



Date: 11/ 06/2025

Lab Practical #02:

Study of different network devices in detail.

Practical Assignment #02:

1. Give difference between below network devices.
 - Hub and Switch
 - Switch and Router
 - Router and Gateway
2. Working of below network devices:
 - Repeater
 - Modem((DSL and ADSL)
 - Hub
 - Bridge
 - Switch
 - Router
 - Gateway

Hub and Switch

No.	Hub	Switch
1	Operate at the Physical Layer (Layer-1).	Operate at the Data Link Layer (Layer 2) or some Network Layer (Layer 3) switches exist.
2	Broadcast data to all devices connected.	Sends data only to the destination device.
3	Does not have MAC address learning capability.	Can learn and store MAC address.
4	More collisions due to broadcasting.	Reduces collisions by intelligent switching.
5	Less secure and less efficient.	More secure and efficient.

Switch and Router

No.	Switch	Router
1	Work within a local network.	Connects multiple networks.
2	Operate at the Data Link Layer (Layer 2) or some Network Layer (Layer 3) switches exist.	Operated at Network Layer (Layer 3).
3	Use MAC addresses to forward data.	Use IP addresses to forward data.
4	No routing capability.	Has routing capabilities and maintains routing tables.
5	Best for LAN.	Best for connecting LANs to WANs or internet.

Router and Gateway

No.	Router	Gateway
1	Forwards data packets between networks.	Acts as a translator between different network protocols.
2	Works at the network layer.	Works at all layers of the OSI model.
3	Requires similar protocols across networks.	Can connect dissimilar networks.
4	Performs routing function only.	Performs protocol conversation, translation.
5	Used for IP-based networks.	Used when different communication protocols are used.

Working of below network devices:

1. Repeater

- A repeater is used to amplify or boost weak network signals. When data travels over long distances, the signal gets weaker. The repeater receives that weak signal cleans it and retransmits it at the original strength.
- Layer: Physical Layer (Layer 1)
- Use: Extends the range of the network.

2. Modem (DSL/ADSL)

- A modem stands for Modulator-Demodulator. It converts digital signals from a computer into analog signals that can be sent through telephone lines, and vice versa.
- **DSL (Digital Subscriber Line):** High-speed internet over copper phone lines.
- **ADSL (Asymmetric DSL):** Faster download speed than upload speed. Commonly used at home.
- **Layer:** Physical and Data Link Layers.
- **Use:** Connects computer/network to the internet.

3. Hub

- A hub is a basic device that connects multiple computers in a network. It sends incoming data to all connected devices, regardless of which one actually needs it.
- It does not have any intelligence or memory.
- **Layer:** Physical Layer (Layer 1)
- **Use:** Simple LAN connections.

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4. Bridge

- A bridge connects two separate LAN segments and manages the traffic between them. It filters data and forwards it only if needed, based on MAC addresses.
- Reduces Traffic by dividing the network.
- **Layer:** Data Link Layer (Layer 2)
- **Use:** To split a large network into smaller parts.

5. Switch

- A switch is smarter than a hub. It connects devices in a network and sends data only to the device that needs it by using MAC addresses.
- It keeps a table of which device is connected to which port.
- **Layer:** Data Link Layer (Layer 2)
- **Use:** Efficient LAN communication with less collision.

6. Router

- A router connects different networks together. It forwards data based on IP addresses and selects the best path to send the data.
- Used to connect LANs to the internet.
- **Layer:** Network Layer (Layer 3)
- **Use:** Internet sharing and routing between networks.

7. Gateway

- A gateway connects two different types of networks that use different communication rules(protocols).it translates the data so both networks can understand.
- Act like a translator between networks.
- **Layer:** All layers
- **Use:** Used in large systems, especially when different protocols are involved.