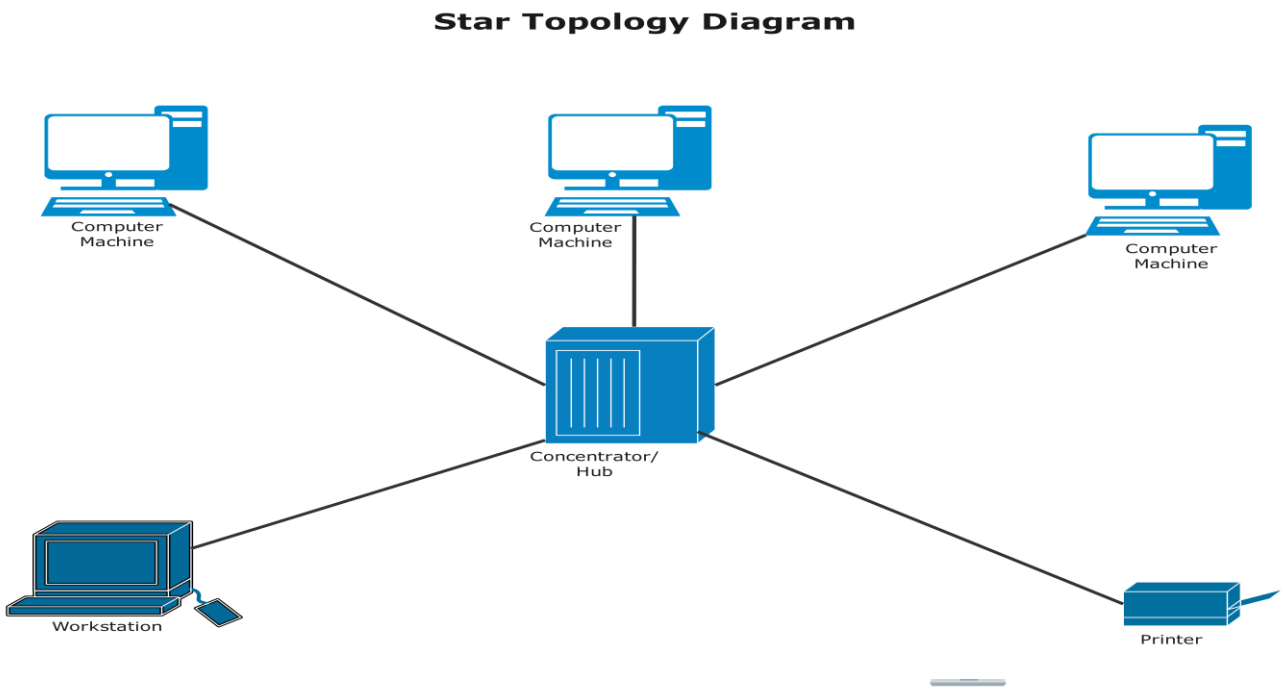
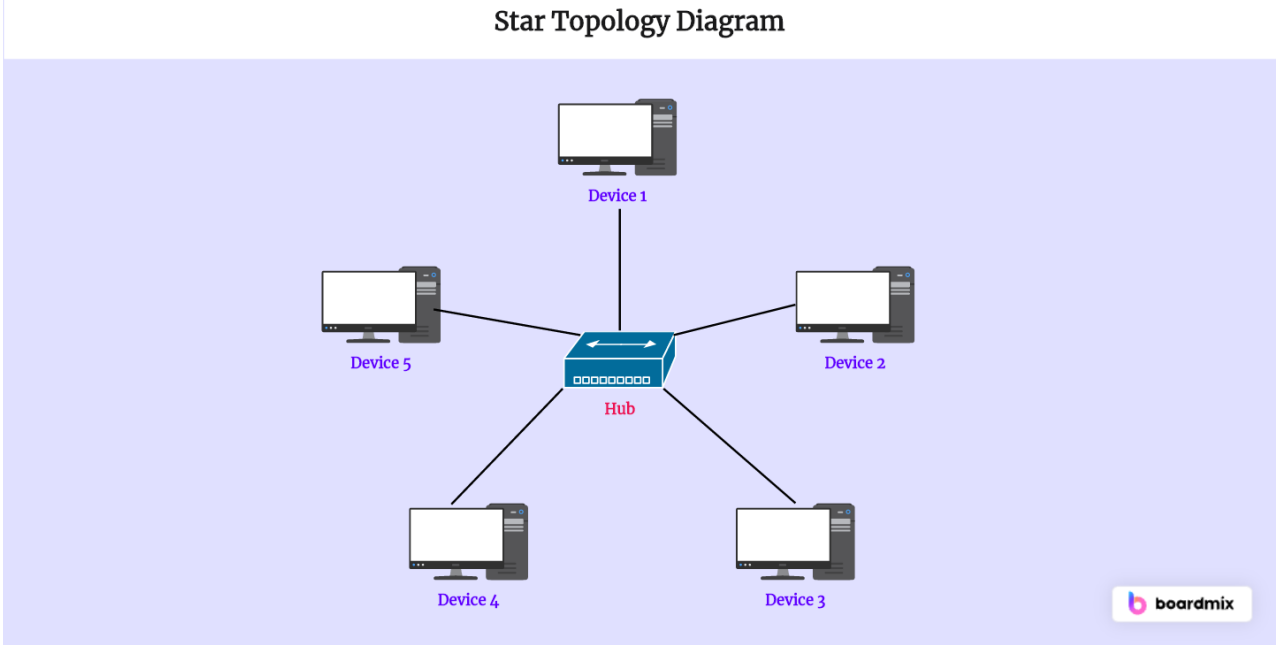
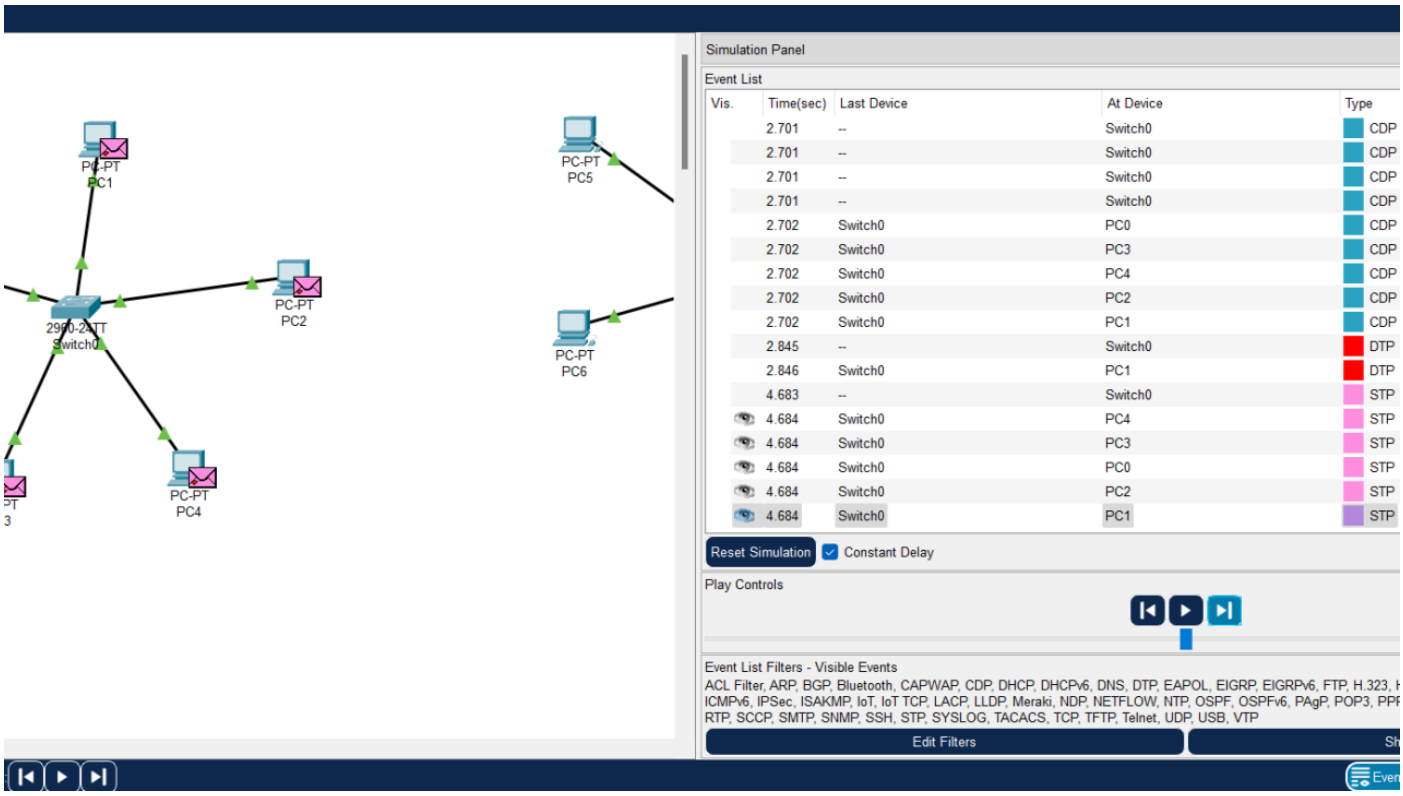
What is Star Topology?

Star topology is a network configuration in which **all computers (nodes) are connected to a central device**, such as a **hub, switch, or router**, using individual communication links (usually cables).

In this topology, **every data transmission must pass through the central device** before reaching its destination. The central device therefore controls and manages the entire network communication.







Key Components of Star Topology

- **Central device**: Switch, hub, or router
- **Nodes**: Computers, printers, servers, etc.
- **Transmission media**: Ethernet cables (UTP, STP, or fiber optic)
- **Network Interface Cards (NICs)** on each node

How Star Topology Works

1. A node sends data to the central device.
2. The central device checks the destination address.
3. The data is forwarded to the appropriate receiving node.
4. Other nodes are not affected by this communication.

Characteristics of Star Topology

- Each node has a **dedicated connection** to the central device.
- Failure of one cable affects **only one node**, not the entire network.
- Failure of the central device **brings down the whole network**.

Advantages of Star Topology

- **Easy to install and manage**
- **Fault detection is simple**
- **High performance**, especially when switches are used
- **Easy to expand** by adding new nodes
- One node failure does **not affect others**

Disadvantages of Star Topology

- **Central device dependency** (single point of failure)
- Requires **more cabling** than bus topology
- Higher **cost** due to switches and cables

Applications of Star Topology

- School computer laboratories
- Office Local Area Networks (LANs)
- Banking and corporate environments
- Home and small business networks

Steps in Star Topology Using Cisco Packet Tracer

Cisco Packet Tracer is a simulation tool used to design and test network topologies. Below are the **step-by-step procedures** for creating a **star topology** in Packet Tracer.

Step 1: Launch Cisco Packet Tracer

- Open **Cisco Packet Tracer** on your computer.
- You will see a blank workspace where devices can be placed.

Step 2: Add Network Devices

- From the **Device-Type Selection Box** at the bottom:
    - Click **End Devices**
    - Drag and drop multiple **PCs** (e.g., PC0, PC1, PC2, PC3) into the workspace.
- Click **Network Devices**
    - Select **Switches**
    - Drag and drop **one switch** (e.g., 2960 Switch) at the center.

Step 3: Arrange Devices in Star Form

- Place the **switch at the center**.
- Arrange the PCs **around the switch** to visually represent a star topology.

Step 4: Connect Devices with Cables

- Click **Connections** (lightning bolt icon).
- Select **Copper Straight-Through cable**.

- Connect:
  - PC0 → Switch (FastEthernet0/1)
  - PC1 → Switch (FastEthernet0/2)
  - PC2 → Switch (FastEthernet0/3)
  - PC3 → Switch (FastEthernet0/4)

Each PC must have **its own individual cable** connected to the switch.

Step 5: Configure IP Addresses

- Click on **PC0** → Desktop → IP Configuration
  - IP Address: 192.168.1.1
  - Subnet Mask: 255.255.255.0
- Repeat for other PCs:
  - PC1: 192.168.1.2
  - PC2: 192.168.1.3
  - PC3: 192.168.1.4

Ensure all PCs are on the **same network**.

Step 6: Test Network Connectivity

- Click **PC0** → Desktop → Command Prompt.
- Type:
- ping 192.168.1.2
- Repeat ping tests between other PCs.

✅ Successful replies indicate that the **star topology is working correctly**.

Step 7: Save the Project

- Click **File** → **Save**
- Give the project a name (e.g., *Star_Topology.pkt*)

Summary

Star topology is a **reliable, efficient, and widely used network design** where all nodes connect to a central device. In Cisco Packet Tracer, it is implemented by placing a switch at the center, connecting all end devices individually, configuring IP addresses, and testing communication.