosted on dedicated applications, physical servers or virtual applications.
5	The main function of a router is routing the traffic from one network to the other.	The main function of a gateway is to translate one protocol to the other.

Working of below network devices:

1. Switch:

A network layer switch, also known as a Layer 3 switch, is a device that combines the functionality of a traditional switch and a router. Unlike a standard switch that operates at the data link layer (Layer 2) of the OSI model, a network layer switch operates at the network layer (Layer 3). This allows it to not only forward data based on MAC addresses but also route packets based on IP addresses. These switches are often used in large networks to enhance performance by reducing the need for dedicated routers, supporting VLANs, and enabling inter-VLAN routing. This results in improved network efficiency, reduced latency, and better traffic management.

2. Router:

A router is a networking device that directs data packets between different computer networks. It operates at the network layer (Layer 3) of the OSI model, using IP addresses to determine the best path for forwarding data to its destination. Routers connect multiple networks, manage traffic, and provide features such as network address translation (NAT), firewall protection, and quality of service (QoS). They are essential for internet connectivity, enabling communication between devices on local area networks (LANs) and wide area networks (WANs). By efficiently routing data, routers ensure reliable and efficient network performance.

3. Gateway:

Gateway is a network node that serves as an access point to another network, often connecting different network architectures and protocols. Operating at various layers of the OSI model, a gateway can facilitate communication between incompatible systems by translating data formats, protocols, or addressing schemes. It is commonly used to connect a local area network (LAN) to a wide area network (WAN) or the internet. Gateways are crucial for enabling interoperability and seamless data exchange in diverse and complex network environments. They also provide additional functions like security filtering and traffic management.