

Worksheet – 3.2

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Branch: BE-CSE (LEET)

Section/Group: 809/A

Semester: 4th

Date of Performance: 05/05/2022

Subject Name: Computer Network Lab

Subject Code: 20CSP-257

1. Aim/Overview of the practical:

Create a network that implement the DHCP server.

2. Task to be done/ Which logistics used:

Create a network that implement the DHCP server.

Prerequisites:

S/W:

- Laptop/Desktop
- CISCO Packet Tracer program

H/W:

- Main Memory - 128 MB RAM
- Hard Disk – minimum 20 GB IDE Hard Disk
- 44 MB Floppy Disk Drive
- –52X IDE CD-ROM Drive
- PS/2 HCL

3. Steps for experiment/Code with Result/Output:

DHCP stands for Dynamic Host Configuration Protocol. It is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway. RFCs 2131 and 2132 define DHCP as an Internet Engineering Task Force (IETF) standard based on Bootstrap Protocol (BOOTP), a protocol with which DHCP shares many implementation details. DHCP allows hosts to obtain required TCP/IP configuration information from a DHCP server.

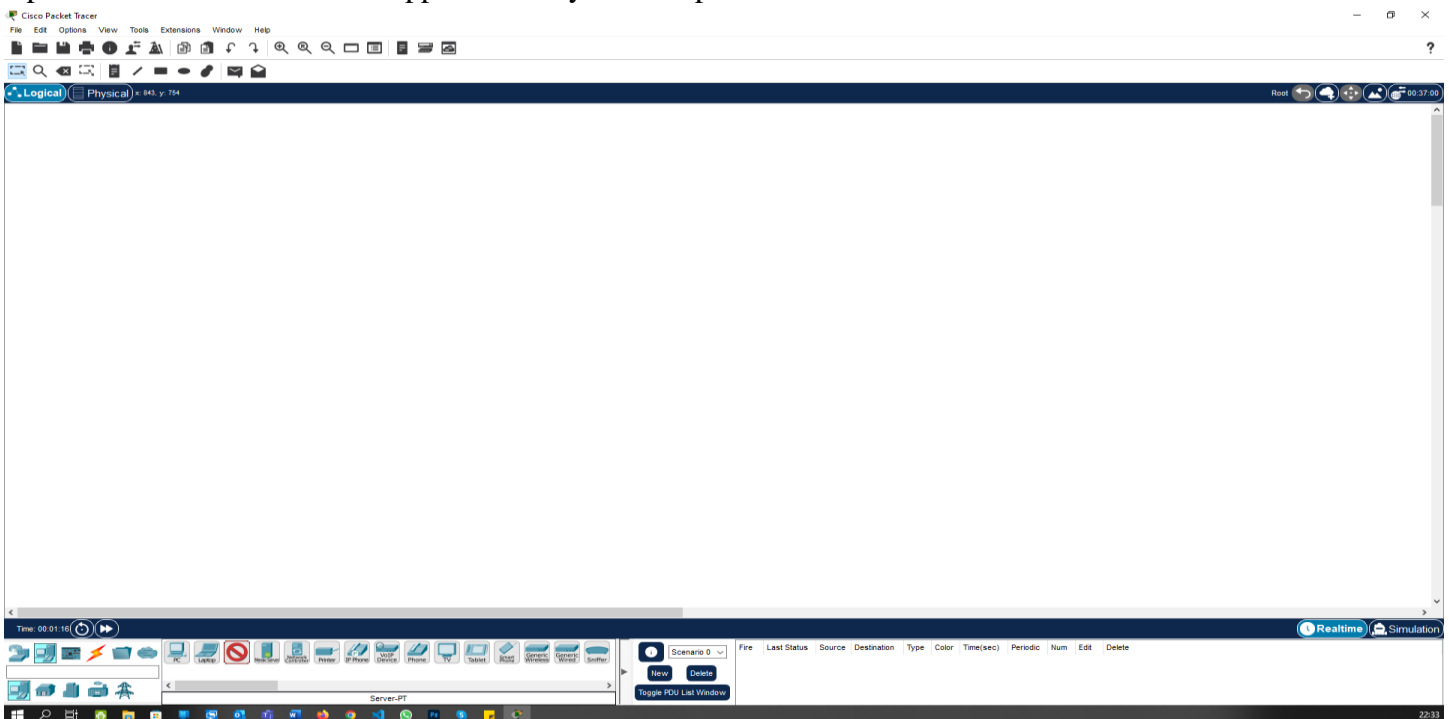
Windows Server 2016 includes DHCP Server, which is an optional networking server role that you can deploy on your network to lease IP addresses and other information to DHCP clients. All Windows-based client operating systems include the DHCP client as part of TCP/IP, and DHCP client is enabled by default.

Benefits of DHCP

1. **Reliable IP address configuration.** DHCP minimizes configuration errors caused by manual IP address configuration, such as typographical errors, or address conflicts caused by the assignment of an IP address to more than one computer at the same time.
2. **Reduced network administration.** DHCP includes the following features to reduce network administration:
 - I. Centralized and automated TCP/IP configuration.
 - II. The ability to define TCP/IP configurations from a central location.
 - III. The ability to assign a full range of additional TCP/IP configuration values by means of DHCP options.
 - IV. The efficient handling of IP address changes for clients that must be updated frequently, such as those for portable devices that move to different locations on a wireless network.
 - V. The forwarding of initial DHCP messages by using a DHCP relay agent, which eliminates the need for a DHCP server on every subnet.

Procedure:

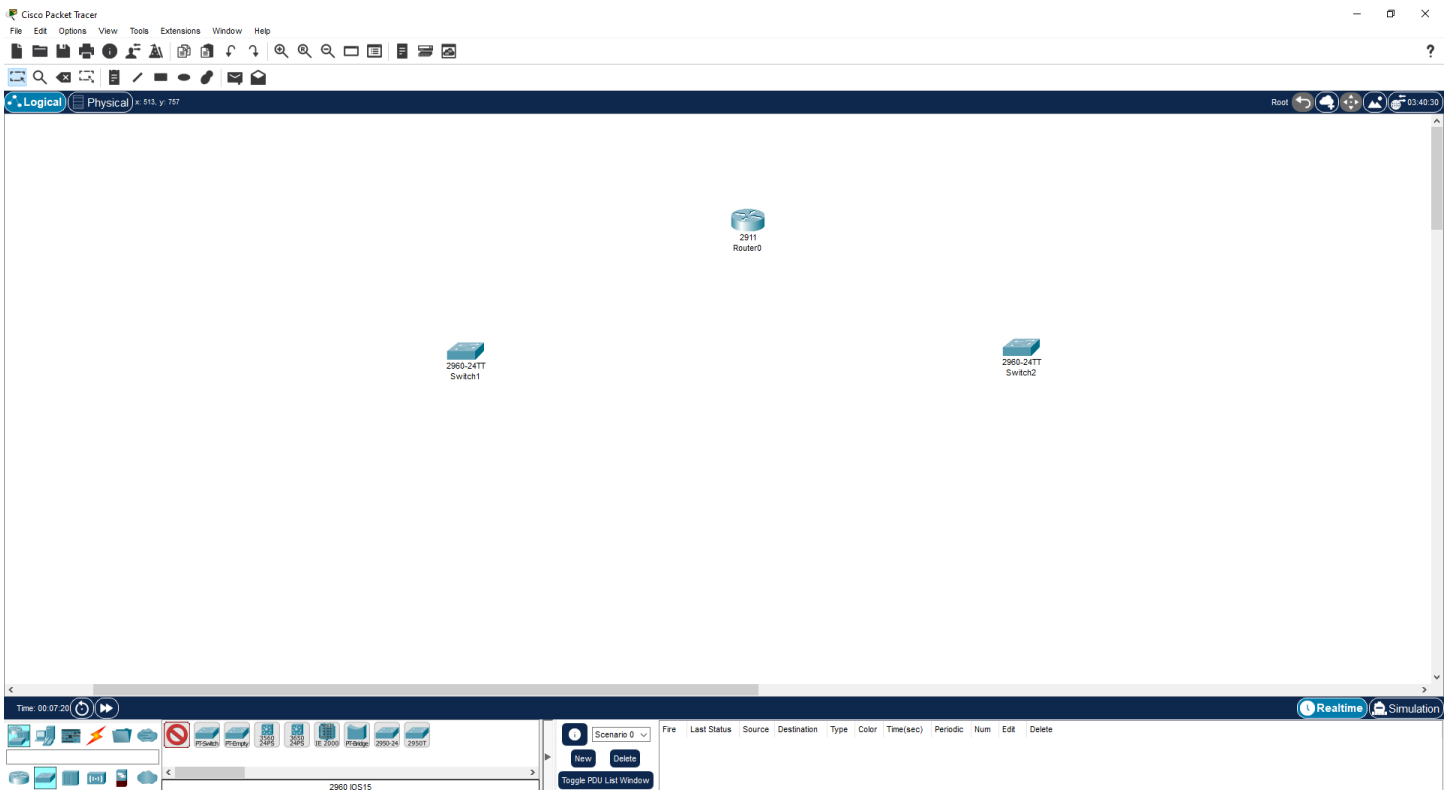
Open the Cisco Packet Tracer Application in your Computer



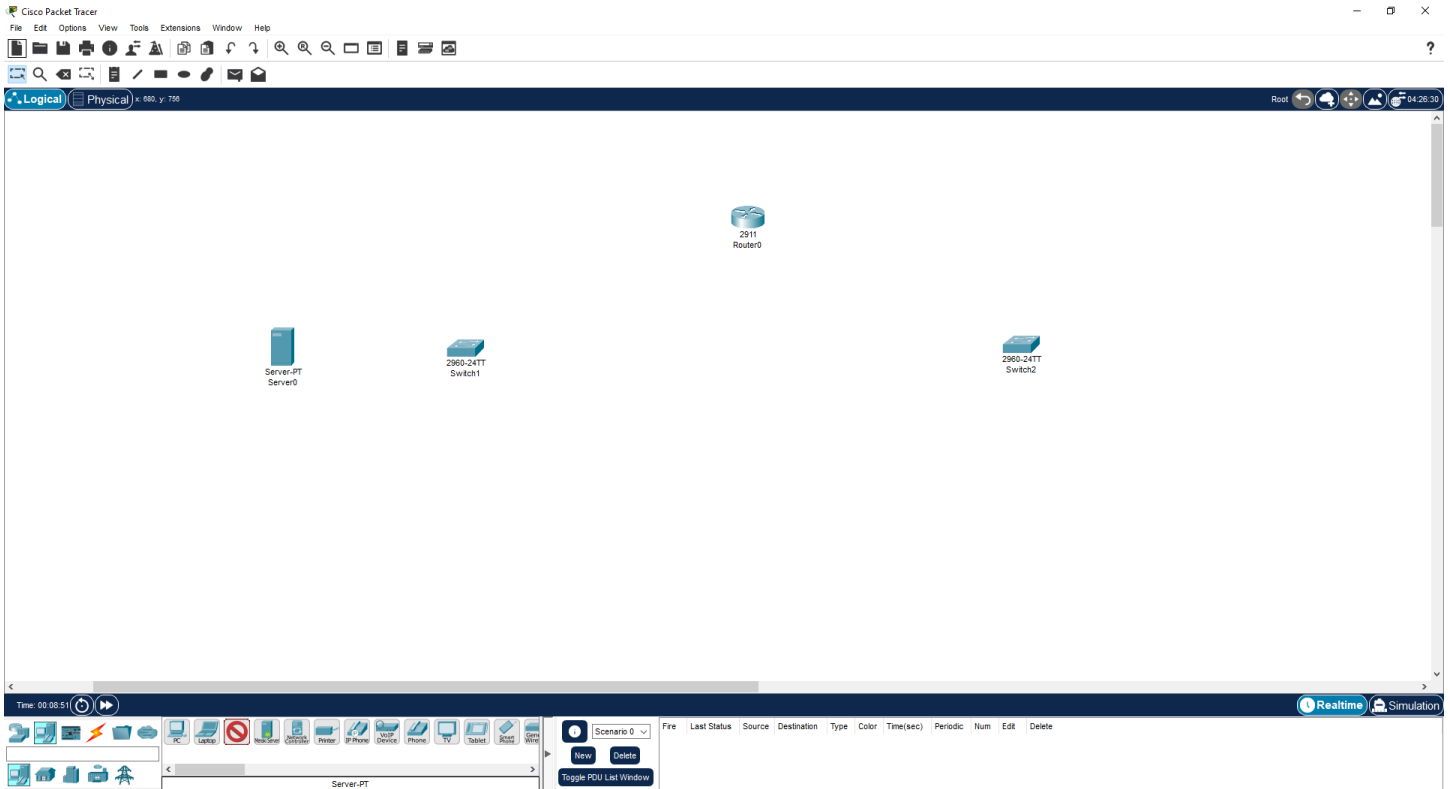
Go to the Bottom Bar “Network Devices -> Routers” and create the Router:



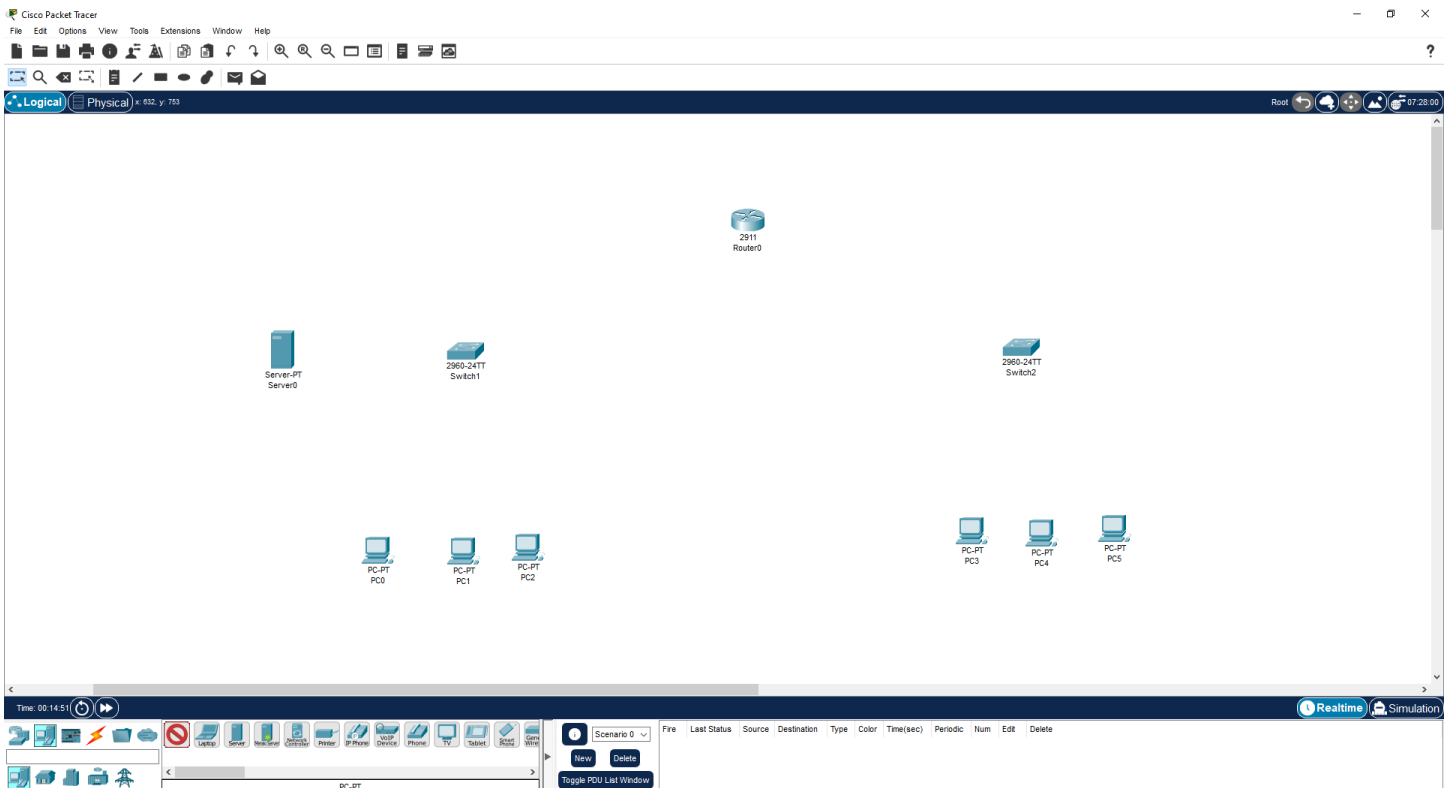
Go to the Bottom Bar “Network Devices -> Switchers” and create the two switches:



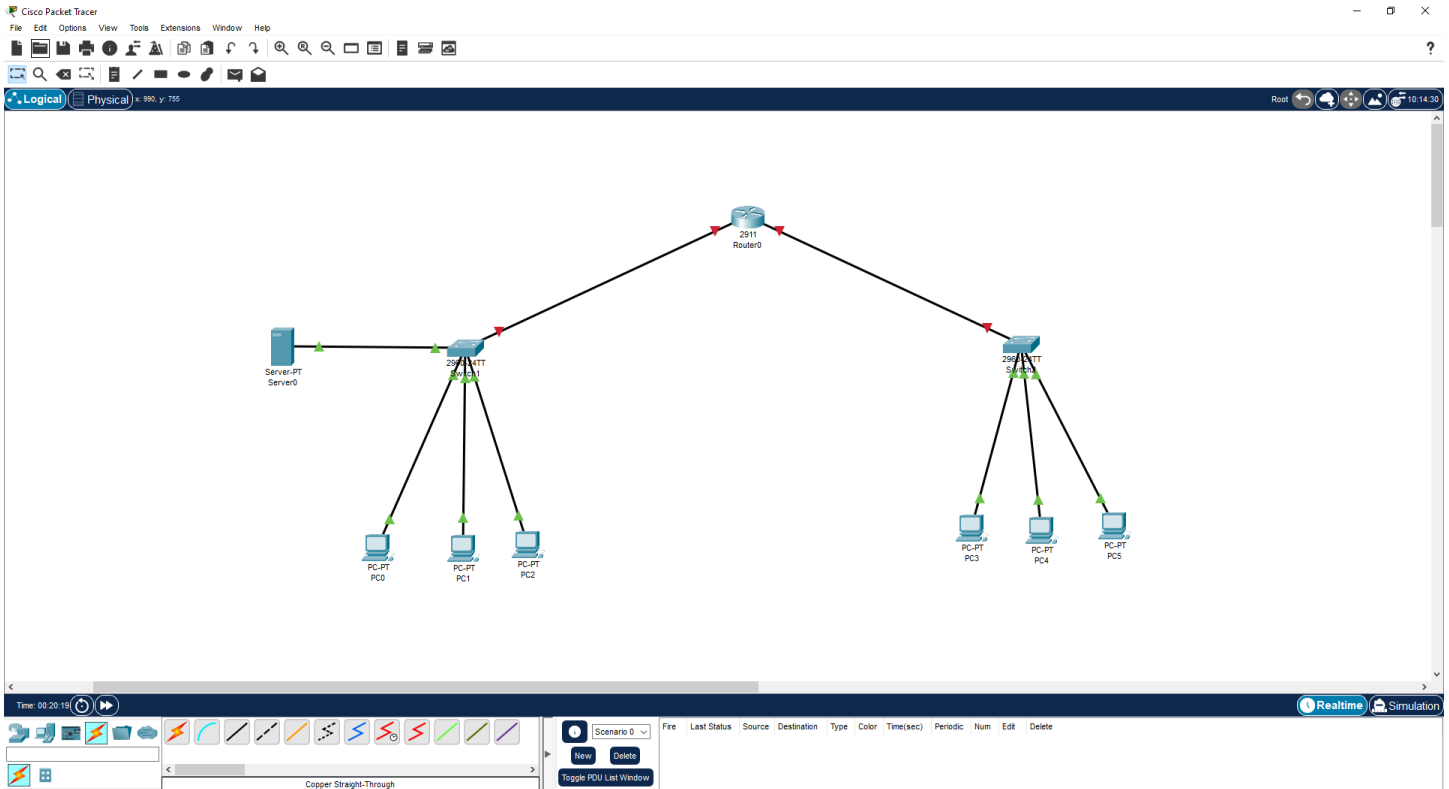
Go to the Bottom Bar “End Devices -> Servers” and create the server:



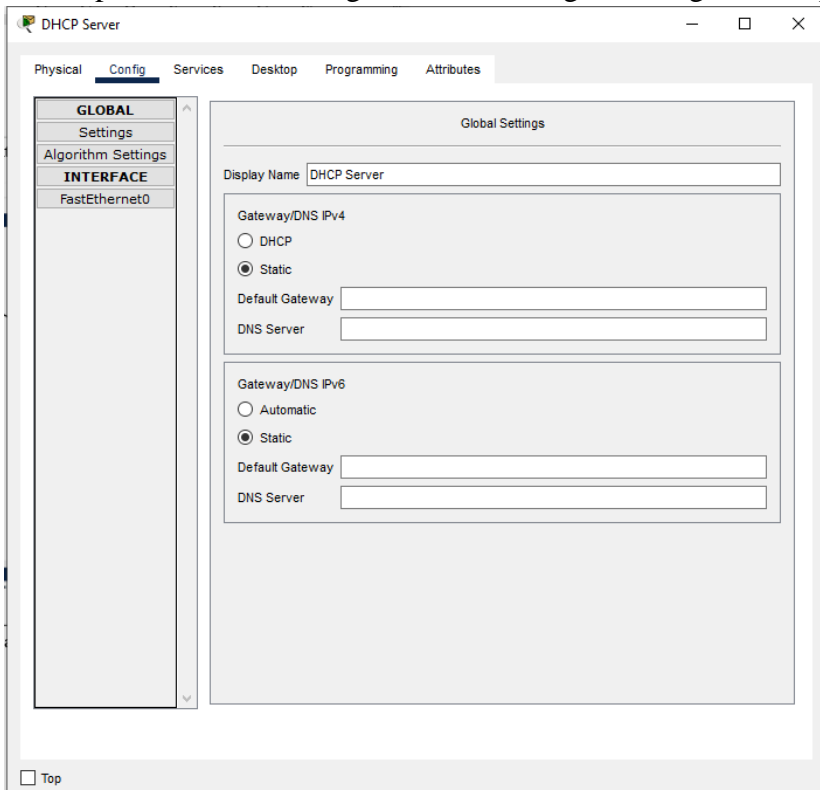
In Bottom Bar “End Devices -> PC” and create the 3-3 PCs for each Switches:



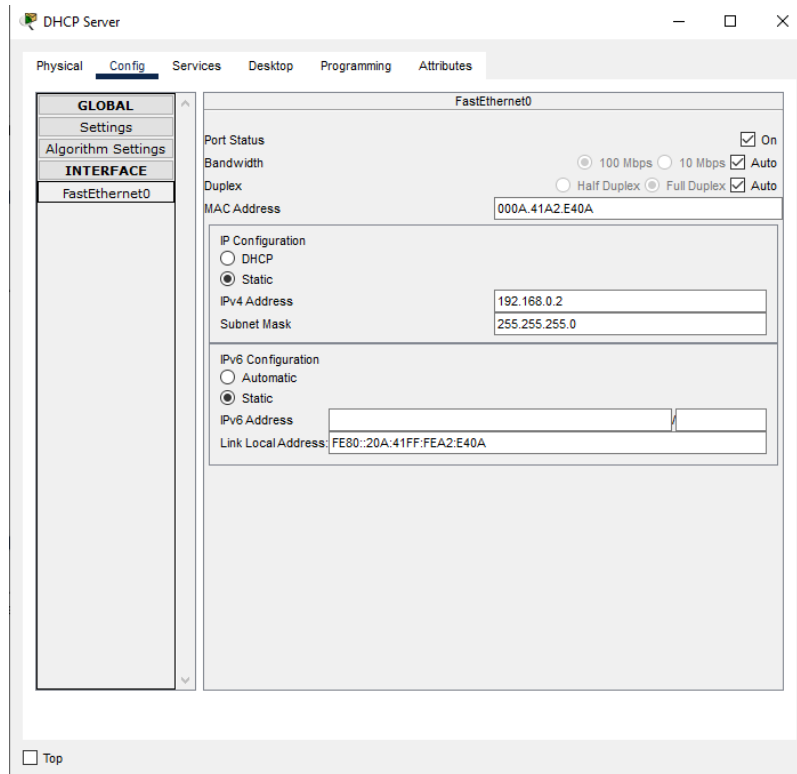
In Bottom Bar “Connections -> Copper Straight-Through” and create the connections between all the Devices:



Now Open the Server configuration -> Config -> Change the Display Name to DHCP Server



Open Fast Ethernet 0 and assign the ip-address



DHCP Server

Physical Config Services Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

FastEthernet0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 000A.41A2.E40A

IP Configuration

☐ DHCP

☒ Static

IPv4 Address 192.168.0.2

Subnet Mask 255.255.255.0

IPv6 Configuration

☐ Automatic

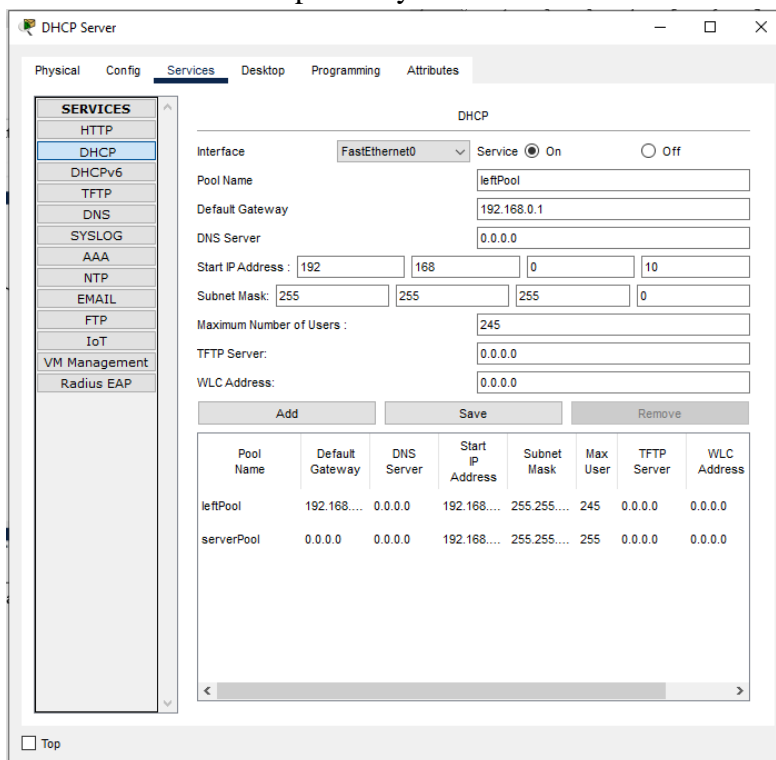
☒ Static

IPv6 Address

Link Local Address FE80::20A:41FF:FEA2:E40A

☐ Top

Go to services->DHCP and add the Serverpool left and right assign the Default gateway 192.168.0.1 & 172.0168.0.1 respectively.



DHCP Server

Physical Config Services Desktop Programming Attributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

Interface FastEthernet0 Service ☒ On ☐ Off

Pool Name leftPool

Default Gateway 192.168.0.1

DNS Server 0.0.0.0

Start IP Address : 192 168 0 10

Subnet Mask: 255 255 255 0

Maximum Number of Users : 245

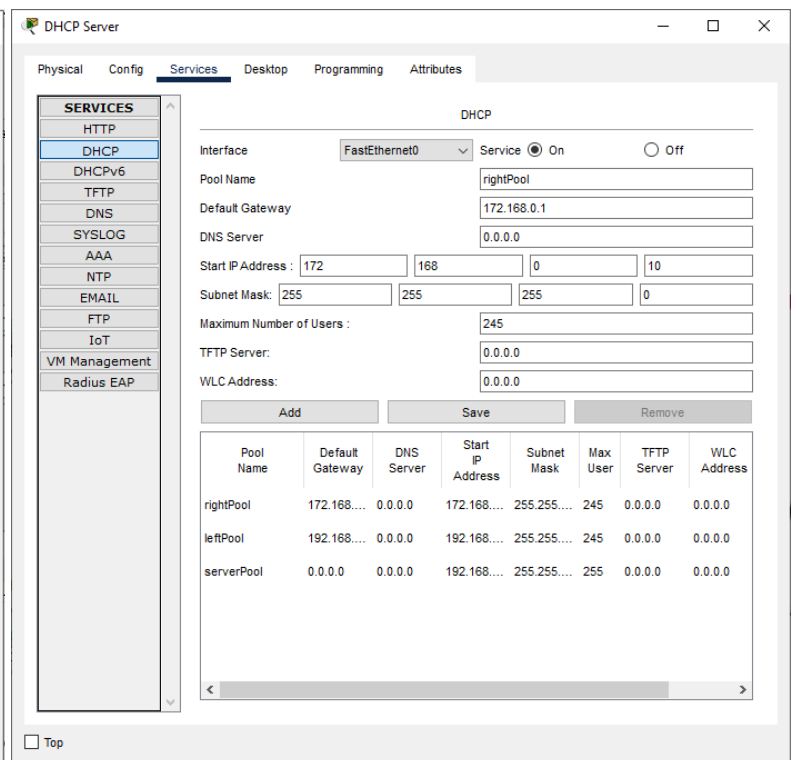
TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
leftPool	192.168.0.1	0.0.0.0	192.168.0.10	255.255.255.0	245	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	192.168.0.1	255.255.255.0	255	0.0.0.0	0.0.0.0

☐ Top



DHCP Server

Physical Config Services Desktop Programming Attributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

Interface FastEthernet0 Service ☒ On ☐ Off

Pool Name rightPool

Default Gateway 172.168.0.1

DNS Server 0.0.0.0

Start IP Address : 172 168 0 10

Subnet Mask: 255 255 255 0

Maximum Number of Users : 245

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
rightPool	172.168.0.1	0.0.0.0	172.168.0.10	255.255.255.0	245	0.0.0.0	0.0.0.0
leftPool	192.168.0.1	0.0.0.0	192.168.0.1	255.255.255.0	245	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	192.168.0.1	255.255.255.0	255	0.0.0.0	0.0.0.0

☐ Top

Now Remove the ServerPool content which was default added and make it 0 all.

DHCP Server

Physical Config Services Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Start IP Address: 0 0 0 0

Subnet Mask: 0 0 0 0

Maximum Number of Users: 255

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	255	0.0.0.0	0.0.0.0
rightPool	172.168.0.1	0.0.0.0	172.168.0.10	255.255.255.0	245	0.0.0.0	0.0.0.0
leftPool	192.168.0.1	0.0.0.0	192.168.0.10	255.255.255.0	245	0.0.0.0	0.0.0.0

☐ Top

Now Go to the Server Configuration and select GigabitEthernet0/0, Turned it on and assign the ip address for left Network.

Router0

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- GigabitEthernet0/0
- GigabitEthernet0/1
- GigabitEthernet0/2

GigabitEthernet0/0

Port Status: ☒ On ☐ Off

Bandwidth: 1000 Mbps 100 Mbps 10 Mbps ☒ Auto

Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address: 0004.BADA.0101

IP Configuration

IPv4 Address: 192.168.0.1

Subnet Mask: 255.255.255.0

Tx Ring Limit: 10

Equivalent IOS Commands

```

Press RETURN to get started!

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address
% Incomplete command
Router(config-if)#ip address
% Incomplete command
Router(config-if)#no shutdown
Router(config-if)#
%LINE-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
Router(config-if)#
%LINE-5-CHANGED: Interface GigabitEthernet0/0, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
ip address 192.168.0.1 255.255.255.0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#
  
```

☐ Top

Now Select the GigabitEthernet0/0, Turned it On and assign the ip address for right Network.

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

SWITCHING

RIP

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

GigabitEthernet0/1

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

Pv4 Address

Subnet Mask

Tx Ring Limit

1000 Mbps

100 Mbps

10 Mbps

Auto

Half Duplex

Full Duplex

Auto

0004 BADA 0102

172.168.0.1

255.255.0.0

10

Equivalent IOS Commands

```

Router>configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#no shutdown
Router(config-if)#
%LINK-3-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
shutdown
Router(config-if)#
%LINK-3-CHANGED: Interface GigabitEthernet0/0, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
ip address 192.168.0.1 255.255.255.0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#no shutdown
Router(config-if)#
%LINK-3-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
ip address 172.168.0.1 255.255.0.0
Router(config-if)#ip address 172.168.0.1 255.255.0.0
Router(config-if)#

```

Top

Now goto CLI section and ruh the respective commands.

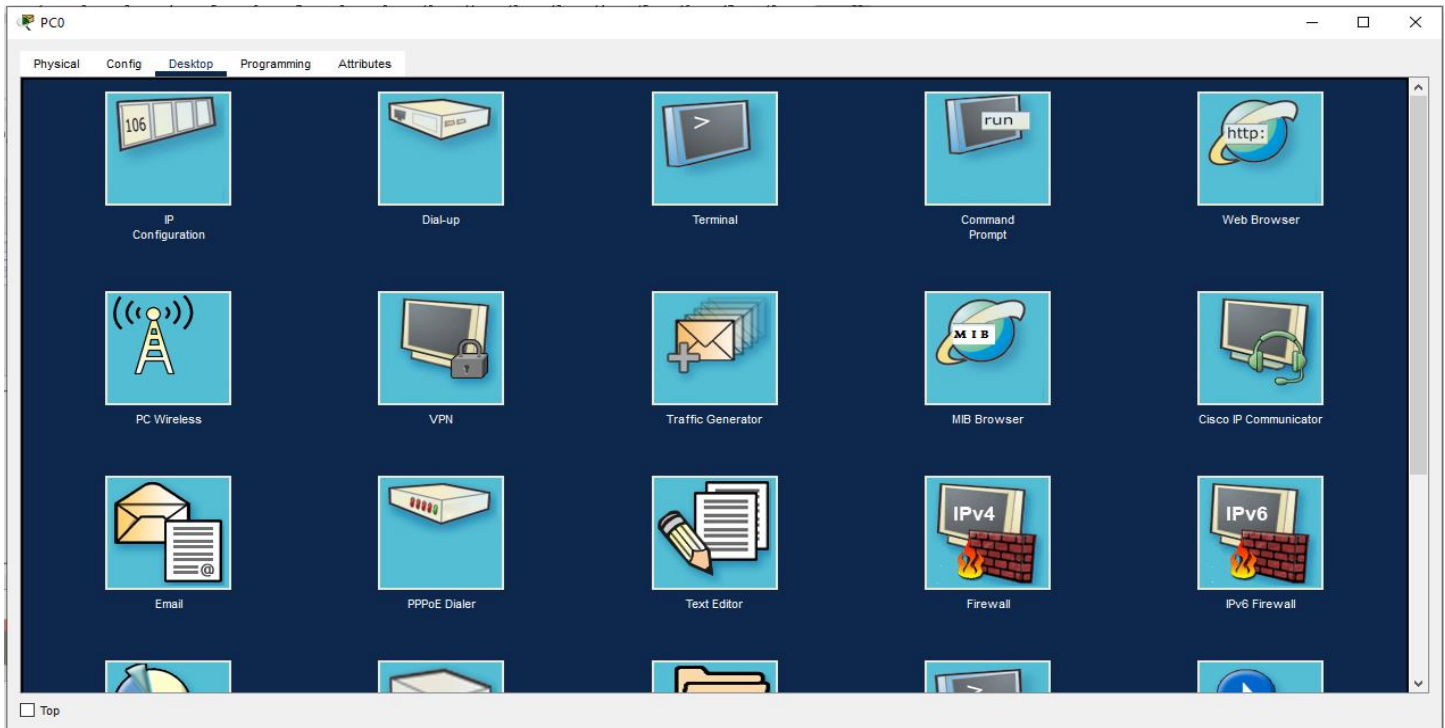
The screenshot shows the Cisco Packet Tracer interface with the Router0 configuration window open. The 'CLI' tab is selected, showing the following commands and output:

```
Router>
Router>
Router>
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Router>
Router>
Router>
Router>
Router>
Router>
Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip helper-address 192.168.0.2
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

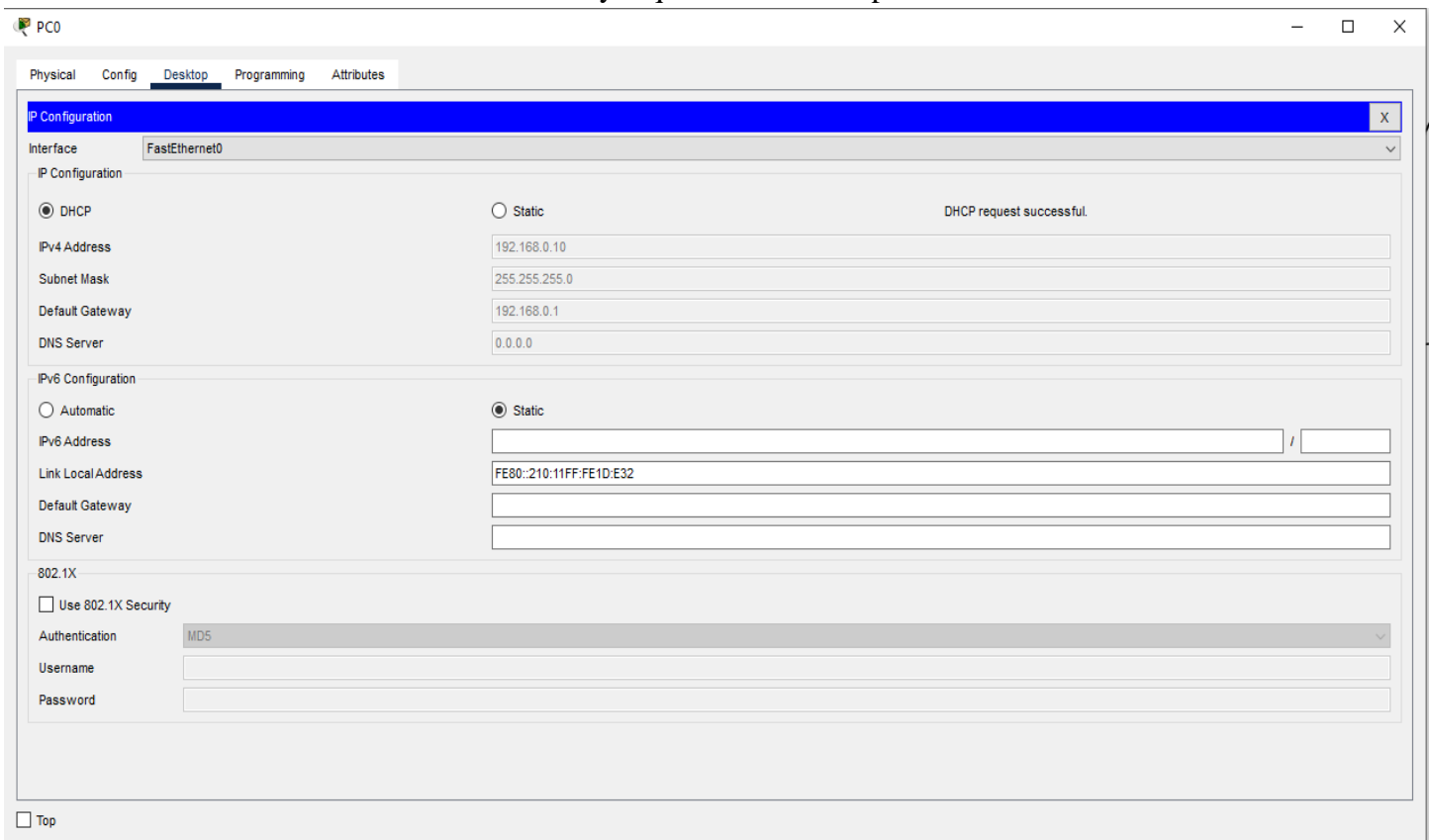
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip helper-address 192.168.0.2
Router(config-if)#
```

At the bottom of the window, there is a status bar with the text 'Ctrl+F6 to exit CLI focus' and two buttons: 'Copy' and 'Paste'.

Now in LeftPool/LAN-1 goto the PC0 Desktop -> Select IP Configuration



Select the DHCP mode and it will automatically request the DHCP Ip address



Do the Same for All PC

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP
 ☐ Static
 DHCP request successful.

IPv4 Address

192.168.0.11

Subnet Mask

255.255.255.0

Default Gateway

192.168.0.1

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic
 ☒ Static

IPv6 Address

Link Local Address

FE80::2D0:FFFF:FE15:CC30

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MDS

Username

Password

Top

PC2

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP
 ☐ Static
 DHCP request successful.

IPv4 Address

192.168.0.12

Subnet Mask

255.255.255.0

Default Gateway

192.168.0.1

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic
 ☒ Static

IPv6 Address

Link Local Address

FE80::240:BFF:FE72:938E

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security


Authentication

MDS

Username

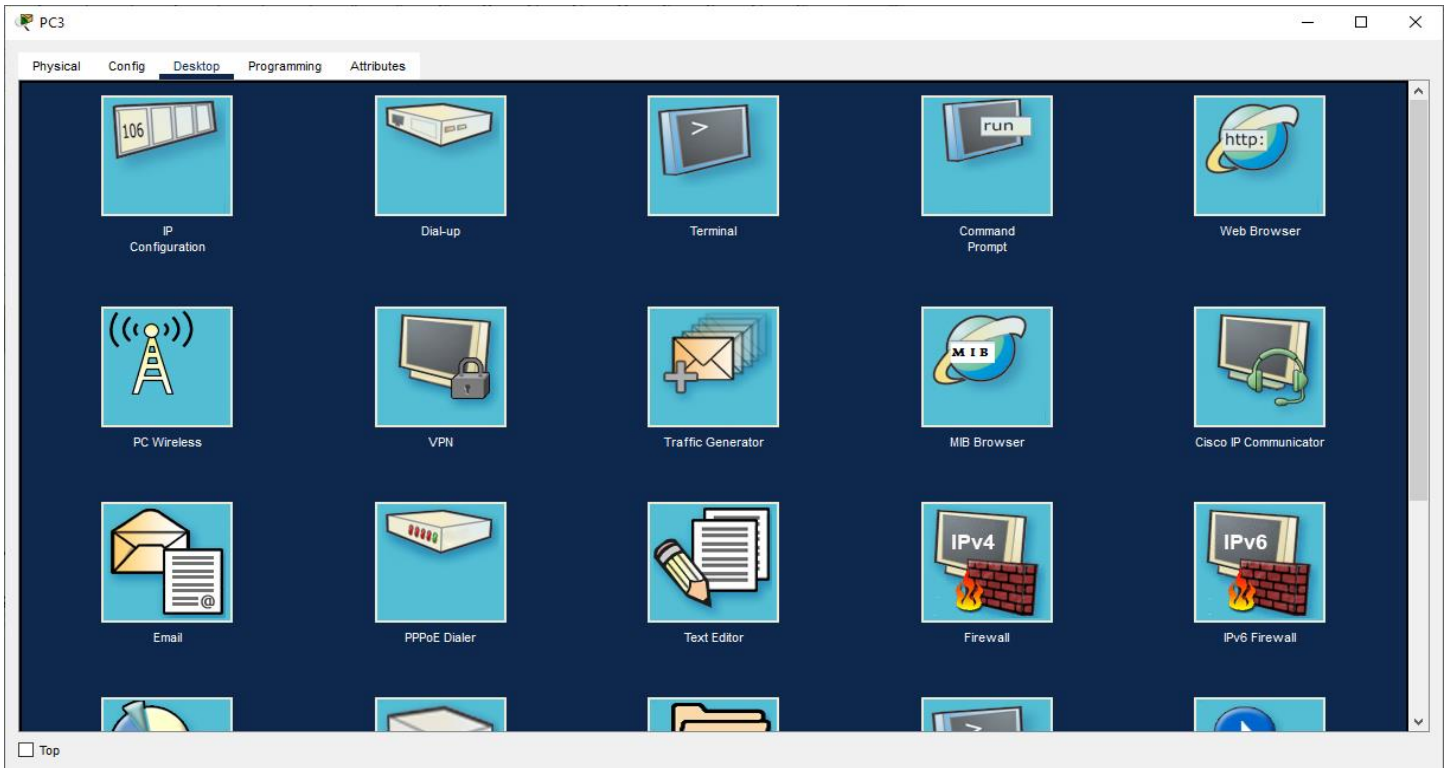
Password

Top

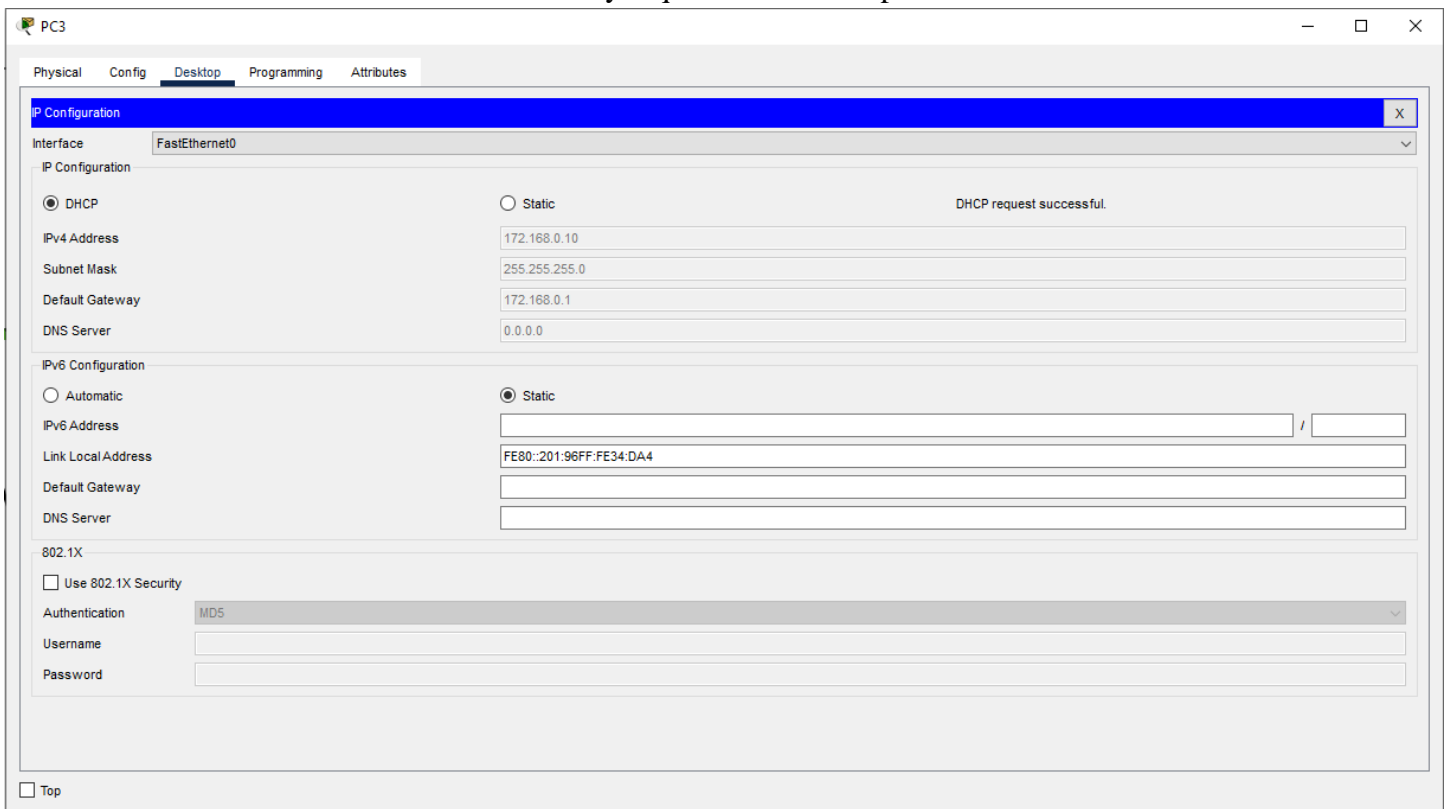


✉ egov@cumail.in

Now in RightyPool/LAN-2 goto the PC3 Desktop -> Select IP Configuration



Select the DHCP mode and it will automatically request the DHCP Ip address



Do the Same for All PC

PC4

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static DHCP request successful.

IPv4 Address: 172.168.0.11

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::207:ECFF:FE33:E5C0

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MDS

Username:

Password:

☐ Top

PC5

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static DHCP request successful.

IPv4 Address: 172.168.0.12

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::207:ECFF:FE03:6D6D

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

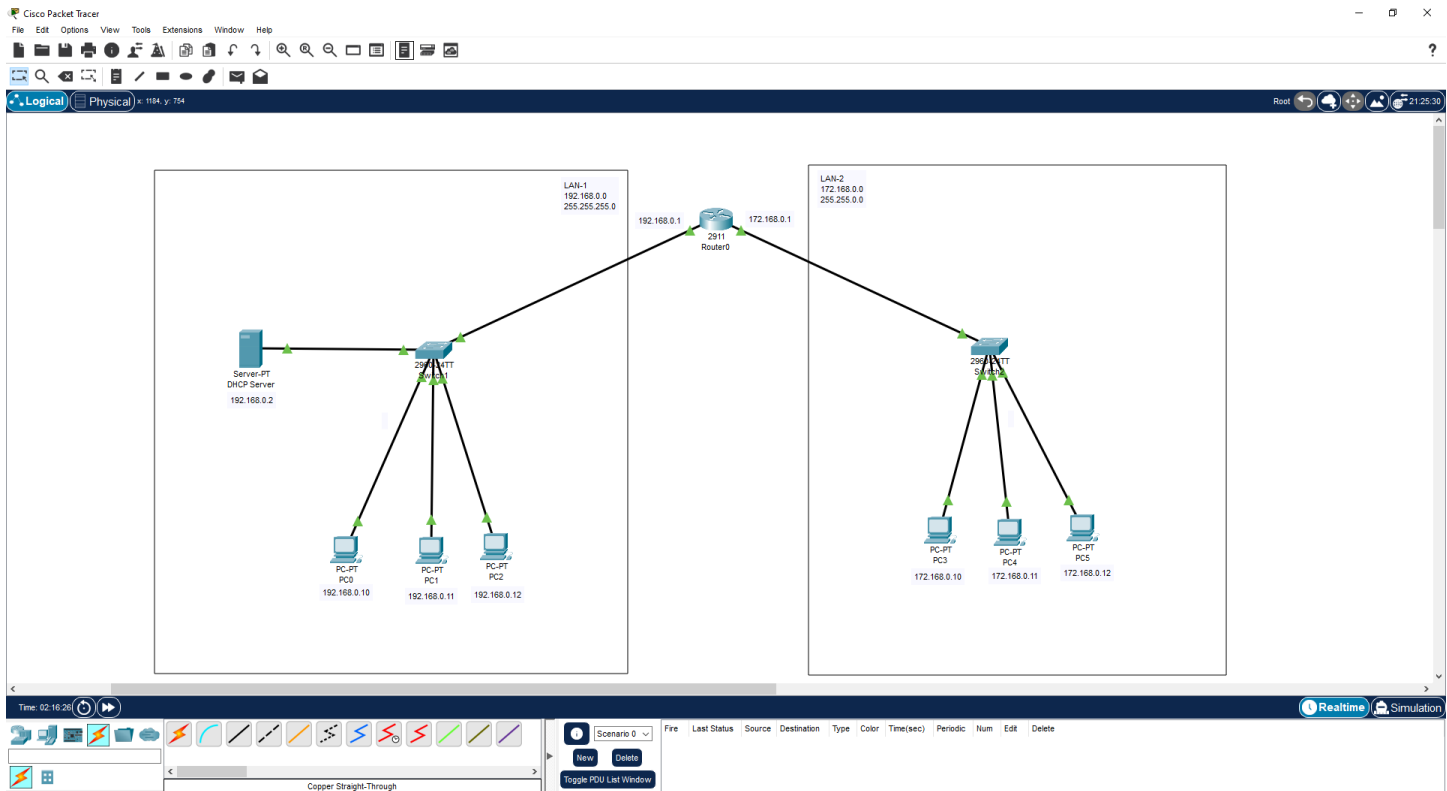
Authentication: MDS

Username:

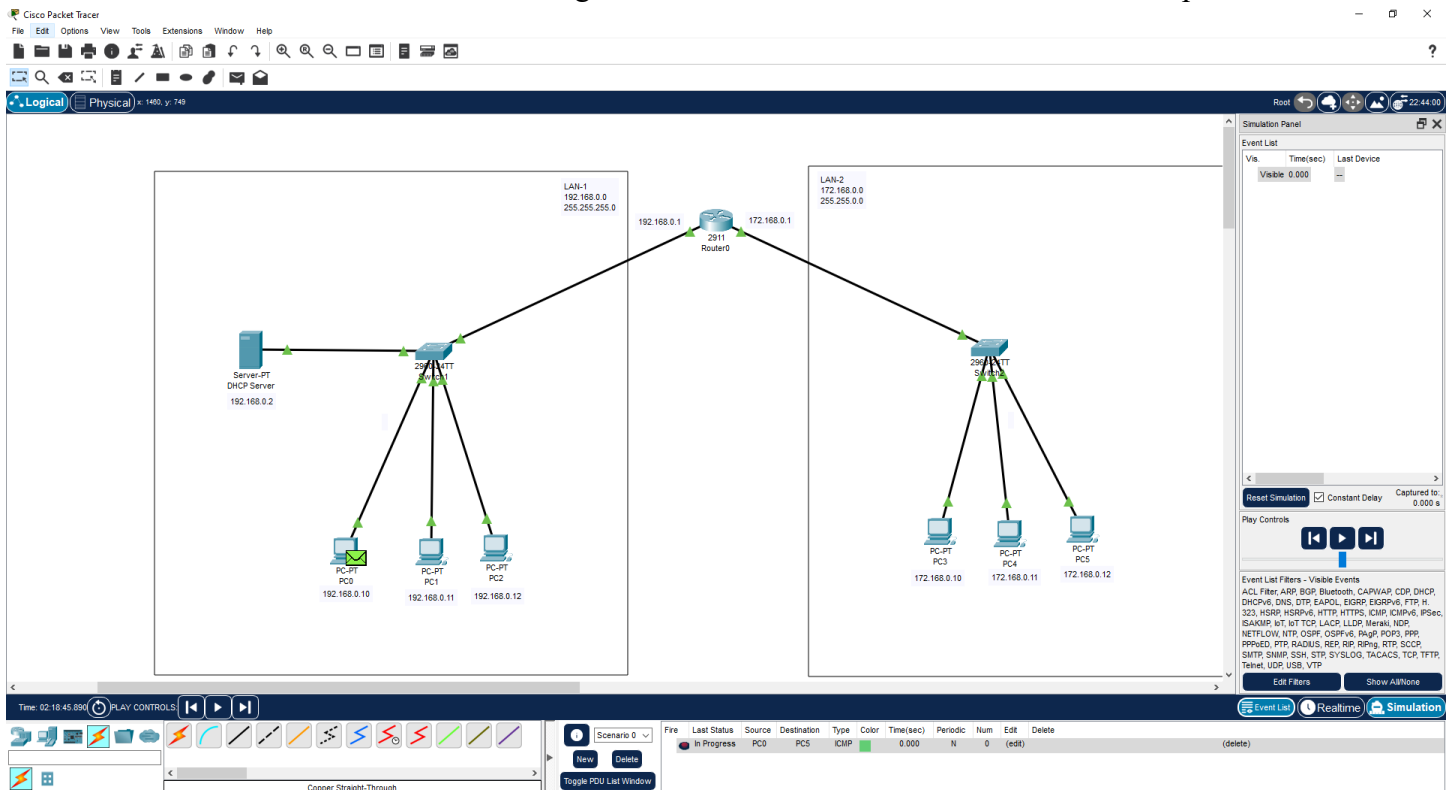
Password:

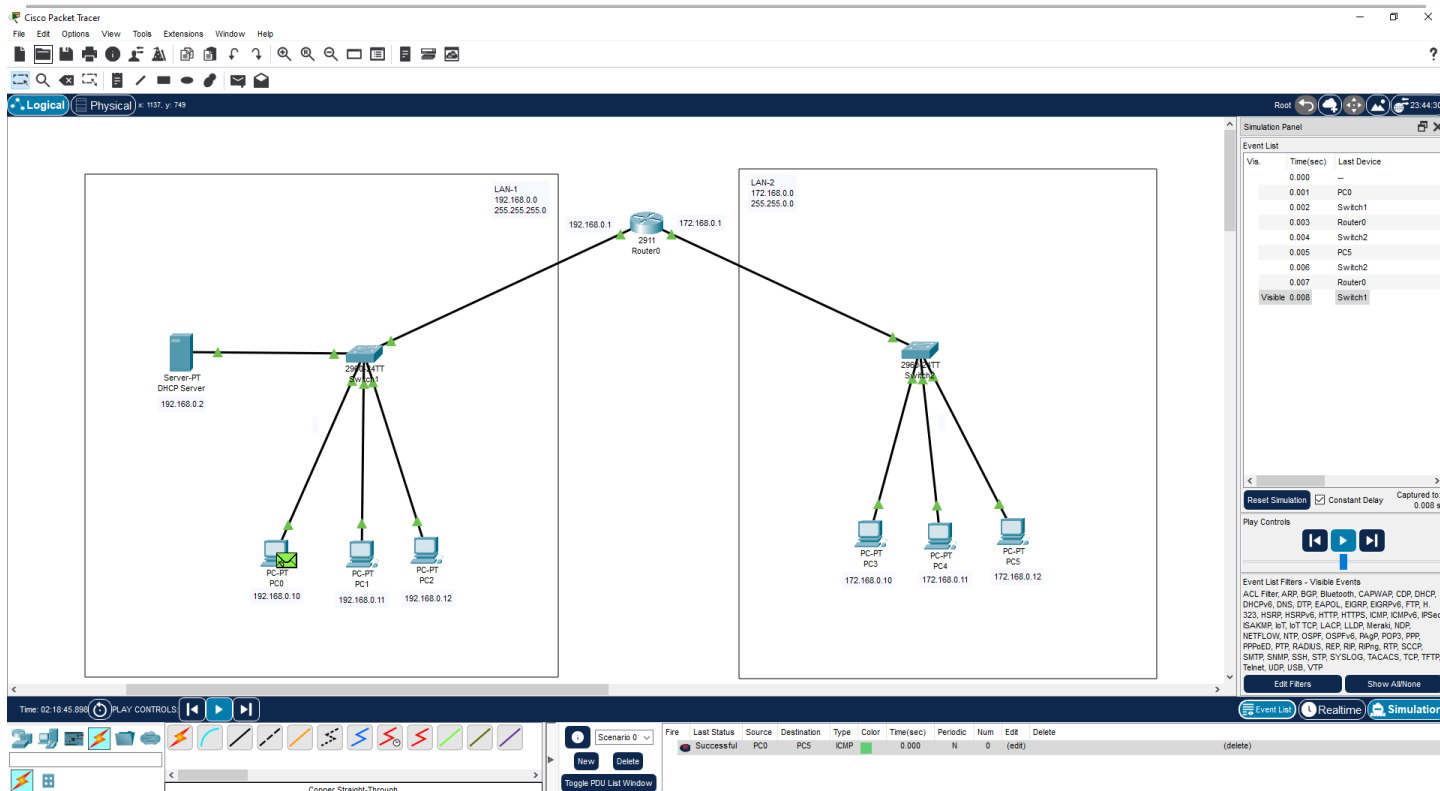
☐ Top

Finally I've completed the all connectio and IP addressing of the Network



Now in Simulation mode I'll send the message from PC0 to PC4 and record the Simulation process.





Learning outcomes (What I have learnt):

1. Learnt how to create the DHCP Server connection.
2. Learnt how to configure DHCP server success fully and send the message withing two different networks.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			