

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	A hub is a basic networking device that connects multiple Ethernet devices, making them act as a single network segment.	A switch is a more advanced device that connects multiple devices within a LAN and can manage data traffic efficiently.
2	It operates at the physical layer of the OSI model.	It operates at the data link layer of the OSI model.
3	Hub is a broadcast type transmission.	Switch is a Unicast, multicast and broadcast type transmission.
4	Cheaper as compared to switch.	Expensive as compared to hub.
5	Hub is a half duplex transmission mode.	Switch is a full duplex transmission mode.

Switch and Router

No.	Switch	Router
1	A switch is a more advanced device that connects multiple devices within a LAN and can manage data traffic efficiently.	A router connects different networks together and routes data between them. It determines the best path for data to travel from one network to another.
2	It operates at the data link layer of the OSI model.	Operates at the network layer of the OSI model.
3	Switch is used by only LAN.	Router is used by LAN as well as MAN.
4	The types of switching are: Circuit, Packet, and Message Switching.	The types of routing are: Adaptive and non-adaptive routing.
5	Switch is an expensive device than hub. but cheaper than router.	Router is a relatively much more expensive device than switch.

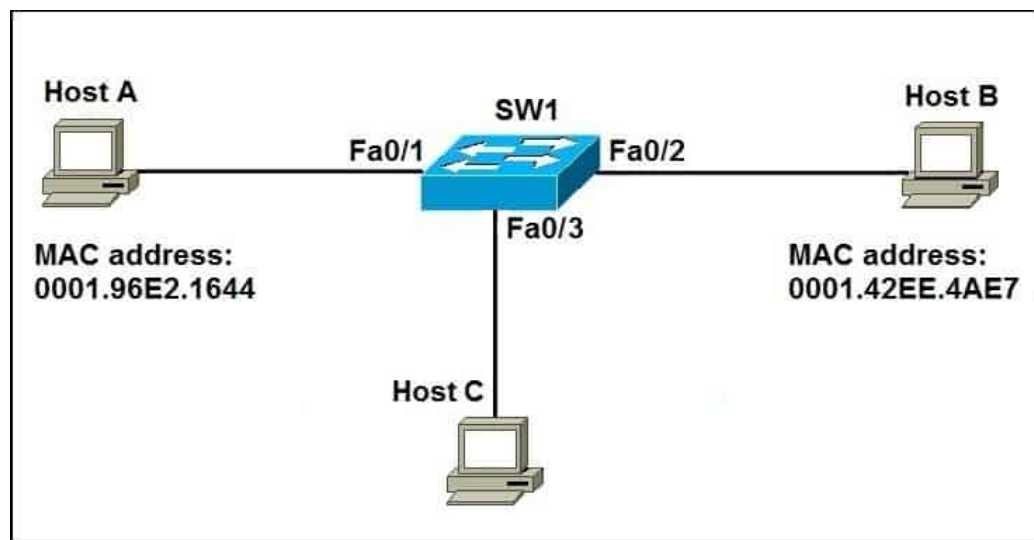
Router and Gateway

No.	Router	Gateway
1	A router connects different networks together and routes data between them. It determines the best path for data to travel from one network to another.	A gateway serves as a point of entry and exit for a network. It connects different types of networks and can translate data from one protocol or format to another.
2	Operates at the network layer of the OSI model.	Can operate at any layer of the OSI model, depending on the type of gateway.
3	It supports the dynamic routing.	It does not support dynamic routing.
4	It is hosted on only the dedicated applications.	It is hosted on dedicated applications, physical servers or virtual applications.
5	Working principle of a router is to install routing details for multiple networks and routing traffic based upon the destination address.	Working principle of a gateway is to differentiate what is inside the network and what is outside the network.

Working of below network devices:

1. Switch

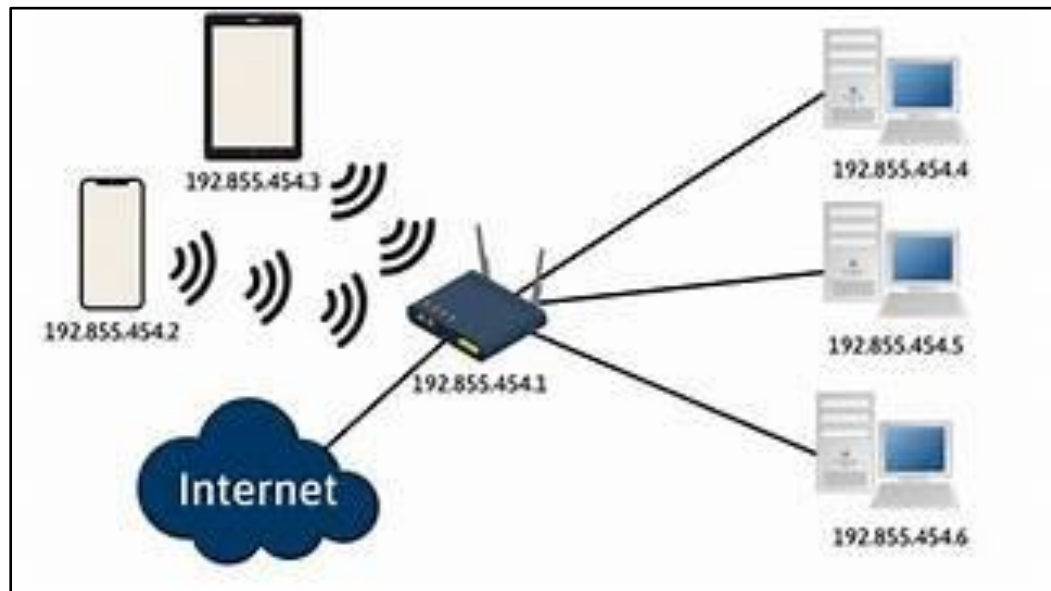
- When the source wants to send the data packet to the destination, the packet first enters the switch and the switch reads its header and finds the MAC address of the destination to identify the device then it sends the packet out through the appropriate ports that lead to the destination devices.
- Switch establishes a temporary connection between the source and destination for communication and terminates the connection once the conversation is done. Also, it offers full bandwidth to network traffic going to and from a device simultaneously to reduce collision.



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2. Router

- A router determines a packet's future path by examining the destination IP address of the header and comparing it to the routing database. The list of routing tables outlines how to send the data to a specific network location. They use a set of rules to determine the most effective way to transmit the data to the specified IP address.
- To enable communication between other devices and the internet, routers utilize a modem, such as a cable, fiber, or DSL modem. Most routers include many ports that can connect a variety of devices to the internet simultaneously. In order to decide where to deliver data and where traffic is coming from, it needs routing tables.
- A routing table primarily specifies the router's default path. As a result, it might not determine the optimum path to forward the data for a particular packet. For instance, the office router directs all networks to its internet service provider through a single default channel.
- Static and dynamic tables come in two varieties in the router. The dynamic routing tables are automatically updated by dynamic routers based on network activity, whereas the static routing tables are configured manually.



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3. Gateway

- Actually what happens on the gateway after receiving a data packet is that they check header information that is present in the data packet. After that, it validates the destination IP address and searches for any error. If it gets no error then it makes that data packet compatible for the new network by converting protocols or other stuff.

