School of Computer Science
Mca-Aiml

Lab Experiment 1
Computer Network

Sumbitted To
Dr. Saurabh Jain

Submitted By
Name: Suraj Kumar
Sap Id - 590016150
Date- 15-Aug-2025

Experiment- 1

Familiarization of Network devices

Aim: Study of the following Network devices in detail:

- Repeater
- Hub
- Switch
- Bridge
- Router
- Gate way

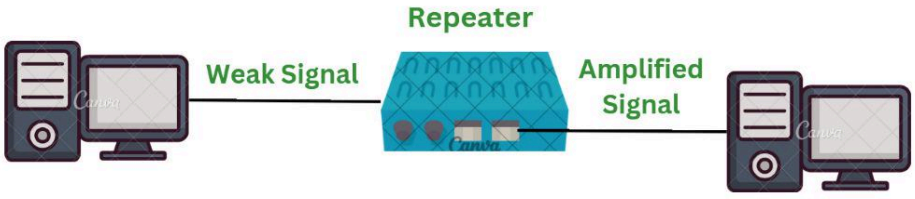
Apparatus (Software): No Software or hardware needed.

Theory: In Data communication & network, network devices play an important role. Each network device is considered as a node of a graph. Network devices are components used to connect computers or other electronic devices together so that they can share files or resources like printers or fax machines. Devices used to set up a Local Area Network (LAN) are the most common types of network devices used by the public. A LAN requires a hub, router, switch, Bridge, cabling or radio technology, network cards, and if online access is desired, a high-speed modem. This is much less complicated than it might sound to someone new to networking.

Procedure: Explain each Network devices in details with proper diagram. Write short notes on each Network devices.

1. Repeater

- **Definition:** A repeater is a Layer 1 (Physical Layer) device that regenerates and amplifies a network signal to extend the distance it can travel. It is a simple, unintelligent device.
- **Working:** As a data signal travels over a long distance, it experiences signal degradation and weakens. A repeater receives this weak signal, boosts it back to its original strength, and then transmits it to the next segment of the network. This allows data to travel over longer distances than a single cable could support. It does not perform any data filtering or processing.
- **Short Notes:** Extends network range, operates at Layer 1, used in both wired and wireless networks.



2. Hub

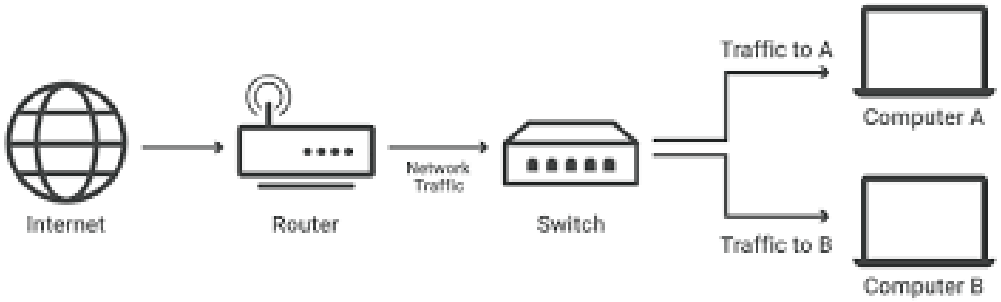
- **Definition:** A hub is a Layer 1 (Physical Layer) device that connects multiple network devices. It serves as a central connection point for all devices on a network segment.
- **Working:** When a hub receives data on one of its ports, it simply broadcasts that data to all other connected ports. It has no knowledge of the destination and cannot filter traffic. This "dumb" broadcasting creates a single collision domain, meaning all devices share the same bandwidth and collisions are frequent, making it very inefficient.
- **Short Notes:** Broadcasts all data, operates at Layer 1, creates a single collision domain, largely obsolete.

3. Switch

- **Definition:** A switch is a more intelligent device than a hub, operating at Layer 2 (Data Link Layer). It connects multiple devices within a Local Area Network (LAN).
- **Working:** A switch builds a MAC address table to learn which devices are connected to which ports. When a data frame arrives, the switch reads the destination MAC address and forwards the frame only to the specific port where the recipient is located. This

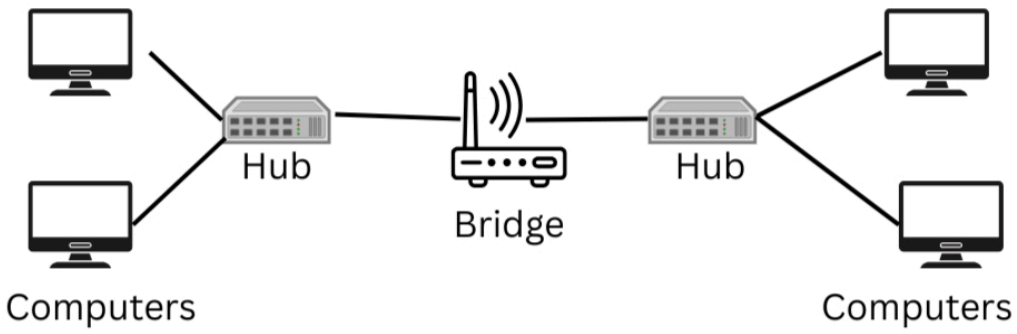
directed forwarding, known as "switching," significantly reduces network traffic and collisions, improving overall network performance and security.

- **Short Notes:** Intelligently forwards data, operates at Layer 2, creates multiple collision domains, a cornerstone of modern LANs.



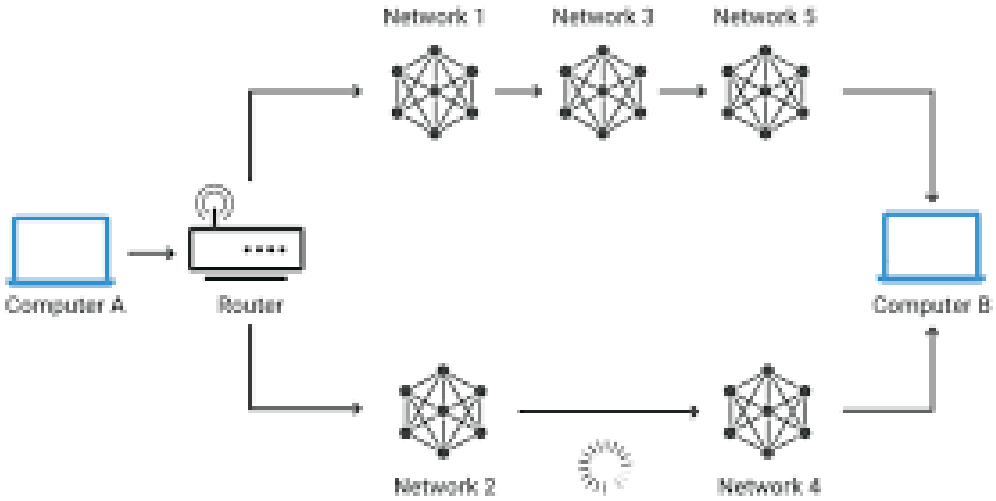
4. Bridge

- **Definition:** A bridge is a Layer 2 (Data Link Layer) device that connects two separate network segments.
- **Working:** It inspects incoming data frames and forwards them to the other segment only if the destination MAC address is on that segment. By doing this, it isolates traffic between the two segments, reducing overall network congestion. Bridges are essentially two-port switches.
- **Short Notes:** Segments networks, operates at Layer 2, filters traffic based on MAC addresses, largely replaced by modern switches.



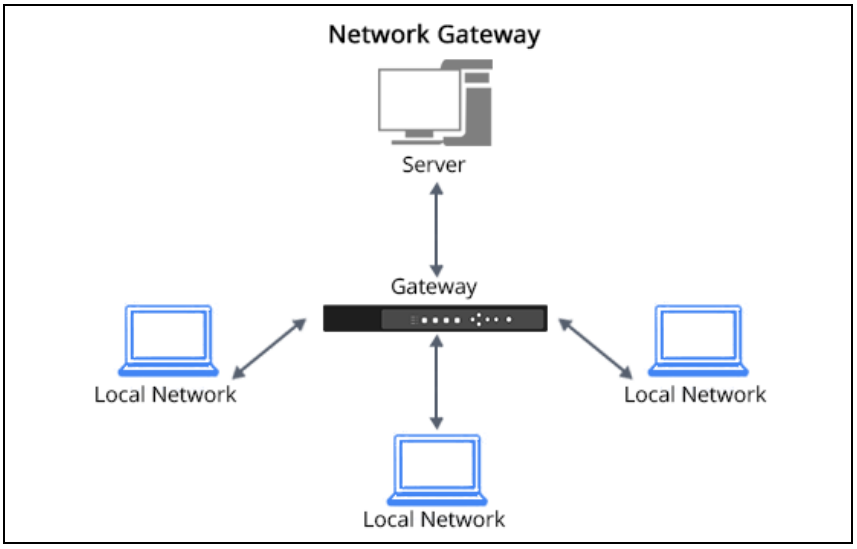
5. Router

- **Definition:** A router is a device that connects different networks and operates at Layer 3 (Network Layer). It is essential for connecting a local network to a wide area network (WAN), such as the internet.
- **Working:** Routers use IP addresses to determine the best path for data packets to travel between different networks. They maintain a routing table to make informed decisions about where to forward packets, ensuring they reach their intended destination efficiently. Routers can also provide security features like firewalls.
- **Short Notes:** Connects different networks, operates at Layer 3, uses IP addresses for routing, essential for internet connectivity.



6. Gateway

- **Definition:** A gateway is a device that connects two networks that use different protocols. It acts as an entry and exit point for a network and can operate across all seven layers of the OSI model.
- **Working:** A gateway functions as a protocol translator. It takes data from a network using one protocol and converts it to a format that a network using a different protocol can understand. This enables communication between otherwise incompatible systems. A router can also function as a gateway.
- **Short Notes:** Connects dissimilar networks, can operate at all layers, acts as a protocol translator.



Conclusion: Gain the knowledge about the Network Devices.

THANK YOU