

Topology

Definition of Network Topology:

Network topology can be defined as *“the physical and logical arrangements of nodes and connections in a network.”* Nodes usually include devices such as switches, routers and software with switch and router features.

Types of the network topology:

There are several types of topologies:

- Bus topology
- Star topology
- Ring topology
- Mesh topology
- Tree topology
- Hybrid topology

Bus topology:

In the bus topology network topology, every node is connected in series along a single cable. This arrangement is found today primarily in the cable broadband distribution networks.

Star topology:

In a star topology network topology, a central device connects to all other nodes through a central hub. Most wired home and office network are the common examples of star topology.

Ring topology:

In the ring topology, the nodes are connected in a closed-loop configuration. Some rings pass data in one direction only, while others are capable of transmission in both directions. Industrial control system and SONET are common examples of ring topology.

Mesh topology:

In the mesh network topology, each node is connected to every other in the network. This topology is often used in the large organization or companies because it handles a large amount of data traffic and can be easily expended. This topology links nodes with connections so that multiple paths between at least some points of the network are available.

Tree topology:

The tree topology consists of one root node and all other nodes are connected in a hierarchy. the topology itself is connected in a star configuration. Ethernet switch network is configured as trees.

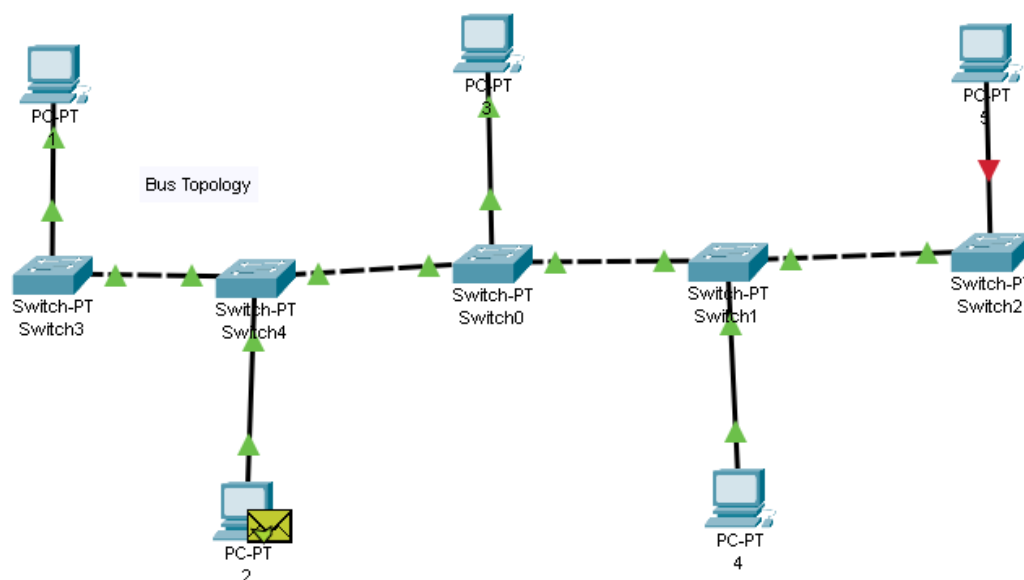
Hybrid Topology:

The combination of two or more topologies is called the hybrid network topology. Hybrid network topology typically provide exceptional flexibility as they can accommodate a number of steps. Different departments of same organization adapt the hybrid topology

Task # 01

Bus topology:

“In the bus topology network topology, every node is connected in series along a single cable. This arrangement is found today primarily in the cable broadband distribution networks”



Procedure:

- First five computers are taken and their names are set.
- four PT-switch are taken A wire connection is made between them.
- Then each computer is assigned an IP address.
- left click on each computer and go to the desktop and assign an IP address.
- By going to the packet tracer's PC command line and typing ping, the IP address of the receiver's computer is written and a message is passed to it, which, if correct, tells us that our network is correct.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.4
|
Pinging 192.168.0.4 with 32 bytes of data:

Reply from 192.168.0.4: bytes=32 time=1ms TTL=128
Reply from 192.168.0.4: bytes=32 time=1ms TTL=128
Reply from 192.168.0.4: bytes=32 time=1ms TTL=128
Reply from 192.168.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
```

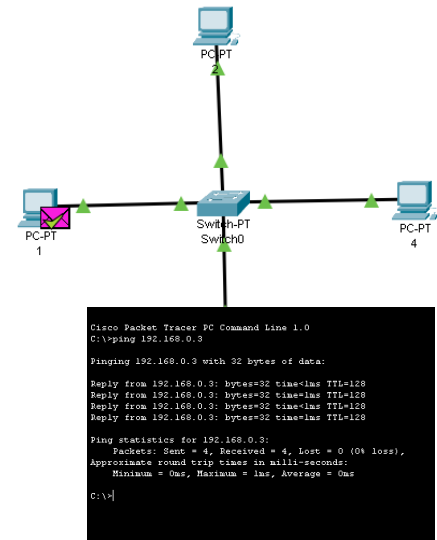
Task # 02

Start topology

“In a star topology network topology, a central device connects to all other nodes through a central hub. Most wired home and office network are the common examples of star topology.”

Procedure:

- To build Star topology first take four computers and a central switch connect them with wires.
- Assign each computer a unique IP address.
- Ping it from the command line. write the IP address of the receiver computer and run it and it will prove that your network is correct.
- After that see the message delivered between them. will be completed



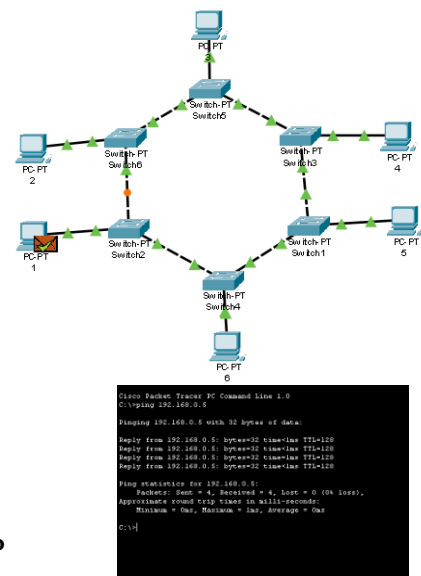
Task # 03

Ring topology

“In the ring topology, the nodes are connected in a closed-loop configuration. Some rings pass data in one direction only, while others are capable of transmission in both directions. Industrial control system and SONET are common examples of ring topology.”

Procedure:

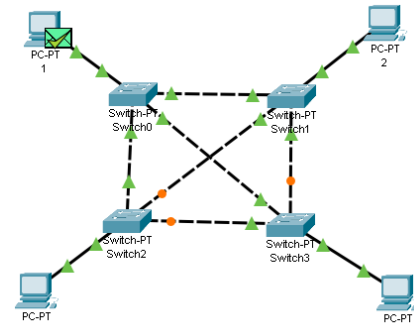
- To construct the ring topology, first take six computers and six PT switches.
- then arrange them and connect them with wires.
- Assign a unique IP address to each computer.
- Go to the command line and type ping and write the IP address of the receiver computer, which if correct will prove that your network is correct and, in this way, the up message will be delivered to the network.



Task # 04

Mesh topology

“In the mesh network topology, each node is connected to every other in the network. This topology is often used in the large organization or companies because it handles a large amount of data traffic and can be easily expanded. This topology links nodes with connections so that multiple paths between at least some points of the network are available.”



Procedure:

- 1. To create a mesh topology, first take four computers and four switches and connect them together.
- 2. After that assign a unique IP address to each PC.
- 3. Go to the Cisco command line and write the address of the receiver computer with PING and it will be written after clicking on the sender computer.
- 4. And thus, after delivering the message our mesh topology will be complete.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

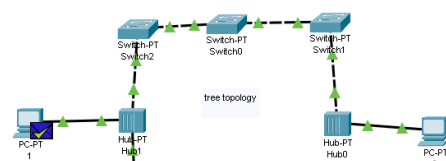
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time=23ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 23ms, Average = 6ms
C:\>
```

Task # 05

Tree topology

“The tree topology consists of one root node and all other nodes are connected in a hierarchy. the topology itself is connected in a star configuration. Ethernet switch network is configured as trees.”



Procedure:

- 1. To make the Tree topology we first took three PT-Switches and two hubs and three computers and arranged them.
- 2. connect them with the wire.
- 3. Each PC is assigned a unique IP address after making a connection between them. Each PC is assigned a unique IP address after making a connection between them.
- 4. After that, after clicking on the center computer, go to the command line and type ping and write the address of the receiver computer.
- 5. send your message between them to complete the topology.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

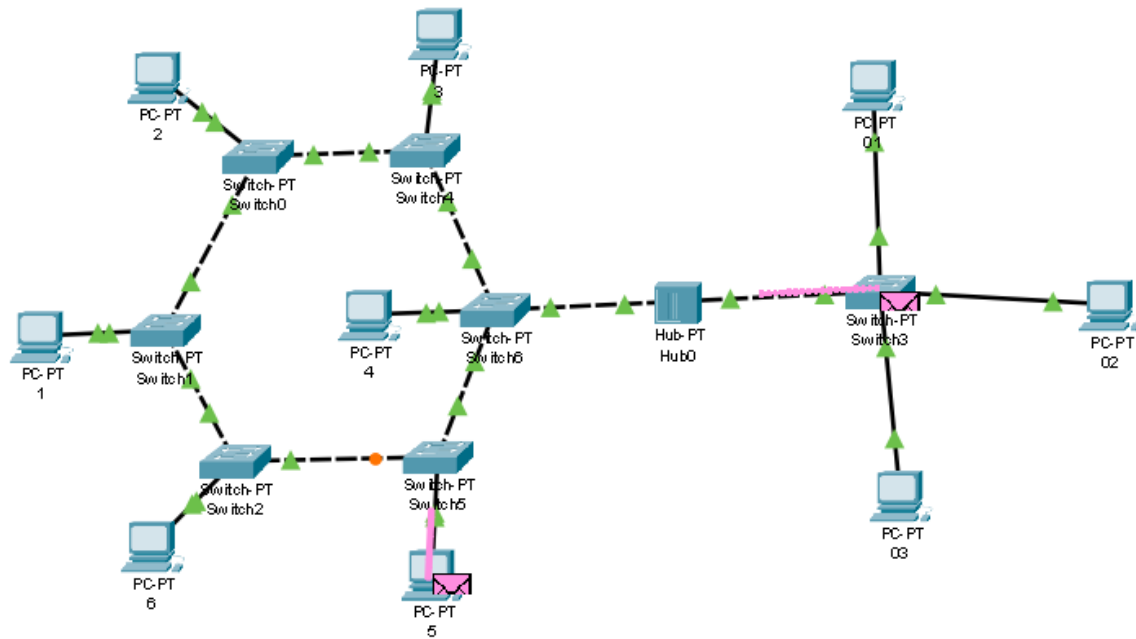
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time=11ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 3ms
C:\>
```

Task # 06

Hybrid topology

“The combination of two or more topologies is called the hybrid network topology. Hybrid network topology typically provide exceptional flexibility as they can accommodate a number of steps. Different departments of same organization adapt the hybrid topology “



Procedure:

- 1.To create a hybrid topology, we have to combine two topologies First we took six computers and six switches to create a ring topology and connected them between them.
- 2. and after giving each computer an IP address we created a star topology network system.
- 3.And connected both of them through a hub.
- 4. After clicking on the sender computer, go to the command line and type ping and write the IP address of the receiver computer.
- 5.And complete your hybrid topology network by doing message passing

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.9

Pinging 192.168.0.9 with 32 bytes of data:

Reply from 192.168.0.9: bytes=32 time<1ms TTL=128
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128
Reply from 192.168.0.9: bytes=32 time=10ms TTL=128
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>
```