Lab Record

of

Computer Networks

(CSF303)

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Session 2022-23

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Experiment - 1

Aim: Study of transmission media.

Transmission media is a communication channel that carries the information from the sender to the receiver. Data is transmitted through the electromagnetic signals. The main functionality of the transmission media is to carry the information in the form of bits through LAN(Local Area Network).

In OSI(Open System Interconnection) phase, transmission media supports the Layer 1. Therefore, it is considered to be as a Layer 1 component.

Transmission media are of two types:

1. Guided Media

It is also referred to as Wired or Bounded transmission media. Signals being transmitted are directed and confined in a narrow pathway by using physical links.

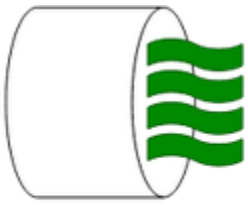
Features: High Speed, secure, used for comparatively shorter distances.

There are 3 major types of Guided Media:

(I) **Twisted Pair Cable**

It consists of 2 separately insulated conductor wires wound about each other. Generally, several such pairs are bundled together in a protective sheath. They are the most widely used Transmission Media. Twisted Pair is of two types:

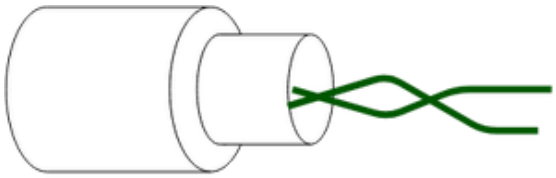
- **Unshielded Twisted Pair (UTP):**
  UTP consists of two insulated copper wires twisted around one another. This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. It is used for telephonic applications.



Unshielded Twisted Pair

- **Shielded Twisted Pair (STP):**

This type of cable consists of a special jacket (a copper braid covering or a foil shield) to block external interference. It is used in fast-data-rate Ethernet and in voice and data channels of telephone lines.



Shielded Twisted Pair

(II) **Coaxial Cable**

It has an outer plastic covering containing an insulation layer made of PVC or Teflon and 2 parallel conductors each having a separate insulated protection cover. The coaxial cable transmits information in two modes: Baseband mode(dedicated cable bandwidth) and Broadband mode(cable bandwidth is split into separate ranges). Cable TVs and analogue television networks widely use Coaxial cables.

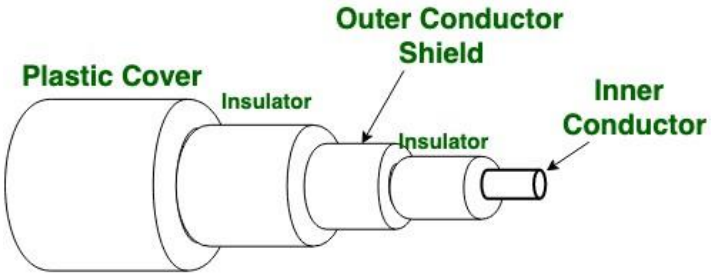


Figure of Coaxial Cable

(III) **Optical Fibre Cable**

It uses the concept of reflection of light through a core made up of glass or plastic. The core is surrounded by a less dense glass or plastic covering called the cladding. It is used for the transmission of large volumes of data.

The cable can be unidirectional or bidirectional. The WDM (Wavelength Division Multiplexer) supports two modes, namely unidirectional and bidirectional mode.

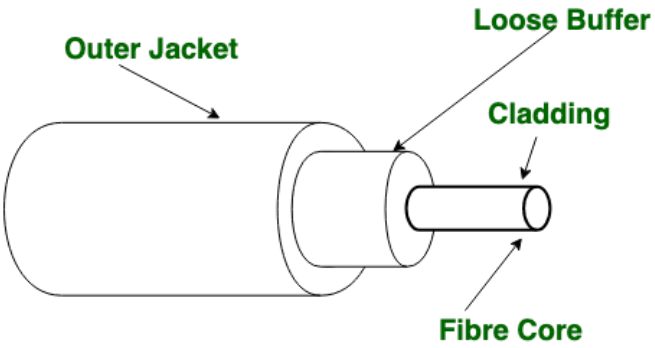


Figure of Optical Fibre Cable

2. Unguided Media:

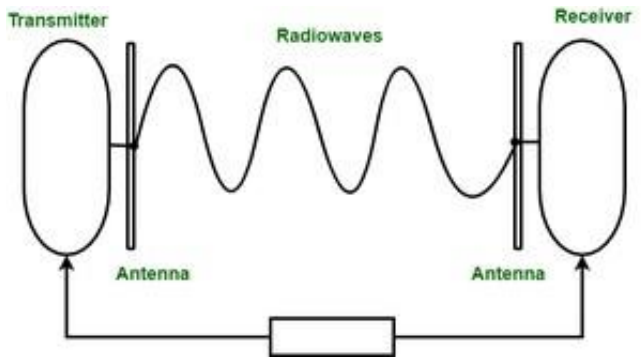
It is referred to as Wireless or Unbounded transmission media. No physical medium is required for the transmission of electromagnetic signals.

Features: The signal is broadcasted through air, less Secure, used for larger distances.

There are 3 types of Signals transmitted through unguided media:

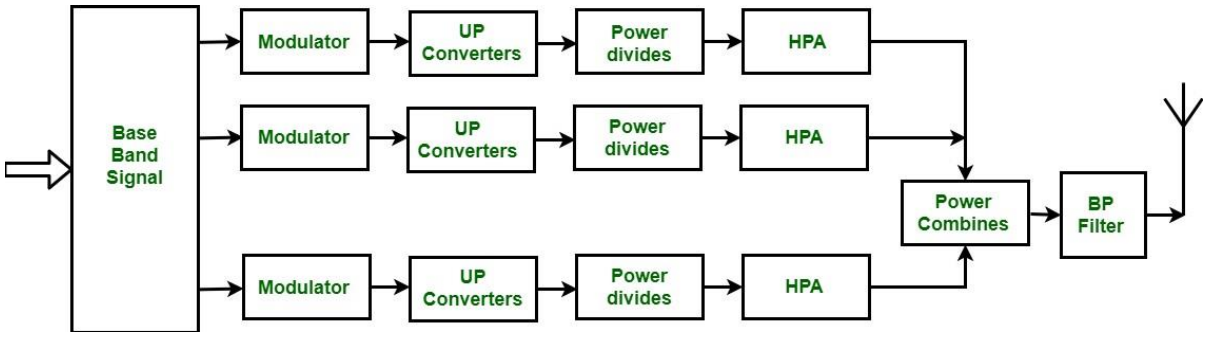
(I) **Radio waves**

These are easy to generate and can penetrate through buildings. The sending and receiving antennas need not be aligned. Frequency Range:3KHz – 1GHz. AM and FM radios and cordless phones use Radio waves for transmission.



(ii) **Microwaves**

It is a line-of-sight transmission i.e., the sending and receiving antennas need to be properly aligned with each other. The distance covered by the signal is directly proportional to the height of the antenna. Frequency Range:1GHz – 300GHz. These are majorly used for mobile phone communication and television distribution.



(iii) **Infrared**

Infrared waves are used for very short distance communication. They cannot penetrate through obstacles. This prevents interference between systems. Frequency Range:300GHz – 400THz. It is used in TV remotes, wireless mouse, keyboard, printer, etc.

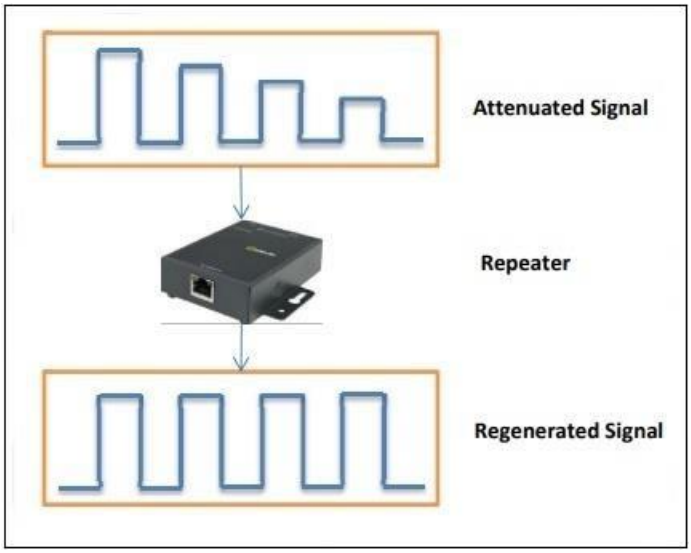
Experiment – 2

Aim: Study of various network connecting devices.

A computer network's network devices allow various hardware components to connect. Physical devices, networking hardware, and network equipment are all terms used to describe these devices, also known as computer networking devices. Each network device in a computer network performs a certain function based on its capabilities, so it serves different objectives at various segments.

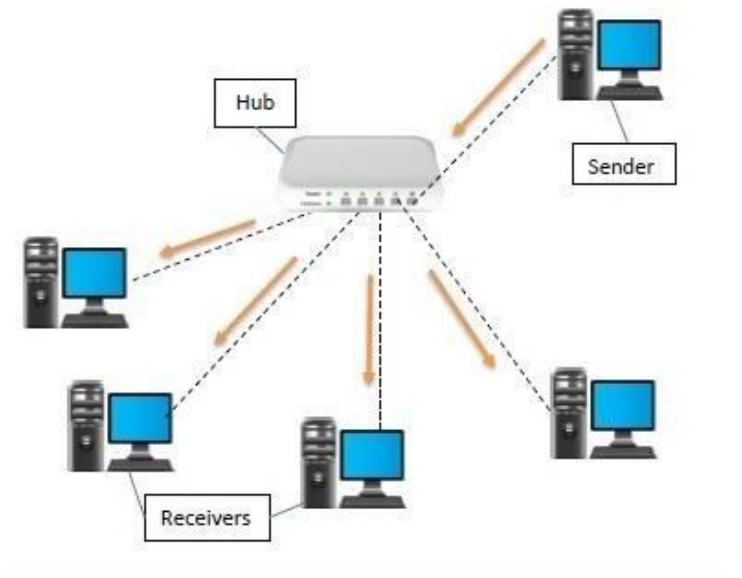
1. Repeater

A repeater operates at the physical layer. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which the signal can be transmitted over the same network. An important point to be noted about repeaters is that they do not amplify the signal. When the signal becomes weak, they copy the signal bit by bit and regenerate it at the original strength. It is a 2-port device.



2. Hub

A hub is basically a multiport repeater. A hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different stations. Hubs cannot filter data, so data packets are sent to all connected devices. In other words, the collision domain of all hosts connected through Hub remains one. Also, they do not have the intelligence to find out the best path for data packets which leads to inefficiencies and wastage.

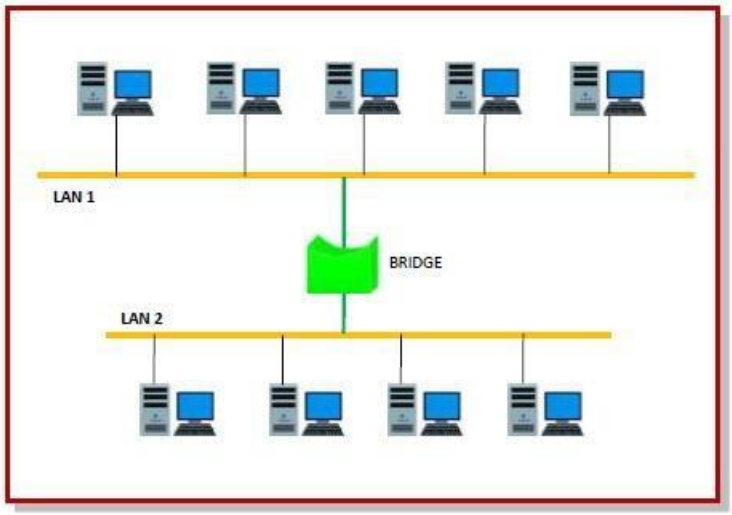


Types of Hubs

- **Active Hub:-** These are the hubs that have their own power supply and can clean, boost, and relay the signal along with the network. It serves both as a repeater as well as a wiring centre. These are used to extend the maximum distance between nodes.
- **Passive Hub :-** These are the hubs that collect wiring from nodes and power supply from the active hub. These hubs relay signals onto the network without cleaning and boosting them and can't be used to extend the distance between nodes.
- **Intelligent Hub :-** It works like active hubs and includes remote management capabilities. They also provide flexible data rates to network devices. It also enables an administrator to monitor the traffic passing through the hub and to configure each port in the hub.

3. Bridge

A bridge operates at the data link layer. A bridge is a repeater, with add on the functionality of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2-port device.

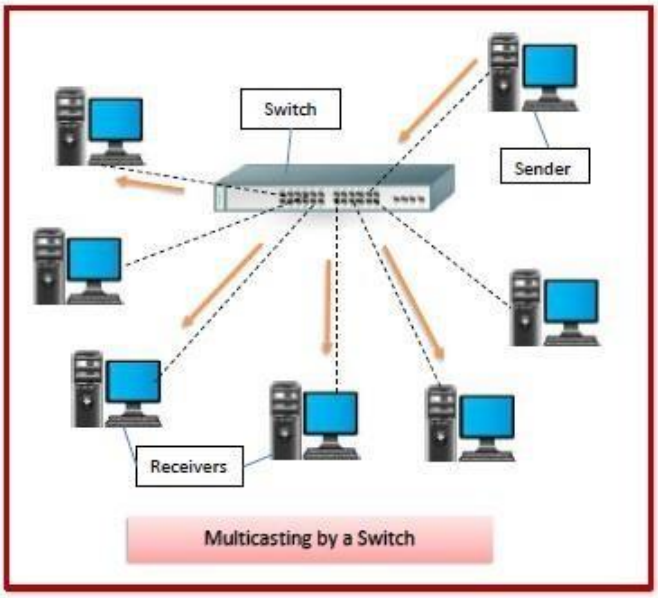


Types of Bridges

- **Transparent Bridges:-** These are the bridge in which the stations are completely unaware of the bridge's existence i.e., whether or not a bridge is added or deleted from the network, reconfiguration of the stations is unnecessary. These bridges make use of two processes i.e., bridge forwarding and bridge learning.
- **Source Routing Bridges:-** In these bridges, routing operation is performed by the source station and the frame specifies which route to follow. The host can discover the frame by sending a special frame called the discovery frame, which spreads through the entire network using all possible paths to the destination.

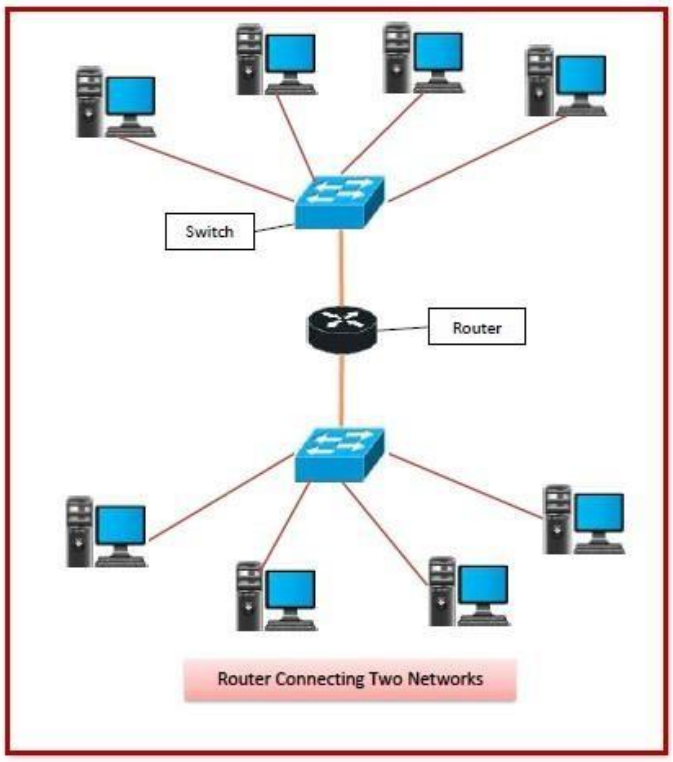
4. Switch

A switch is a multiport bridge with a buffer and a design that can boost its efficiency(a large number of ports imply less traffic) and performance. A switch is a data link layer device. The switch can perform error checking before forwarding data, which makes it very efficient as it does not forward packets that have errors and forward good packets selectively to the correct port only. In other words, the switch divides the collision domain of hosts, but broadcast domain remains the same.



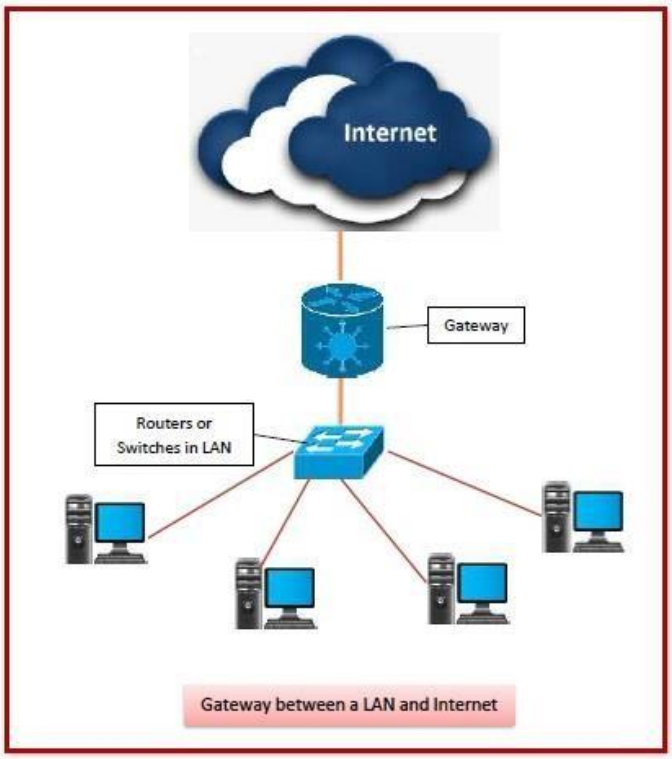
5. Routers

A router is a device like a switch that routes data packets based on their IP addresses. The router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it.



6. Gateway

A gateway, as the name suggests, is a passage to connect two networks together that may work upon different networking models. They basically work as the messenger agents that take data from one system, interpret it, and transfer it to another system. Gateways are also called protocol converters and can operate at any network layer. Gateways are generally more complex than switches or routers. Gateway is also called a protocol converter.



Experiment - 3

Aim: Study of different types of network and network topologies.

A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications.

A computer network can be categorized by their size. A computer network is mainly of four types:

1. **Local Area Network (LAN):** A LAN is a network that covers an area of around 10 kilometres. For example, a college network or an office network. Depending upon the needs of the organization, a LAN can be a single office, building, or Campus. We can have two PCs and one printer in-home office or it can extend throughout a company and include audio and video devices. Each host in LAN has an identifier, an address that defines hists in LAN. A packet sent by the host to another host carries both the source host's and the destination host's address.
2. **Metropolitan Area Network (MAN):** MAN refers to a network that covers an entire city. For example: consider the cable television network.
3. **Wide Area Network (WAN):** WAN refers to a network that connects countries or continents. For example, the Internet allows users to access a distributed system called www from anywhere around the globe. WAN interconnects connecting devices such as switches, routers, or modems. A LAN is normally privately owned by an organization that uses it. We see two distinct examples of WANs today: pointto-point WANs and Switched WANs.
4. **PAN(Personal Area Network):** Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters. Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network. Personal computer devices that are used to develop the personal area network are the laptop, mobile phones, media player and play stations. There are two types of Personal Area Networks, wired and wireless.

Network Topology

The arrangement of a network that comprises nodes and connecting lines via sender and receiver is referred to as network topology.
The various network topologies are:

1. Bus Topology:

Bus topology is a network type in which every computer and network device is connected to a single cable. It transmits the data from one end to another in a single direction. No bidirectional feature is in bus topology. It is a multi-point connection and a non-robust topology because if the backbone fails the topology crashes. In Bus Topology, various

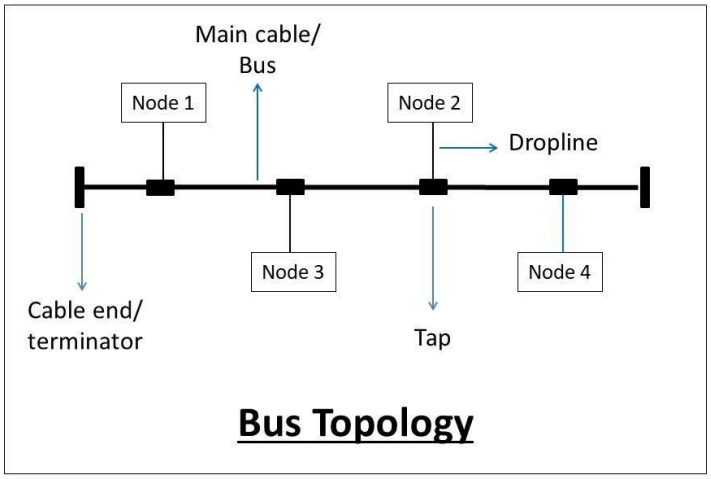
MAC (Media Access Control) protocols are followed by LAN ethernet connections like TDMA, Pure Aloha, CDMA, Slotted Aloha, etc.

Advantages:

- Easy to implement and extend.
- Less expensive because it requires least amount of cable to connect the computers together.
- Suitable and easy to use for small or temporary networks.
- For extension a repeater can also be used.

Disadvantages:

- Heavy network traffic can slow a bus.
- Proper termination is required.
- Fault in the bus cable stops all transmission.
- Difficult to administer.



2. Star Topology:

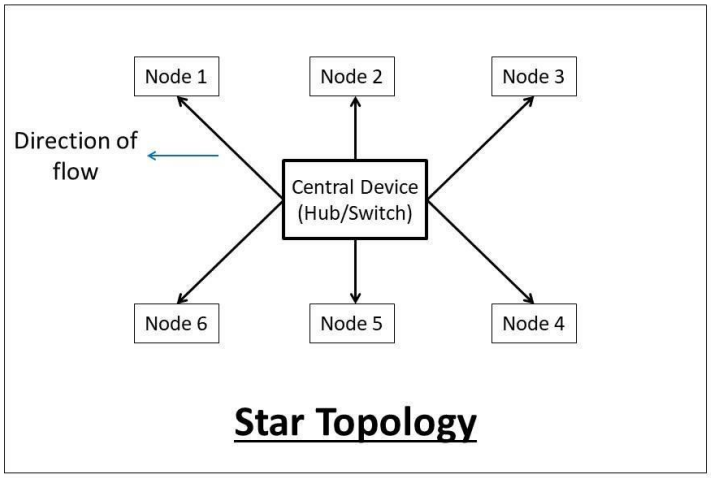
In star topology, all the devices are connected to a single hub through a cable. This hub is the central node and all other nodes are connected to the central node. The hub can be passive in nature i.e., not an intelligent hub such as broadcasting devices, at the same time the hub can be intelligent known as an active hub. Active hubs have repeaters in them. Coaxial cable or RJ-45 cables are used to connect the computers. In Star Topology, many popular Ethernet LAN protocols are used as CD(Collision Detection), CSMA (Carrier Sense Multiple Access), etc.

Advantages:

- Easy to diagnose network fault.
- Good performance.
- Scalable, easy to set up and to extend.
- Use of multiple cable types in the same network with a hub.

Disadvantages:

- Totally depend on a single hub.
- Expensive to install.



3. Ring Topology:

In this topology, it forms a ring connecting devices with exactly two neighbouring devices. A number of repeaters are used for Ring topology with a large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node. Hence to prevent data loss repeaters are used in the network.

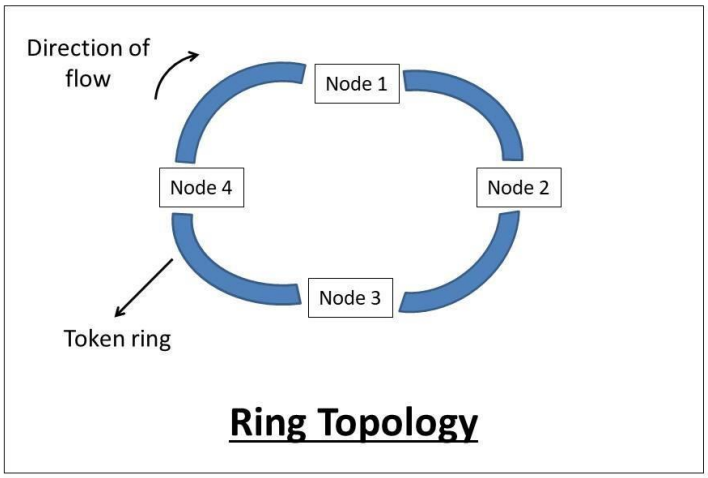
The data flows in one direction, i.e.., it is unidirectional, but it can be made bidirectional by having 2 connections between each Network Node, it is called Dual Ring Topology. InRing Topology, the Token Ring Passing protocol is used by the workstations to transmit the data.

Advantages:

- It offers high performance for a small number of workstations or for large networks where each station has a similar workload.
- Easy to extend.

Disadvantages:

- Adding and removing disrupt the network.
- Troubleshooting is difficult.



4. Mesh Topology:

Mesh topology is a computer network topology in which nodes are interconnected with each other. In other words, direct communication takes place between the nodes in the network.

There are mainly two types of Mesh:

Full Mesh: In which each node is connected to every other node in the network.

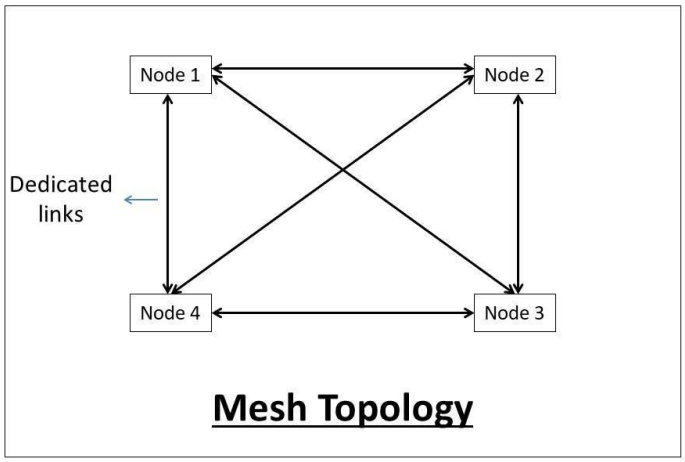
Partial Mesh: In which, some nodes are not connected to every node in the network.

Advantages:

- Robust.
- Fault diagnosis is easy.
- Provide security and privacy.
- Each connection can carry its own load.

Disadvantages:

- Cabling cost is more.
- Installation and configuration are difficult.



5. Tree Topology:

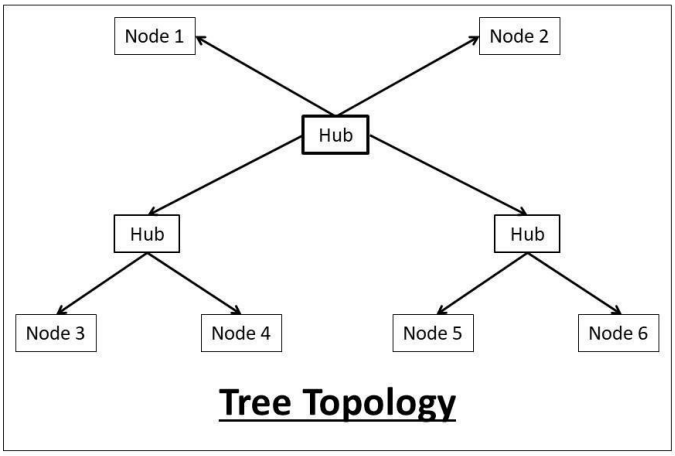
This topology is the variation of the Star topology. This topology has a hierarchical flow of data. In Tree Topology, SAC (Standard Automatic Configuration) protocols like DHCP and SAC are used.

Advantages:

- Easily managed and maintained.
- Error detection is easily done.
- Expansion of nodes is possible and easy.
- Extension of bus and star topologies.

Disadvantages:

- Heavily cabled.
- Central hub fails network fails.



6. Hybrid Topology :

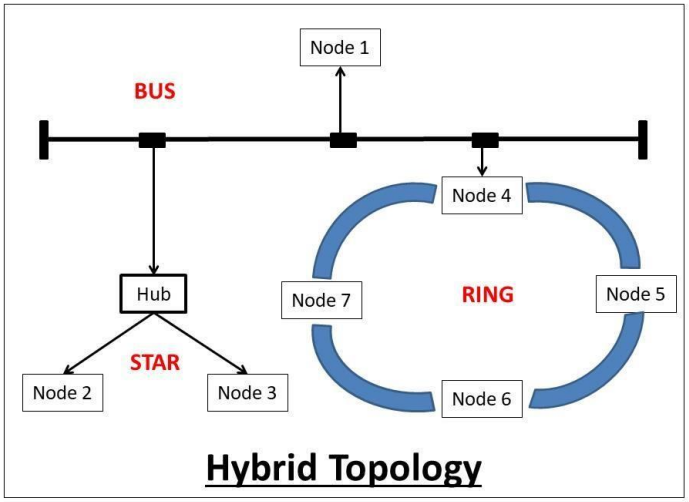
This topology technology is the combination of all the various types of topologies we have studied above. It is used when the nodes are free to take any form. It means these can be individuals such as Ring or Star topology or can be a combination of various types of topologies seen above. Each individual topology uses the protocol that has been discussed earlier.

Advantages:

- This topology is very flexible.
- the size of network can be easily expanded by adding new device.

Disadvantages:

- It is very difficult to design the architecture of the Hybrid Network.
- Hubs used in this topology are very expensive.
- The infrastructure cost is very high as hybrid network requires a lot of cabling, network devices.



Experiment - 4

Aim: Simulate a network having two communication node using cisco packet tracker.

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Akshat	ICMP		0.000	N	0	(edit)	
	Successful	Akshat	Mohit	ICMP		0.000	N	1	(edit)	

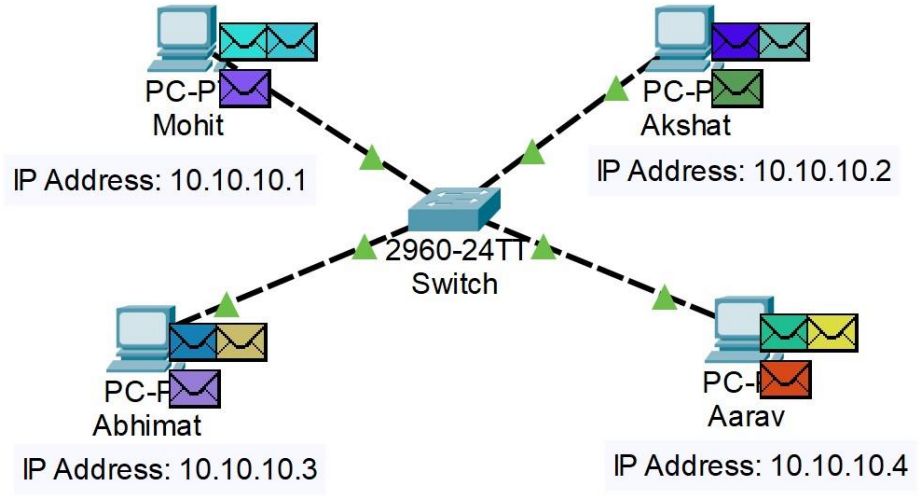
Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	Mohit	ICMP
	0.000	--	Mohit	ARP
	0.000	--	Akshat	ICMP
	0.000	--	Akshat	ARP
	0.001	Mohit	Akshat	ARP
	0.001	Akshat	Mohit	ARP
	0.002	Akshat	Mohit	ARP
	0.002	Mohit	Akshat	ARP
	0.002	--	Mohit	ICMP
	0.002	--	Akshat	ICMP
	0.003	Mohit	Akshat	ICMP
	0.003	Akshat	Mohit	ICMP
	0.004	Akshat	Mohit	ICMP
	0.004	Mohit	Akshat	ICMP

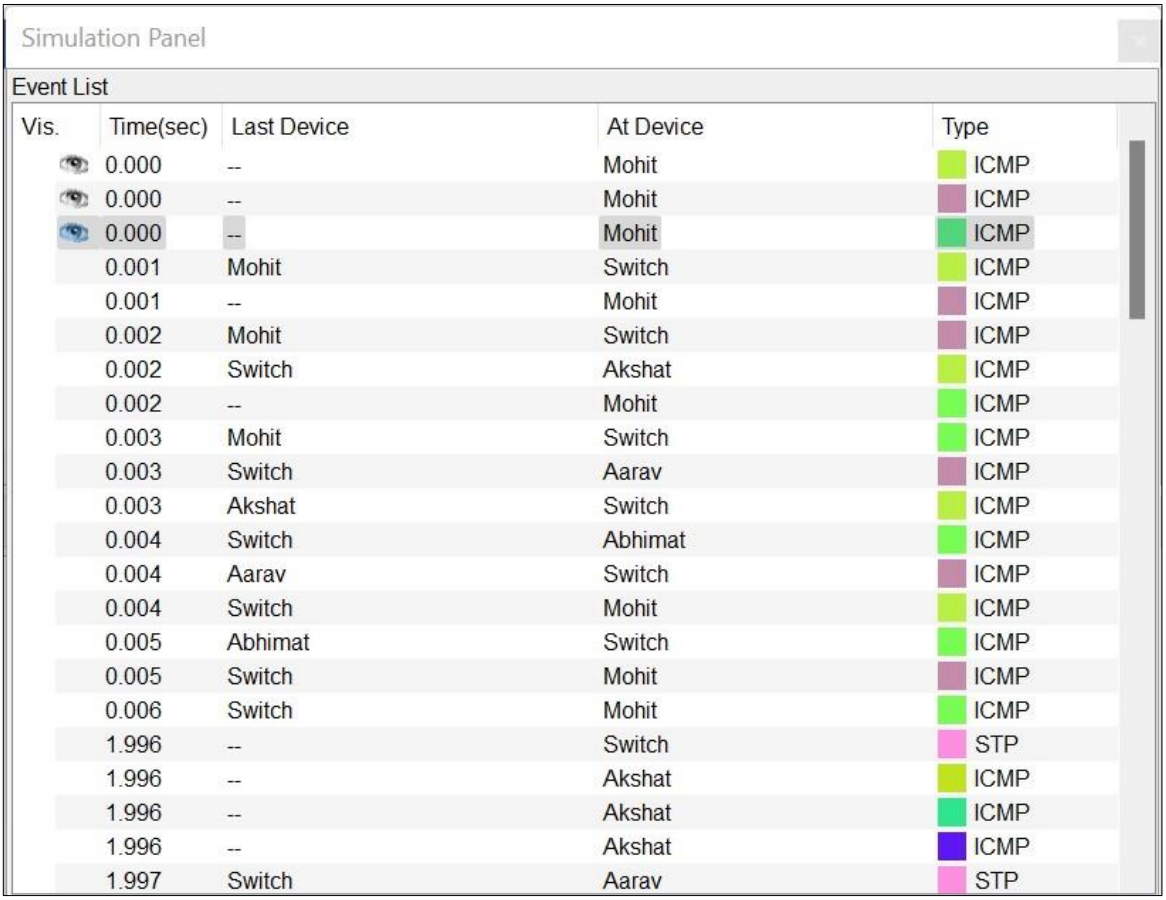
Experiment - 5

Simulate a network having four communication nodes with one switch using cisco packet tracker.



PDU List Window

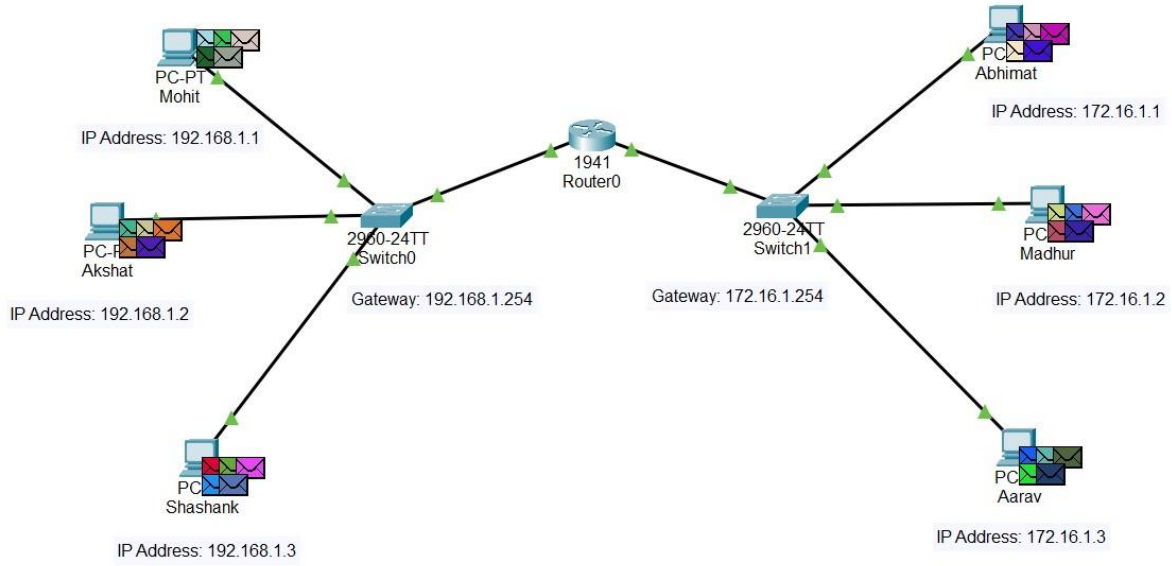
Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Akshat	ICMP		0.000	N	0	(edit)	
	Successful	Mohit	Aarav	ICMP		0.000	N	1	(edit)	
	Successful	Mohit	Abhimat	ICMP		0.000	N	2	(edit)	
	Successful	Akshat	Mohit	ICMP		1.996	N	3	(edit)	
	Successful	Akshat	Abhimat	ICMP		1.996	N	4	(edit)	
	Successful	Akshat	Aarav	ICMP		1.996	N	5	(edit)	
	Successful	Abhi...	Mohit	ICMP		3.994	N	6	(edit)	
	Successful	Abhi...	Akshat	ICMP		3.994	N	7	(edit)	
	Successful	Abhi...	Aarav	ICMP		3.994	N	8	(edit)	
	Successful	Aarav	Mohit	ICMP		5.996	N	9	(edit)	
	Successful	Aarav	Akshat	ICMP		5.996	N	10	(edit)	
	Successful	Aarav	Abhimat	ICMP		5.996	N	11	(edit)	



Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	Mohit	ICMP
	0.000	--	Mohit	ICMP
	0.000	--	Mohit	ICMP
	0.001	Mohit	Switch	ICMP
	0.001	--	Mohit	ICMP
	0.002	Mohit	Switch	ICMP
	0.002	Switch	Akshat	ICMP
	0.002	--	Mohit	ICMP
	0.003	Mohit	Switch	ICMP
	0.003	Switch	Aarav	ICMP
	0.003	Akshat	Switch	ICMP
	0.004	Switch	Abhimat	ICMP
	0.004	Aarav	Switch	ICMP
	0.004	Switch	Mohit	ICMP
	0.005	Abhimat	Switch	ICMP
	0.005	Switch	Mohit	ICMP
	0.006	Switch	Mohit	ICMP
	1.996	--	Switch	STP
	1.996	--	Akshat	ICMP
	1.996	--	Akshat	ICMP
	1.996	--	Akshat	ICMP
	1.997	Switch	Aarav	STP

Experiment-06

Simulate a network having two subnets using 2 switch, one router and 6 nodes using Cisco packet tracer.



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
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	Successful	Mohit	Aarav	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Mohit	Abhimat	ICMP		0.191	N	2	(edit)	(delete)
	Successful	Akshat	Abhimat	ICMP		1.995	N	3	(edit)	(delete)
	Successful	Akshat	Madhur	ICMP		2.189	N	4	(edit)	(delete)
	Successful	Akshat	Aarav	ICMP		2.190	N	5	(edit)	(delete)
	Successful	Shas...	Abhimat	ICMP		4.185	N	6	(edit)	(delete)
	Successful	Shas...	Madhur	ICMP		5.989	N	7	(edit)	(delete)
	Successful	Shas...	Aarav	ICMP		5.989	N	8	(edit)	(delete)
	Successful	Abhi...	Mohit	ICMP		6.187	N	9	(edit)	(delete)
	Successful	Abhi...	Akshat	ICMP		8.188	N	10	(edit)	(delete)
	Successful	Abhi...	Shashank	ICMP		8.188	N	11	(edit)	(delete)
	Successful	Madhur	Mohit	ICMP		9.987	N	12	(edit)	(delete)
	Successful	Madhur	Akshat	ICMP		9.987	N	13	(edit)	(delete)
	Successful	Madhur	Shashank	ICMP		9.987	N	14	(edit)	(delete)
	Successful	Aarav	Mohit	ICMP		10.188	N	15	(edit)	(delete)
	Successful	Aarav	Akshat	ICMP		10.188	N	16	(edit)	(delete)
	Successful	Aarav	Shashank	ICMP		10.188	N	17	(edit)	(delete)
	Successful	Mohit	Akshat	ICMP		10.198	N	18	(edit)	(delete)
	Successful	Mohit	Shashank	ICMP		10.198	N	19	(edit)	(delete)
	Successful	Akshat	Mohit	ICMP		14.192	N	20	(edit)	(delete)
	Successful	Akshat	Shashank	ICMP		14.192	N	21	(edit)	(delete)
	Successful	Shas...	Mohit	ICMP		16.190	N	22	(edit)	(delete)
	Successful	Shas...	Akshat	ICMP		16.190	N	23	(edit)	(delete)
	Successful	Abhi...	Madhur	ICMP		17.980	N	24	(edit)	(delete)
	Successful	Abhi...	Aarav	ICMP		17.980	N	25	(edit)	(delete)
	Successful	Madhur	Abhimat	ICMP		18.192	N	26	(edit)	(delete)
	Successful	Madhur	Aarav	ICMP		18.192	N	27	(edit)	(delete)
	Successful	Aarav	Abhimat	ICMP		19.982	N	28	(edit)	(delete)
	Successful	Aarav	Madhur	ICMP		19.982	N	29	(edit)	(delete)

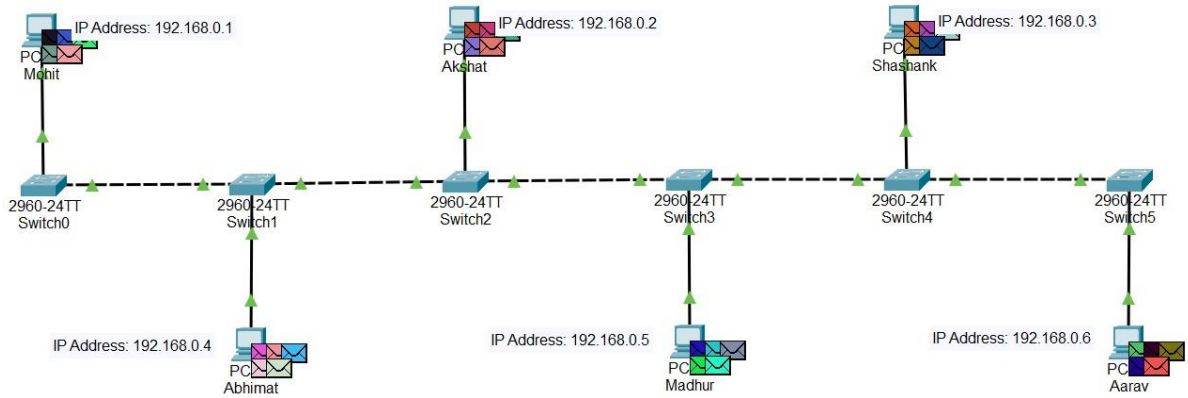
Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	Mohit	ICMP
	0.000	--	Mohit	ICMP
	0.001	Mohit	Switch0	ICMP
	0.001	--	Mohit	ICMP
	0.002	Mohit	Switch0	ICMP
	0.002	Switch0	Router0	ICMP
	0.003	Switch0	Router0	ICMP
	0.003	Router0	Switch1	ICMP
	0.004	Router0	Switch1	ICMP
	0.004	Switch1	Madhur	ICMP
	0.005	Switch1	Aarav	ICMP
	0.005	Madhur	Switch1	ICMP
	0.006	Aarav	Switch1	ICMP
	0.006	Switch1	Router0	ICMP
	0.007	Switch1	Router0	ICMP
	0.007	Router0	Switch0	ICMP
	0.008	Router0	Switch0	ICMP
	0.008	Switch0	Mohit	ICMP
	0.009	Switch0	Mohit	ICMP
	0.190	--	Switch1	STP
	0.191	Switch1	Router0	STP
	0.191	Switch1	Aarav	STP
	0.191	Switch1	Abhimat	STP
	0.191	Switch1	Madhur	STP
	0.191	--	Mohit	ICMP
	0.192	Mohit	Switch0	ICMP
	0.193	Switch0	Router0	ICMP
	0.194	Router0	Switch1	ICMP

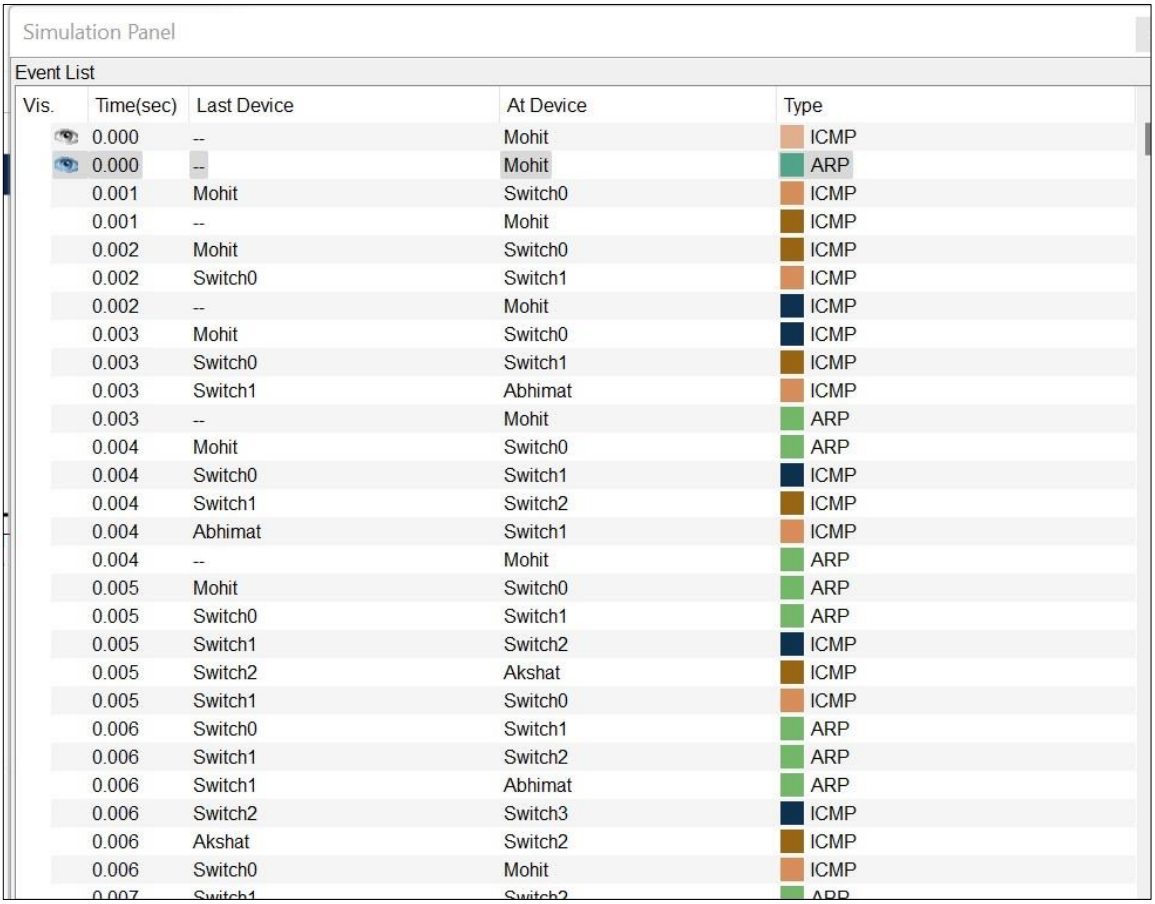
Experiment- 7

Simulate a network using bus topology using cisco packet tracker.



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Abhimat	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Mohit	Akshat	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Mohit	Madhur	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Mohit	Shashank	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Mohit	Aarav	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Abhi...	Mohit	ICMP		0.995	N	5	(edit)	(delete)
	Successful	Abhi...	Akshat	ICMP		0.995	N	6	(edit)	(delete)
	Successful	Abhi...	Madhur	ICMP		0.995	N	7	(edit)	(delete)
	Successful	Abhi...	Shashank	ICMP		0.995	N	8	(edit)	(delete)
	Successful	Abhi...	Aarav	ICMP		0.995	N	9	(edit)	(delete)
	Successful	Akshat	Mohit	ICMP		2.992	N	10	(edit)	(delete)
	Successful	Akshat	Abhimat	ICMP		2.992	N	11	(edit)	(delete)
	Successful	Akshat	Madhur	ICMP		2.992	N	12	(edit)	(delete)
	Successful	Akshat	Shashank	ICMP		2.992	N	13	(edit)	(delete)
	Successful	Akshat	Aarav	ICMP		2.992	N	14	(edit)	(delete)
	Successful	Madhur	Mohit	ICMP		4.994	N	15	(edit)	(delete)
	Successful	Madhur	Abhimat	ICMP		4.994	N	16	(edit)	(delete)
	Successful	Madhur	Akshat	ICMP		4.994	N	17	(edit)	(delete)
	Successful	Madhur	Shashank	ICMP		4.994	N	18	(edit)	(delete)
	Successful	Madhur	Aarav	ICMP		4.994	N	19	(edit)	(delete)
	Successful	Shas...	Mohit	ICMP		5.609	N	20	(edit)	(delete)
	Successful	Shas...	Abhimat	ICMP		5.609	N	21	(edit)	(delete)
	Successful	Shas...	Akshat	ICMP		5.609	N	22	(edit)	(delete)
	Successful	Shas...	Madhur	ICMP		5.609	N	23	(edit)	(delete)
	Successful	Shas...	Aarav	ICMP		5.609	N	24	(edit)	(delete)
	Successful	Aarav	Mohit	ICMP		8.993	N	25	(edit)	(delete)
	Successful	Aarav	Abhimat	ICMP		8.993	N	26	(edit)	(delete)
	Successful	Aarav	Akshat	ICMP		8.993	N	27	(edit)	(delete)
	Successful	Aarav	Madhur	ICMP		8.993	N	28	(edit)	(delete)
	Successful	Aarav	Shashank	ICMP		8.993	N	29	(edit)	(delete)



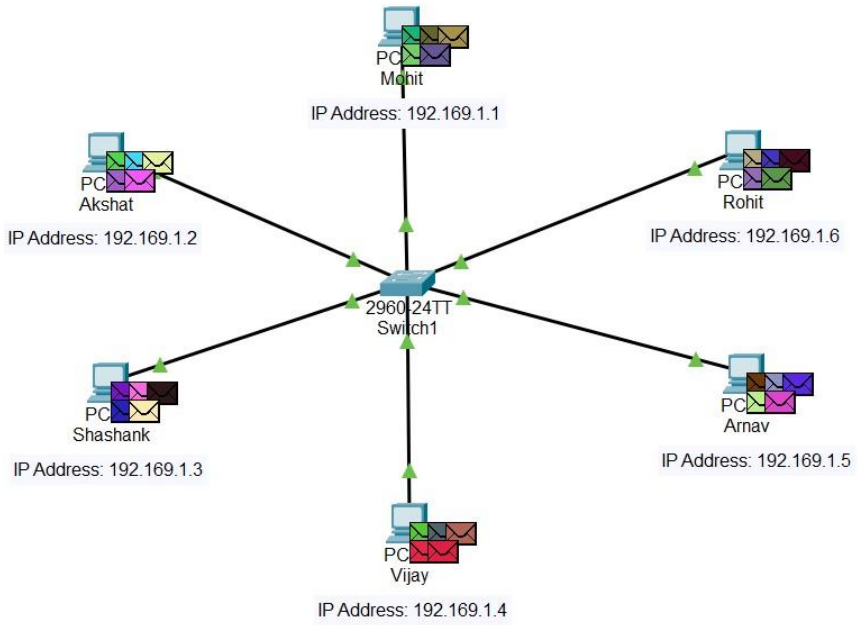
Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	Mohit	ICMP
	0.000	--	Mohit	ARP
	0.001	Mohit	Switch0	ICMP
	0.001	--	Mohit	ICMP
	0.002	Mohit	Switch0	ICMP
	0.002	Switch0	Switch1	ICMP
	0.002	--	Mohit	ICMP
	0.003	Mohit	Switch0	ICMP
	0.003	Switch0	Switch1	ICMP
	0.003	Switch1	Abhimat	ICMP
	0.003	--	Mohit	ARP
	0.004	Mohit	Switch0	ARP
	0.004	Switch0	Switch1	ICMP
	0.004	Switch1	Switch2	ICMP
	0.004	Abhimat	Switch1	ICMP
	0.004	--	Mohit	ARP
	0.005	Mohit	Switch0	ARP
	0.005	Switch0	Switch1	ARP
	0.005	Switch1	Switch2	ICMP
	0.005	Switch2	Akshat	ICMP
	0.005	Switch1	Switch0	ICMP
	0.006	Switch0	Switch1	ARP
	0.006	Switch1	Switch2	ARP
	0.006	Switch1	Abhimat	ARP
	0.006	Switch2	Switch3	ICMP
	0.006	Akshat	Switch2	ICMP
	0.006	Switch0	Mohit	ICMP
	0.007	Switch1	Switch2	ARP

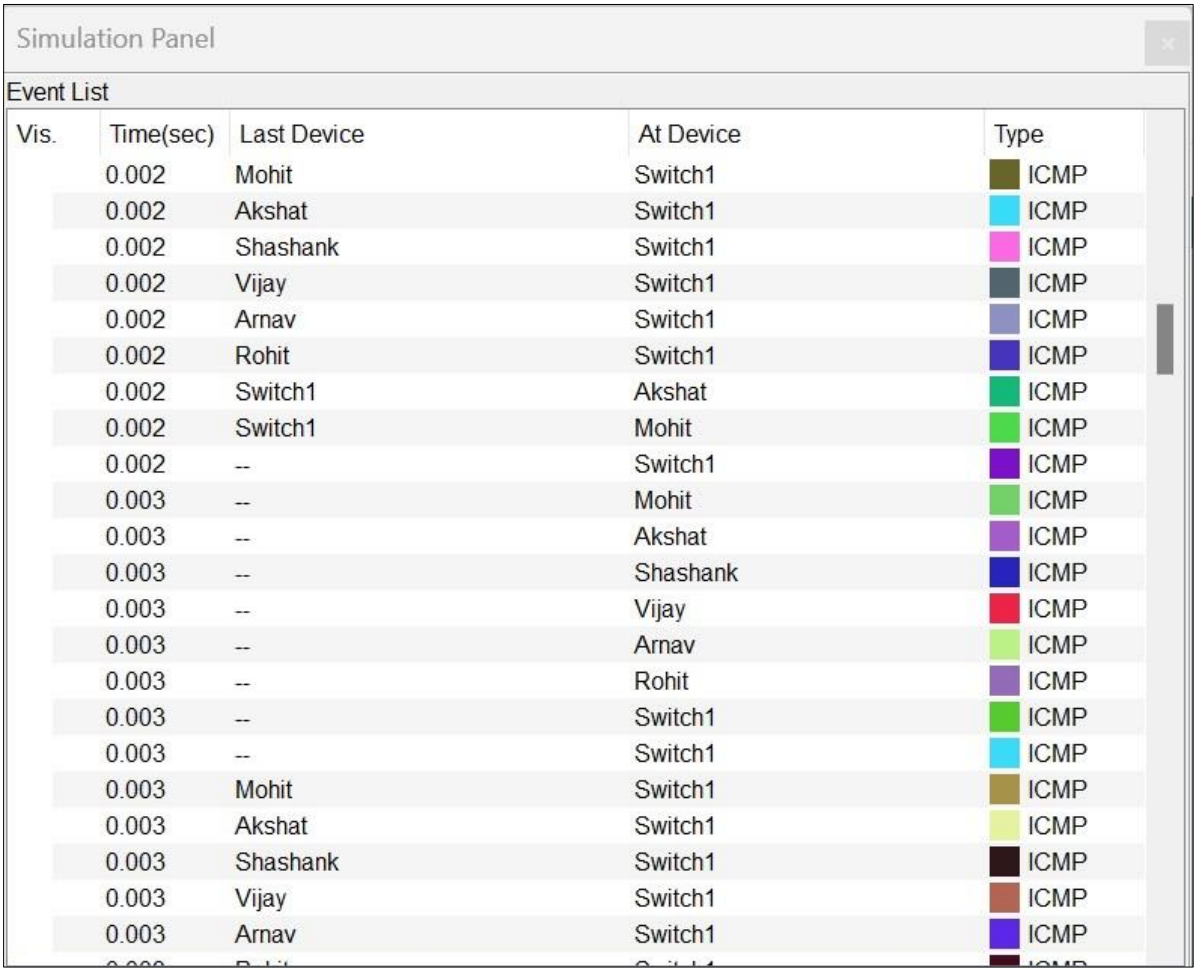
Experiment- 8

Simulate a network using star topology using cisco packet tracker.



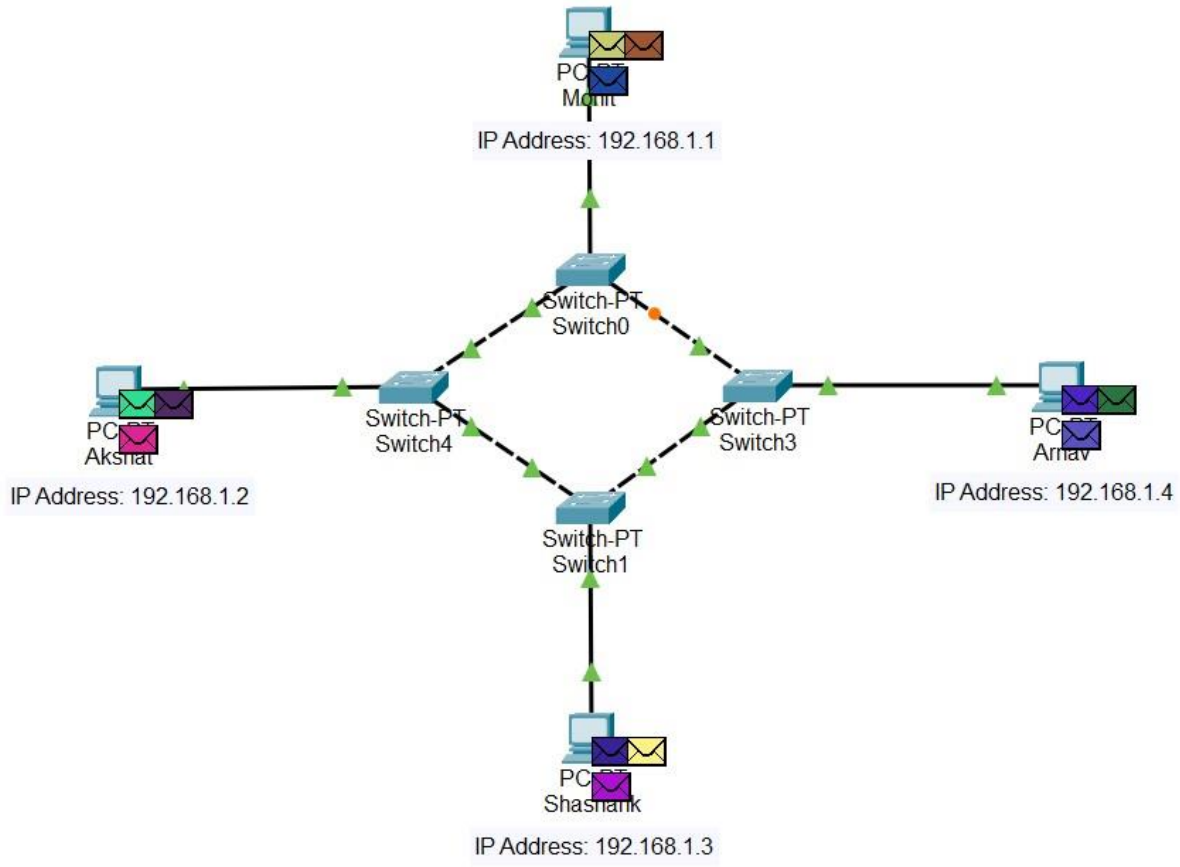
PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Akshat	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Mohit	Shashank	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Mohit	Vijay	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Mohit	Arnav	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Mohit	Rohit	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Akshat	Mohit	ICMP		0.000	N	5	(edit)	(delete)
	Successful	Akshat	Shashank	ICMP		0.000	N	6	(edit)	(delete)
	Successful	Akshat	Vijay	ICMP		0.000	N	7	(edit)	(delete)
	Successful	Akshat	Arnav	ICMP		0.000	N	8	(edit)	(delete)
	Successful	Akshat	Rohit	ICMP		0.000	N	9	(edit)	(delete)
	Successful	Shas...	Mohit	ICMP		0.000	N	10	(edit)	(delete)
	Successful	Shas...	Akshat	ICMP		0.000	N	11	(edit)	(delete)
	Successful	Shas...	Vijay	ICMP		0.000	N	12	(edit)	(delete)
	Successful	Shas...	Arnav	ICMP		0.000	N	13	(edit)	(delete)
	Successful	Shas...	Rohit	ICMP		0.000	N	14	(edit)	(delete)
	Successful	Vijay	Mohit	ICMP		0.000	N	15	(edit)	(delete)
	Successful	Vijay	Akshat	ICMP		0.000	N	16	(edit)	(delete)
	Successful	Vijay	Shashank	ICMP		0.000	N	17	(edit)	(delete)
	Successful	Vijay	Arnav	ICMP		0.000	N	18	(edit)	(delete)
	Successful	Vijay	Rohit	ICMP		0.000	N	19	(edit)	(delete)
	Successful	Arnav	Mohit	ICMP		0.000	N	20	(edit)	(delete)
	Successful	Arnav	Akshat	ICMP		0.000	N	21	(edit)	(delete)
	Successful	Arnav	Shashank	ICMP		0.000	N	22	(edit)	(delete)
	Successful	Arnav	Vijay	ICMP		0.000	N	23	(edit)	(delete)
	Successful	Arnav	Rohit	ICMP		0.000	N	24	(edit)	(delete)
	Successful	Rohit	Mohit	ICMP		0.000	N	25	(edit)	(delete)
	Successful	Rohit	Akshat	ICMP		0.000	N	26	(edit)	(delete)
	Successful	Rohit	Shashank	ICMP		0.000	N	27	(edit)	(delete)
	Successful	Rohit	Vijay	ICMP		0.000	N	28	(edit)	(delete)
	Successful	Rohit	Arnav	ICMP		0.000	N	29	(edit)	(delete)


Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.002 Mohit Switch1 ICMP
0.002 Akshat Switch1 ICMP
0.002 Shashank Switch1 ICMP
0.002 Vijay Switch1 ICMP
0.002 Arnav Switch1 ICMP
0.002 Rohit Switch1 ICMP
0.002 Switch1 Akshat ICMP
0.002 Switch1 Mohit ICMP
0.002 -- Switch1 ICMP
0.003 -- Mohit ICMP
0.003 -- Akshat ICMP
0.003 -- Shashank ICMP
0.003 -- Vijay ICMP
0.003 -- Arnav ICMP
0.003 -- Rohit ICMP
0.003 -- Switch1 ICMP
0.003 -- Switch1 ICMP
0.003 Mohit Switch1 ICMP
0.003 Akshat Switch1 ICMP
0.003 Shashank Switch1 ICMP
0.003 Vijay Switch1 ICMP
0.003 Arnav Switch1 ICMP

Experiment- 9

Simulate a network using ring topology using cisco packet tracker.



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Akshat	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Mohit	Shashank	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Mohit	Arnav	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Akshat	Mohit	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Akshat	Shashank	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Akshat	Arnav	ICMP		0.000	N	5	(edit)	(delete)
	Successful	Shas...	Mohit	ICMP		0.000	N	6	(edit)	(delete)
	Successful	Shas...	Akshat	ICMP		0.000	N	7	(edit)	(delete)
	Successful	Shas...	Arnav	ICMP		0.000	N	8	(edit)	(delete)
	Successful	Arnav	Mohit	ICMP		0.000	N	9	(edit)	(delete)
	Successful	Arnav	Akshat	ICMP		0.000	N	10	(edit)	(delete)
	Successful	Arnav	Shashank	ICMP		0.000	N	11	(edit)	(delete)

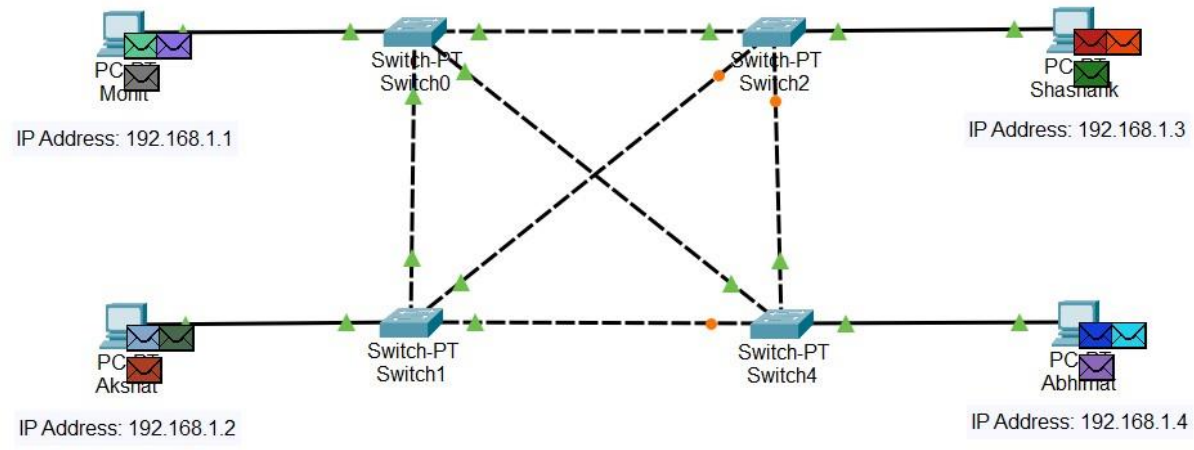
Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.001	Mohit	Switch0	ICMP
	0.001	Akshat	Switch4	ICMP
	0.001	Shashank	Switch1	ICMP
	0.001	Arnav	Switch3	ICMP
	0.001	--	Arnav	ICMP
	0.002	--	Mohit	ICMP
	0.002	--	Akshat	ICMP
	0.002	--	Shashank	ICMP
	0.002	Mohit	Switch0	ICMP
	0.002	Akshat	Switch4	ICMP
	0.002	Shashank	Switch1	ICMP
	0.002	Arnav	Switch3	ICMP
	0.002	Switch0	Switch4	ICMP
	0.002	Switch4	Switch0	ICMP
	0.002	Switch1	Switch4	ICMP
	0.002	Switch3	Switch1	ICMP
	0.002	--	Arnav	ICMP
	0.003	Mohit	Switch0	ICMP
	0.003	Akshat	Switch4	ICMP
	0.003	Shashank	Switch1	ICMP
	0.003	Arnav	Switch3	ICMP
	0.003	Switch0	Switch4	ICMP

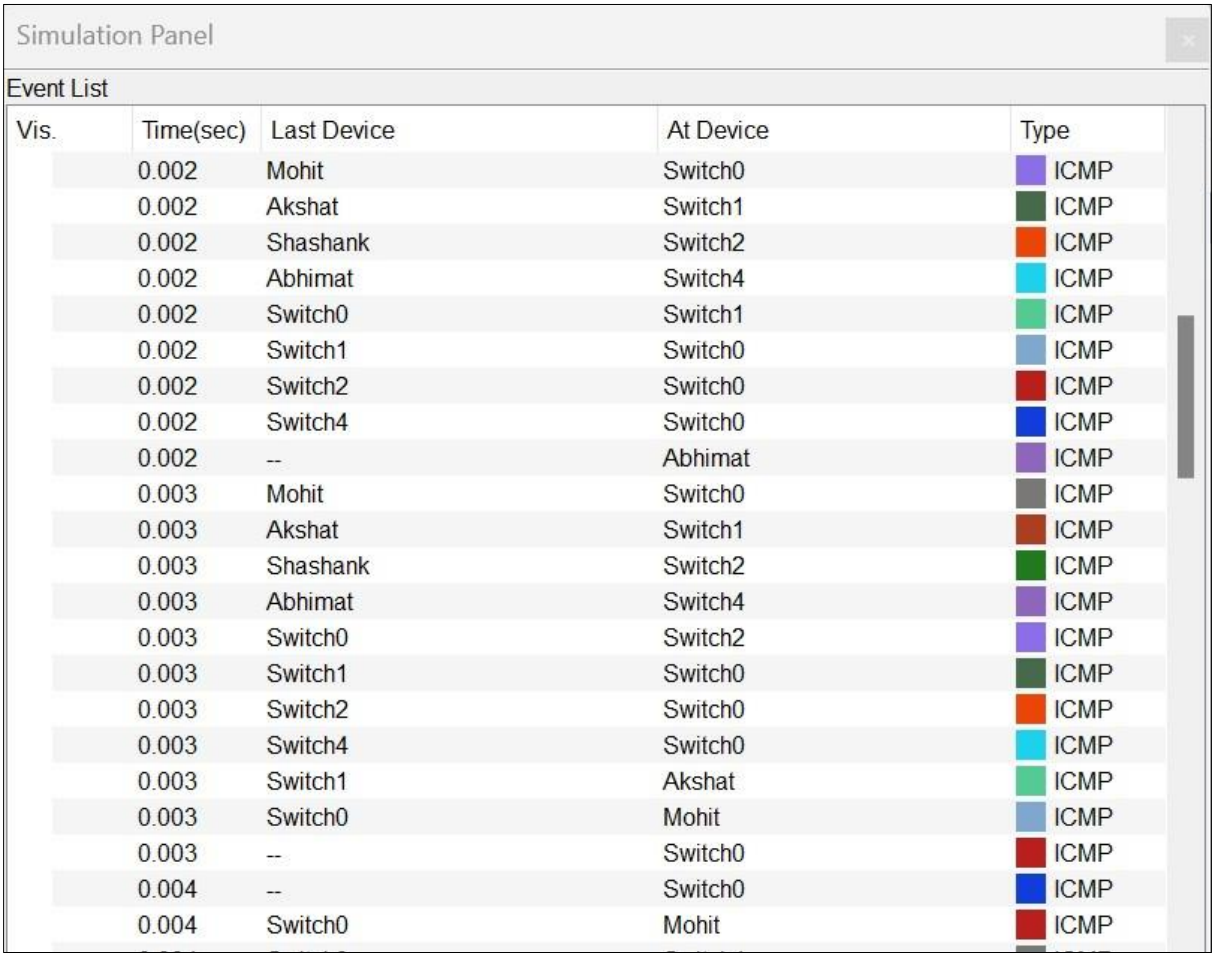
Experiment - 10

Simulate a network using mesh topology using cisco packet tracker.



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec	Periodic	Num	Edit	Delete
	Successful	Mohit	Akshat	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Mohit	Shashank	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Mohit	Abhimat	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Akshat	Mohit	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Akshat	Shashank	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Akshat	Abhimat	ICMP		0.000	N	5	(edit)	(delete)
	Successful	Shas...	Mohit	ICMP		0.000	N	6	(edit)	(delete)
	Successful	Shas...	Akshat	ICMP		0.000	N	7	(edit)	(delete)
	Successful	Shas...	Abhimat	ICMP		0.000	N	8	(edit)	(delete)
	Successful	Abhi...	Mohit	ICMP		0.000	N	9	(edit)	(delete)
	Successful	Abhi...	Akshat	ICMP		0.000	N	10	(edit)	(delete)
	Successful	Abhi...	Shashank	ICMP		0.000	N	11	(edit)	(delete)


Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
0.002 Mohit Switch0 ICMP
0.002 Akshat Switch1 ICMP
0.002 Shashank Switch2 ICMP
0.002 Abhimat Switch4 ICMP
0.002 Switch0 Switch1 ICMP
0.002 Switch1 Switch0 ICMP
0.002 Switch2 Switch0 ICMP
0.002 Switch4 Switch0 ICMP
0.002 -- Abhimat ICMP
0.003 Mohit Switch0 ICMP
0.003 Akshat Switch1 ICMP
0.003 Shashank Switch2 ICMP
0.003 Abhimat Switch4 ICMP
0.003 Switch0 Switch2 ICMP
0.003 Switch1 Switch0 ICMP
0.003 Switch2 Switch0 ICMP
0.003 Switch4 Switch0 ICMP
0.003 Switch1 Akshat ICMP
0.003 Switch0 Mohit ICMP
0.003 -- Switch0 ICMP
0.004 -- Switch0 ICMP
0.004 Switch0 Mohit ICMP