Experiment No-04

AIM: Demonstrate the different types of topologies and types of transmission media by using a packet tracer tool

Objective

- To understand and implement different network topologies in Packet Tracer.
- To identify and demonstrate various transmission media (wired and wireless).

Apparatus/Software Required

- Computer system
- Cisco Packet Tracer software

PROBLEM STATMENT:

Demonstrate the different types of topologies and types of transmission media by using a packet tracer tool

OUTCOMES:
CO1: Demonstrate LAN and WAN protocol behavior using Modern Tools.
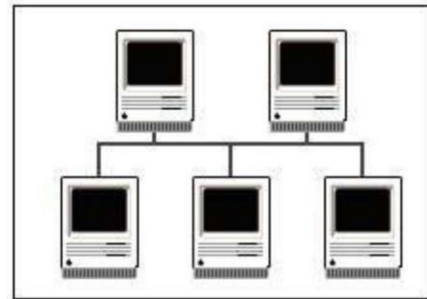
SOFTWARE & HARDWARE REQUIREMENTS:

- Software: Open source O.S.and wireshark, Cisco packet tracer tool

- Hardware: Computer, LAN Cards, RJ-45 Connectors, Switch, CAT-5 Cable, Cable tester, Crimping tool, etc.
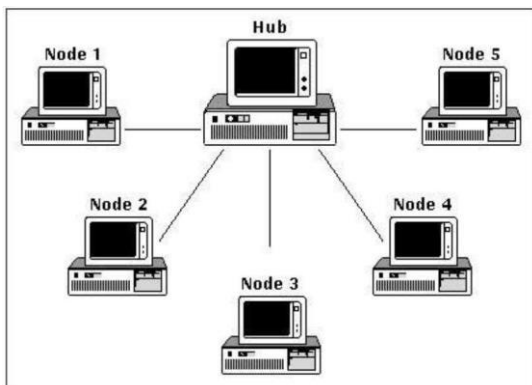
THEORY:

Demonstrate the all types of topologies using packet tracer tool

1. Bus Topologies:-

In a bus network configuration, each node is connected to one main communications line. With this arrangement, even if one of the nodes goes down, the rest of the network can continue to function normally.
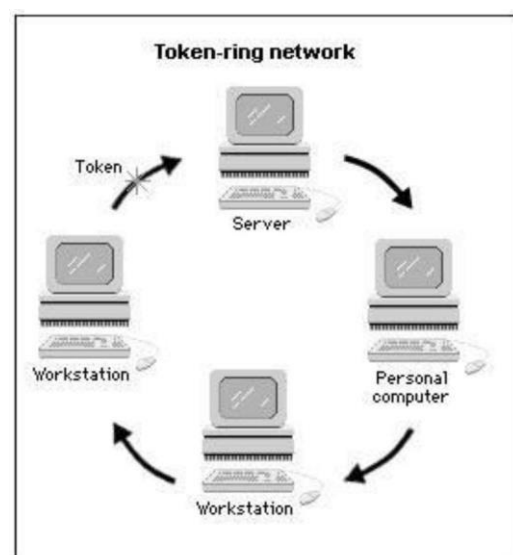
2. Star Topologies:-

A star network consists of several nodes connected to a central hub/switch in a star-shaped configuration. Messages from individual nodes pass directly to the hub/switch, which determines any further routing.
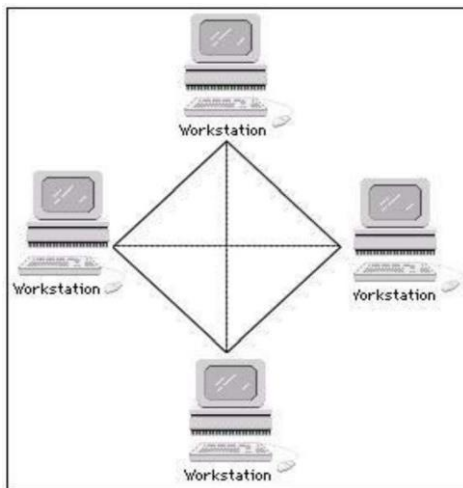
3. Ring Topology:-

Token Ring Network, in computer science, a LAN formed in a ring (closed loop) topology that uses token passing as a means of regulating traffic. On a token ring network, a token governing the right to transmit is passed from one station to the next in a physical circle. If a station has information to transmit, it "seizes" the token, marks it as being in use, and inserts the information. The "busy" token, plus message, is then passed around the circle, copied when it arrives at its

destination, and eventually returned to the sender. The sender removes the attached message and then passes the freed token to the next station in line. Token ring networks are defined in the IEEE 802.5 standards.
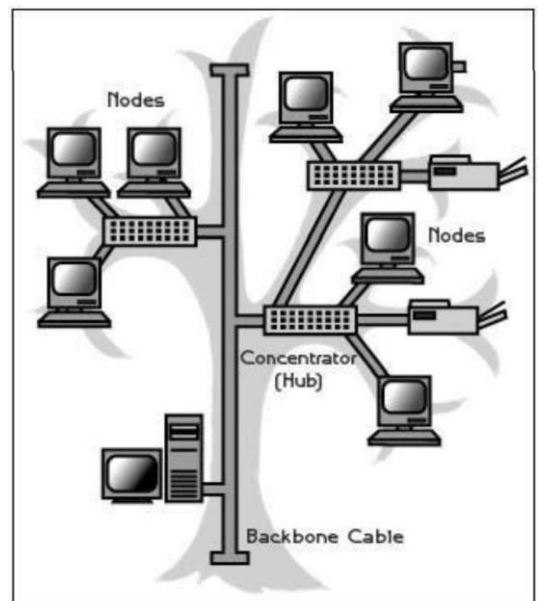
4. Mesh Topology:-

The type of network topology in which each of the nodes of the network is connected to each of the other nodes in the network with a point-to-point link – this makes it possible for data to be simultaneously transmitted from any single node to all of the other nodes.
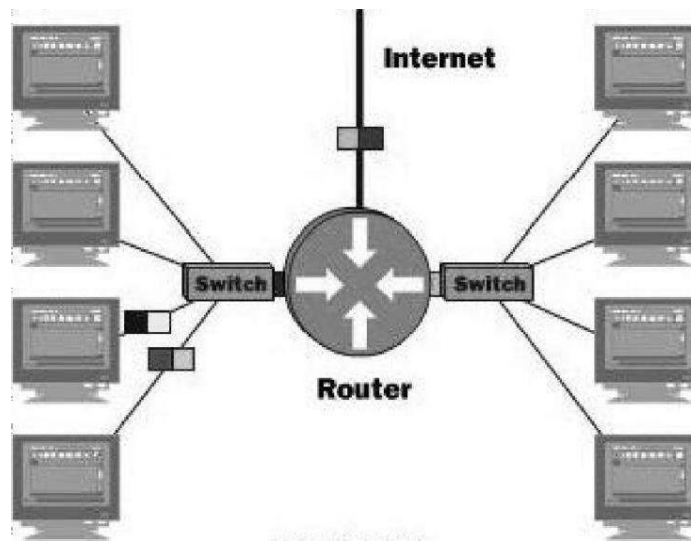
5. Hybrid/Tree Topology:-

A tree topology combines characteristics of linear bus and star topologies. It consists of groups of starconfigured workstations connected to a linear bus backbone cable.

These topologies can also be mixed. For example, a bus-star network consists of a high-bandwidth bus, called the *backbone*, which connects a collection of slowerbandwidth star segments.

How Routers Work:

Routers are the traffic cops of intranets. They make sure that all data gets sent to where it's supposed to go and that it gets sent via the most efficient route. Routers are also useful tools to make the most efficient use of the intranet. Routers are used to segment traffic and provide redundancy of routes. Routers use encapsulation to permit different protocols to be sent across otherwise incompatible networks.

Procedure

1. **Open Cisco Packet Tracer.**
2. **Create different topologies:**
   - **Bus Topology:** Place PCs in a line, connect them using a single coaxial cable (via hubs if needed).
   - **Star Topology:** Place PCs around a switch, connect with copper straight-through cables.
   - **Ring Topology:** Connect PCs in a circular loop using straight-through cables.
   - **Mesh Topology:** Connect each PC to every other PC using cables.
3. **Demonstrate transmission media:**
   - Use **Copper Straight-through** cable for PC to switch.
   - Use **Cross-over cable** for PC to PC direct connection.
   - Use **Fiber-optic cable** for high-speed backbone (Router ↔ Router).

    o   Add an **Access Point** and connect **Laptops/Wireless PCs** to show wireless media.

4. **Test connectivity:**

    o   Use the **ping command** in Command Prompt of PCs (ping <IP>) to verify.

    o   Observe the **simulation mode** to visualize packet transmission.

CONCLUSION:-