# ENTERPRISE END TO END NETWORK BY USING RIP PROTOCOL

A project report submitted to

**REGIONAL TELECOM TRAINING CENTRE**

**BSNL-HYDERABAD,**

**TELANGANA, INDIA**

In fulfilment of requirements for the award of internship in

**BACHELOR OF TECHNOLOGY**

**IN**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

Submitted by


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**BRINAVAN INSTITUTE OF TECHNOLOGY & SCIENCE**

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

This is to certify that the project entitled

**ENTERPRISE END TO END NETWORK BY USING RIP PROTOCOL**

Is the bonafide record of work carried out by

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# DECLARATION

We hereby declare that the project titled "**ENTERPRISE END TO END NETWORK BY USING RIP PROTOCOL"** is an authenticated work carried out by us the students of **BRINDAVAN INSTITUTE OF TECHNOLOGY & SCIENCE,** Kurnool during the (1 month) 23rd May – 18th June 2022.

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**ABSTRACT**

The Sole purpose to study end to end network is to create simplicity across worldwide. The side arms of successful networking or scalability robustness fault identification communication modularity security and maintaining privacy. The key for making a network is to provide essential tools and techniques that will offer the quality public or private network**.** As we discussed Earlier the key purpose is to create a simplicity that means creating simplicity across the cities where an end to end connect work is connected. Obtaining success in failure/ break-down conditions is the main purpose of a network. So to achieve that requirement network designing involves certain to apologies, protocols, bandwidth allocation. Topology requirement can be described as maintaining two adjacent networks against any failure in a single link or node. Protocol requirement can be described as using dynamic static routing protocol to provide routes must be congestion free in a network. Bandwidth allocation is needed to actively allocate extra bandwidth just to maintain the working condition in a network.

# LIST OF FIGURES

# 1.INTRODUCTION TO INTERNETWORKING:

Internetworking is combined of 2 words, inter and networking which implies an association between totally different nodes or segments. Internetworking is enforced in Layer three (Network Layer) of the OSI-ISO model. The foremost notable example of internetworking is the Internet.

There is chiefly 3 units of Internetworking:

1. Extranet
2. Intranet
3. Internet

**1.Extranet** – It's a network of the internetwork that's restricted in scope to one organization or entity however that additionally has restricted connections to the networks of one or a lot of different sometimes, however not essential. It's the very lowest level of Internetworking, usually enforced in an exceedingly personal area. Associate degree extranet may additionally be classified as a Man, WAN, or different form of network however it cannot encompass one

local area network i.e it should have a minimum of one reference to associate degree external network.

**2**.**Intranet** – This associate degree computer network could be a set of interconnected networks, which exploits the Internet Protocol and uses IP-based tools akin to web browsers and FTP tools, that are underneath the management of one body entity. That body entity closes the computer network to the remainder of the planet and permits solely specific users. Most typically, this network is the internal network of a corporation or different enterprise

**3**.**Internet** – A selected Internetworking, consisting of a worldwide interconnection of governmental, academic, public, and personal networks based mostly upon the Advanced analysis comes Agency Network (ARPANET) developed by ARPA of the U.S. Department of Defence additionally home to the World Wide Web (WWW) and cited as the 'Internet' to differentiate from all different generic Internetworks.

## 2.1. LOCAL AREA NETWORK:

A local area network is a group of computers and peripheral devices that share a common communications line or wireless link to a server within a distinct geographic area a local area network may serve as few as 2 or 3 users in homes office for thousands of users in a corporation central office home owners and information technology administrator setup Lancer so that the networks notes can communicate and share resources such as printers or network storage.

LAN networking requires Ethernet cables and layer 2 switches along with devices that can connect and communicate using Ethernet larger land often include layer 3 switches or routers to streamline traffic flows.

LAN enables users to connect to internal servers, websites and other LANs that belong to the same wide area network (WAN). Ethernet and Wi-Fi are the 2 primary ways to enable LAN connections Ethernet is an institute of Electrical and Electronics Engineers specification that enables computers to communicate with each other.

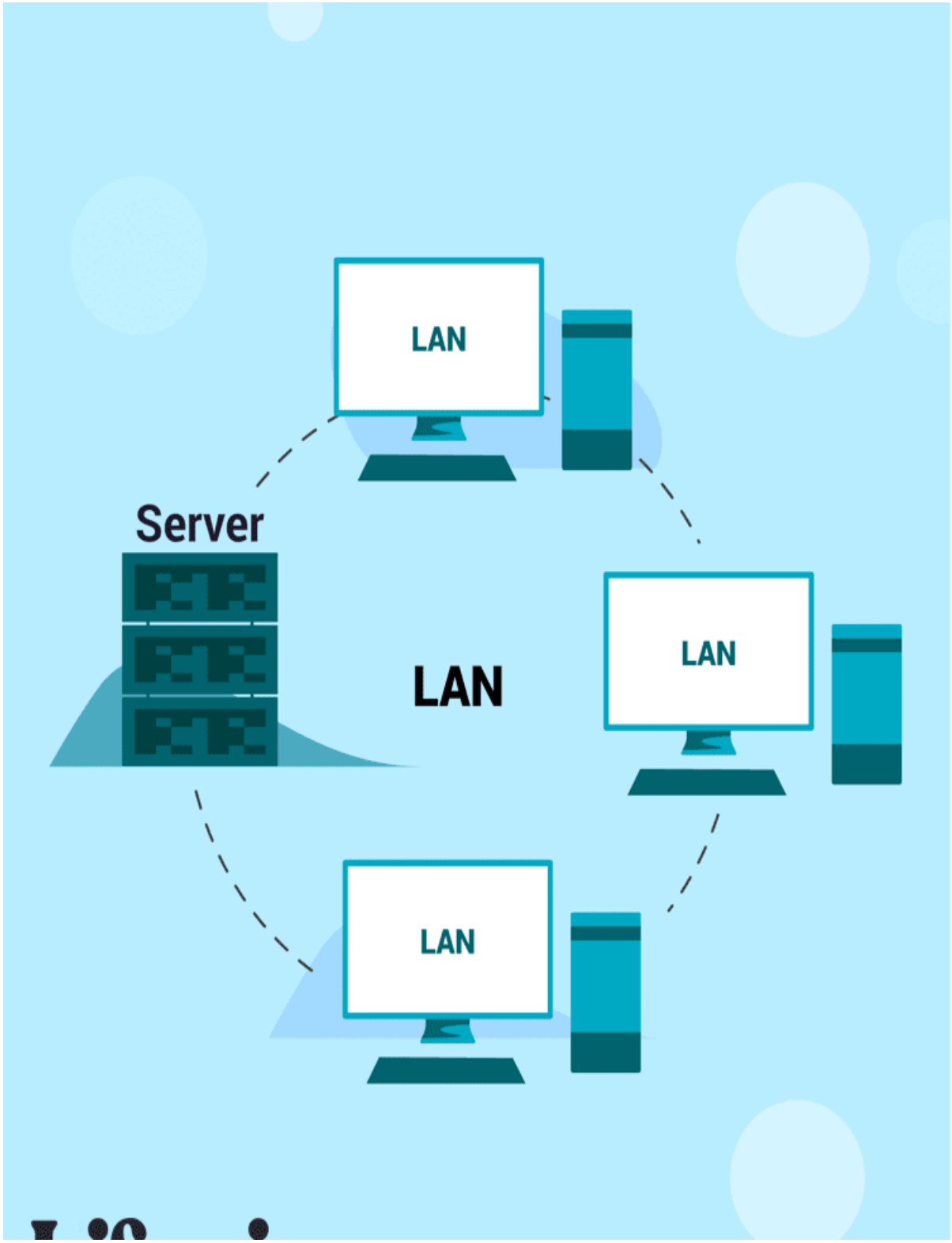



**Fig:2.1**. LAN Network

## 2.2. NOMENCLATURE OF LAN CABLE:

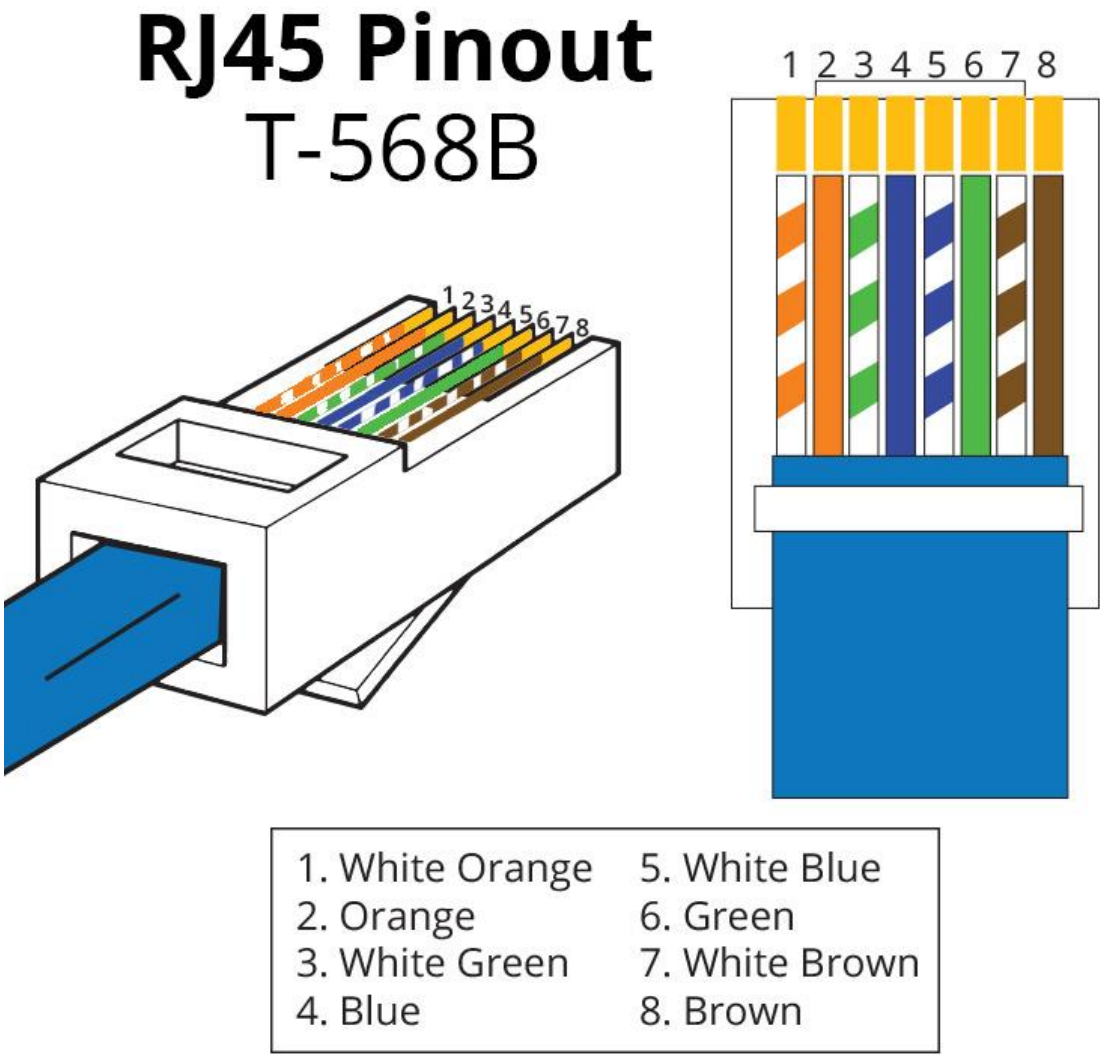



**Fig:2.2**. LAN Cable

## 2.3. WIDE AREA NETWORK:

A wide area network is a large network of information that is not tied single location vans can facilitate communication the sharing of information and much more between devices from around the world through WAN provider.

WANs can be vital for international business but there is also essential for everyday use as the Internet is considered the largest WAN in the world. Wide area networks are a form of telecommunication networks that can connect devices from multiple locations and across the globe WANs are the largest and most expensive forms of computer networks available to date.

WANs are used to connect LANs and other type of networks together so that the users and computers in one location and the computers in other locations. Many WANs are built for one particular organization and or private other built by Internet service providers provide connections from an organization’s LAN to the Internet. Brands are often built using leased lines at each end of the leased line

a router connects the land on one side with a second router within the land on the other. WAN includes the technologies to transmit data, image, audio and video information over long distances and different LANs and MANs.

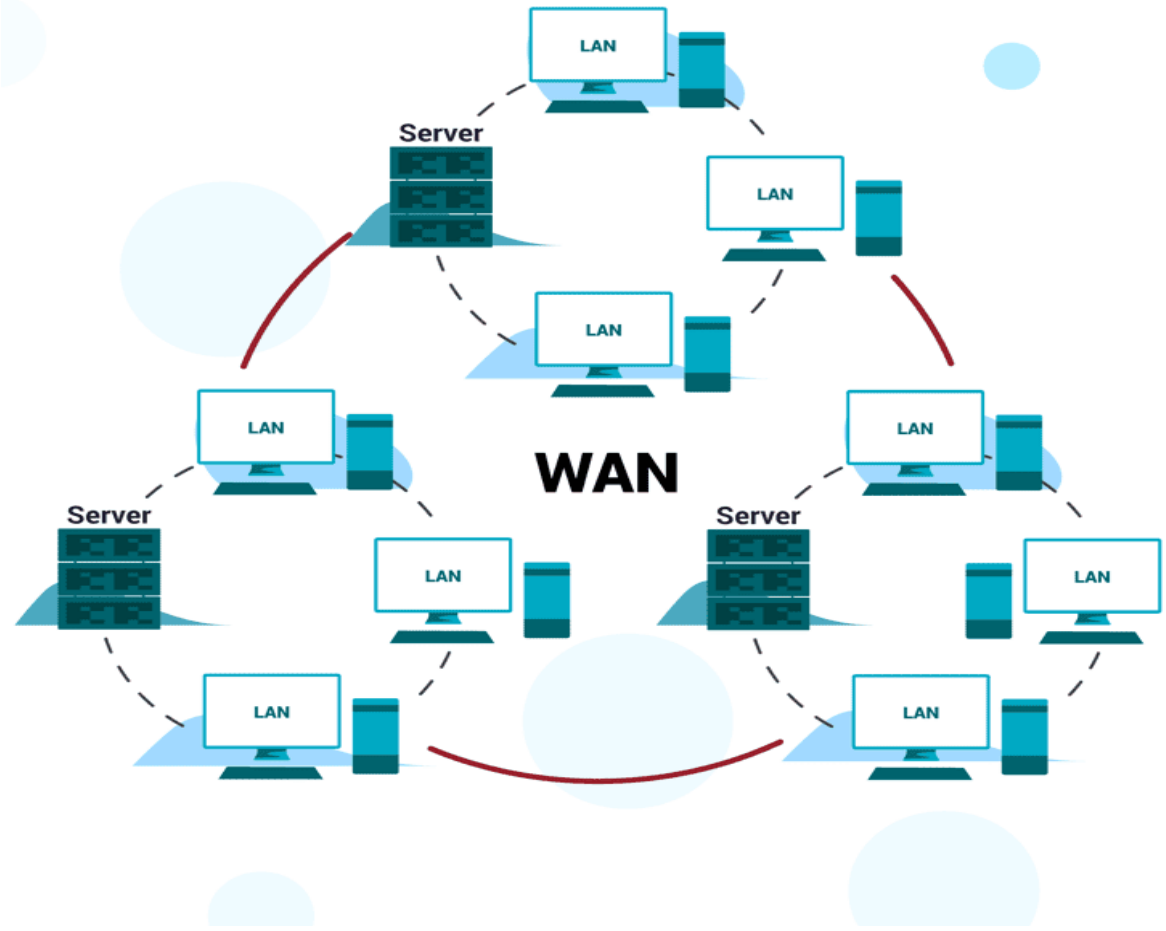



**Fig:2.3.** WAN Network

## 3.1. IP ADDRESS:

An IP address is a unique address that identifies a device on the internet or a local network. IP stands for "Internet Protocol," which is the set of rules governing the format of data sent via the internet or local network. In essence, IP addresses are the identifier that allows information to be sent between devices on a network: they contain location information and make devices accessible for communication. The internet needs a way to differentiate between different computers, routers, and websites. IP addresses provide a way of doing so and form an essential part of how the internet works.

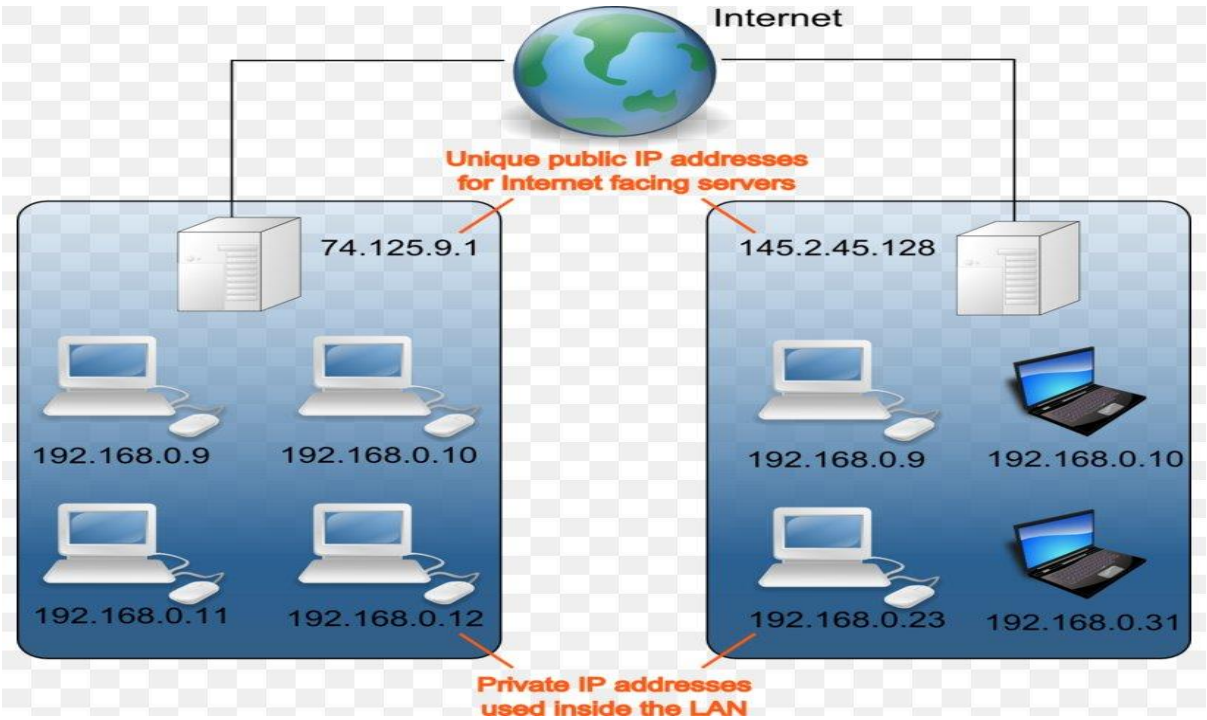



**Fig:3.1.** IP Address

## 3.2. SUBNET MASK:

Every device has an IP address with two pieces: the client or host address and the server or network address. IP addresses are either configured by a DHCP server or manually configured (static IP addresses). The subnet mask splits the IP address into the host and network addresses, thereby defining which part of the IP address belongs to the device and which part belongs to the network. The device called a gateway or default gateway connects local devices to other networks.

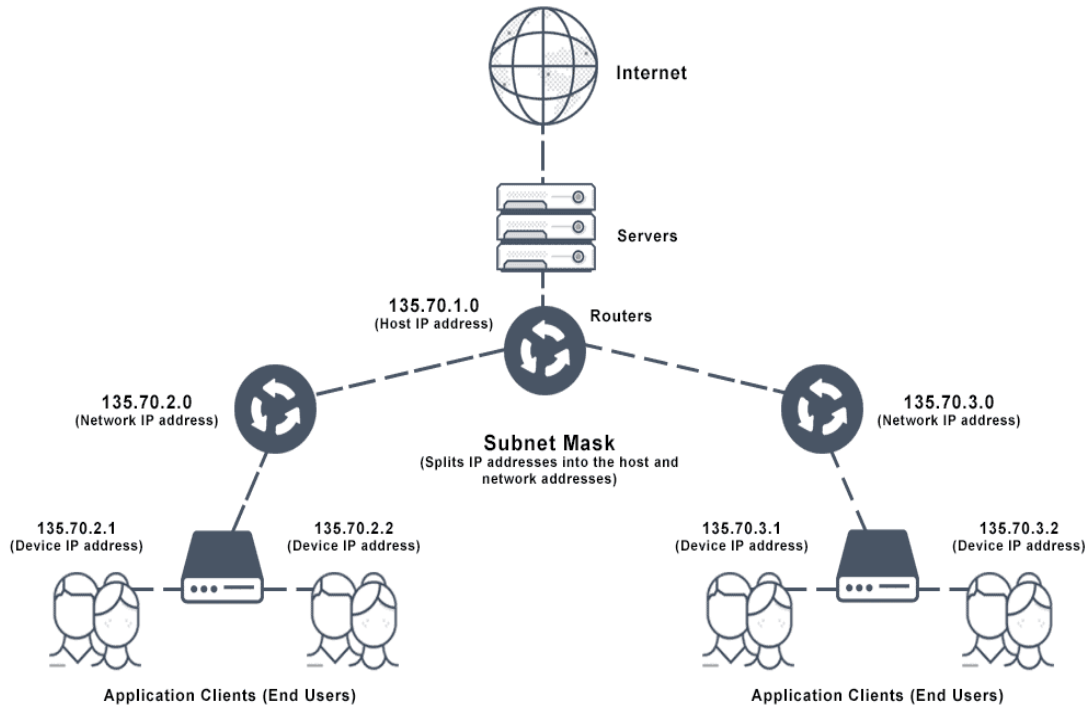



**Fig:3.2**. Subnet Mask

# 4. INTERNET SERVICE PROVIDER (ISP):

An Internet service provider (ISP) is an organization that provides services for accessing, using, or participating in the internet. ISPs can be organized in various forms, such as commercial, community-owned, non-profit or otherwise privately owned. Internet services typically provided by ISPs can include Internet access, Internet transit, domain name registration, web hosting, Usenet service, and colocation. The term Internet service provider (ISP) refers to a company that provides access to the Internet to both personal and business customers. ISPs make it possible for their customers friends—all for a fee.

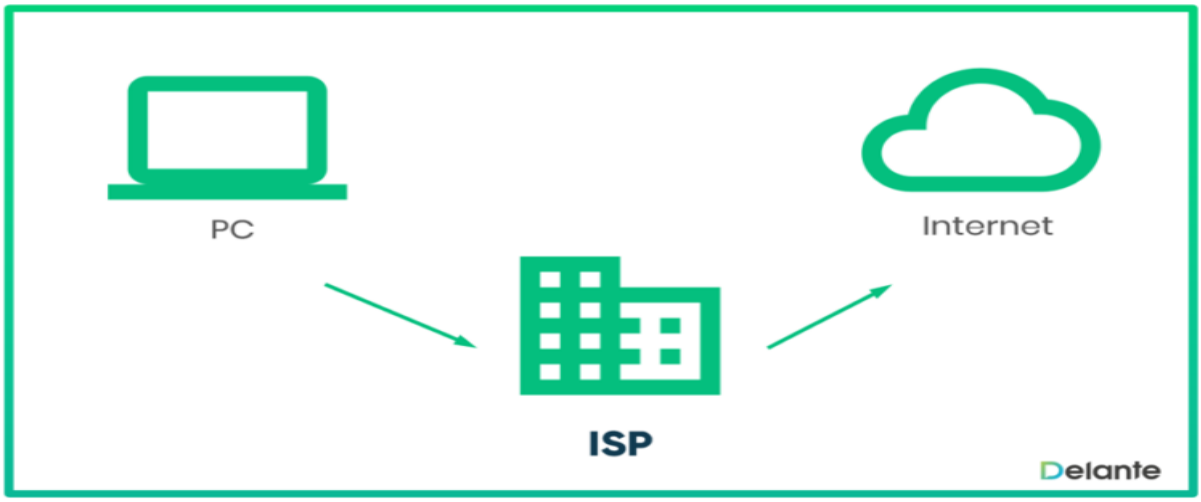



**Fig:4**. Internet Service Provider

# 5.1. NETWORK SWITCH:

A network switch is networking hardware that connects devices on a computer network by using packet switching to receive on forward data to the destination device. A network switch connects devices within a network often a local area network or LAN and forwards data packets to and from those devices. Unlike a router, switch only sends data to the single device it is intended for not to networks of multiple devices.


**Fig:5.1**. Network Switch

## 5.2. ROUTER:

The router is a physical or virtual internetworking device that is designed to receive, analyze, and forward data packets between computer networks. A router examines a destination IP address of a given data packet, and it uses the headers and forwarding tables to decide the best way to transfer the packets. A router is used in **LAN** (Local Area Network) and **WAN** (Wide Area Network) environments. It shares information with other routers in networking.

**Fig:5.2.** Router

# 6.1. ACCESS TECHNOLOGIES:

Access Network is a type of network which connects the end system to the immediate router, physically in the path from the end system to any other distant end system. In telecommunications it is the network connecting subscribers to ISP.

Some of the examples of the **Access Networks** are as follows −

- Home network
- Mobile network
- Asymmetric Digital Subscriber Line (ADSL)
- Internet service provider (ISP)

Some of **access technologies** are as follows −

- Ethernet
- The Telephone Line
- Wi-fi
- Cable internet access
- Fibre to the home (FTTH)
- Dial-up modem
- Digital subscriber line

## 6.2. CONSOLE CABLE:

Console cables also known as Cisco cables, rollover cables and management cables are designed for a specific purpose. They connect Cisco networking devices to terminals or PCs for configuration. Typically, the Cisco end will connect via RJ45, and the terminal end will conclude in a serial connection.

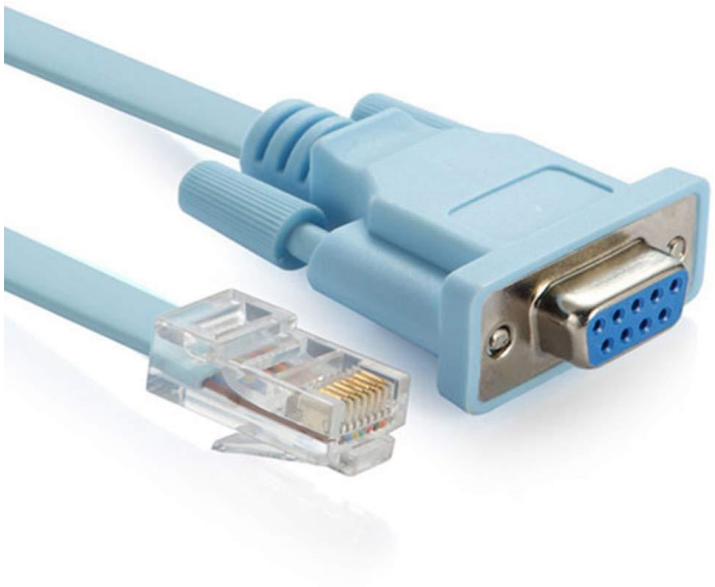


**Fig:6.2**. Console Cable

## 6.3. CROSS CABLE:

Cross cable enables one to establish a direct connection between two computing devices using Ethernet ports.

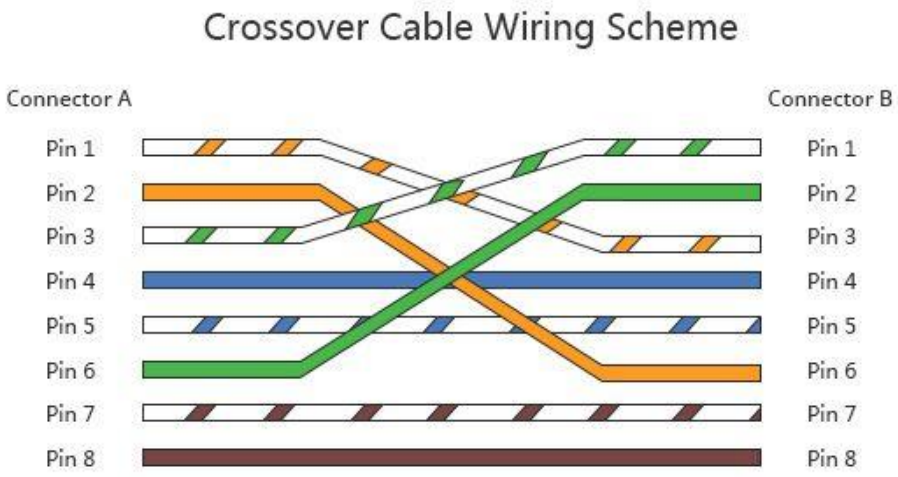



**Fig:6.3.** Cross Cable

## 7.1. ROUTING:

A Router is a process of selecting path along which the data can be transferred from source to the destination. Routing is performed by a special device known as a router. Router works at the network layer in the OSI model and internet layer in TCP/IP model. router is a networking device that forwards the packet based on the information available in the packet header and forwarding table. The routing algorithms are used for routing the packets. The routing algorithm is nothing but a software responsible for deciding the optimal path through which packet can be transmitted. he routing protocols use the metric to determine the best path for the packet delivery. The metric is the standard of measurement such as hop count, bandwidth, delay, current load on the path, etc. used by the routing algorithm to determine the optimal path to the destination. The routing algorithm initializes and maintains the routing table for the process of path determination.

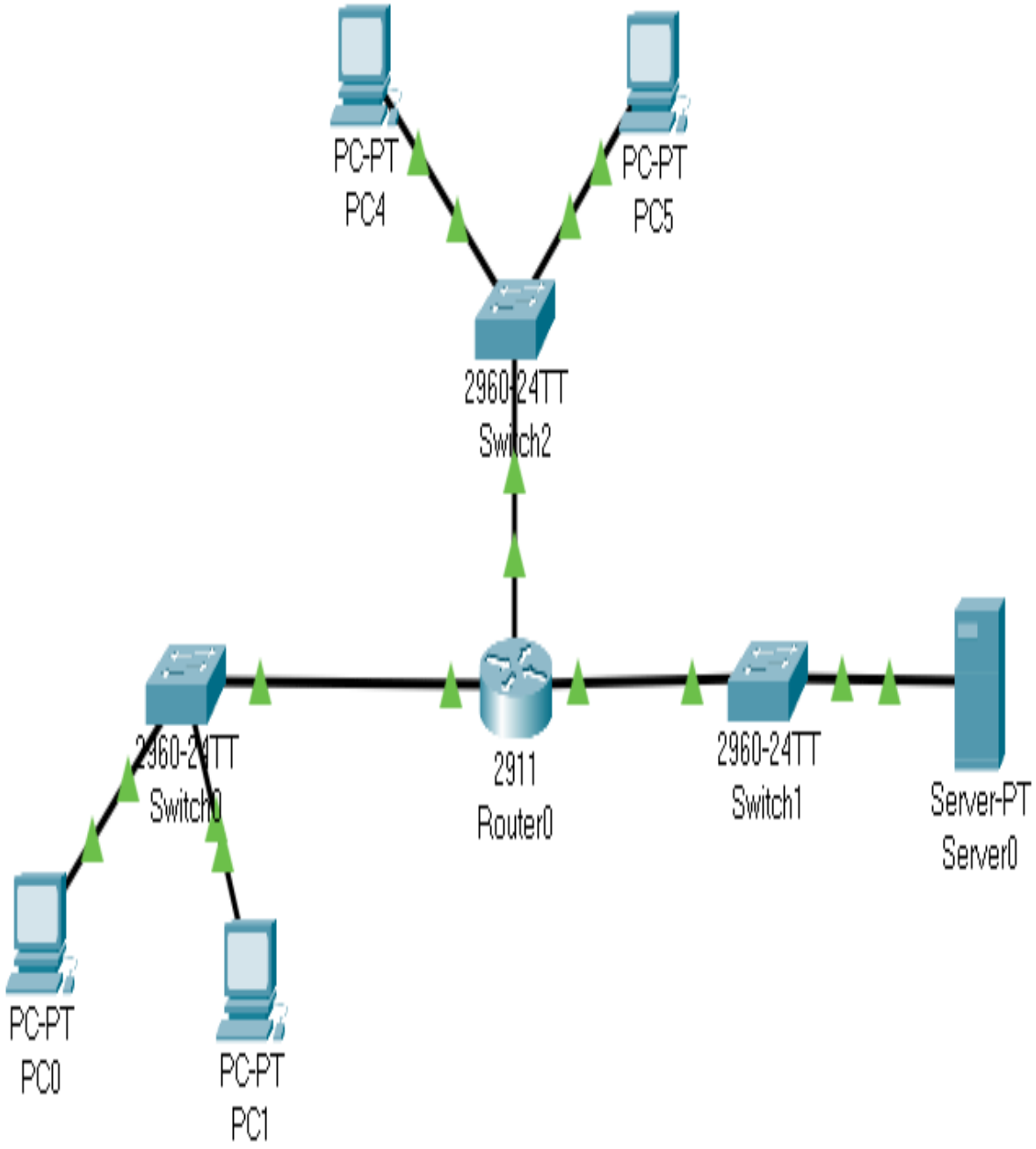



**Fig:7.1.** Routing

# 7.2. TYPES OF ROUTING:

Routing is a process that is performed by layer 3 (or network layer) devices in order to deliver the packet by choosing an optimal path from one network to another.

There are 2 types of routing:

**1. Static routing** –

Static routing is a process in which we have to manually add routes to the routing table.

**Advantages** –

No routing overhead for router CPU which means a cheaper router can be used to do routing.

It adds security because an only administrator can allow routing to particular networks only.

No bandwidth usage between routers.

**Disadvantages** –For a large network, it is a hectic task for administrators to manually add each route for the network in the routing table on each router.

The administrator should have good knowledge of the topology. If a new administrator comes, then he has to manually add each route so he should have very good knowledge of the routes of the topology.

**Configuration-**

Router# configure t

Router<config>#ip route 192.168.2.0 255.255.255.0 10.0.0.2

Router<config>#end

Router# wr

```
Password:
TRIPURA>en
Password:
TRIPURA#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
TRIPURA(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.2
TRIPURA(config)#end
TRIPURA#wr
Building configuration...
[OK]
TRIPURA#sh ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, FastEthernet0/1
C    192.168.1.0/24 is directly connected, FastEthernet0/0
S    192.168.2.0/24 [1/0] via 10.0.0.2
```

**2. Default Routing** –

This is the method where the router is configured to send all packets towards a single router (next hop). It doesn't matter to which network the packet belongs, it is forwarded out to the router which is configured for default routing. It is generally used with stub routers. A stub router is a router that has only one route to reach all other networks.

**3. Dynamic Routing** –

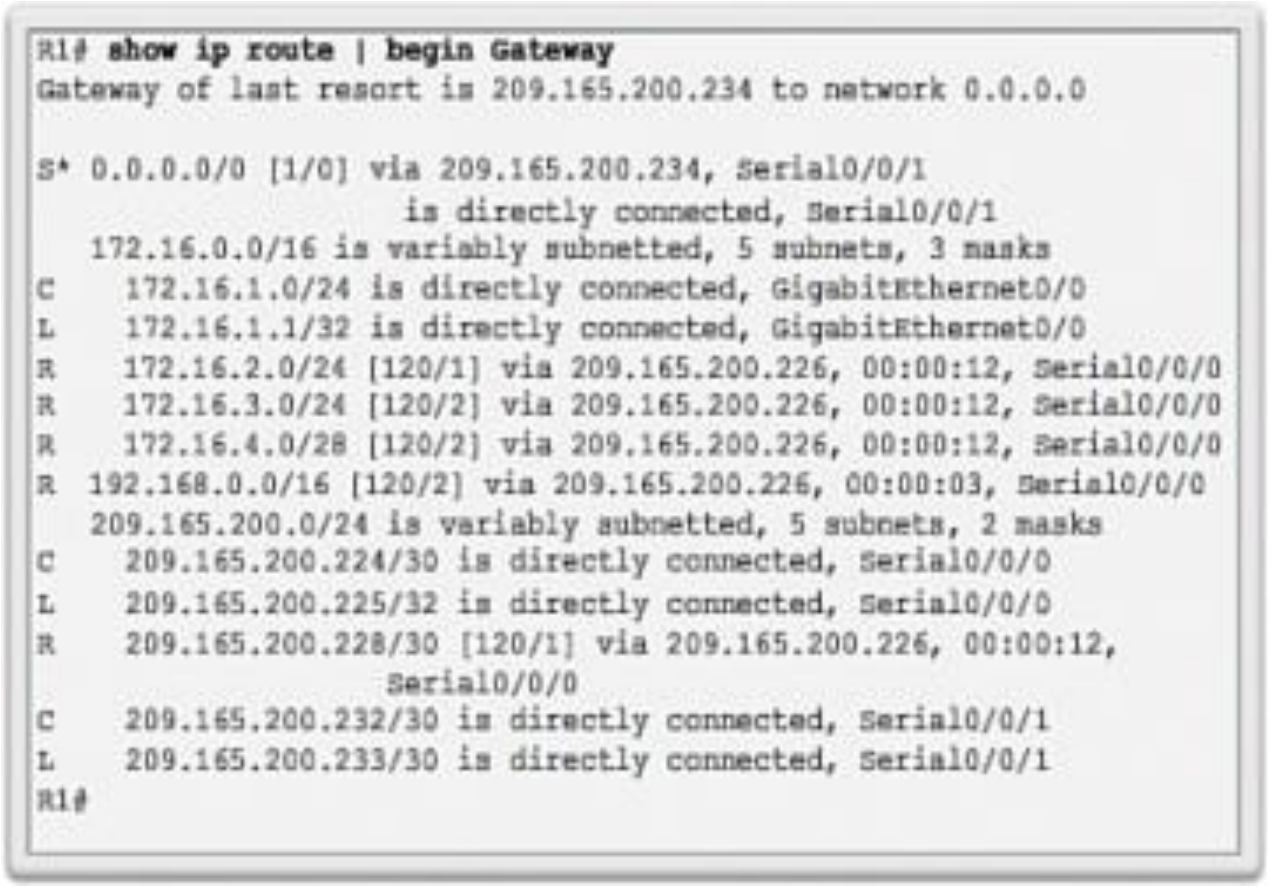
Dynamic routing makes automatic adjustments of the routes according to the current state of the route in the routing table. Dynamic routing uses protocols to discover network destinations and the routes to reach them. RIP and OSPF are the best examples of dynamic routing protocols. Automatic adjustments will be made to reach the network destination if one route goes down.

**Advantages** – Easy to configure. More effective at selecting the best route to a destination remote network

**Disadvantages** – Consumes more bandwidth for communicating with other neighbors. Less secure than static routing.

## 7.3. ROUTING TABLE:

A routing table is a set of rules, often viewed in table format, that is used to determine where data packets traveling over an Internet Protocol (IP) network will be directed. All IP-enabled devices, including routers and switches, use routing tables.



```
R1# show ip route | begin Gateway
Gateway of last resort is 209.165.200.234 to network 0.0.0.0

S* 0.0.0.0/0 [1/0] via 209.165.200.234, Serial0/0/1
                   is directly connected, Serial0/0/1
   172.16.0.0/16 is variably subnetted, 5 subnets, 3 masks
C     172.16.1.0/24 is directly connected, GigabitEthernet0/0
L     172.16.1.1/32 is directly connected, GigabitEthernet0/0
R     172.16.2.0/24 [120/1] via 209.165.200.226, 00:00:12, Serial0/0/0
R     172.16.3.0/24 [120/2] via 209.165.200.226, 00:00:12, Serial0/0/0
R     172.16.4.0/28 [120/2] via 209.165.200.226, 00:00:12, Serial0/0/0
R  192.168.0.0/16 [120/2] via 209.165.200.226, 00:00:03, Serial0/0/0
   209.165.200.0/24 is variably subnetted, 5 subnets, 2 masks
C     209.165.200.224/30 is directly connected, Serial0/0/0
L     209.165.200.225/32 is directly connected, Serial0/0/0
R     209.165.200.228/30 [120/1] via 209.165.200.226, 00:00:12,
                    Serial0/0/0
C     209.165.200.232/30 is directly connected, Serial0/0/1
L     209.165.200.233/30 is directly connected, Serial0/0/1
R1#
```

**Fig7.3.** Routing Table

## 8.1 PUTTY SOFTWARE:

PuTTY is a free and open-source terminal emulator, serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection. It can also connect to a serial port. The name "PuTTY" has no official meaning.

PuTTY was originally written for Microsoft Windows, but it has been ported to various other operating systems.

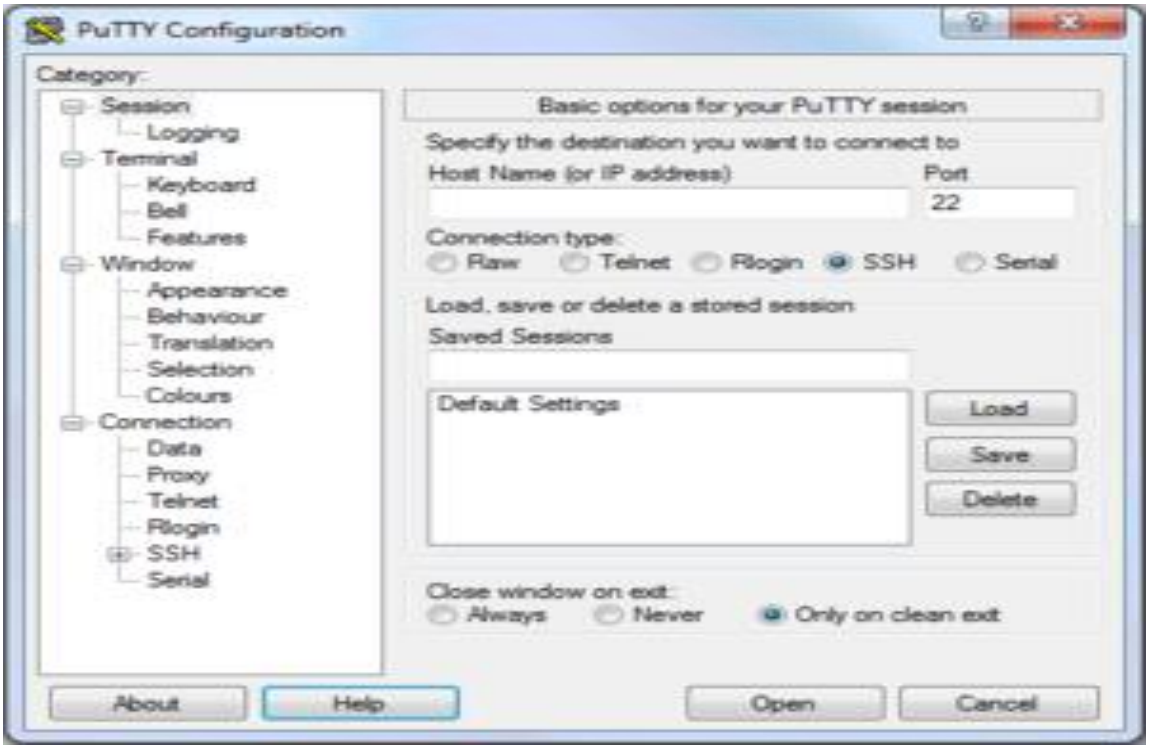



**Fig:8.1**. Putty Software

## 8.2. TELNET:

TELNET stands for TErminaL NETwork. It is a type of protocol that enables one computer to connect to local computer. It is a used as a standard TCP/IP protocol for virtual terminal service which is given by ISO. Computer which starts connection known as the local computer. Computer which is being connected to i.e. which accepts the connection known as remote computer. When the connection is established between local and remote computer. During telnet operation whatever that is being performed on the remote computer will be displayed by local computer. Telnet operates on client/server principle.

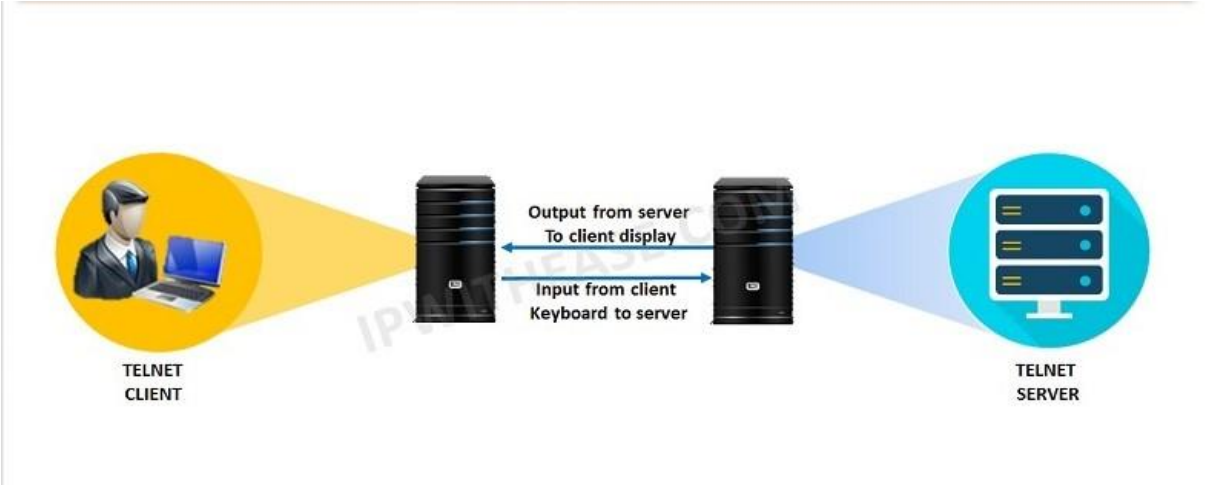



**Fig:8.2.** Telnet

## 8.3. CISCO PACKET TRACER:

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

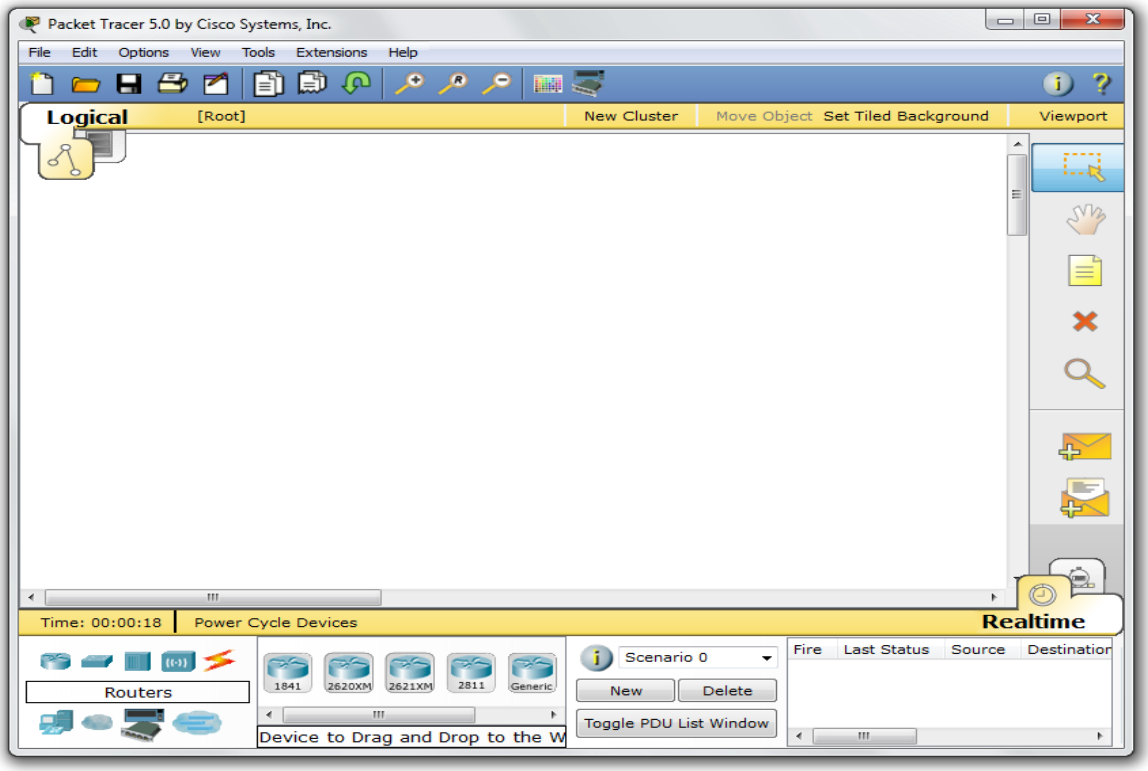



**Fig:8.3.** Cisco Packet Tracer

# 9.1. RIP PROTOCOL:

Routing Information Protocol (RIP) is a dynamic routing protocol that uses hop count as a routing metric to find the best path between the source and the destination network. It is a distance-vector routing protocol that has an AD value of 120 and works on the Network layer of the OSI model. RIP uses port number 520.

**Hop Count**

Hop count is the number of routers occurring in between the source and destination network. The path with the lowest hop count is considered as the best route to reach a network and therefore placed in the routing table. RIP prevents routing loops by limiting the number of hops allowed in a path from source and destination. The maximum hop count allowed for RIP is 15 and a hop count of 16 is considered as network unreachable.

## RIP CONFIGURATION

Router(config)#router rip

Router(config-router)#ver 2

Router(config-router)#network 10.0.0.0

Router(config-router)#no auto-summary

Router(config-router)#end

Router#wr

## BEFORE RIP CONFIGURATION

## AFTER RIP CONFIGURATION

```
TRIPURA#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
TRIPURA(config)#router rip
TRIPURA(config-router)#ver 2
TRIPURA(config-router)#network 10.0.0.0
TRIPURA(config-router)#no auto-summary
TRIPURA(config-router)#end
TRIPURA#wr
Building configuration...
[OK]
TRIPURA#
*Jan  1 23:40:35.242: %SYS-5-CONFIG_I: Configured from console by console
TRIPURA#wr
Building configuration...
[OK]
TRIPURA#sh ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, FastEthernet0/1
C    192.168.1.0/24 is directly connected, FastEthernet0/0
R    192.168.2.0/24 [120/1] via 10.0.0.2, 00:00:22, FastEthernet0/1
TRIPURA#
TRIPURA#
TRIPURA#ping 192.168.2.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
TRIPURA#
```

# 10.1. BASIC SETUP:

Software Required: CISCO PACKET TRACER

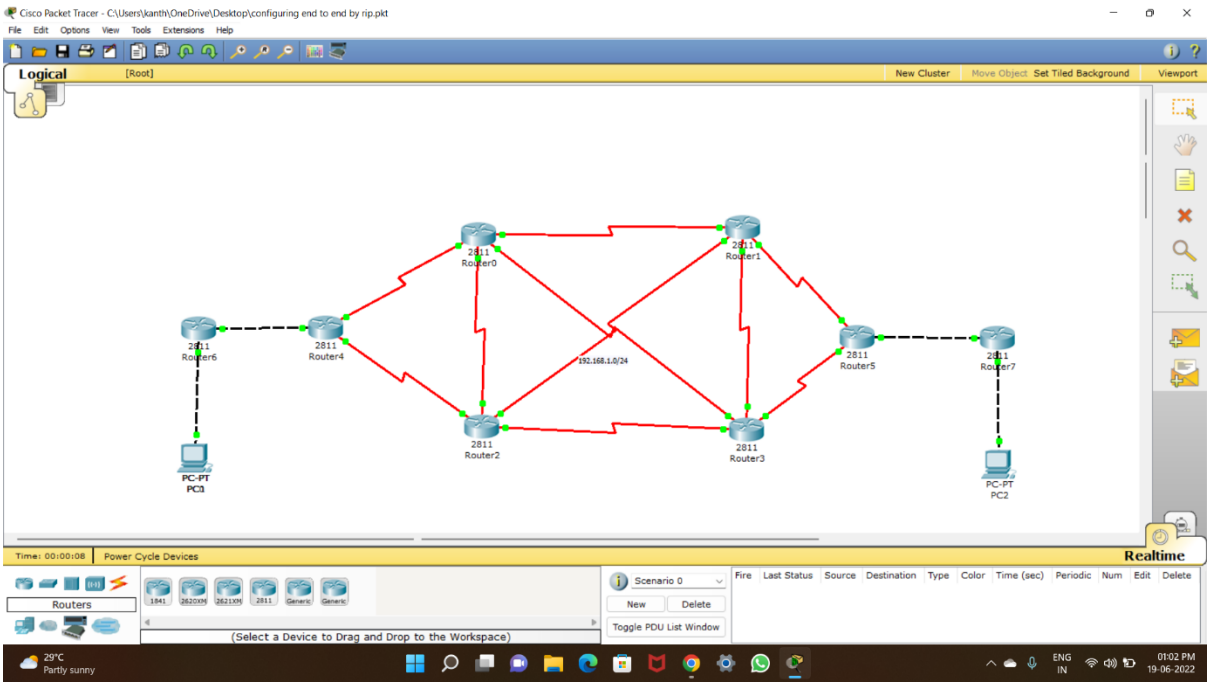



**Fig:10.1.** Basic Step

**Router 0:**

Serial0/0/0---192.168.1.1

Serial0/0/1---192.168.2.1

Serial0/2/0---192.168.3.1

Serial0/2/1---192.168.4.1

**Router 1:**

Serial0/0/0---192.168.1.2

Serial0/0/1---192.168.2.3

Serial0/2/0---192.168.11.3

Serial0/2/1---192.168.4.3

**Router 2:**

Serial0/0/0---192.168.1.3

Serial0/0/1---192.168.2.2

Serial0/2/0---192.168.11.2

Serial0/2/1---192.168.5.2

**Router 3:**

Serial0/0/0---192.168.1.4

Serial0/0/1---192.168.2.4

Serial0/2/0---192.168.3.2

Serial0/2/1---192.168.5.4

**Router 4:**

FastEthernet0/0---192.168.6.1

Serial0/0/0---192.168.4.2

Serial0/0/1---192.168.5.1

**Router 5:**

FastEthernet0/0---192.168.6.3

Serial0/0/0---192.168.4.4

Serial0/0/1---192.168.5.3

**Router 6:**

FastEthernet0/0---192.168.6.2

FastEthernet0/1---192.168.7.1

**Router 7:**

FastEthernet0/0---192.168.6.4

FastEthernet0/1---192.168.17.2

**PC-1:**

IP Address---192.168.7.2

Subnet Mask---255.255.255.0

Gateway---192.168.7.1

**PC-2:**

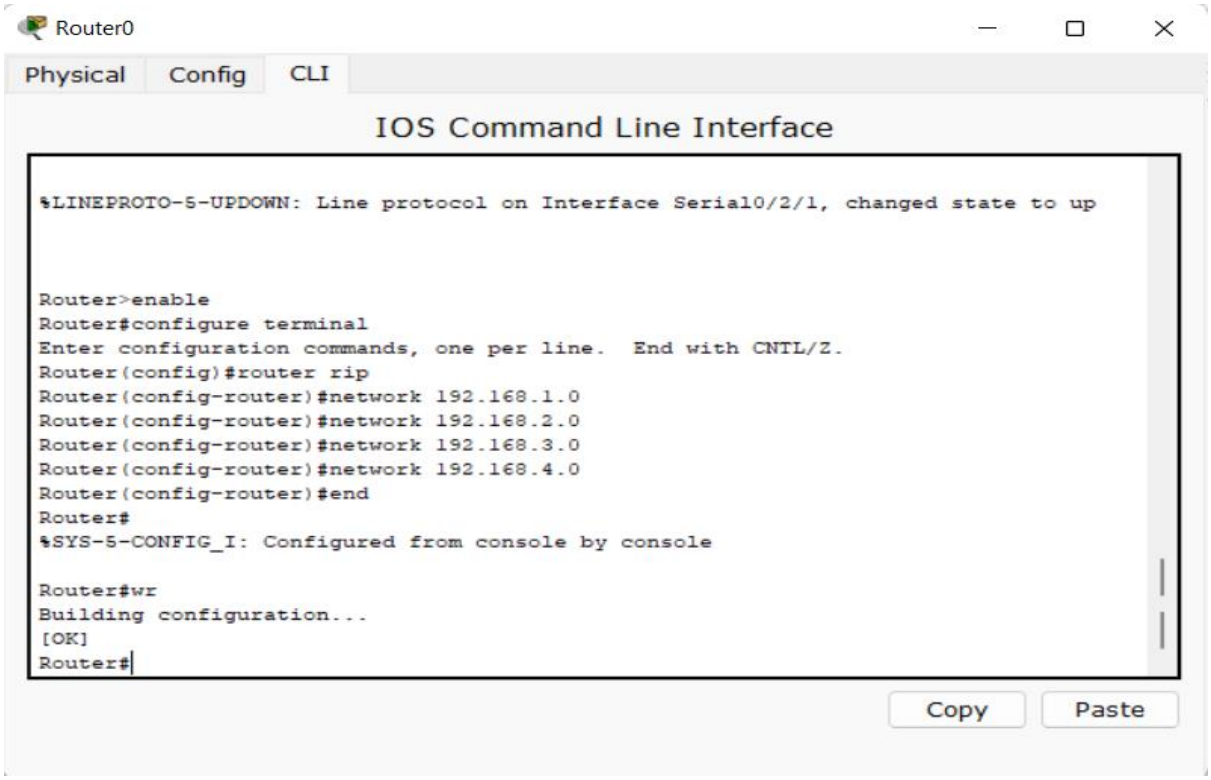
IP Address---192.168.17.3

Subnet Mask---255.255.255.0

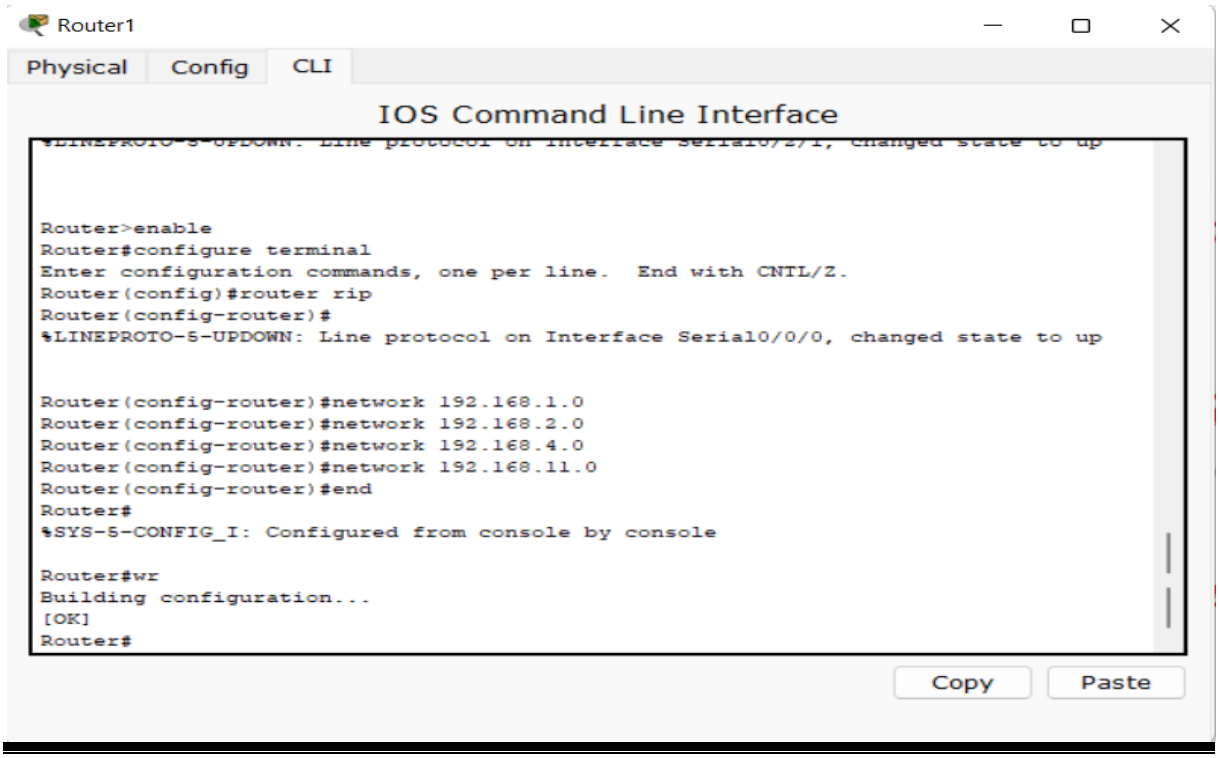
Gateway---192.168.17.2

# 10.2. CONFIGURATIONS:

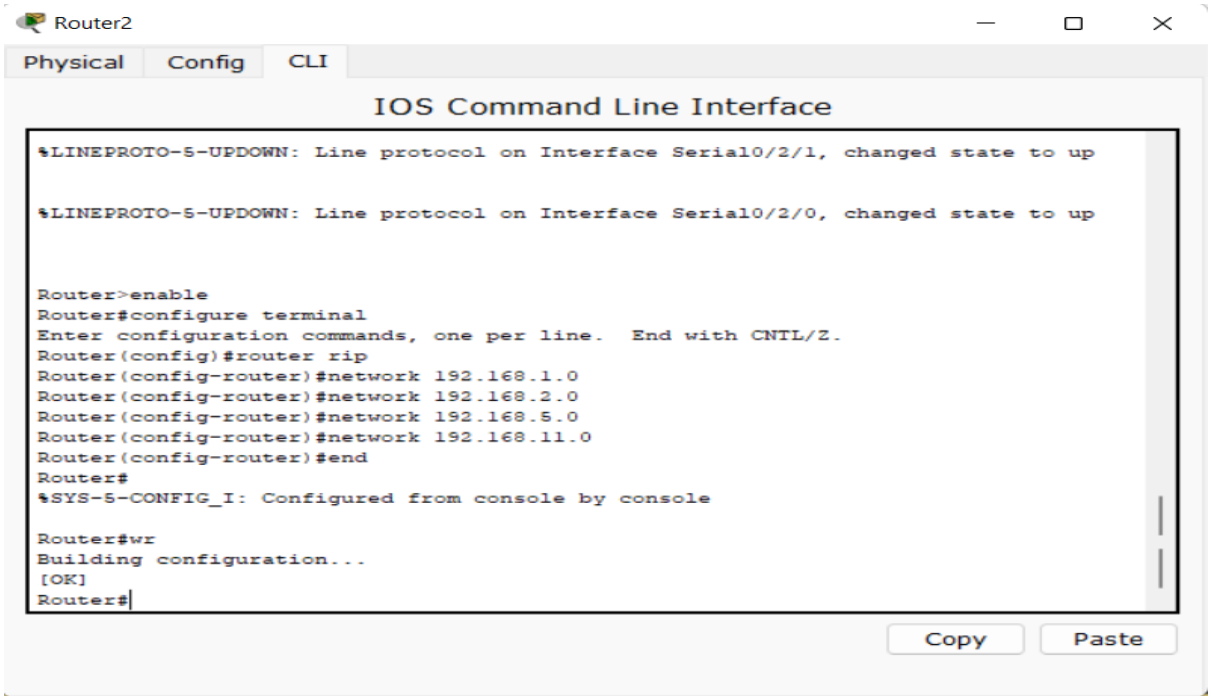
## Router 0:



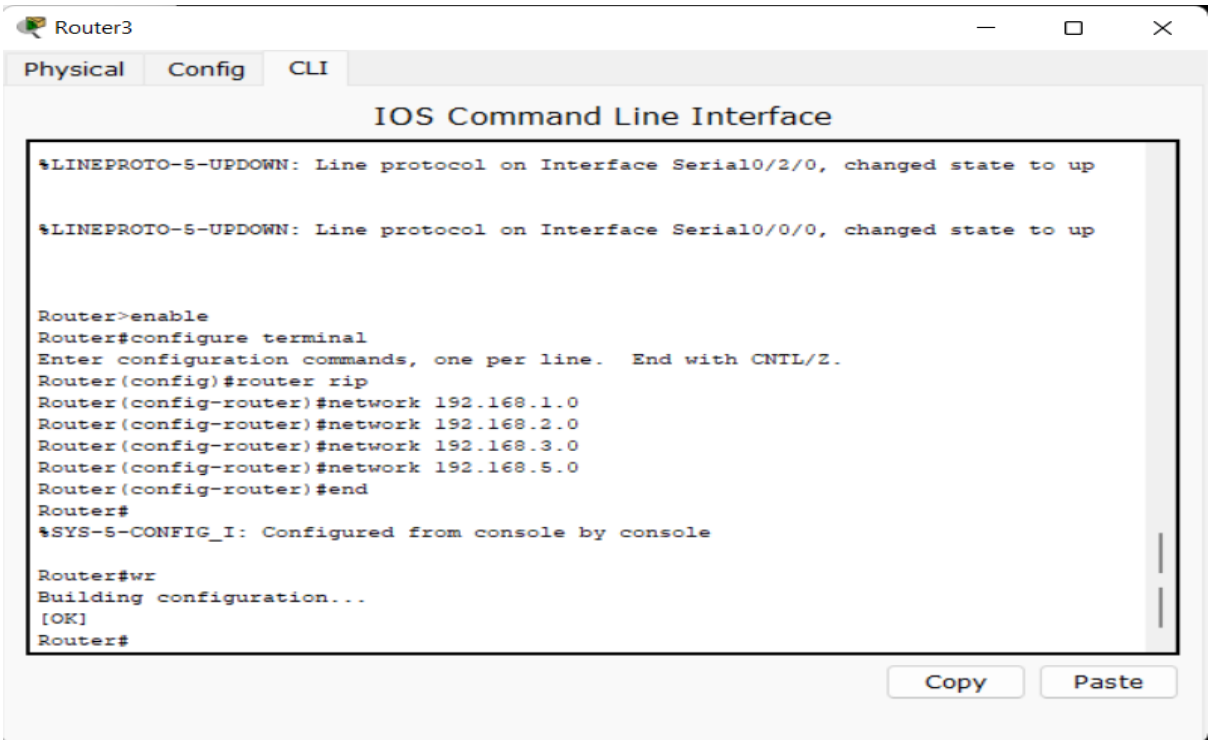

Router 1:



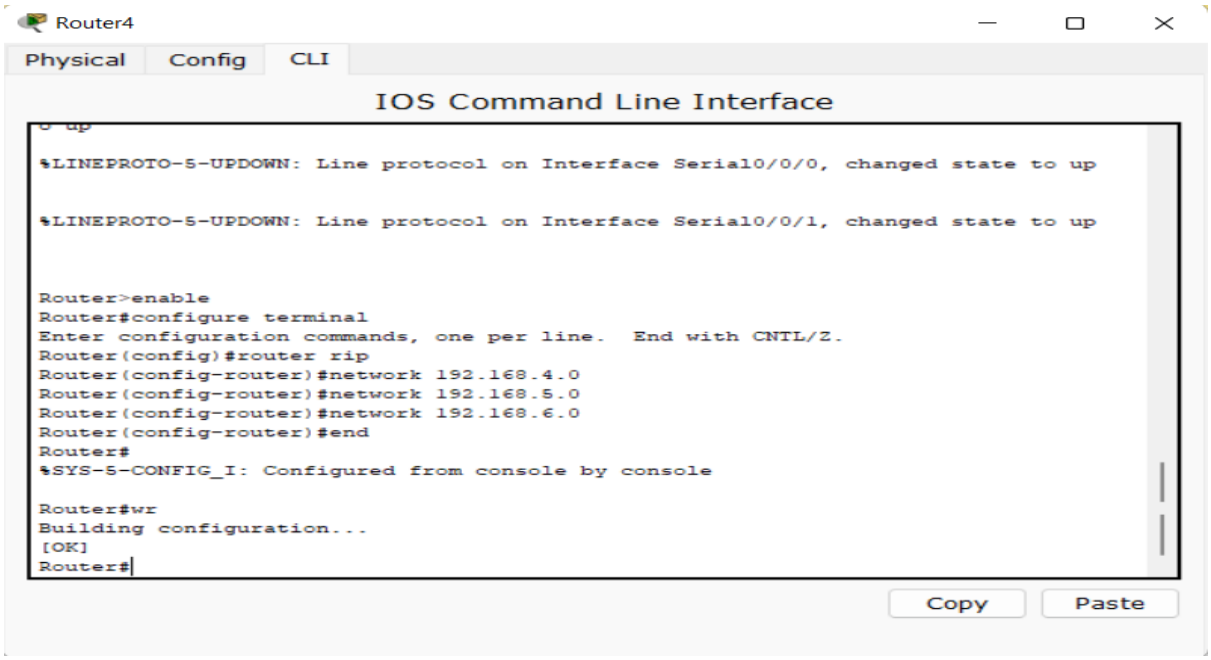
Router 2:



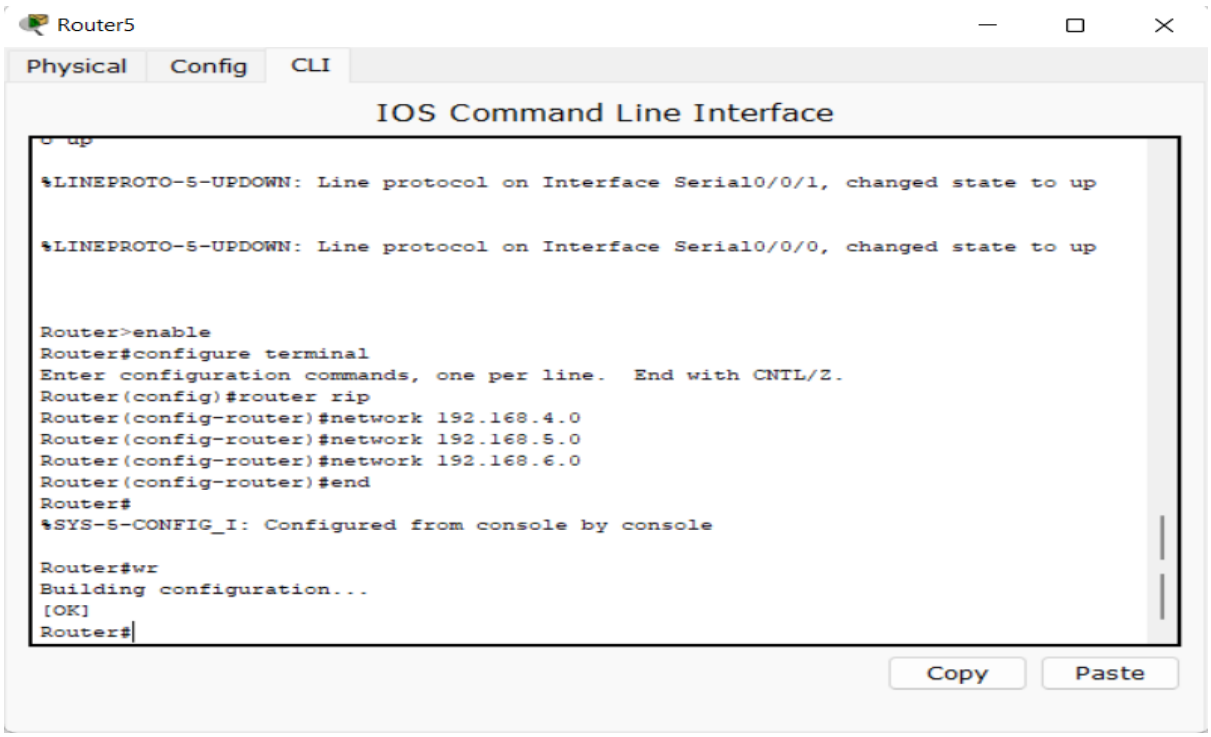

Router 3:



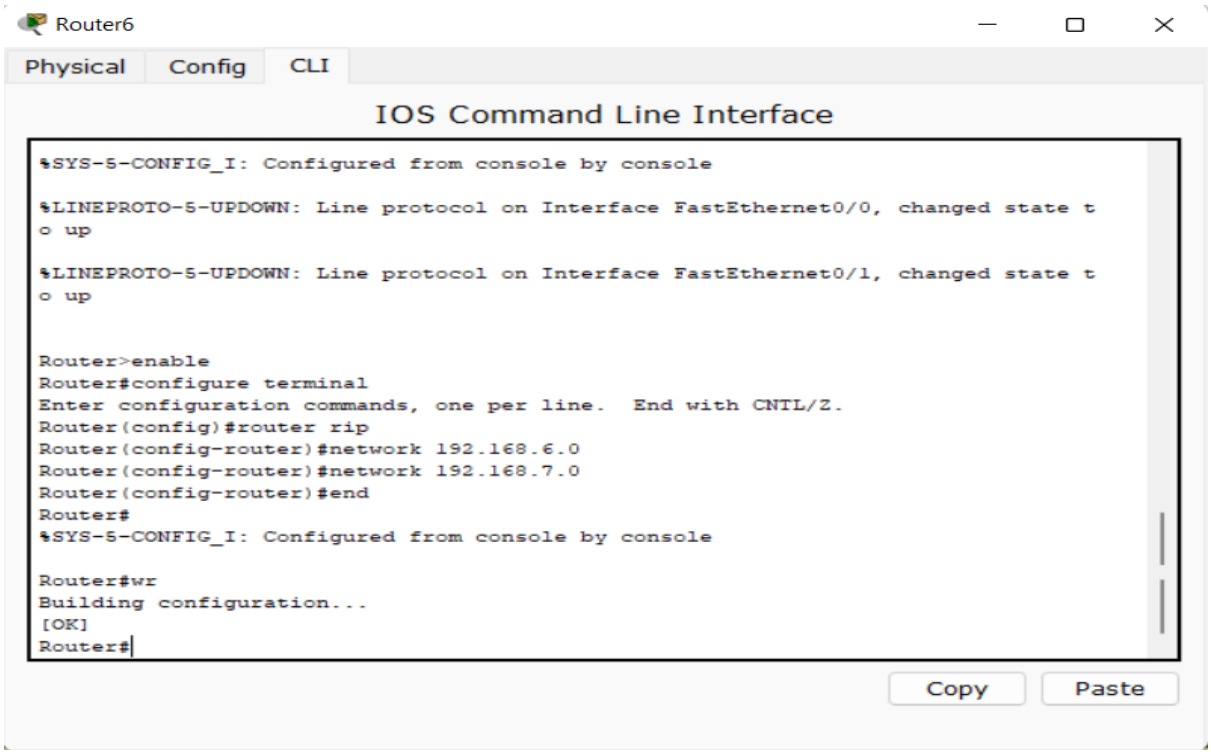
Router 4:



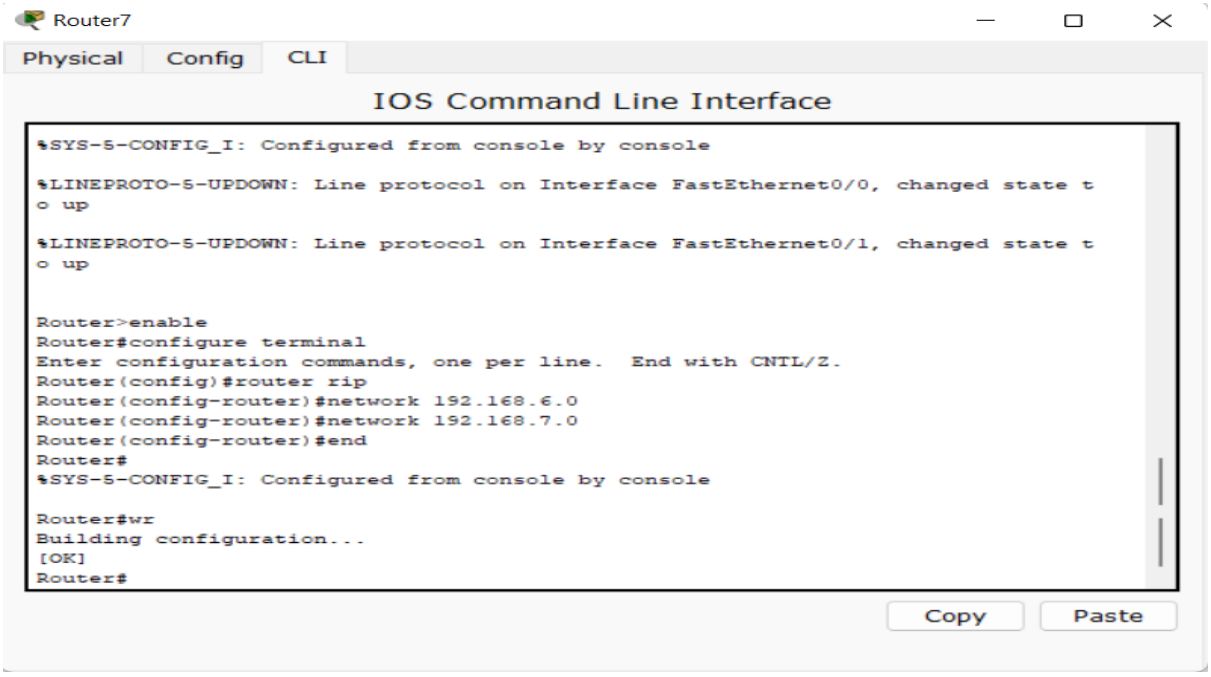

Router 5:



Router -6:

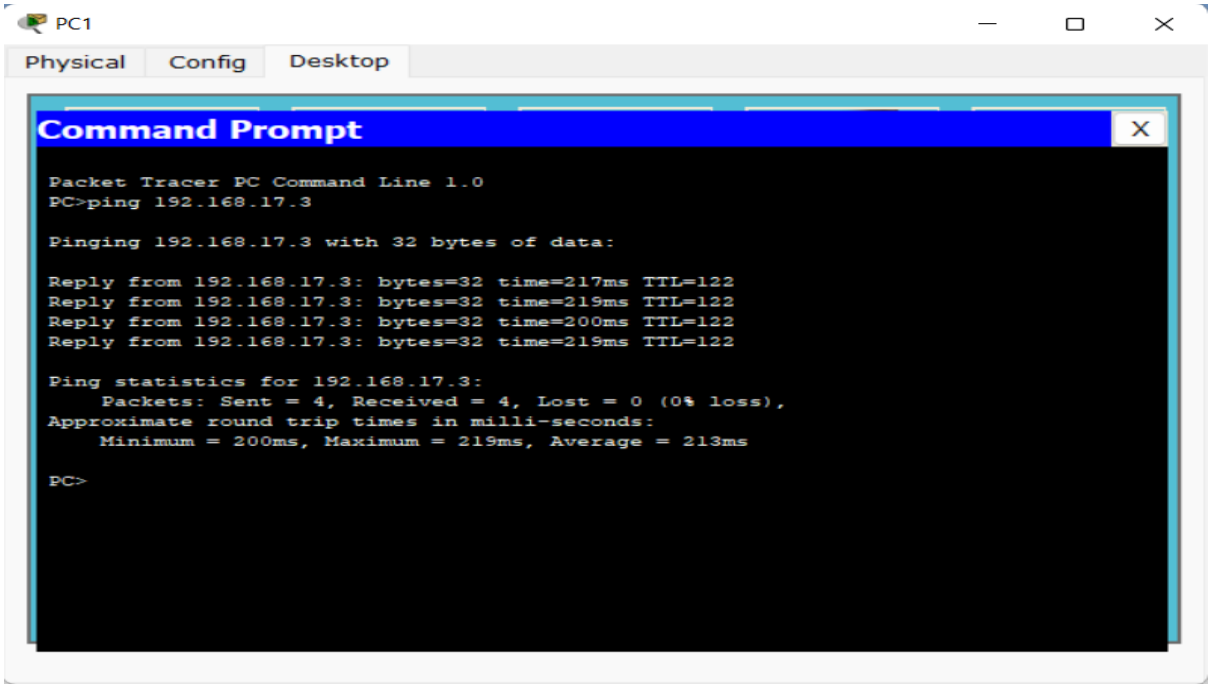



Router 7:

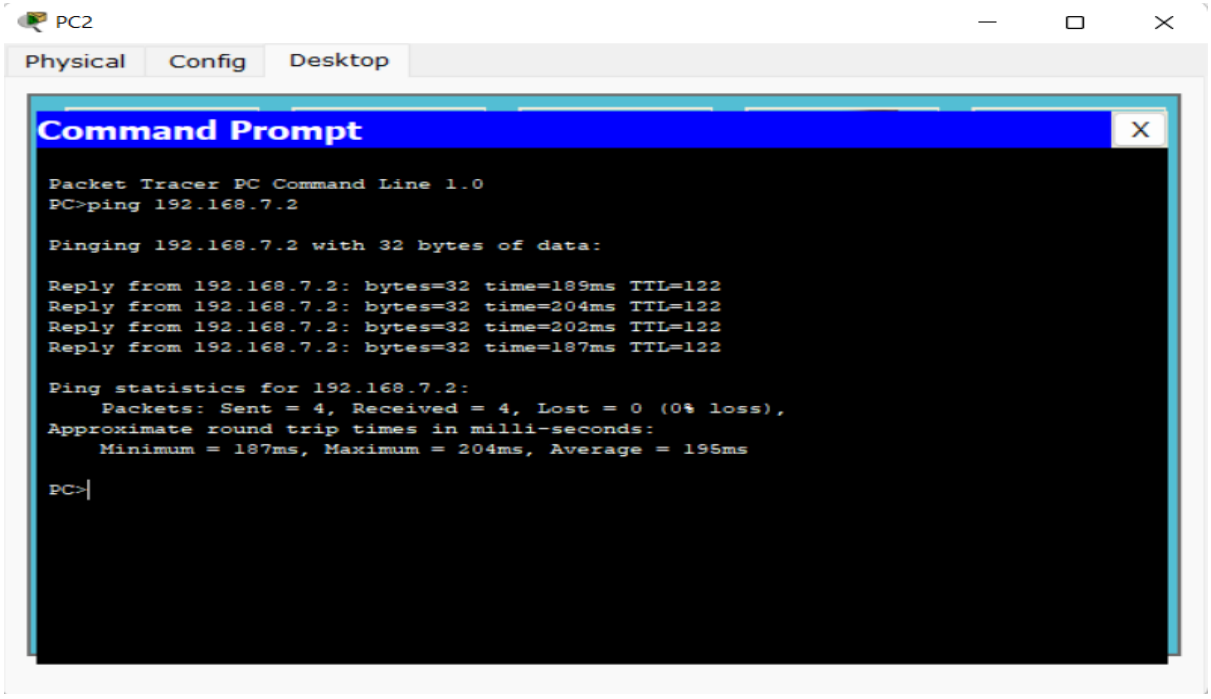


# 10.3. PING CONFIGURATION OF PCs:

PC-1




PC-2:



# 11. RESULTS:

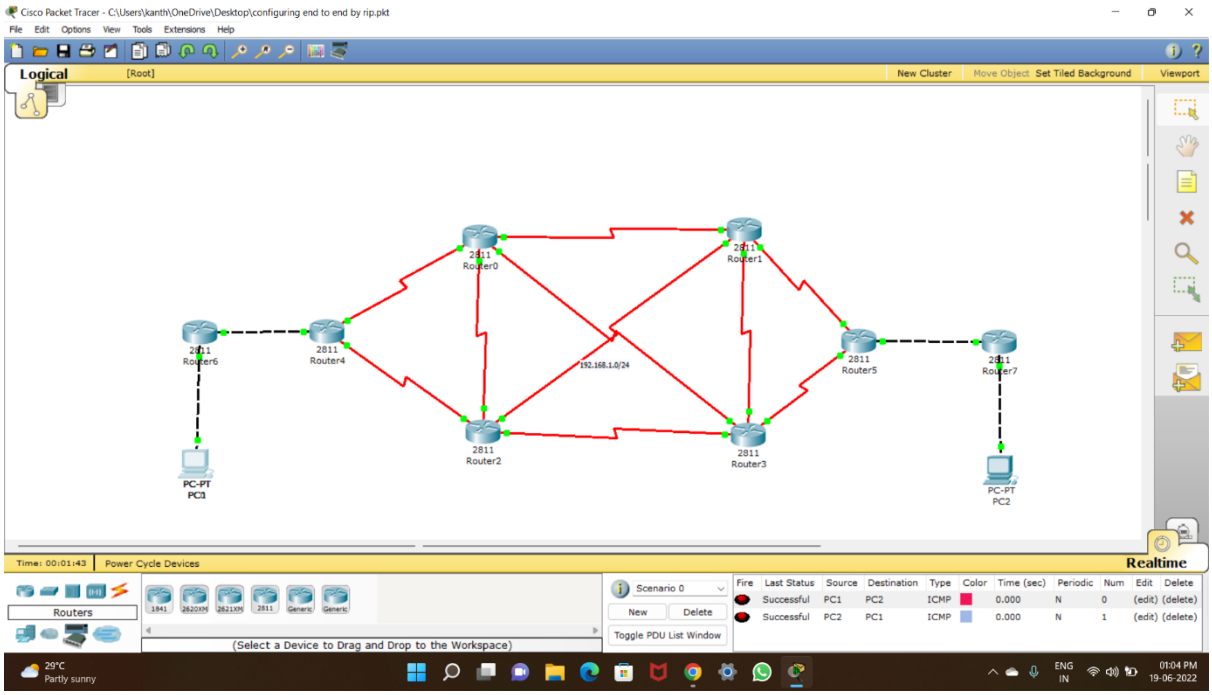



**Fig:11.1.** Output of the Simulation

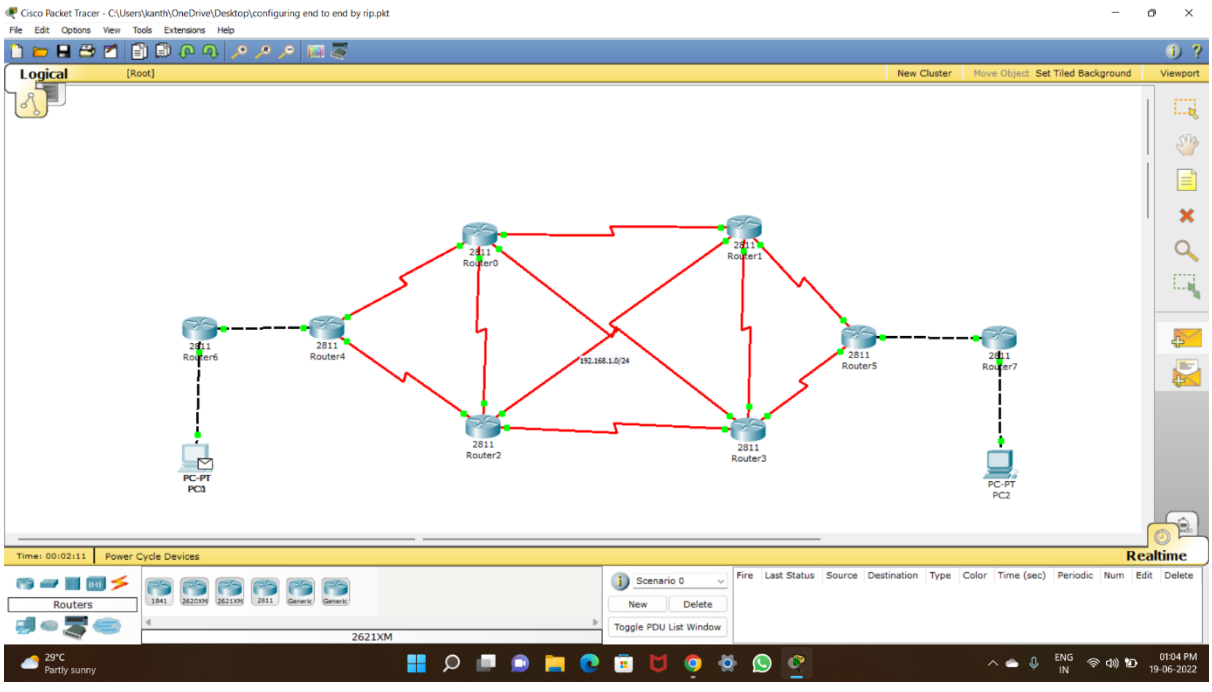



**Fig:11.2.** Message Transferring Simulation

# 12.CONCLUSION:

In conclusion, a network is two or more computers connected together using a telecommunication system for the purpose of communicating and sharing resources. Without having a network, Companies would not be able to share resources and increase productivity more effectively. The WAN network allowed companies to use the Internet over large areas. This provided the company to have meetings overseas by video conferencing and sharing data over the network. As you can see, Networks have many benefits to the end user. Weather your Network is Wired or Wireless, Networks are an important part of technology.

# 13.FUTURESCOPE:

The only varying parameter in our analysis, other than routing protocol of course, was the size of the network topology. Improvement or future works for this project can include adding metrics on interfaces such as cost, bandwidth, distance, Bit Error Rate (BER), and delay. Furthermore, various network topologies (in terms of size, routers and links used) can be implemented for comparison of performance between these routing protocols. Since it is the most complex routing protocol, more time could be spent on analyzing it to find the value of parameters that need to be set in order for it to perform optimally. Another possibility is to implement real network topologies used, perhaps in a university campus a company office, or a larger network ENSC427- Final Project 25 size while also modifying the network parameters, such as interfaces, to those of the actual scenario being analyzed.

# 14.REFERENCES:

[1] B. Wu. “Simulation Based Performance Analyses on RIPv2, EIGRP, and OSPF Using OPNET.” Internet: http://digitalcommons.uncfsu.edu/cgi/viewcontent.cgi?article=1011&context=macsc_wp, Aug. 20, 2011, [Mar. 15, 2013]

[2] D. Xu. “OSPF, EIGRP, and RIP performance analysis based on OPNET.” Internet: www.sfu.ca/~donx, [Mar. 15, 2013].

[3] J. Varsalone, in Cisco CCNA/CCENT Exam 640-802, 640-822, 640-816 preparation kit [electronic resource] : with Cisco router simulations, Rockland, Mass. : Syngress ; Oxford: Elsevier Science, 2009.

[4] U.D. Black, in IP routing protocols : RIP, OSPF, BGP, PNNI, and Cisco routing protocols, Upper Saddle River, NJ: Prentice Hall, 2000.

[5] M.K. Denko, in Mobile opportunistic networks : architectures, protocols and applications, Boca Raton: CRC Press, 2011.

[6] D. Medhi & K. Ramasamy, in Network routing : algorithms, protocols, and architectures, Amsterdam ; Boston : Elsevier: Morgan Kaufmann Publishers, 2007.

# THANK YOU