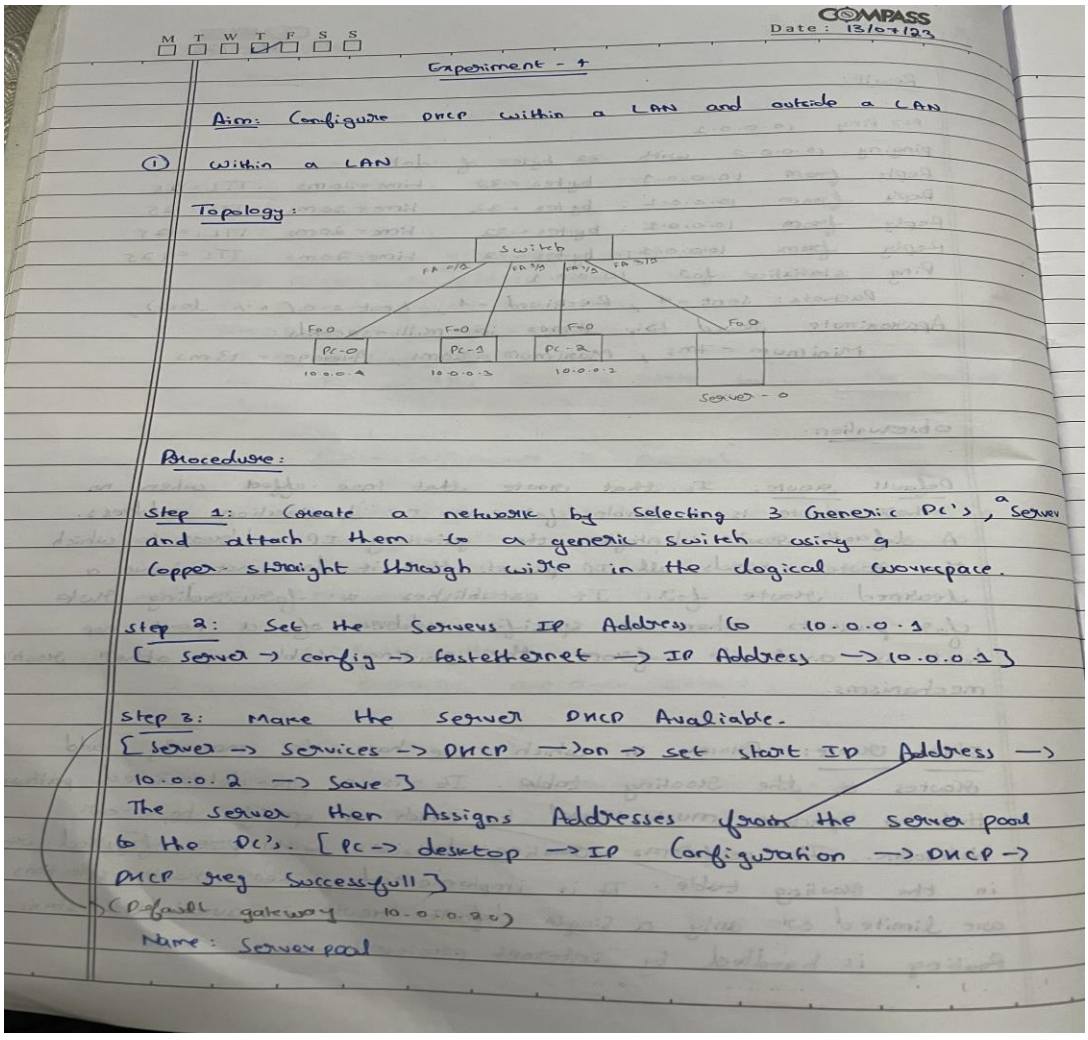
LAB PROGRAM – 4

Q)Configure DHCP within a LAN and outside LAN.

1) Within a LAN :

Procedure :



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COMPASS

Date : 13/07/23

Experiment - 1

Aim: Configure DHCP within a LAN and outside a LAN

① within a LAN

Topology :

Procedure :

Step 1: Create a network by selecting 3 Generic Pc's, a Server and attach them to a generic switch using a Copper straight through wire in the logical workspace.

Step 2: Set the Servers IP Address to 10.0.0.1
[server -> config -> fastEthernet -> IP Address -> 10.0.0.1]

Step 3: Make the server DHCP Available.
[server -> services -> DHCP -> on -> set start IP Address -> 10.0.0.2 -> save]
The server then Assigns Addresses from the server pool to the Pc's. [Pc -> desktop -> IP Configuration -> DHCP -> DHCP req successfull]
(Default gateway 10.0.0.2 c)
Name : Server pool

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Result:

PC> Ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4 : bytes = 32 time = 1ms TTL = 128

Reply from 10.0.0.4: bytes = 32 time = 0 ms TTL = 128

Reply from 10.0.0.4: bytes = 32 time = 0 ms TTL = 128

Reply from 10.0.0.4: bytes = 32 time = 0ms TTL = 128

Ping statistics for 10.0.0.4:

Packets ; Sent = 4, Received = 4, Lost = 0 (0% loss),

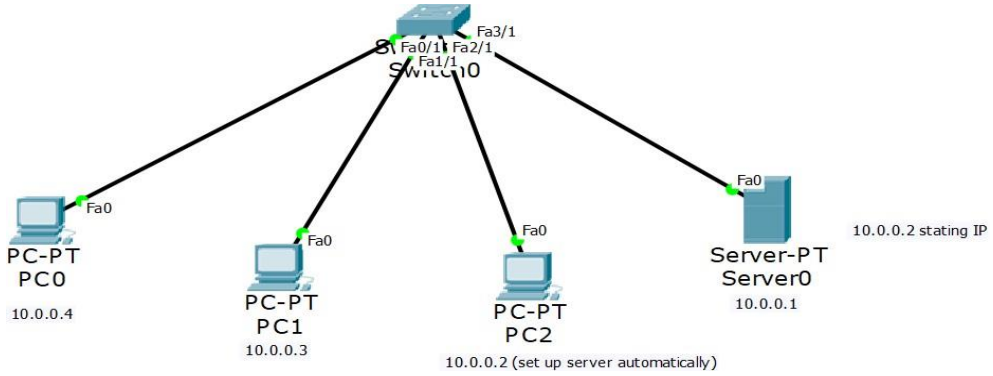
Approximate round trip times in milli-seconds:

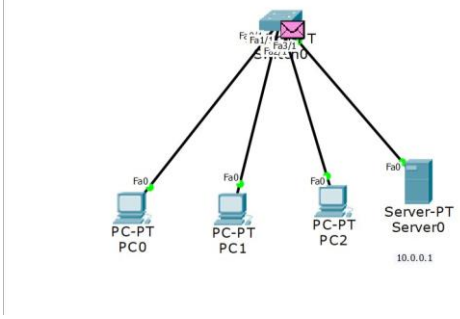
Minimum = 0ms, Maximum = 1ms, Average = 0ms

observation:

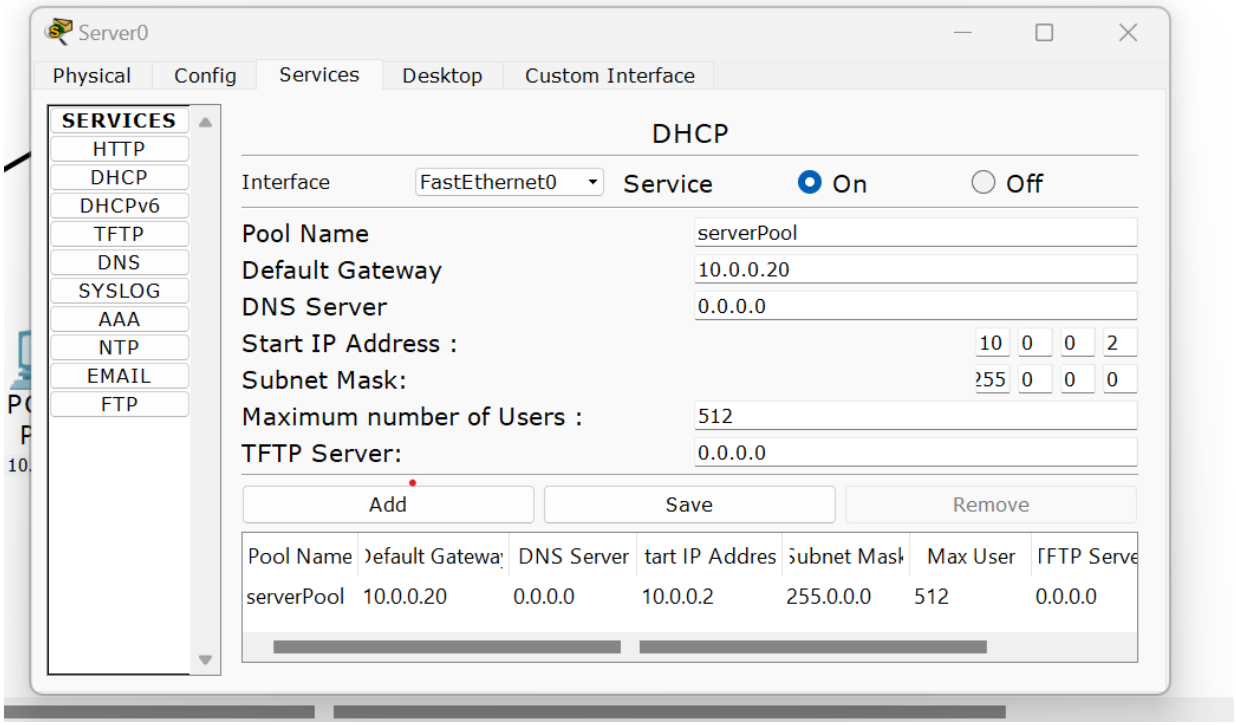
DHCP -> Dynamic host Configuration protocol. This protocol helps manage Allocation of IP Address to end-users. When a device wants Access to a network that's using DHCP, it sends a request for an IP address that is picked up by a DHCP server. The server responds by delivering an IP Address to the device from a pool of IP Addresses, then monitors the use of the Address and takes it back after a specified time/ when system shuts down.

Topology :

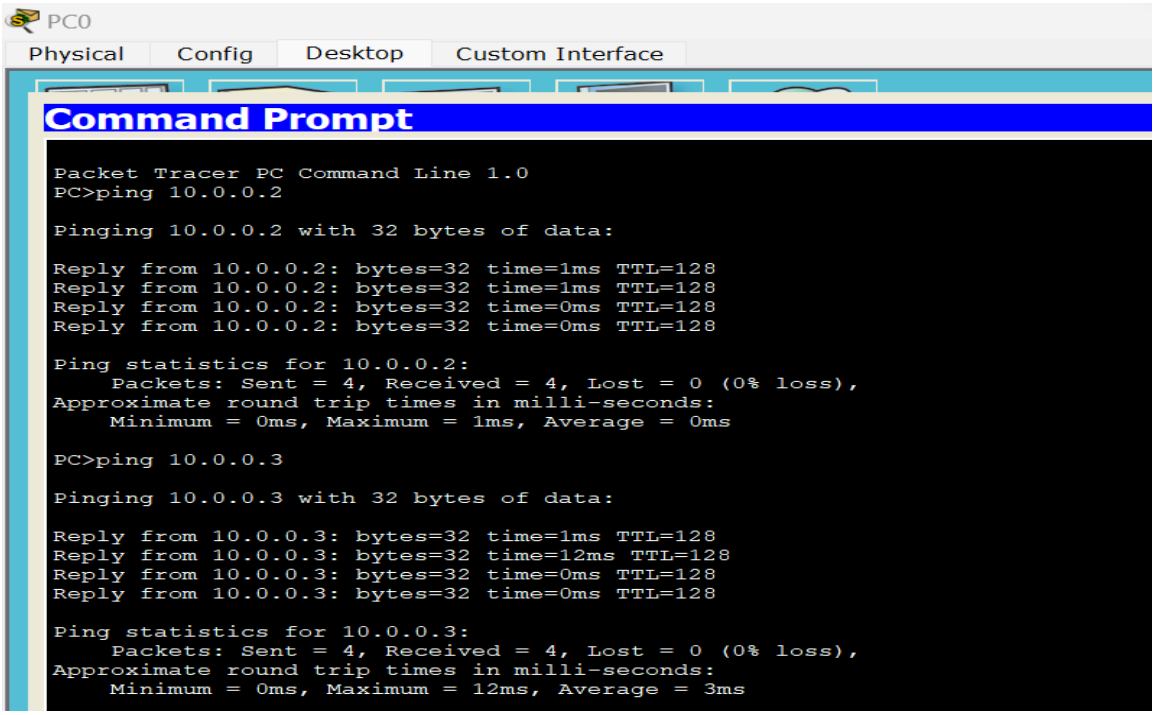




Server 0 :

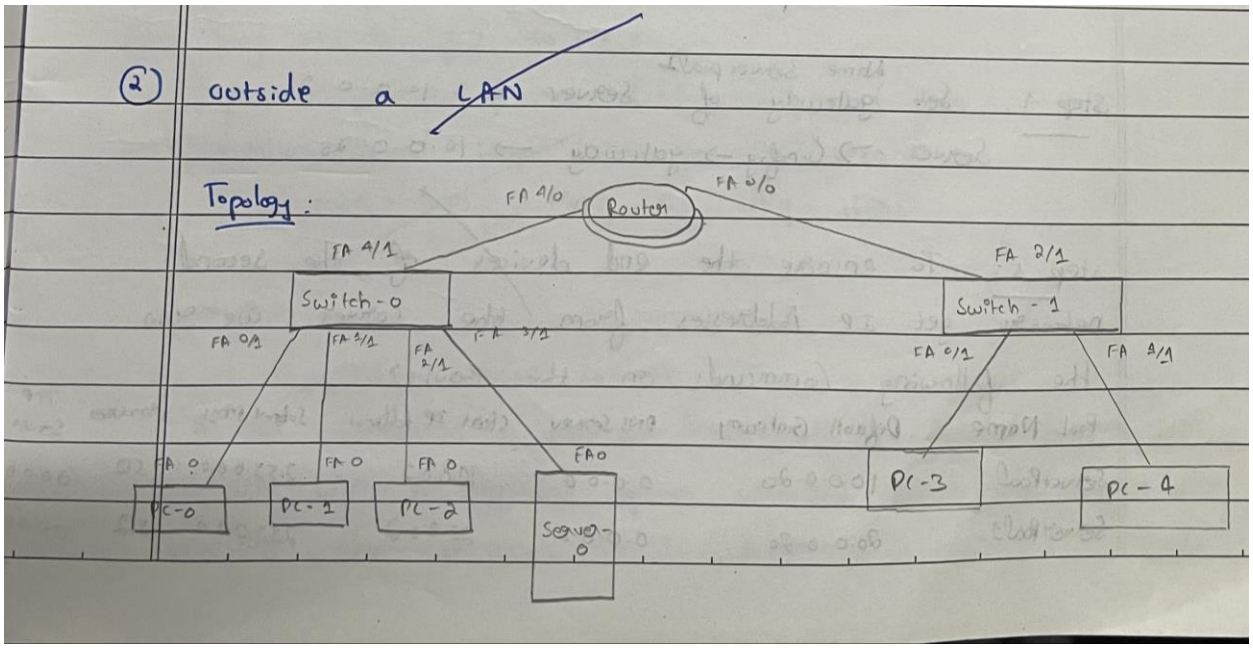


Ping Results :



2) Outside a LAN :

Procedure :



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Procedure:

step 1: follow the steps mentioned under the experiment Configuring DHCP within a LAN.

step 2: Create another network with 2 PC's connected to a server using a copper straigh through wire. Connect the switch from the second network to the switch in the first network using a Router.

step 3: Configure the router [static Route]
[Router → CLI]

step 3a) enable
3b) Config t
3c) interface fastethernet 4/0
3d) ip Address 10.0.0.20 255.00.0
3e) no shut
3f) exit
3g) interface fastethernet 0/0
3h) ip Address 20.0.0.20 255.0.0.0
3i) no shut
3j) exit
3k) exit
3l) show ip route

step 4: Set gateway of Server to 10.0.0.20
Name: Server pool1
Server → Config → gateway → 10.0.0.20

step 5: To ensure the end devices of the second network get IP Addresses from the server, we run the following commands on the Router.

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server
ServerPool	10.0.0.20	0.0.0.0	10.0.0.2	255.0.0.0	512	0.0.0.0
ServerPool1	20.0.0.20	0.0.0.0	20.0.0.2	255.0.0.0	512	0.0.0.0

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5a) enable
5b) Config t
5c) interface fastethernet 0/0
5d) ip helper-Address 10.0.0.1
5e) no shut
5f) exit

step 6: Server → Services → DHCP → serverpool 1 → start IP Address → 20.0.0.2 → Add. (Making DHCP Available to the Second network)
The server then Assigns Addresses from the server pool to the PC's of Second network.
(PC → desktop → IP Configuration → DHCP → DHCP req Successful)
> (Default gateway - 20.0.0.20)

Result:

Pc> ping 40.0.0.1
pinging 40.0.0.1 with 32 bytes of data
Request timed out
Reply from 40.0.0.1 : bytes = 32 time = 20ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 9ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 21ms TTL = 125
ping statistics for 40.0.0.1
packets sent = 4, recieved = 3, host = 1 (Lost = 25%)
Approx round trip times in milli seconds
min = 9ms, Max = 21, Avg = 16ms

observation:

→ used in TCP/IP network
A DHCP server is a way to Automatically configure the system in the LAN. A requestor from an end device sends out a message that requests an IP Address. The server responds

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with an IP lease i.e an IP Address from the Address pool and some additional configuration. DHCP automates and Centrally manages these configurations rather than requiring network administrators to manually Assign IP Address to all network devices.

→ when you connect a new device, it still does not have an IP Address. It will call over the network for a DHCP server. This request arrives to all devices and the Server Also.

→ The DHCP hears the call and answers with an IP Address to the newly Connected device.

→ The IP Address will Arrive to the device and the device will Accept it and will send a request to use it.

→ The server gets accepting message from the device. It will provide IP address to the device along with Subnet mask and DNS server.

The DHCP leases the IP Address for a limited time. After the time passes, the IP Address will go back to the IP pool of available IP addresses.

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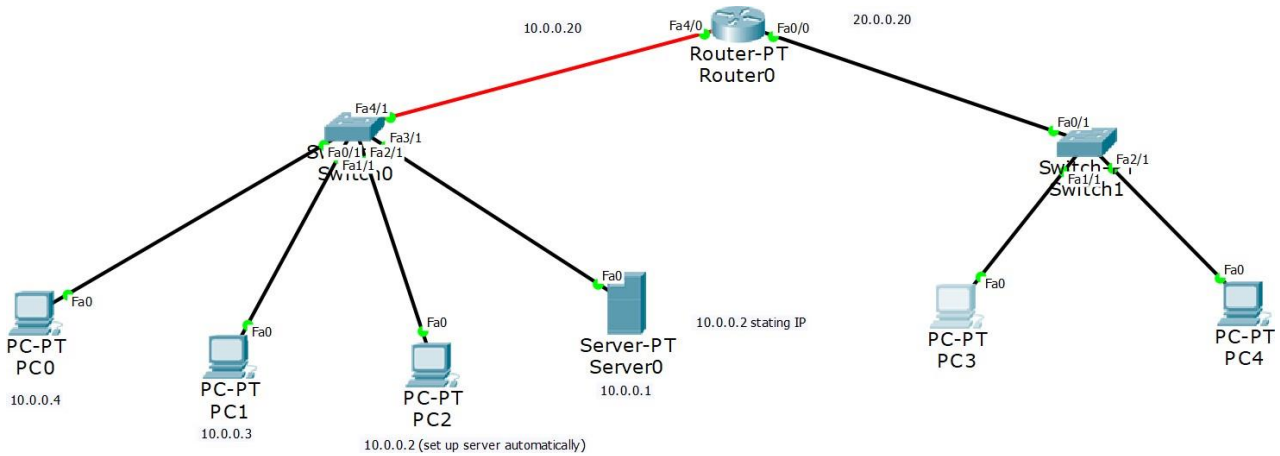
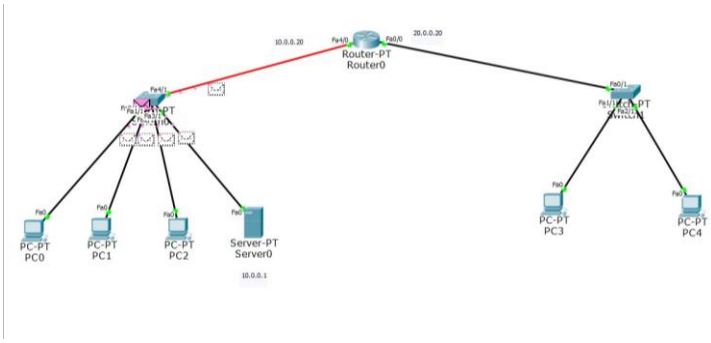
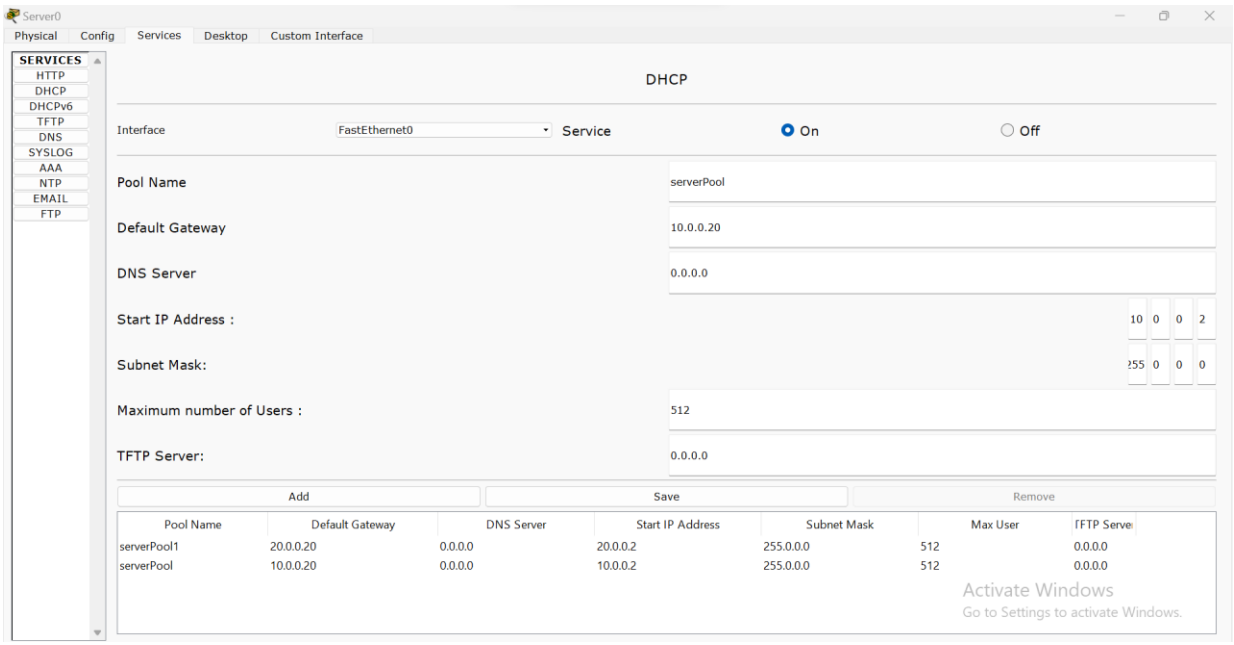
Topology :


10.0.0.20
Fa4/0
Fa0/0
20.0.0.20
Router-PT
Router0
Fa4/1
Fa3/1
Fa0/1
Fa2/1
Fa1/1
Switch1
Fa0
PC-PT
PC0
10.0.0.4
PC-PT
PC1
10.0.0.3
PC-PT
PC2
10.0.0.2 (set up server automatically)
Server-PT
Server0
10.0.0.1
10.0.0.2 stating IP
PC-PT
PC3
PC-PT
PC4



Server 0


Server0
Physical
Config
Services
Desktop
Custom Interface
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPool
Default Gateway
10.0.0.20
DNS Server
0.0.0.0
Start IP Address :
10 0 0 2
Subnet Mask:
255 0 0 0
Maximum number of Users :
512
TFTP Server:
0.0.0.0
Add
Save
Remove
Pool Name
Default Gateway
DNS Server
Start IP Address
Subnet Mask
Max User
TFTP Serve
serverPool1
20.0.0.20
0.0.0.0
20.0.0.2
255.0.0.0
512
0.0.0.0
serverPool
10.0.0.20
0.0.0.0
10.0.0.2
255.0.0.0
512
0.0.0.0
Activate Windows
Go to Settings to activate Windows.

Router Configuration : (Router 0)

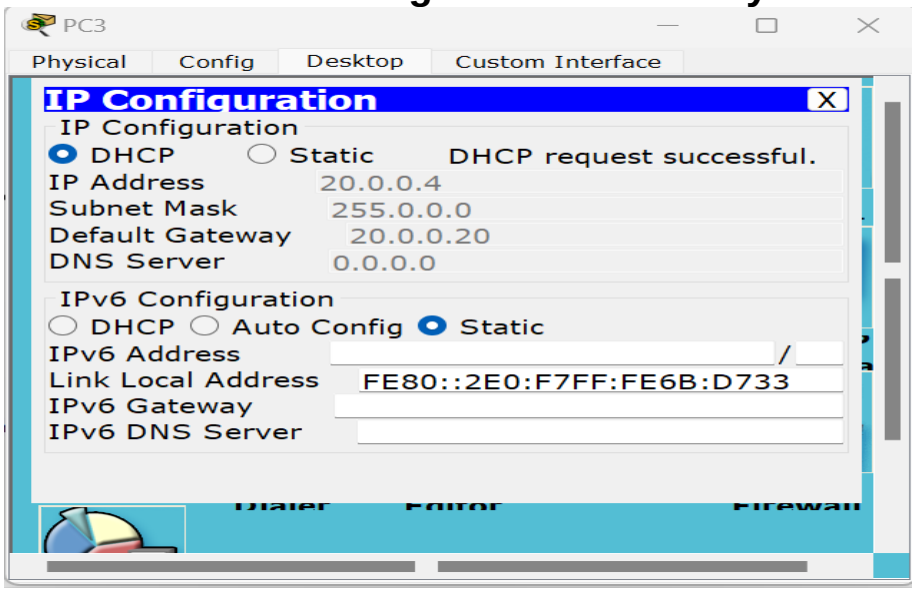
Router0

Physical | Config | CLI

IOS Command

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
exit
Router(config)#interface fastethernet0/0
Router(config-if)#ip address 20.0.0.20 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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, FastEthernet4/0
C    20.0.0.0/8 is directly connected, FastEthernet0/0
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet0/0
Router(config-if)#ip helper-address 10.0.0.1
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#exit
```

Automation IP is assigned in the PCs by Server 0 via DHCP:



Ping Results :

```
PC>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

Reply from 20.0.0.2: bytes=32 time=1ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```