Laboratory Manual

Computer Communication & Networks Lab

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Experiment 1:

Aim of the Experiment:

Study of various computer networking components

Details:

Components: Routers, switch, bridge, repeater, hub, WAP, firewall, NIC card:

Refer:

Computer networks share common devices, functions, and features including servers, clients, transmission media, shared data, shared printers and other hardware and software resources, network interface card(NIC), local operating system(LOS), and the network operating system (NOS).

- **Servers** –
- Servers are computers that hold shared files, programs, and the network operating system. Servers provide access to network resources to all the users of the network. There are many different kinds of servers, and one server can provide several functions. For example, there are file servers, print servers, mail servers, communication servers, database servers, fax servers and web servers, to name a few. Sometimes it is also called host computer, servers are powerful computer that store data or application and connect to resources that are shared by the user of a network.
- **Clients** - Clients are computers that access and use the network and shared network resources. Client computers are basically the customers(users) of the network, as they request and receive services from the servers. These days, it is typical for a client to be a personal computer that the users also use for their own non-network applications.\
- **Transmission Media** - Transmission media are the facilities used to interconnect computers in a network, such as twisted-pair wire, coaxial cable, and optical fiber cable. Transmission media are sometimes called transmission medium channels, links or lines.
- **Shared data** - Shared data are data that file servers provide to clients such as data files, printer access programs and e-mail.
- **Shared printers and other peripherals** - Shared printers and peripherals are hardware resources provided to the users of the network by servers. Resources provided include data files, printers, software, or any other items used by clients on the network.
- **Network Interface Card** - Each computer in a network has a special expansion card called a network interface card (NIC). The NIC prepares(formats) and sends data,

receives data, and controls data flow between the computer and the network. On the transmit side, the NIC passes frames of data on to the physical layer, which transmits the data to the physical link. On the receiver's side, the NIC processes bits received from the physical layer and processes the message based on its contents.

- **Local Operating System** - A local operating system allows personal computers to access files, print to a local printer, and have and use one or more disk and CD drives that are located on the computer. Examples are MS-DOS, Unix, Linux, Windows 2000, Windows 98, Windows XP etc. The network operating system is the software of the network. It serves a similar purpose that the OS serves in a stand-alone computer
- **Network Operating System** - The network operating system is a program that runs on computers and servers that allows the computers to communicate over the network.
- **Hub** - Hub is a device that splits a network connection into multiple computers. It is like a distribution center. When a computer requests information from a network or a specific computer, it sends the request to the hub through a cable. The hub will receive the request and transmit it to the entire network. Each computer in the network should then figure out whether the broadcast data is for them or not.
- **Switch** - Switch is a telecommunication device grouped as one of computer network components. Switch is like a Hub but built in with advanced features. It uses physical device addresses in each incoming messages so that it can deliver the message to the right destination or port. Unlike a hub, switch doesn't broadcast the received message to entire network, rather before sending it checks to which system or port should the message be sent. In other words, switch connects the source and destination directly which increases the speed of the network. Both switch and hub have common features: Multiple RJ-45 ports, power supply and connection lights.
- **Router** - When we talk about computer network components, the other device that used to connect a LAN with an internet connection is called Router. When you have two distinct networks (LANs) or want to share a single internet connection to multiple computers, we use a Router. In most cases, recent routers also include a switch which in other words can be used as a switch. You don’t need to buy both switch and router, particularly if you are installing small business and home networks. There are two types of Router: wired and wireless. The choice depends on your physical office/home setting, speed and cost.
- **LAN Cable** A local area Network cable is also known as data cable or Ethernet cable which is a wired cable used to connect a device to the internet or to other devices like computer, printers, etc.

Assignment:

A computer is connected to a wireless access point placed in a corridor of the institute. The WAP is connected to the institute wide WAN.

i. Create a block diagram of the various components that are involved in proving the internet access to this computer.
ii. Discuss the various components and their role that will constitute this WAN from the ISP to the End User.

Experiment 2:

Aim of the Experiment:

To study the fabrication of straight, cross and rollover cables

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Details:

Components: Routers, switch, bridge, repeater, hub, WAP, firewall, NIC card:

Refer: the attached document

Assignment:

When talking about cable pinouts, we often get questions as to the difference in Straightthrough, Crossover, and Rollover wiring of cables and the intended use for each type of cable. These terms are referring to the way the cables are wired (which pin on one end is connected to which pin on the other end). Below we will try to shed some light on this commonly confused subject.

Straight-Through Wired Cables

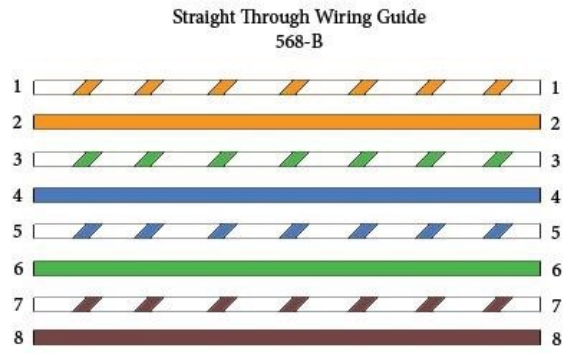
Straight-Through refers to cables that have the pin assignments on each end of the cable. In other words, Pin 1 connector A goes to Pin 1 on connector B, Pin 2 to Pin 2, etc. StraightThrough wired cables are most commonly used to connect a host to a client. When we talk about cat5e patch cables, the Straight-Through wired cat5e patch cable is used to connect computers, printers, and other network client devices to the router switch or hub (the host device in this instance).

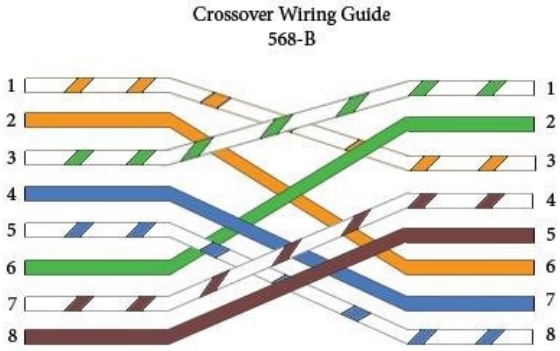
Crossover Wired Cables

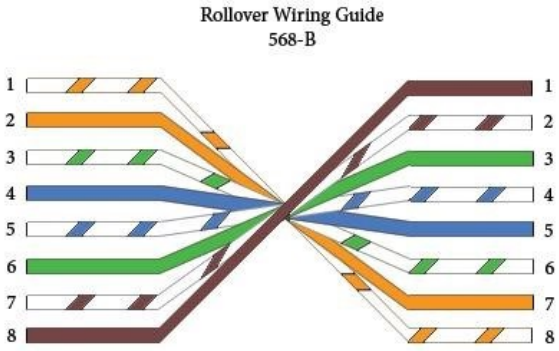
Crossover wired cables (commonly called crossover cables) are very much like StraightThrough cables with the exception that TX and RX lines are crossed (they are at opposite positions on either end of the cable. Using the 568-B standard as an example below, you will see that Pin 1 on connector A goes to Pin 3 on connector B. Pin 2 on connector A goes to Pin 6 on connector B, etc. Crossover cables are most commonly used to connect two hosts directly. Examples would be connecting a computer directly to another computer, connecting a switch directly to another switch, or connecting a router to a router. ***Rollover Wired Cables***

Rollover wired cables, most commonly called rollover cables, have opposite Pin assignments on each end of the cable or, in other words, it is "rolled over." Pin 1 of connector A would be connected to Pin 8 of connector B. Pin 2 of connector A would be connected to Pin 7 of connector B and so on. Rollover cables, sometimes referred to as Yost cables are most commonly used to connect to a device's console port to make programming changes to the

device. Unlike crossover and straight-wired cables, rollover cables are not intended to carry data but instead create an interface with the device.







Experiment 3:

Aim of the Experiment:

Study and implementation of various computer networking specific commands.

Commands:

- ***ipconfig***

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without parameters, ipconfig displays Internet Protocol version 4 (IPv4) and IPv6 addresses, subnet mask, and default gateway for all adapters.

Syntax: `ipconfig /all`

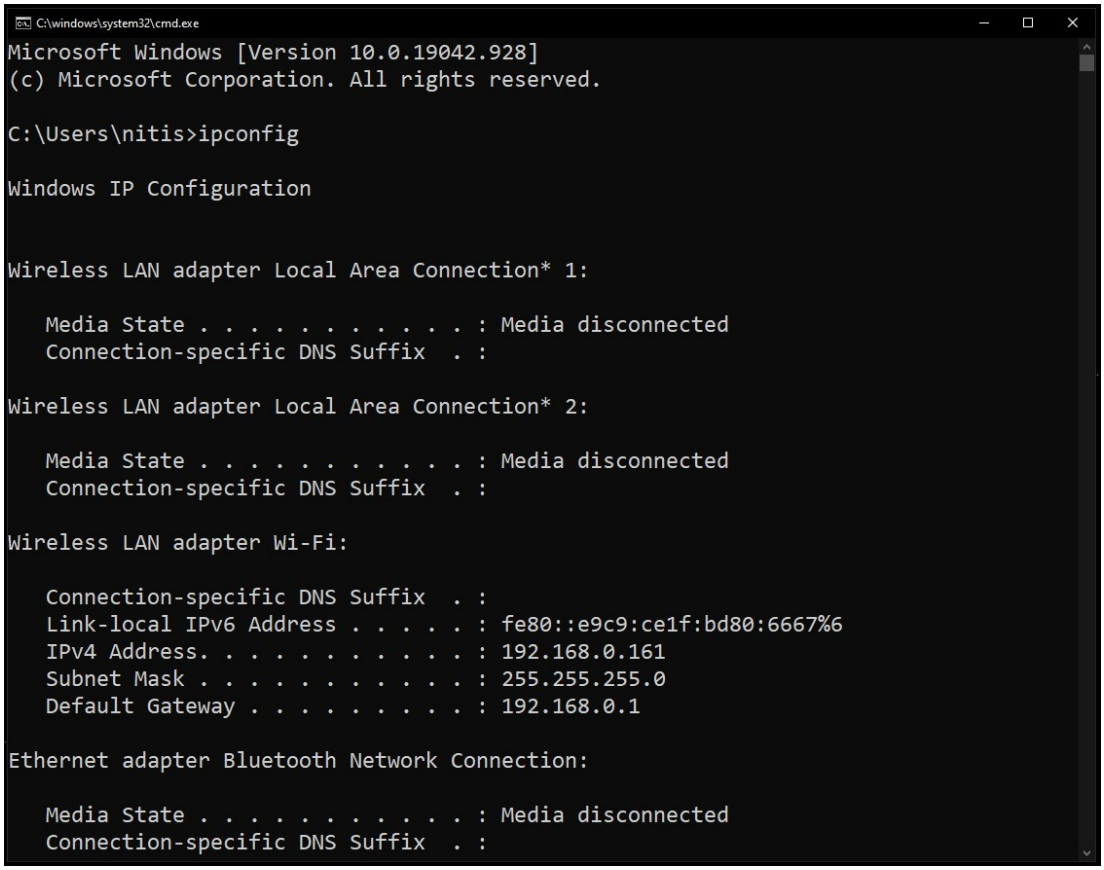
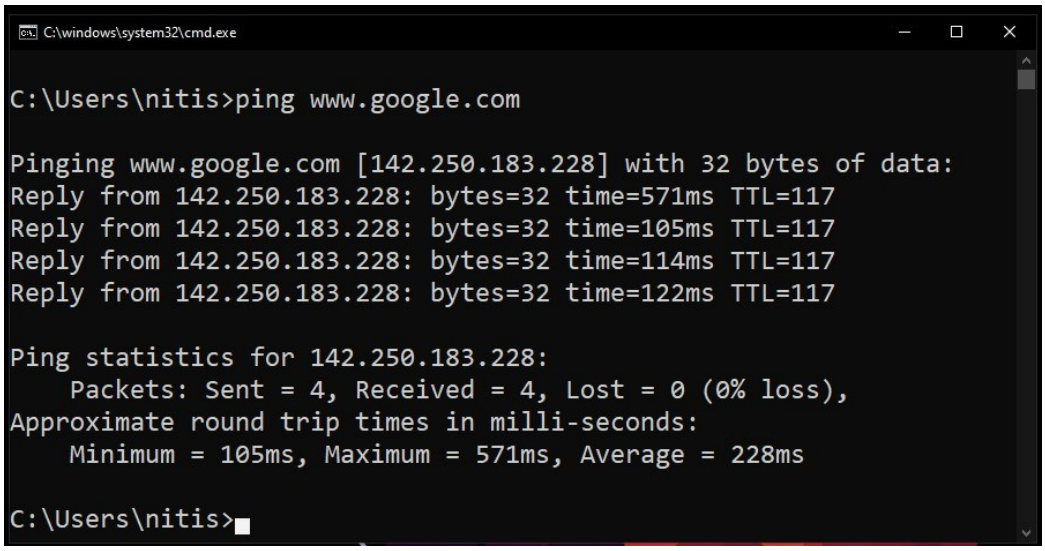


Fig.1:

- ***ping***

Ping is accessed using the command line prompt of the same name, either in combination with the IP address or the target computer's host name.

Syntax: `ping [target address].`
e.g. `ping www.google.com`

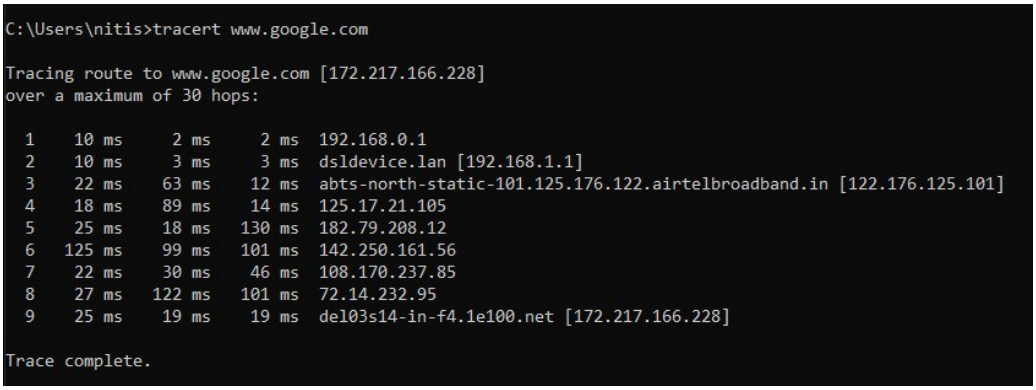


• ***tracert***

Determines the path taken to a destination by sending Internet Control Message Protocol (ICMP) echo Request or ICMPv6 messages to the destination with incrementally increasing time to live (TTL) field values. Each router along the path is required to decrement the TTL in an IP packet by at least 1 before forwarding it.

Syntax: `tracert [target address].`

e.g. `tracert` www.google.com



• ***arp***

Displays and modifies entries in the Address Resolution Protocol (ARP) cache, which contains one or more tables that are used to store IP addresses and their resolved Ethernet or Token Ring physical addresses. There is a separate table for each Ethernet or Token Ring network adapter installed on your computer. Used without parameters, *arp* displays help.

Syntax: `arp -a`

(*Displays current ARP entries by interrogating the current protocol data. If* **`inet_addr`** *is specified, the IP and Physical addresses for only the specified computer are displayed. If more than one network interface uses ARP, entries for each ARP table are displayed.*)

```
C:\Users\nitis>arp -a

Interface: 192.168.0.161 --- 0x6
  Internet Address      Physical Address      Type
  192.168.0.1           e4-c3-2a-0f-1b-fe     dynamic
  192.168.0.136         8e-45-d7-38-17-74     dynamic
  192.168.0.155         b4-2e-99-3f-7a-73     dynamic
  192.168.0.162         96-c8-17-c4-bd-86     dynamic
  192.168.0.169         7a-01-38-f3-92-d9     dynamic
  192.168.0.189         f2-5a-da-6c-d7-bd     dynamic
  192.168.0.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.2             01-00-5e-00-00-02     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  224.168.100.1         01-00-5e-28-64-01     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

C:\Users\nitis>
```

- ***netstat***

Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols). Used without parameters, this command displays active TCP connections.

Syntax: `netstat`

```
C:\Users\nitis>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:61904        Nitish:61903           TIME_WAIT
  TCP    192.168.0.161:49461    52.139.250.253:https   ESTABLISHED
  TCP    192.168.0.161:59998    a23-1-14-101:https     CLOSE_WAIT
  TCP    192.168.0.161:59999    a23-1-14-101:https     CLOSE_WAIT
  TCP    192.168.0.161:60000    a23-1-14-101:https     CLOSE_WAIT
  TCP    192.168.0.161:60007    a104-91-65-148:http    CLOSE_WAIT
  TCP    192.168.0.161:60008    a104-91-65-148:http    CLOSE_WAIT
  TCP    192.168.0.161:60009    a104-91-65-148:http    CLOSE_WAIT
  TCP    192.168.0.161:60010    a104-91-65-148:http    CLOSE_WAIT
  TCP    192.168.0.161:60012    a104-91-65-148:http    CLOSE_WAIT
  TCP    192.168.0.161:60020    a23-1-14-101:https     CLOSE_WAIT
  TCP    192.168.0.161:60789    172.217.194.188:https  ESTABLISHED
  TCP    192.168.0.161:60803    s3-us-west-2-r-w:https  CLOSE_WAIT
```

Experiment 4:
Aim of the Experiment:

Set-up a simple point-to-point network between two stations using Cisco packet tracer.

Procedure:

1. Open the *Cisco Packet Tracer* and setup the point to point network as shown in the Figure 3.1.

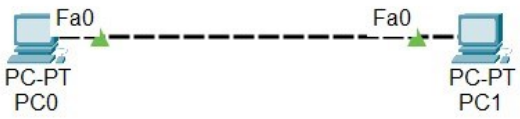


Fig 3.1: A point to point network

2. Connect both the PCs (PC0 and PC1 using cross cable)
3. Assign IP addresses to each PC
    a. Double click on the PC. Following window will open as in Fig 3.2.

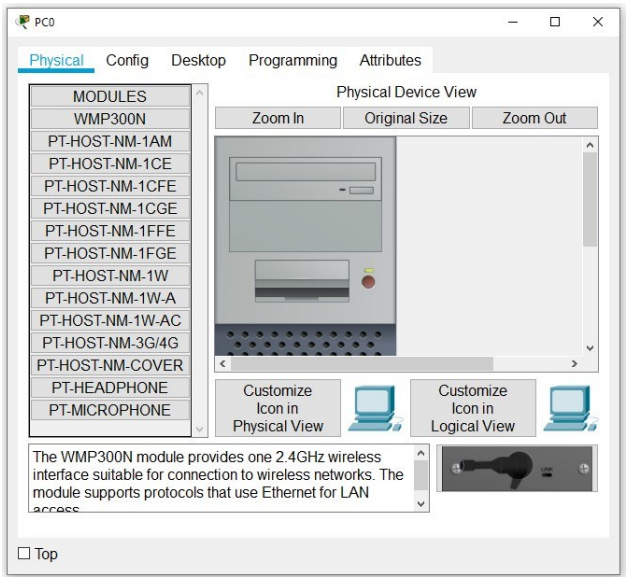


Fig 3.2: PC Panel on Packet Tracer

    b. Select “Desktop” and select “IP Configuration as in Fig. 3.3

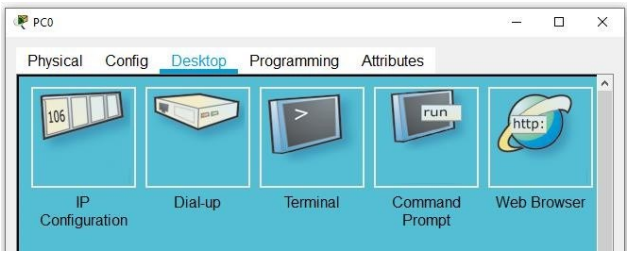


Fig 3.3: Desktop Configuration Panel on Packet Tracer

c. Assign IP Addresses as shown in Fig. 3.4:

i. Assign IP address '192.168.1.1' to PC0 ii.

Assign IP address '192.168.1.2' to PC1

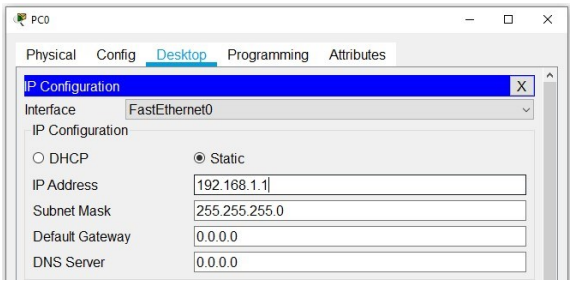


Fig. 3.4: Configuration Panel on Packet Tracer

4. Open the 'Desktop' of PC1, open 'Command Prompt' and try to ping any of the PC on the network to check the end-to-end connectivity as shown in Fig. 3.5.

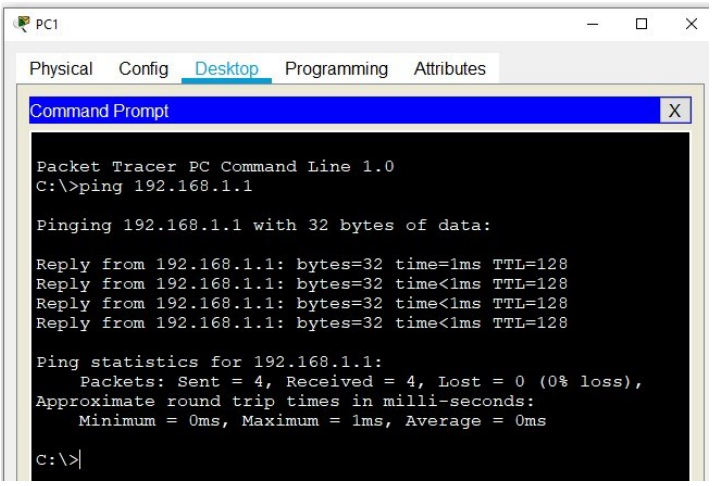


Fig. 3.5: Command Prompt on Packet Tracer

Experiment 5:
Setup a local area network using star topology using a hub

Procedure:

1. Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 4.1.
   Select the following components:
   a. End Devices > PC
   b. Network Devices > Hubs > PT-Hub
2. Connect all the PCs to Hub (PC0 to PC4 using straight cable)

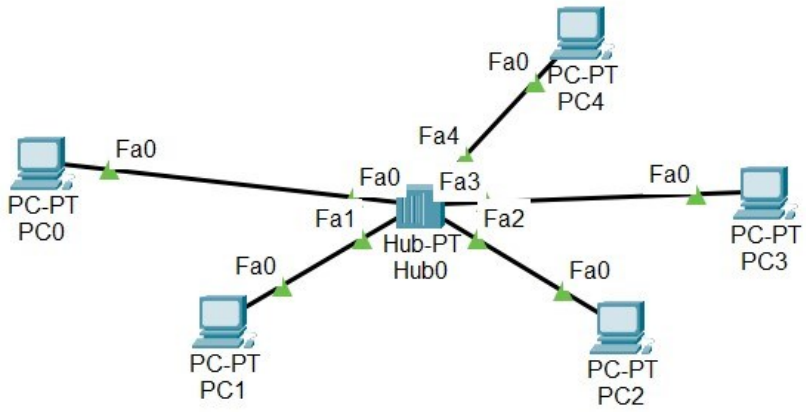


Fig. 4.1: A star topology connected via hub

3. Assign IP addresses to each PC assigned in Experiment 3, Steps 3(a) to 3(c)
   a. IP Addresses:
      i. Assign IP address '192.168.1.1' to PC0 ii.
      Assign IP address '192.168.1.2' to PC1 iii.
      Assign IP address '192.168.1.3' to PC2 iv.
      Assign IP address '192.168.1.4' to PC3 v.
      Assign IP address '192.168.1.5' to PC4

4. Now, switch to 'Simulation Mode' as in Fig. 4.1

Fig 4.2: Simulation tab in Packet Tracer

5. Select the PDU , and try to send it to a specific PC0 to PC3.
    a. The PC0 will send the PDU to the HUB-PT as in Fig. 4.3.

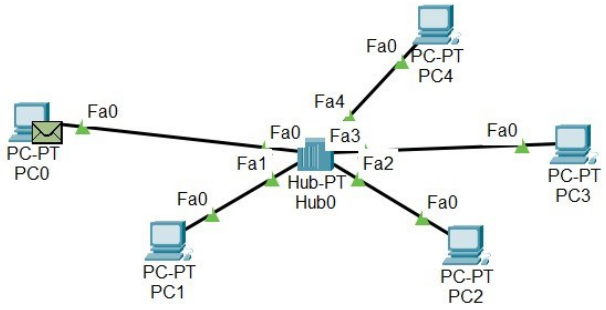


Fig. 4.3 Sending PDU from PC0

    b. The HUB-PT will broadcast the PDU to the entire Network and only the PC3 will accept the PDU rest will Discard the PDU as can be seen in Fig. 4.4.

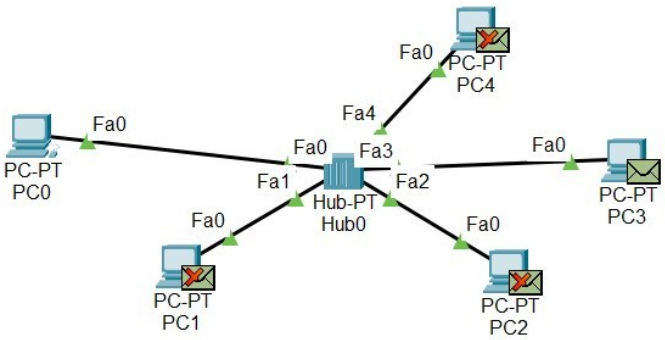


Fig: 4.4 PDUs forwarded by Hub

a. The PC3 will send the ACK back to the PC0 via HUB-PT. HUB-PT will broadcast the PDU to the entire Network and only the PC1 will accept the PDU rest will Discard the ACK PDU as can be seen in Fig. 4.5.

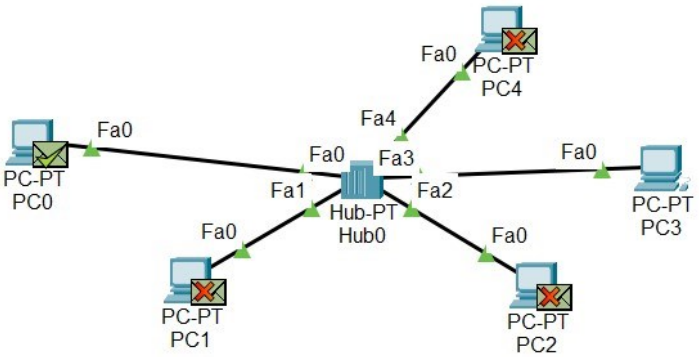


Fig. 4.5 ACK sent by the PC3

Experiment 6:
Setup a local area network using star topology using a Data Link Layer Switch

Procedure:

1. Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 5.1.
   Select the following components:
   a. End Devices > PC
   b. Network Devices > Switches > Switch 2960
2. Connect all the PCs to Switch (PC0 to PC4 using straight cable)

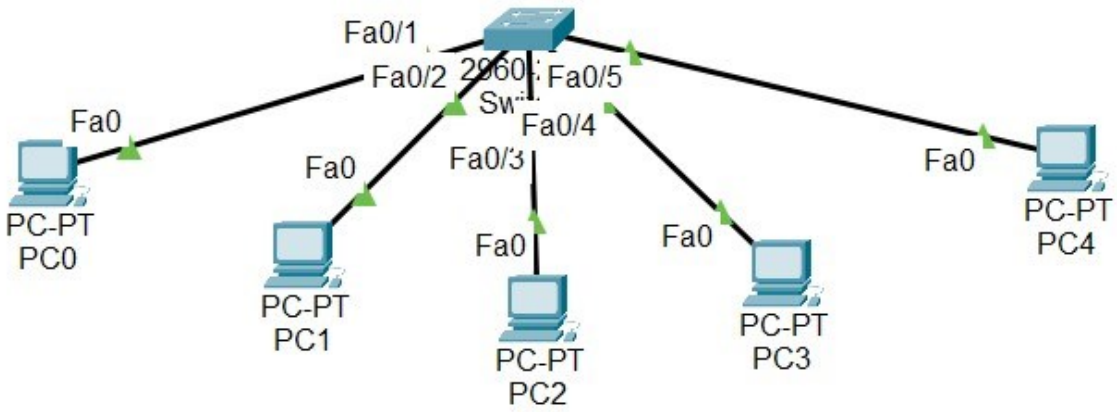


Fig 5.1 A LAN using star topology using a Data Link Layer Switch 3.

Follow the Steps 3 to 5 as in Experiment 4

Experiment 7:

To implement and examine the execution of an ARP request on a LAN

Procedure:

1. Setup Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 5.1.

   Select the following components:

   a. End Devices > PC

   b. Network Devices > Switches > Switch 2960

2. Connect all the PCs to Switch (PC0 to PC4 using straight cable)

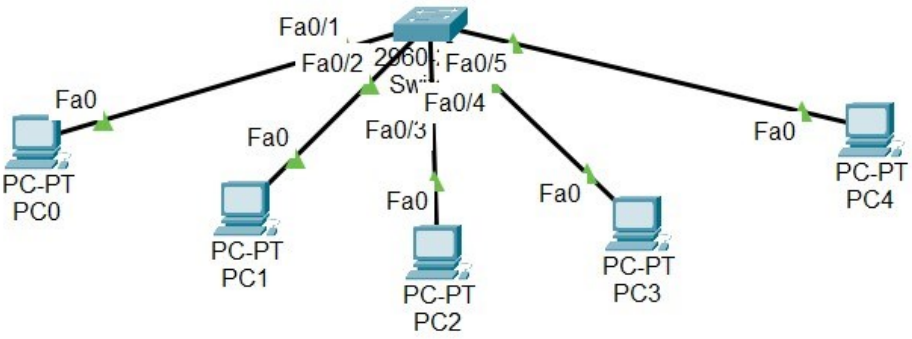


Fig 6.1 A LAN using star topology using a Data Link Layer Switch

3. Follow the Steps 3 and 4 as in Experiment 4.
4. Now, switch to 'Simulation Mode' as in Fig. 6.1

Fig 6.2: Simulation tab

1. Select the PDU , and try to send it to a specific PC0 to PC3.

   a. The PC1 will send the PDU to the Switch as in Fig. 6.3 and the PDU is shown as in Fig. 6.4

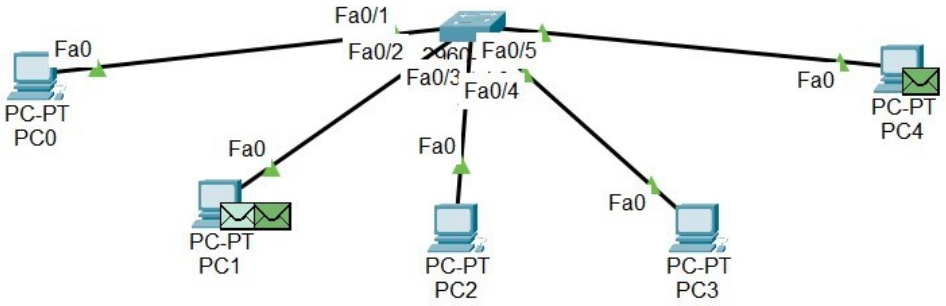


Fig. 6.3 Sending ARP request from PC1 to PC3

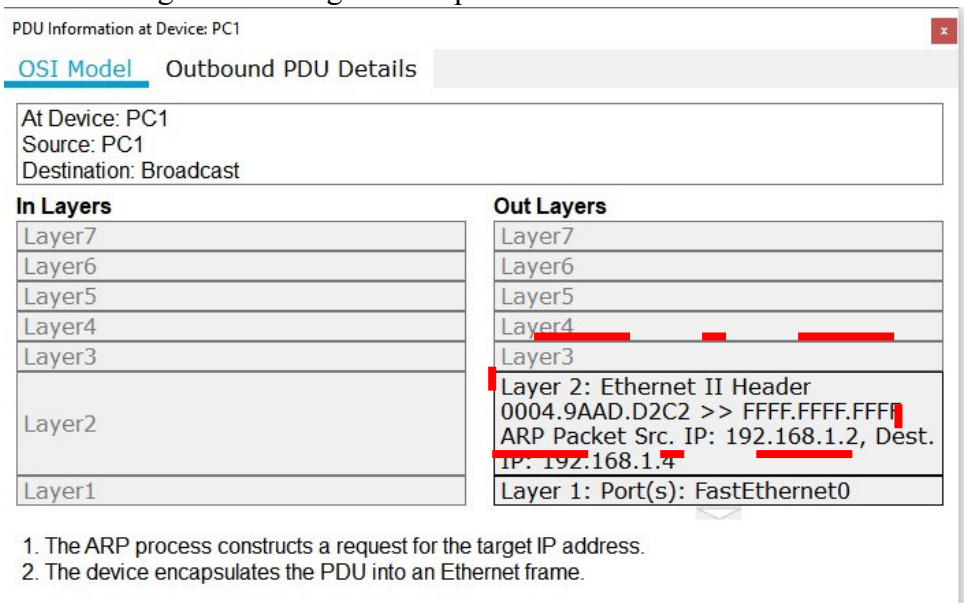


Fig. 6.4: Outbound PDU at PC1

b. The switch will broadcast the PDU to the entire Network and only the PC3 will accept the PDU rest will Discard the PDU as can be seen in Fig. 4.4.

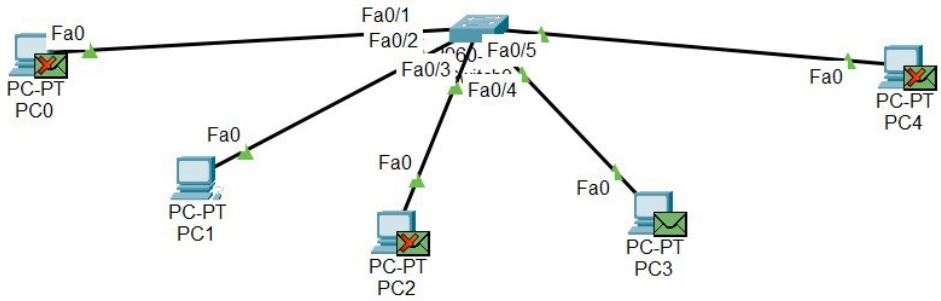


Fig. 6.5: PDU rejected at other PCs and ACK by PC3

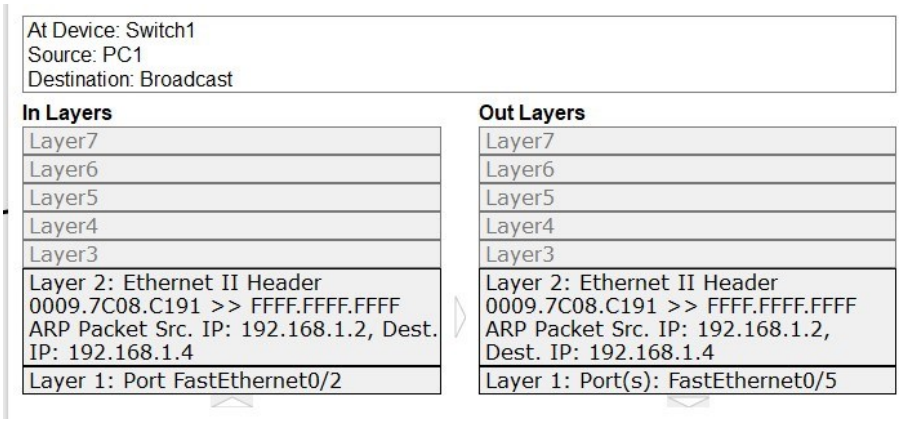


Fig: 6.6: PDU Details at Switch

b. The PC3 will send the ACK back to the PC0 via HUB-PT. HUB-PT will broadcast the PDT to the entire Network and only the PC1 will accept the PDU rest will Discard the ACK PDU as can be seen in Fig. 4.5.

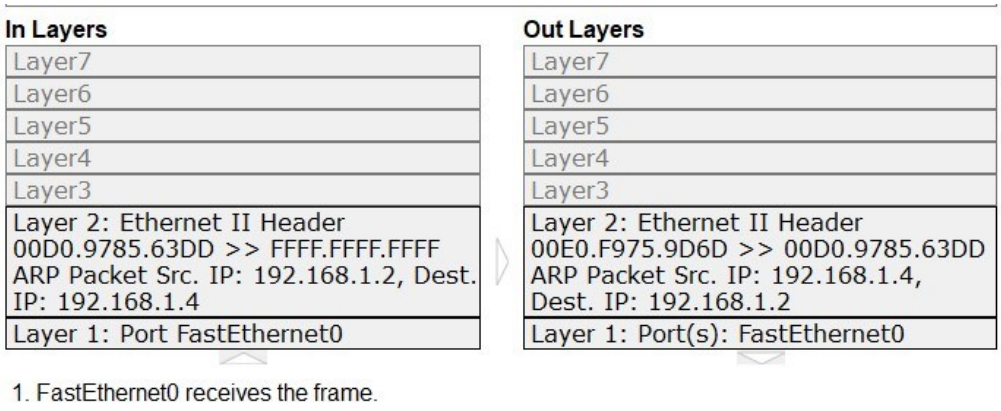


Fig. 6.7: PDU Details at PC3

5. PC1 gets the details of the logical address of the PC3. The APR request has been successfully executed.

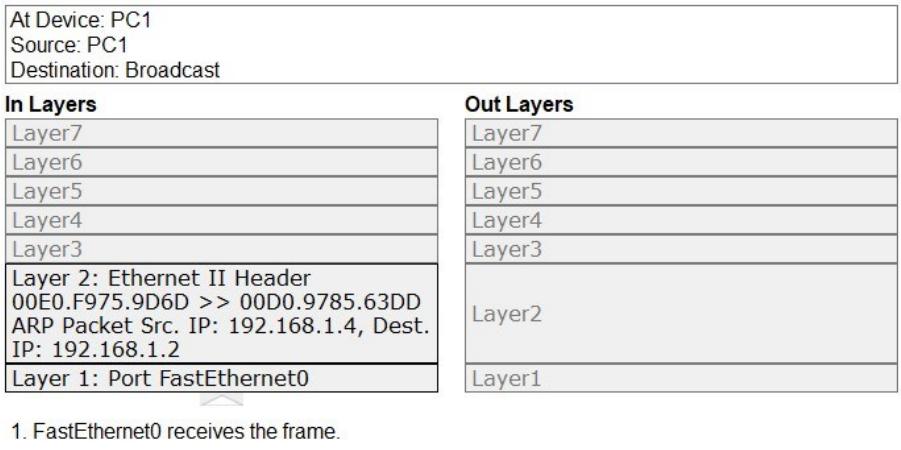


Fig. 6.8 PDU Details at PC3

Experiment 8:

To set-up a wide area network using a router

Procedure:

1. Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 7.1.

   Select the following components:

   a. End Devices > PC

   b. Network Devices > Switches > Switch 2960

   c. Network Devices > Routers > Router 2911

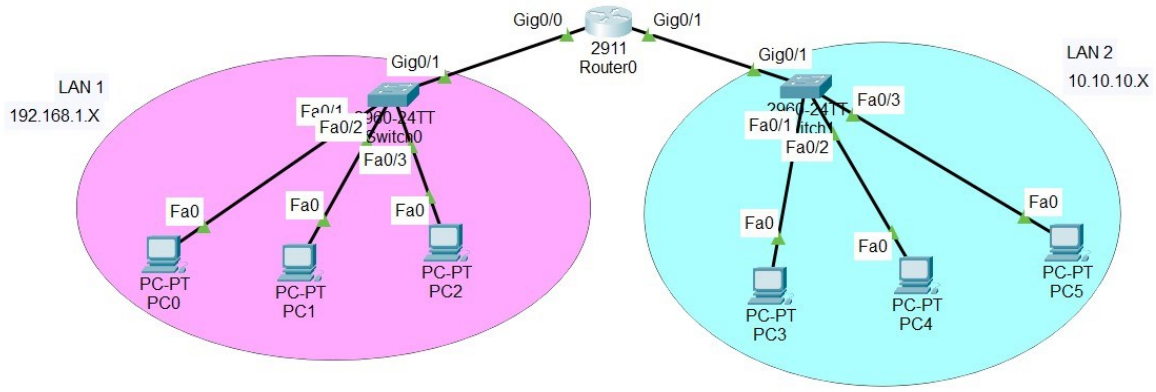


Fig . 7.1: A WAN considered in expreiment

2. Form 2 LANs, and connect 3 PCs to each via a 2960 switch via straight cables

   a. Assign IP Addresses to LAN 1

      i. Assign IP address ‘192.168.1.1’ to PC0

      ii. Assign IP address ‘192.168.1.2’ to PC1

      iii. Assign IP address ‘192.168.1.3’ to PC2

   b. Assign IP Addresses to LAN 2

      i. Assign IP address ‘10.10.10.1’ to PC3

      ii. Assign IP address ‘10.10.10.1’ to PC4 iii.

      Assign IP address ‘10.10.10.1’ to PC5

   c. Connect the Switches to the Router 2911 via Gigabit interface

      i. Connect Gig0/1 of SW 1 to Gig0/0 of Router

- Assign IP Addresses ‘192.168.1.4’ to the Gig0/0 interface of the router 2911 and Check ‘Port Status’ to ‘On’

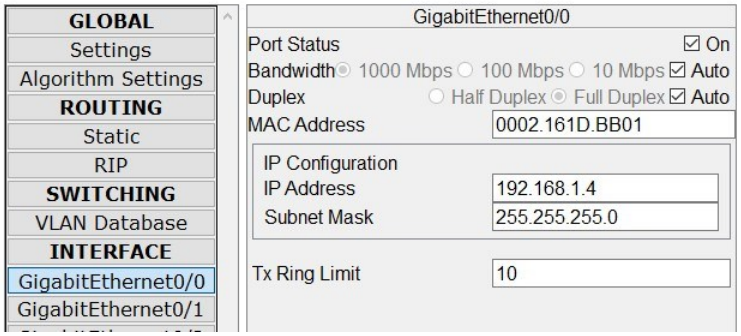


Fig . 7.2: Assigning IP Address to Gig0//0 interface of Router ii.

Connect Gig0/1 of SW 2 to Gig0/1 of Router

- Assign IP Addresses ‘192.168.1.4’ to the Gig0/1 interface of the router 2911 and Check ‘Port Status’ to ‘On’

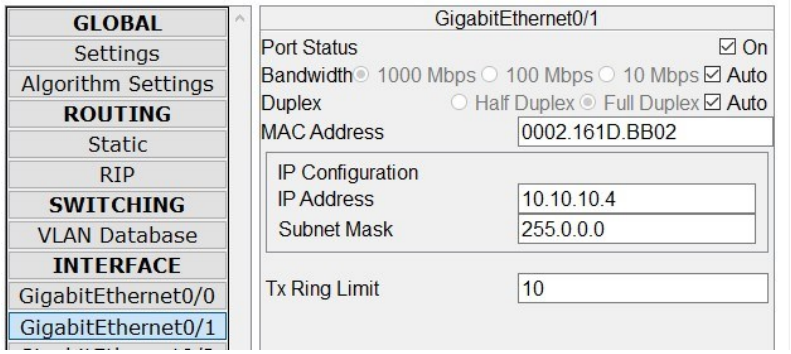


Fig . 7.3: Assigning IP Address to Gig0//0 interface of Router

d. Assign Default Gateway Addresses:

i. GW Address ‘192.168.1.4’ to LAN 1 ii.

GW Address ’10.10.10.4’ to LAN 2

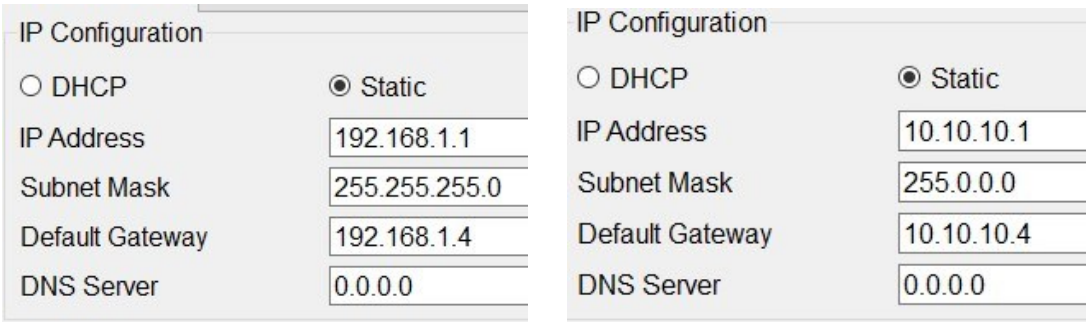
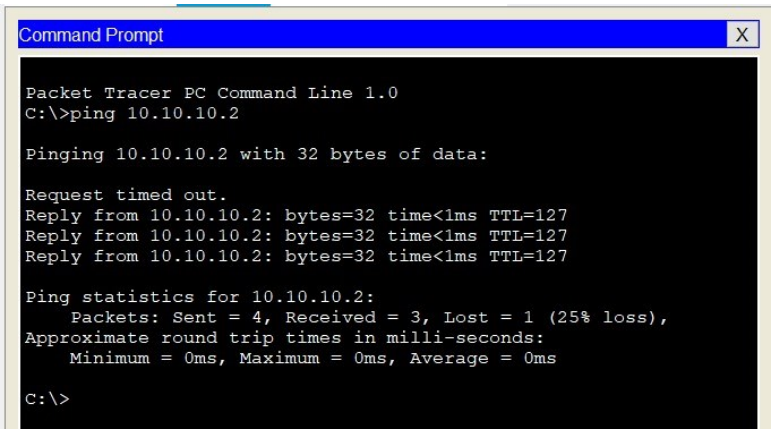


Fig . 7.2: Assigning default gateways for both LANs

3. The network setup is complete
4. Ping PC 4 by PC1
    a. Enter ‘Command Prompt’
    b. Enter command ‘ping 10.10.10.2’



5. The has been successfully configured.

Experiment 9:

To configure and implement the static routing using Cisco Packet Tracer

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Procedure:

1. Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 8.1.

   Select the following components:

   a. End Devices > PC

   b. Network Devices > Switches > Switch 2960

   c. Network Devices > Routers > Router 1821

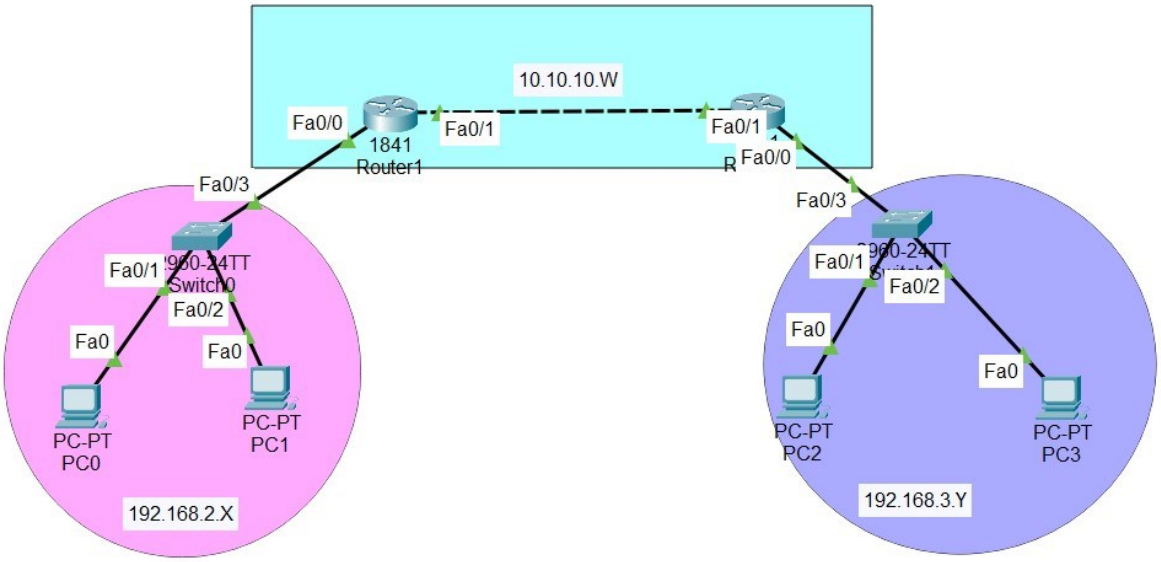


Fig . 8.1: A WAN considered in experiment

2. Form 2 LANs, and connect 2 PCs to each via a 2960 switch via straight cables

   a. Assign IP Addresses to LAN 1

      i. Assign IP address ‘192.168.1.1’ to PC0 ii.

      Assign IP address ‘192.168.1.2’ to PC1

   b. Assign IP Addresses to LAN 2

      i. Assign IP address ‘192.168.3.1’’ to PC2 ii.

      Assign IP address ‘192.168.3.2’’ to PC3

   c. Connect the Switches to the Two Routers 1841 via Fast Ethernet interface

      i. Connect Fa0/3 of SW 1 to Fa0/0 of Router 1

      - Assign IP Addresses ‘192.168.1.3’ to the Fa0/0 interface of the

Router 1 and Check ‘Port Status’ to ‘On’

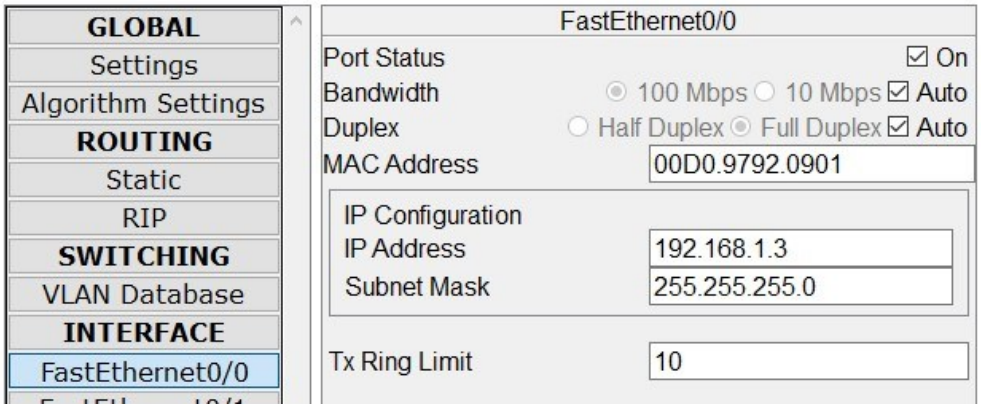


Fig . 8.2: Assigning IP Address to Fa0/0 interface of Router 1 ii.

Connect Fa0/3 of SW 2 to Fa0/0 of Router 2

- Assign IP Addresses ‘192.168.3.3’ to the Fa0/1 interface of the Router 2 and Check ‘Port Status’ to ‘On’

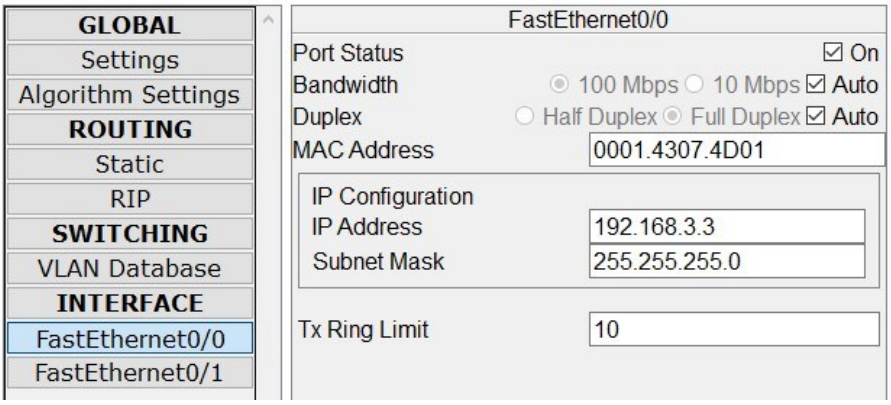


Fig . 8.3: Assigning IP Address to Fa0/0 interface of Router 2

d. Assign Default Gateway Addresses:

i. GW Address ‘192.168.1.3’ to LAN 1 ii.

GW Address ‘192.168.3.3’ to LAN 2

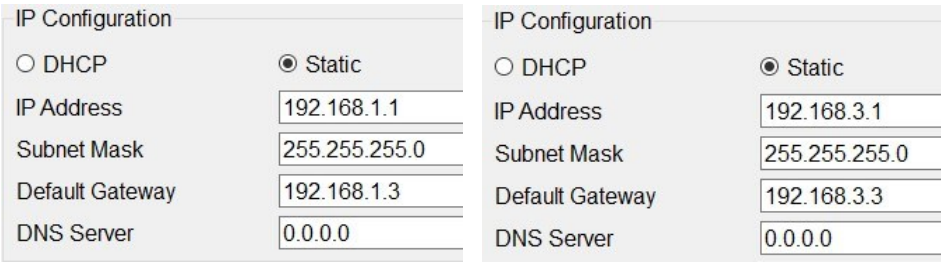


Fig . 8.4: Assigning default gateways for both LANs

3. Configure the Router 1 to Router 2 Connection
    a. Connect both routers using a cross cable via vacant Fa0/1 interface.
    b. Assign the IP Addresses to both these Fa0/1 interface.
        i. Assign IP address ‘10.10.10.1’ to Fa0/1 of Router 1

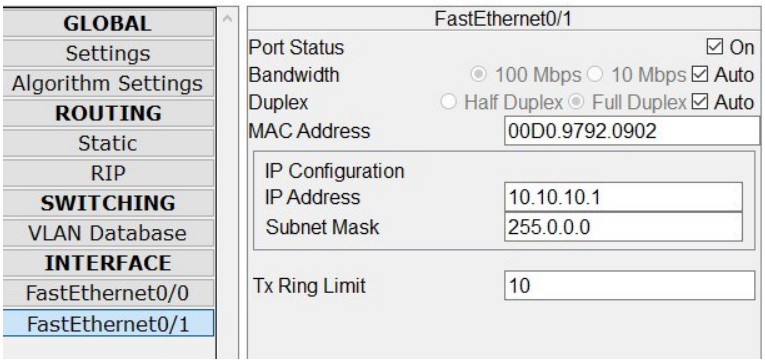


Fig . 8.5: Assigning IP Address to Fa0/1 interface of Router 1 ii.

Assign IP address ‘10.10.10.1’ to Fa0/1 of Router 2

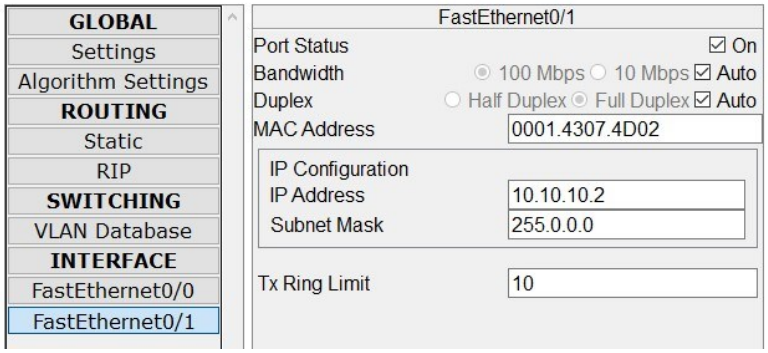


Fig . 8.6: Assigning IP Address to Fa0/1 interface of Router 2

4. Configure the **Static Routing Table**
    a. Choose Router 1
        i. Select Routing > Static
        ii. Define the Network Address ‘192.168.3.0’, subnet mask as 255.255.255.0 and Next Hop as 10.10.10.2 iii.

    Click add.

    iv. The routing entry will be added as in Fig 8.7

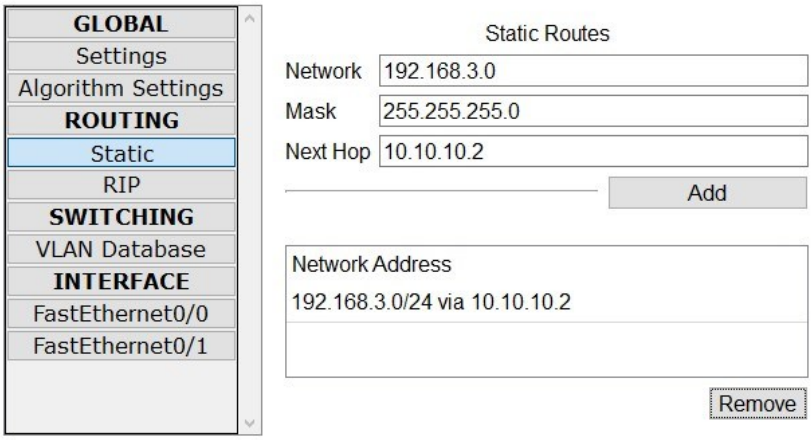


Fig . 8.7: Adding stating routing entries for Router 1

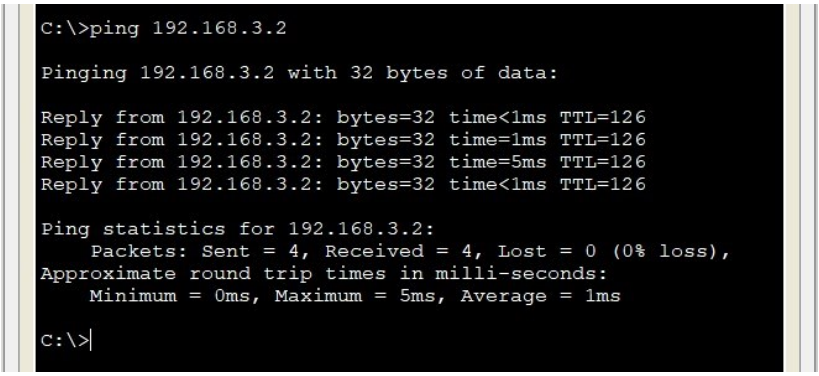
b. Similarly for Router 2

i. Select Routing > Static ii. Add routing entry as in Fig 8.8

Fig . 8.8: Adding stating routing entries for Router 1

5. The network setup is complete
6. Ping PC 1 by PC3

a. Enter ‘Command Prompt’ enter command ‘ping 192.168.3.2’



7. The has been successfully configured.

Experiment 10:

To configure and implement the dynamic routing using Cisco Packet Tracer

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Procedure:

1. Open the *Cisco Packet Tracer* and setup the network as shown in the Figure 9.1.

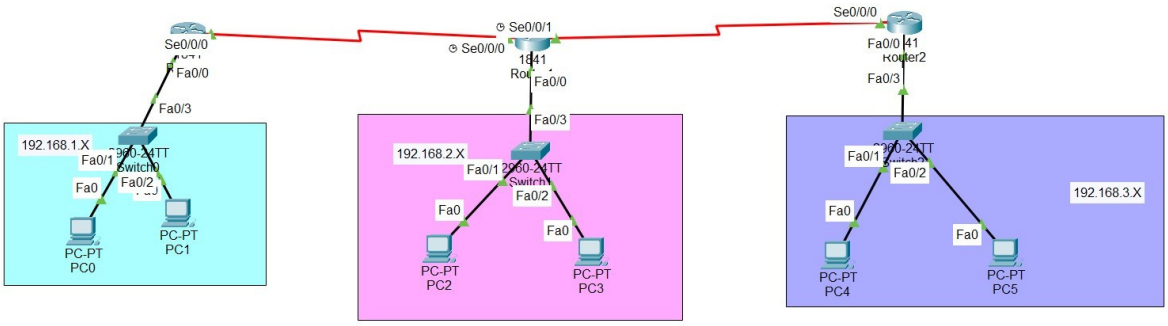


Fig . 9.1: A WAN considered in experiment Select

the following components:

a. End Devices > PC

b. Network Devices > Switches > Switch 2960

c. Network Devices > Routers > Router 1841

   i. Add Serial Interface 'WIC-2T' to each Router

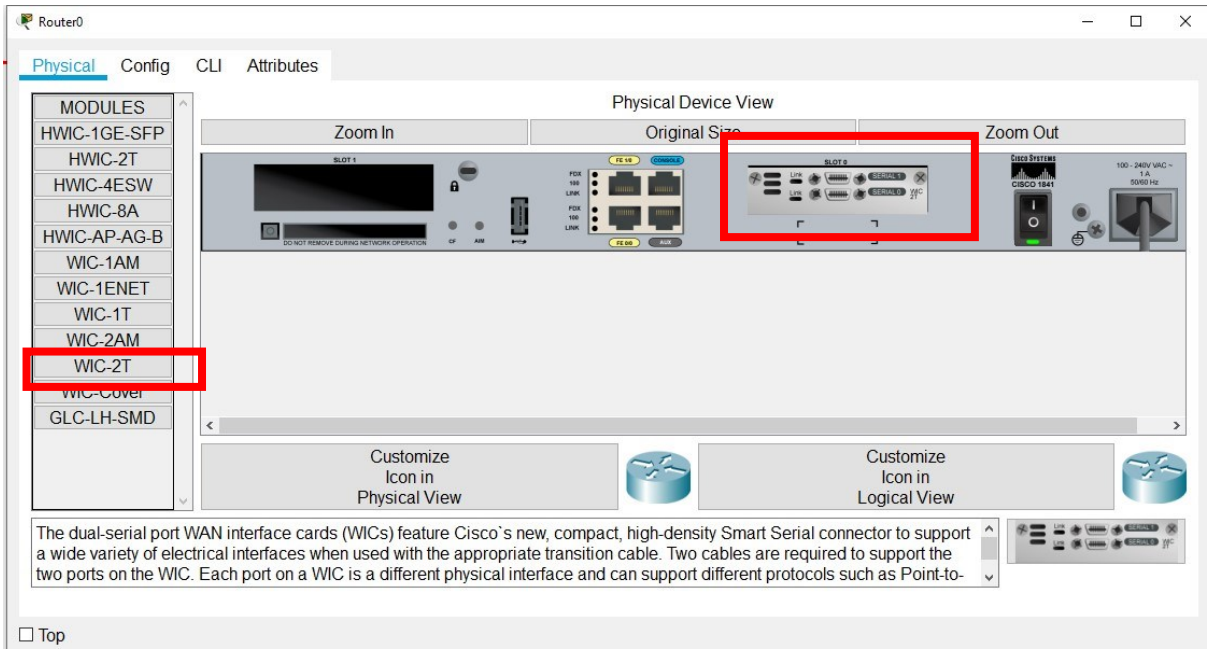


Fig . 9.2: Adding WIC-2T serial interface to Router 1

2. Form 2 LANs, and connect 2 PCs to each via a 2960 switch via straight cables

a. Assign IP Addresses to LAN 1

i. Assign IP address ‘192.168.1.2’ to PC0 ii.

Assign IP address ‘192.168.1.3’ to PC1

b. Assign IP Addresses to LAN 2

i. Assign IP address ‘192.168.2.2’’ to PC2 ii.

Assign IP address ‘192.168.2.3’’ to PC3

c. Assign IP Addresses to LAN 3

i. Assign IP address ‘192.168.3.2’’ to PC4 ii.

Assign IP address ‘192.168.3.3’’ to PC5

d. Connect the Switches to the each Routers 1841 via Fast Ethernet interface

i. Connect Fa0/3 of SW 1 to Fa0/0 of Router 1

- Assign IP Addresses ‘192.168.1.1’ to the Fa0/0 interface of the Router 1 and Check ‘Port Status’ to ‘On’

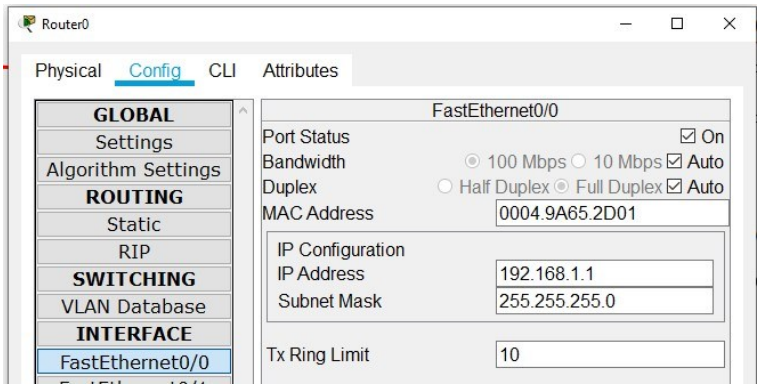


Fig . 9.3: Assigning IP Address to Fa0/0 interface of Router 1 ii.

Connect Fa0/2 of SW 2 to Fa0/0 of Router 2

- Assign IP Addresses ‘192.168.2.1’ to the Fa0/1 interface of the Router 2 and Check ‘Port Status’ to ‘On’

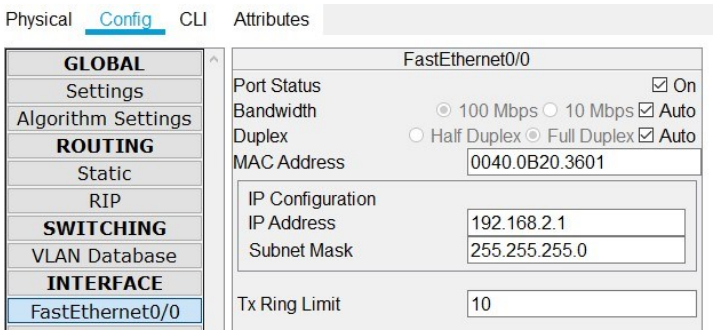


Fig . 8.3: Assigning IP Address to Fa0/0 interface of Router 2

iii. Connect Fa0/2 of SW 3 to Fa0/0 of Router 3

- Assign IP Addresses '192.168.3.1' to the Fa0/1 interface of the Router 2 and Check 'Port Status' to 'On'

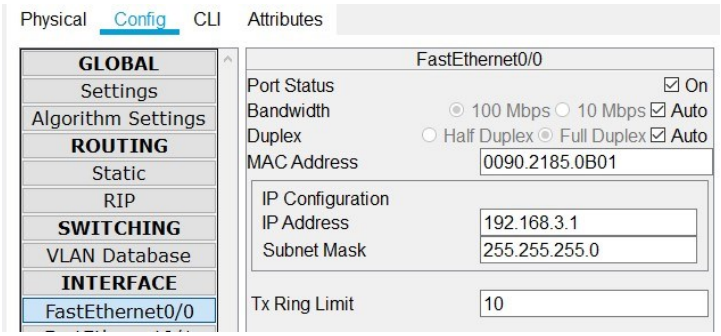


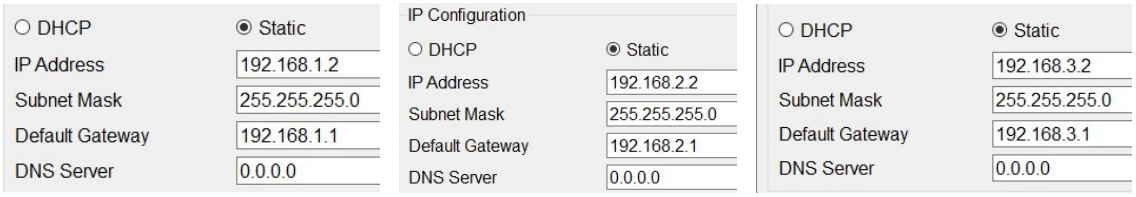
Fig . 8.3: Assigning IP Address to Fa0/0 interface of Router 3

e. Assign Default Gateway Addresses:

i. GW Address '192.168.1.1' to LAN 1 ii.

GW Address '192.168.2.1' to LAN 2 iii.

GW Address '192.168.3.1' to LAN 3



LAN 1 LAN 2 LAN 3

Fig . 8.4: Assigning default gateways for both LANs

3. Configure the Router 1 to Router 2 and Router 2 to Router 2 using Serial Cable

a. Connect Se0/0/0 interface to Router 1 to Se0/0/0 interface of Router 2

b. Connect Se0/0/1 interface to Router 2 to Se0/0/0 interface of Router 3

c. Assign the IP Addresses to each Se0/0/X interface.

i. Assign IP address ‘10.0.0.1’ to Se0/0/0 of Router 1

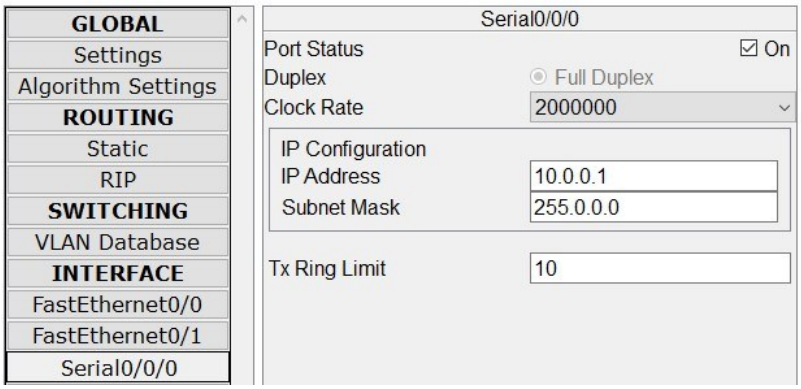


Fig . 8.5: Assigning IP Address to Se0/0/0 interface of Router 1 ii.

Assign IP address ‘10.0.0.2’ to Se0/0/0 of Router 2

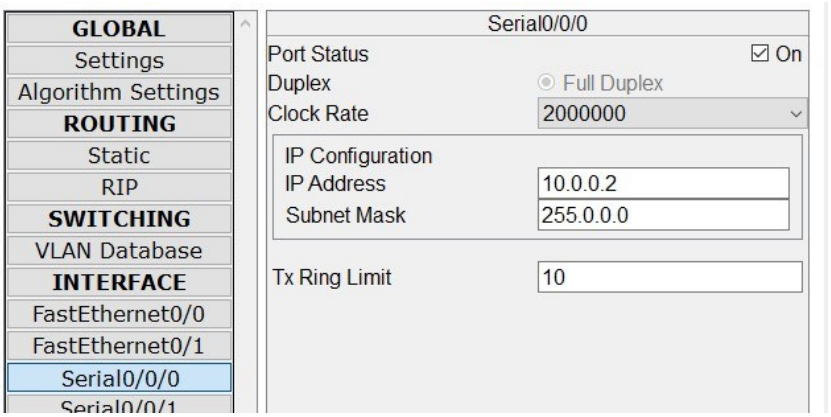


Fig . 8.6: Assigning IP Address to Se0/0/0 interface of Router 2 iii.

Assign IP address ‘11.0.0.1’ to Se0/0/1 of Router 2

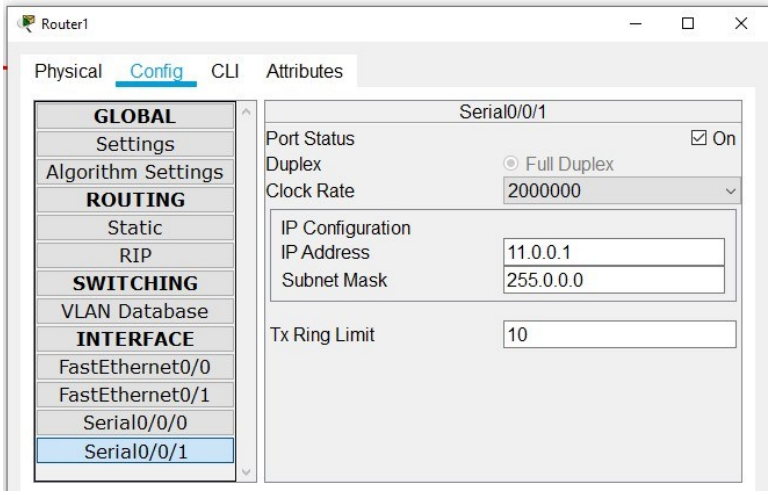


Fig . 8.6: Assigning IP Address to Se0/0/1 interface of Router 2 iv.

Assign IP address '11.0.0.2' to Se0/0/0 of Router 3

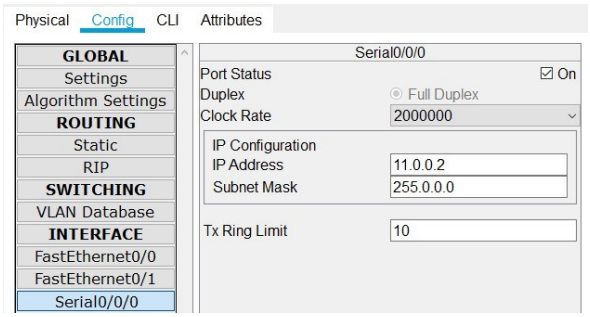


Fig . 8.6: Assigning IP Address to Se0/0/0 interface of Router 3

4. Configure the **Dynamic Routing Table using RIP Protocol**
    a. Choose Router 1
        i. Select Routing > RIP
        ii. Add Network Address of Each Network as
            - 10.0.0.0
            - 11.0.0.0
            - 192.168.1.0
            - 192.168.2.0
            - 192.168.3.0 iii. The routing entry will be added as in Fig 8.7

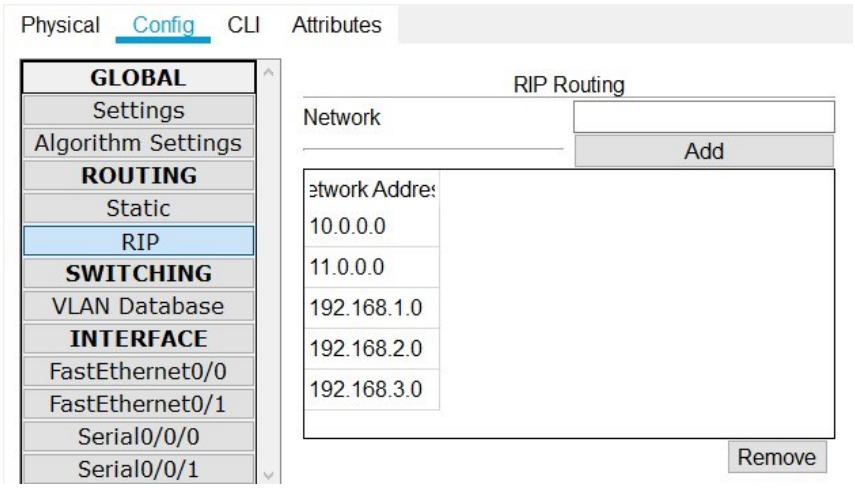
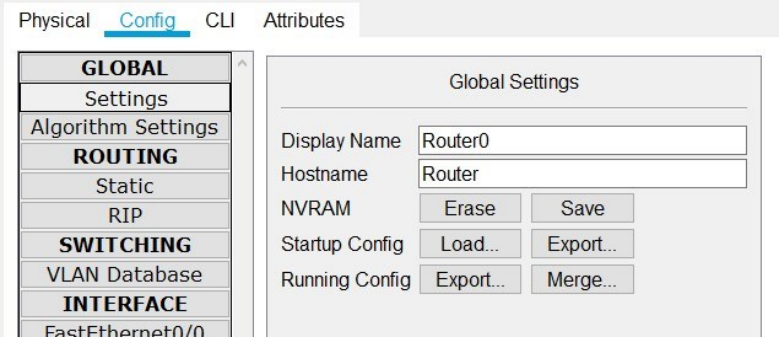
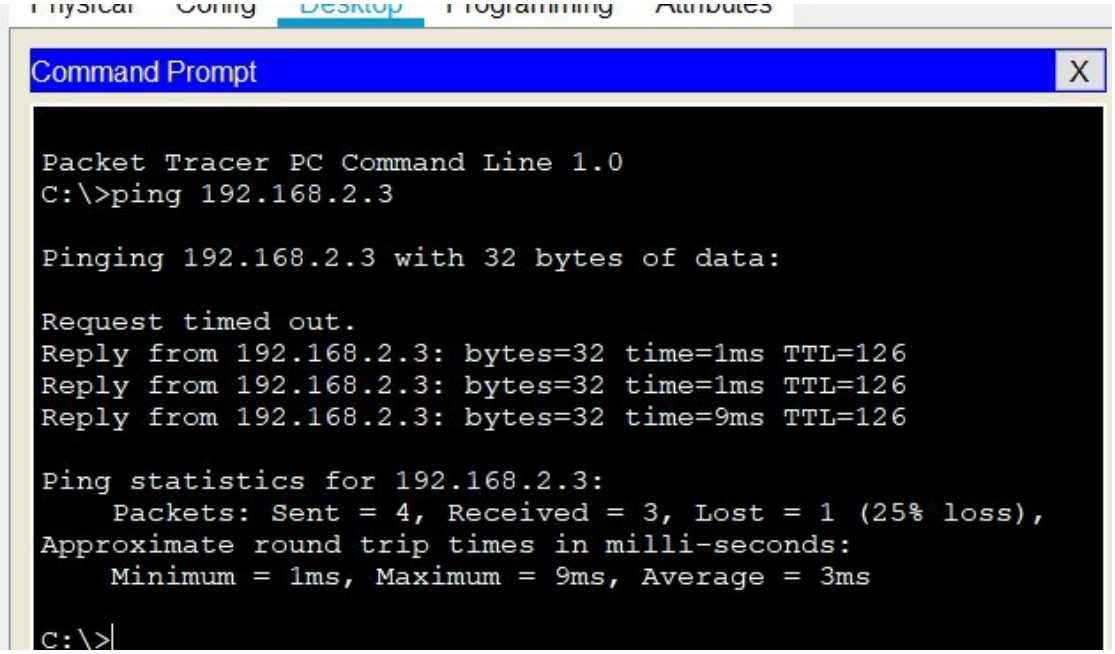


Fig . 8.7: Adding stating routing entries for Router 1

    b. Similarly repeat for Router 2 and Router 3
    c. Go to the Setting Tab: Select Save on NVRAM settings for each router



5. The network setup is complete
6. Ping PC 1 by PC3
    a. Enter ‘Command Prompt’ enter command ‘ping 192.168.2.3’



7. The has been successfully configured.