Computer Networks Lab-1 (ce026)

Cisco Package Tracer:

It is a software tool developed by Cisco which provides network simulation to deal with simple and complex networks. It is use to learn principles of networks and it allow us to create network topologies and imitate modern computer networks. Packet Tracer allows us to create simulated network topologies by dragging and dropping routers, switches and various other types of network devices. Packet Tracer allows us to design complex and large networks, which is often not feasible with physical hardware, due to costs or availability.

Network Topology:

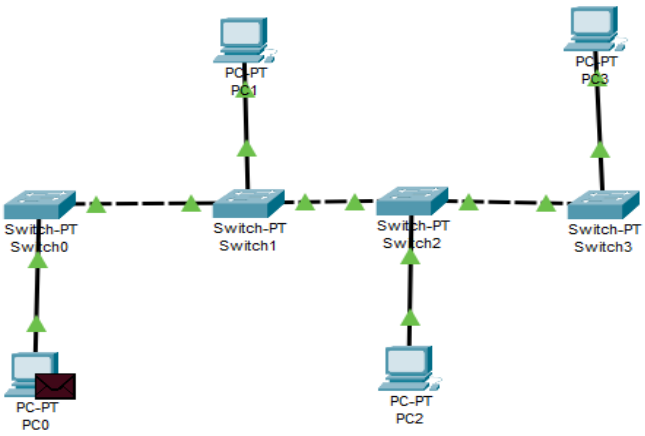
Topology defines the structure of the network of how all the components are interconnected to each other.

List of physical network topology :

- BUS
- RING
- TREE
- STAR
- MESH

Bus Topology

The bus topology is designed in such a way that all the stations are connected through a single cable known as a backbone cable. Each node is either connected to the backbone cable by drop cable or directly connected to the backbone cable. When a node wants to send a message over the network, it puts a message over the network. All the stations available in the network will receive the message whether it has been addressed or not.



- **Advantages of Bus topology:**

  Low-cost cable

  Limited failure

- **Disadvantages of Bus topology:**

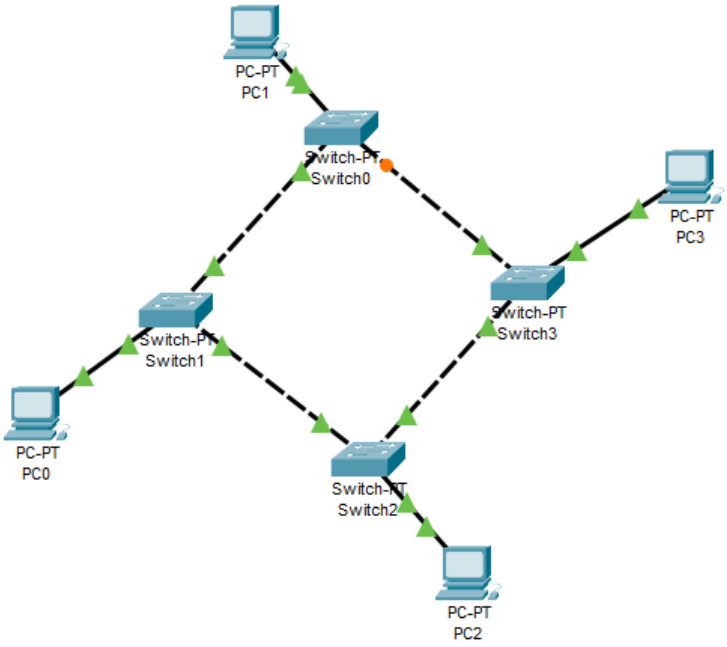
  Extensive cabling

  Signal interference

  Difficult troubleshooting

Ring Topology

Ring topology is like a bus topology, but with connected ends. The node that receives the message from the previous computer will retransmit to the next node. The data flows in one direction (loop).It has no terminated ends.



- **Advantages of Ring topology:**

  Product availability

  Cost

  Reliable

- **Disadvantages of Ring topology:**

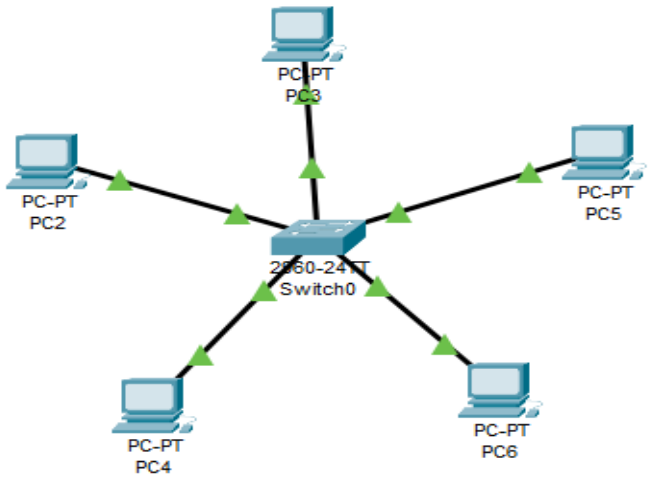
  Difficult troubleshooting

  Delay

  Reconfiguration difficult

Star Topology

Star topology is an arrangement of the network in which every node is connected to the central hub, switch or a central computer. The central computer is known as a server, and the peripheral devices attached to the server are known as clients.



- **Advantages of Star topology**

  Efficient troubleshooting

  Limited failure

  Cost effective

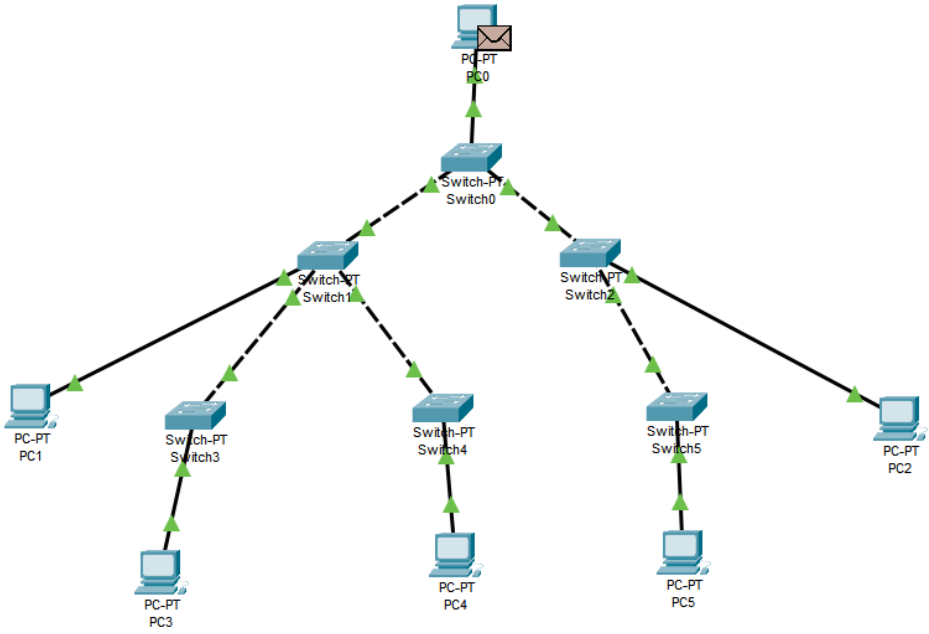
- **Disadvantages of Star topology**

  A Central point of failure

  Cable

Tree Topology

Tree topology combines the characteristics of bus topology and star topology. A tree topology is a type of structure in which all the computers are connected with each other in hierarchical fashion.



- **Advantages of Tree topology:**

  Easily expandable

  Easily manageable

  Easy Error detection

  Limited failure

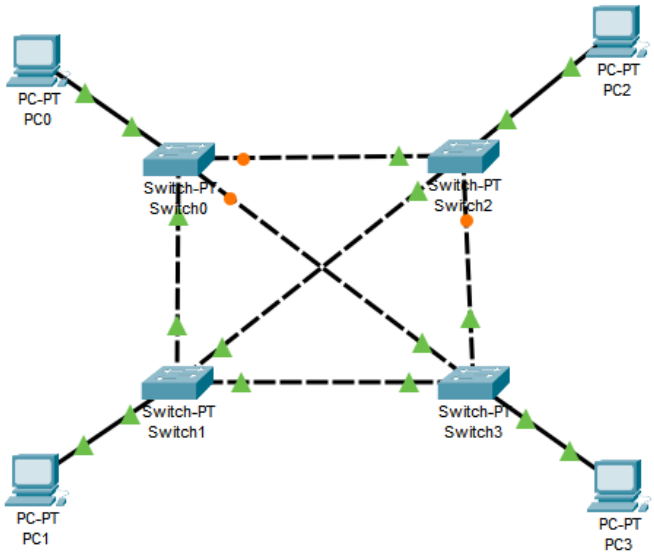
- **Disadvantages of Tree topology:**

  Difficult troubleshooting

  High cost

Mesh Topology

Mesh technology is an arrangement of the network in which computers are interconnected with each other through various redundant connections. There are multiple paths from one computer to another computer. It does not contain the switch, hub or any central computer which acts as a central point of communication.



- **Advantages of Mesh topology:**

  Reliable

  Fast Communication

- **Disadvantages of Mesh topology:**

  Cost

  Management

  Efficiency

- **Difference between SWITCH and HUB:**

SWITCH	HUB
It is operated in data link layer.	It is operated in physical layer.
Varied ports have separate collision domains.	Just a singular domain of collision is present in a hub.
Transmission mode is Full duplex	Transmission mode is Half-duplex
Allow connecting multiple devices and ports.	To connect a network of personal computers should be joined through a central hub.
No collisions occur in a full-duplex switch.	Collisions occur mostly in setups using hubs

- **Difference between straight and cross cable:**

When we connect two devices of different types together, we use a **straight** through **cable** and When we connect two devices of the same type together, we use a **crossover cable**.