

Aim: Study & Verification of standard Network topologies i.e., Star, Tree, Bus etc. (Tool used: Packet Tracer)

Apparatus (Software): Packet tracer Software

Procedure: To implement this practical following network topology is required to be configured using the commands learned in previous practical. After configuring the given network, a packet should be ping from any one machine to another.

- Network topology is the arrangement of the various elements (links, nodes, etc.) of a computer network.
- Essentially, it is the topological structure of a network, and may be depicted physically or logically.
- Physical topology refers to the placement of the network's various components, including device location and cable installation, while logical topology shows how data flows within a network, regardless of its physical design. Distances between nodes, physical interconnections, transmission rates, and/or signal types may differ between two networks, yet their topologies may be identical.
- A good example is a local area network (LAN): Any given node in the LAN has one or more physical links to other devices in the network; graphically mapping these links results in a geometric shape that can be used to describe the physical topology of the network. Conversely, mapping the data flow between the components determines the logical topology of the network.

There are two basic categories of network topologies:

1. Physical topologies
2. Logical topologies
 1. The shape of the cabling layout used to link devices is called the physical topology of the network. This refers to the layout of cabling, the locations of nodes, and the interconnections between the nodes and the cabling.
 2. The physical topology of a network is determined by the capabilities of the network access devices and media, the level of control or fault tolerance desired, and the cost associated with cabling or telecommunications circuits.

Logical topologies are often closely associated with Media Access Control methods and protocols. Logical topologies are able to be dynamically reconfigured by special types of equipment such as routers

and switches.

The study of network topology recognizes eight basic topologies: - Bus Topology

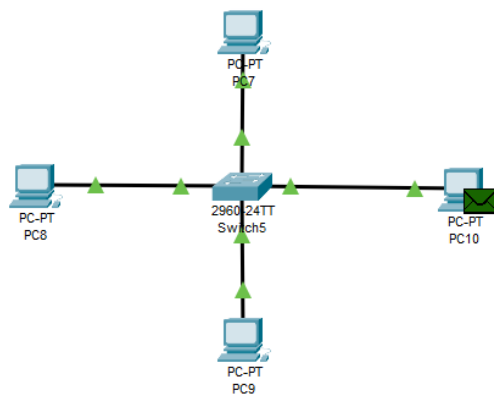
- Star Topology
- Ring or circular Topology
- Mesh Topology
- Tree Topology

Creating of network topology using Cisco Packet tracer is Very easy. By help of its inbuilt tools and functionality user can create topology in very easy ways.

The Star Topology can be done as following steps.

- Select SWITCH Device Type Selection Box.
- Then select SWITCH-PT from Device- Specific Selection Box. - Now Put That SWITCH to the workspace.
- Now Select the few ends device from the selection boxes. - Put all end devices on workspace.
- Now select connection from the selection box.
- Then select 'Automatically choose connection type'.
- Joint the end devices and SWITCH in star connection. - After Joining the Devices, you'll see the Star topology is running. - You can change the Configuration as you want.

STAR TOPOLOGY USING SWITCH



Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC8	ICMP
	0.001	PC8	Switch5	ICMP
	0.002	Switch5	PC10	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.002 s

Play Controls

Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL,

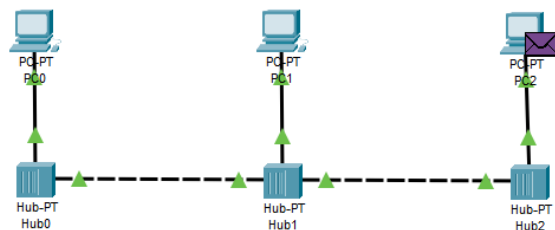
Ping:

```
Pinging 192.168.12.11 with 32 bytes of data:

Reply from 192.168.12.11: bytes=32 time=1ms TTL=128
Reply from 192.168.12.11: bytes=32 time<1ms TTL=128
Reply from 192.168.12.11: bytes=32 time<1ms TTL=128
Reply from 192.168.12.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.12.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

BUS TOPOLOGY USING SWITCHES :



Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC0	ICMP
	0.001	PC0	Hub0	ICMP
	0.002	Hub0	Hub1	ICMP
	0.003	Hub1	PC1	ICMP
	0.003	Hub1	Hub2	ICMP
<input checked="" type="checkbox"/>	0.004	Hub2	PC2	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Ping Check :

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.12.4

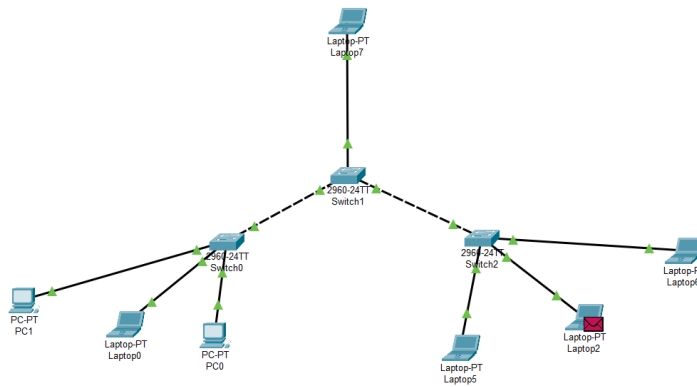
Pinging 192.168.12.4 with 32 bytes of data:

Reply from 192.168.12.4: bytes=32 time=2ms TTL=128
Reply from 192.168.12.4: bytes=32 time=2ms TTL=128
Reply from 192.168.12.4: bytes=32 time<1ms TTL=128
Reply from 192.168.12.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.12.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 1ms

C:\>|
```

TREE TOPOLOGY USING SWITCHES



The screenshot displays the 'Simulation Panel' with the 'Event List' tab selected. The event list contains five entries, with the third entry (Time: 0.003, Device: Laptop2, Type: ICMP) highlighted in orange. Below the event list, the 'Event List Filters - Visible Events' section shows a list of protocols: ACL Filter, ARP, BGP, Bluetooth, CAPWAP, DHCP, DHCP6, DNS, DTP, EAPOL, EIGRP, ESP, GRE, FTP, H.323, HTTP, HTTPS, ICMP, and IPsec. The 'ACL Filter' is currently selected.

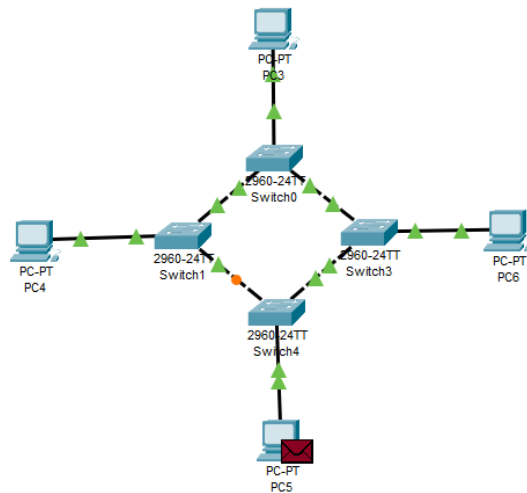
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	Laptop7	ICMP
	0.001	Laptop7	Switch1	ICMP
	0.002	Switch1	Switch2	ICMP
	0.003	Switch2	Laptop2	ICMP
	0.004	Laptop2	Switch2	ICMP

Below the event list, there is a 'Reset Simulation' button and a 'Constant Delay' checkbox (checked). To the right, it says 'Captured to: 0.004 s'. Below this is a 'Play Controls' section with four buttons: a left arrow, a right arrow, a double left arrow, and a double right arrow. A blue vertical bar is positioned below the double left arrow button.

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, DHCP, DHCP6, DNS, DTP, EAPOL, EIGRP, ESP, GRE, FTP, H.323, HTTP, HTTPS, ICMP, IPsec

RING TOPOLOGY USING SWITCHES :



Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC4	ICMP
	0.001	PC4	Switch1	ICMP
	0.002	Switch1	Switch0	ICMP
	0.003	Switch0	Switch3	ICMP
	0.004	Switch3	Switch4	ICMP
	0.005	Switch4	PC5	ICMP

Reset Simulation ☒ Constant Delay Captured to 0.005

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPC, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

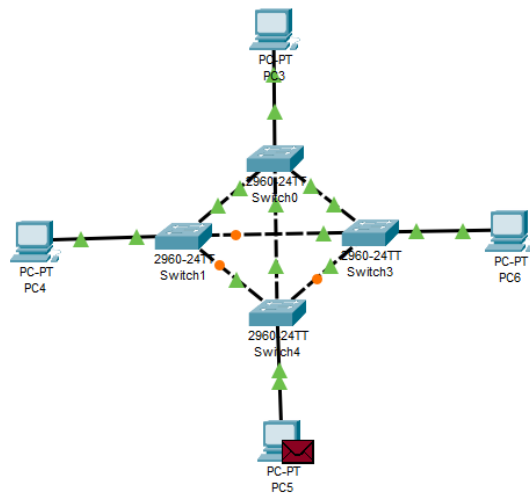
Ping Check :

```
Pinging 192.168.12.9 with 32 bytes of data:

Reply from 192.168.12.9: bytes=32 time<1ms TTL=128
Reply from 192.168.12.9: bytes=32 time<1ms TTL=128
Reply from 192.168.12.9: bytes=32 time<1ms TTL=128
Reply from 192.168.12.9: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.12.9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

MESH TOPOLOGY USING SWITCHES :



Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC4	ICMP
	0.001	PC4	Switch1	ICMP
	0.002	Switch1	Switch0	ICMP
	0.003	Switch0	Switch4	ICMP
<input checked="" type="checkbox"/>	0.004	Switch4	PC5	ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Ping Check :

```
Pinging 192.168.12.9 with 32 bytes of data:

Reply from 192.168.12.9: bytes=32 time=2ms TTL=128
Reply from 192.168.12.9: bytes=32 time<1ms TTL=128
Reply from 192.168.12.9: bytes=32 time=1ms TTL=128
Reply from 192.168.12.9: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.12.9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms
```