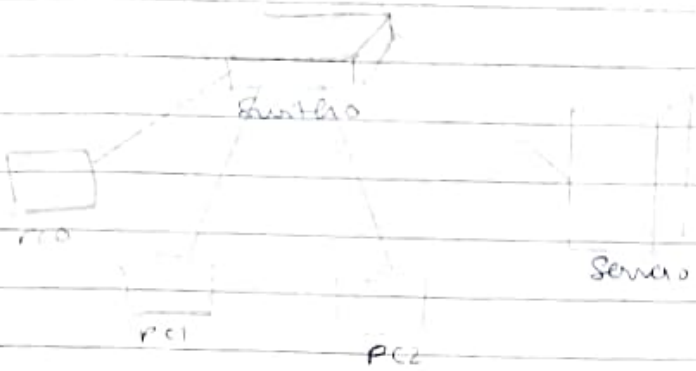
13/2/23

Page No. 25

Experiment - 6

Configure DHCP within a LAN and outside LAN

Topology :- (within LAN)



Procedure :-

i) Select 3 PC's & 1 server & 1 switch
ii) connect them all to the switch using copper cross over wire, wait for all wires to turn green
iii) click on server 0 → ~~set gateway (here 10.0.0.~~ set IP address & subnetmask (10.0.0.1 & 255.0.0.
iv) click on services, click on service on. fill in the start IP Address (here 10.0.0.2) and click on save
We made this server DHCP inbuilt.
v) Now go to a PC → (Desktop) IP config (here PC2)
vi) select DHCP. IP address is allocated automatically. Repeat for all PCs
vii) Ping a PC from another

Result :- (pinging from PC0 ; 10.0.0.4 here)

PC > ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

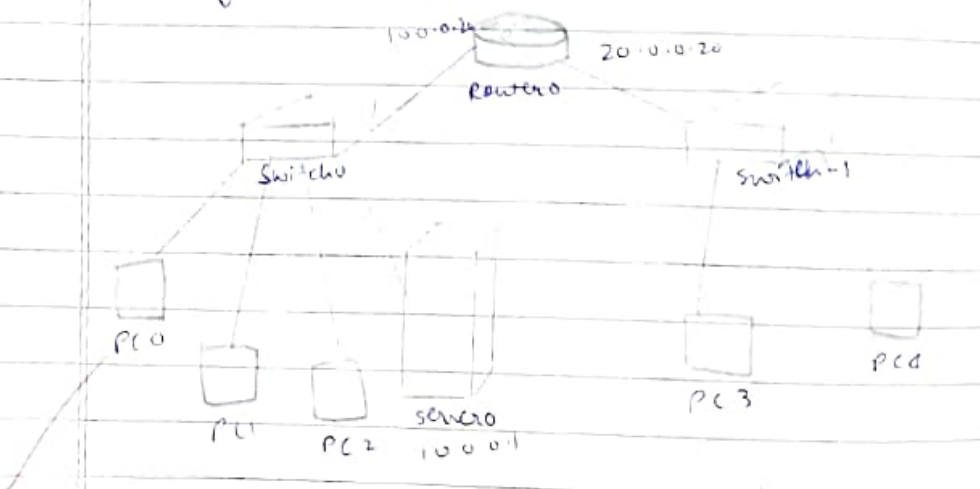
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128

Reply from 10.0.0.2 bytes=32 time=0ms TTL=
Reply from 10.0.0.2 bytes=32 time=0ms TTL=
Reply from 10.0.0.1 bytes=32 time=0ms TTL=

Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milliseconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

Observation:-
i) The server is made DHCP inbuilt so is used to dynamically set the IP address of the PCs.
ii) Here the systems all appear in the same LAN so hence no router is required.
iii) After the IP address was set, we can ping the other systems using their IP addr

Topology:- (outside the LAN.)



Procedure:
i) Add a router, a switch & 2 PC's to the previous configurations
ii) Connect through copper straight through

wire.

iii) Configure the router

```
Router > enable
Router # config t
Router (config) # interface FastEthernet 0/0
Router (config-if) # ip address 20.0.0.20 255.0.0.0
Router (config-if) # no shut

Router (config-if) #
Router (config-if) # exit
Router (config) # ip address 10.0.0.20 255.0.0.0
Router (config-if) # no shut
Router (config-if) #
Router (config-if) # exit
Router (config) # exit

Router # config t
Router (config) # interface fastEthernet 4/0
Router (config-if) # ip helper-address 10.0.0.1
Router (config-if) # no shut
Router (config-if) # exit
Router (config) # exit

Router # show ip route
C   10.0.0.0/8 is directly connected, FastEthernet 4/0
C   20.0.0.0/8 is directly connected, FastEthernet 0/0
```

iv) Now, click on server → config → gateway 10.0.0.20. set the gateway.

v) Click on services tab, DHCP

vi) click on service on.

vii) Enter Default Gateway 10.0.0.20
viii) Start IP Address : 10.0.0.2
Subnet mas : 255.0.0.0
ix) click on save.
x) Now chang pool name to Server Pool1
change Default gateway → 20.0.0.20
start IP address → 20.0.0.2
Subnet mark → 255.0.0.0
xi) click on Add to add the new Pool.

Pool name	Default Gateway	DNS Server	start IP Address
ServerPool	10.0.0.20	0.0.0.0	20.0.0.2
ServerPool 1	20.0.0.20	0.0.0.0	10.0.0.2

Subnet Mask	Max Users	TFTP
		0.0.0.0
255.0.0.0	512	
255.0.0.0	512	0.0.0.0

xi) Now, go to the PC's in new layout → desktop → IP configuration → DHCP
Now the IP address will be generated.
Generate IP address for all systems in the other LAN.
xii) Now, Ping the 1st lan from this LAN.

Result: (Pinging from PC 4, 20.0.0.2 here)
PC> Ping 10.0.0.2
pinging 10.0.0.2 with 32 bytes of data:

Request timed out

Reply from 10.0.0.1 bytes=32 time=0ms TTL=128
Reply from 10.0.0.2 bytes=32 time=0ms TTL=128

Reply from 10.0.0.2 bytes:32 time=0ms TTL=1
Reply from 10.0.0.2 bytes:32 time=0ms TTL=1

observation:-

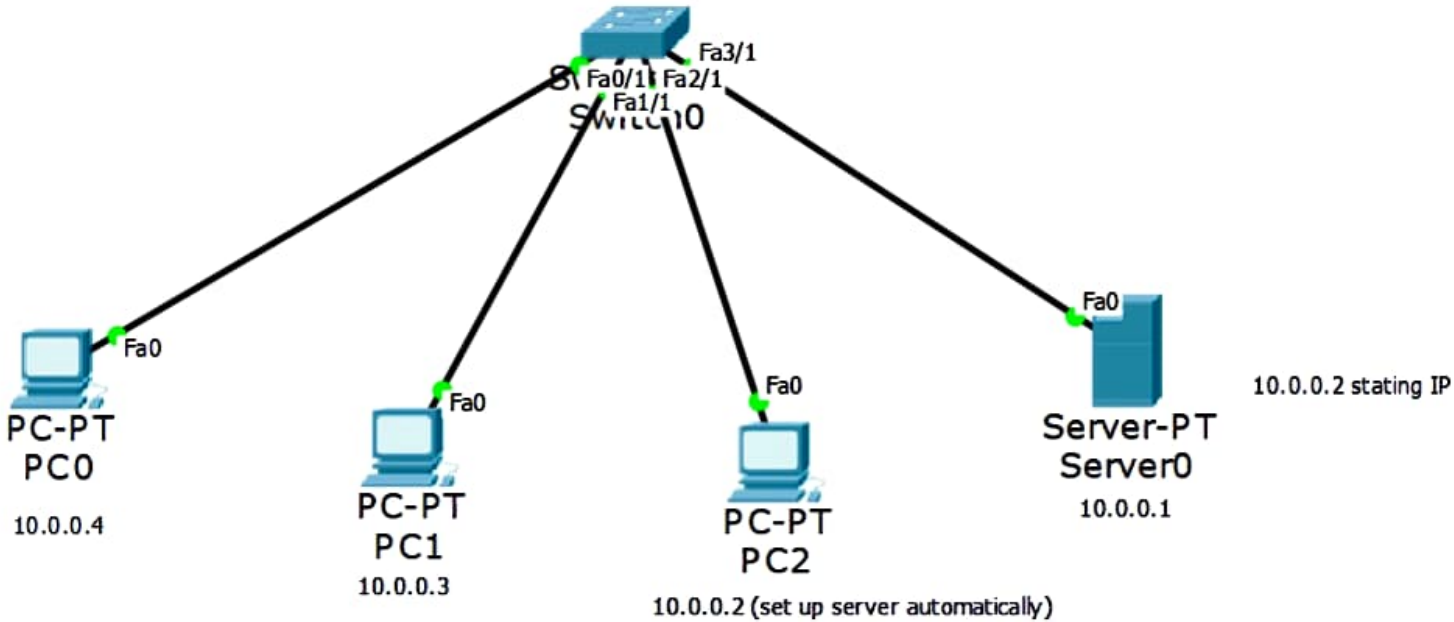
i) The server DHCP dynamically sets the IP address of systems from another LAN

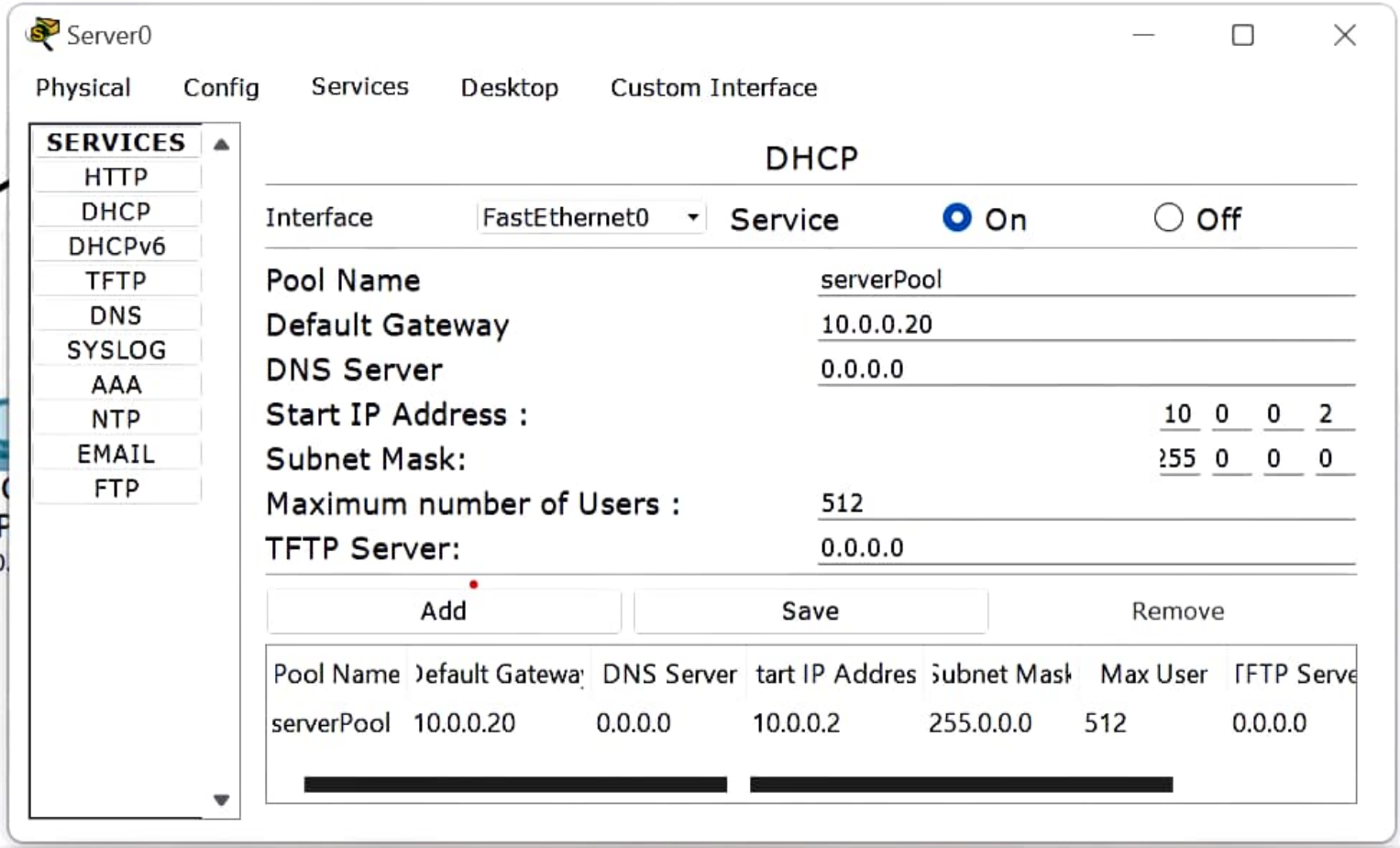
ii) ip helper-address 10.0.0.1 indicates the them to get the IP address from the server whose IP address is 10.0.0.1

iii) Thus configuring the router to connect both LANs, a server from 1 LAN can set IP address of devices in another LAN.

10/10

20/7/23


Fa3/1
Fa0/1
Fa2/1
Fa1/1
Fa0
PC-PT
PC0
10.0.0.4
Fa0
PC-PT
PC1
10.0.0.3
Fa0
PC-PT
PC2
10.0.0.2 (set up server automatically)
Fa0
Server-PT
Server0
10.0.0.1
10.0.0.2 stating IP

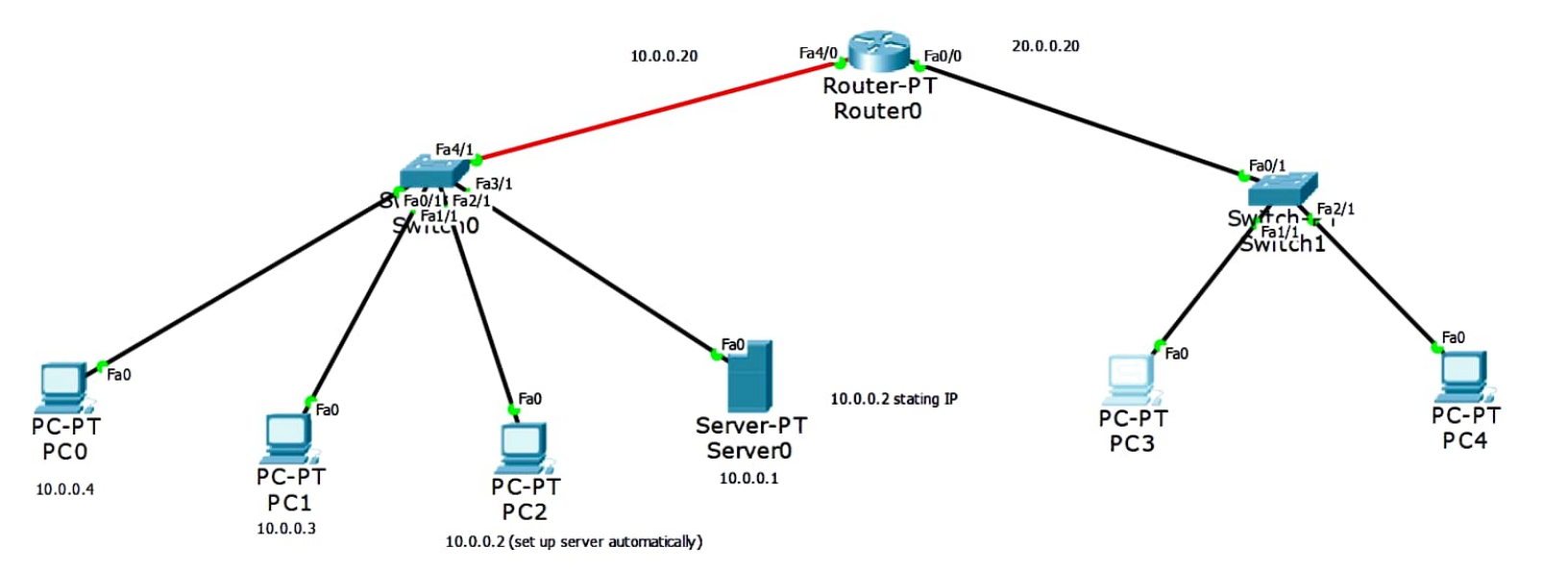

Server0
Physical
Config
Services
Desktop
Custom Interface
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPool
Default Gateway
10.0.0.20
DNS Server
0.0.0.0
Start IP Address :
10 0 0 2
Subnet Mask:
255 0 0 0
Maximum number of Users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

PC0

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=12ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 12ms, Average = 3ms
```


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

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

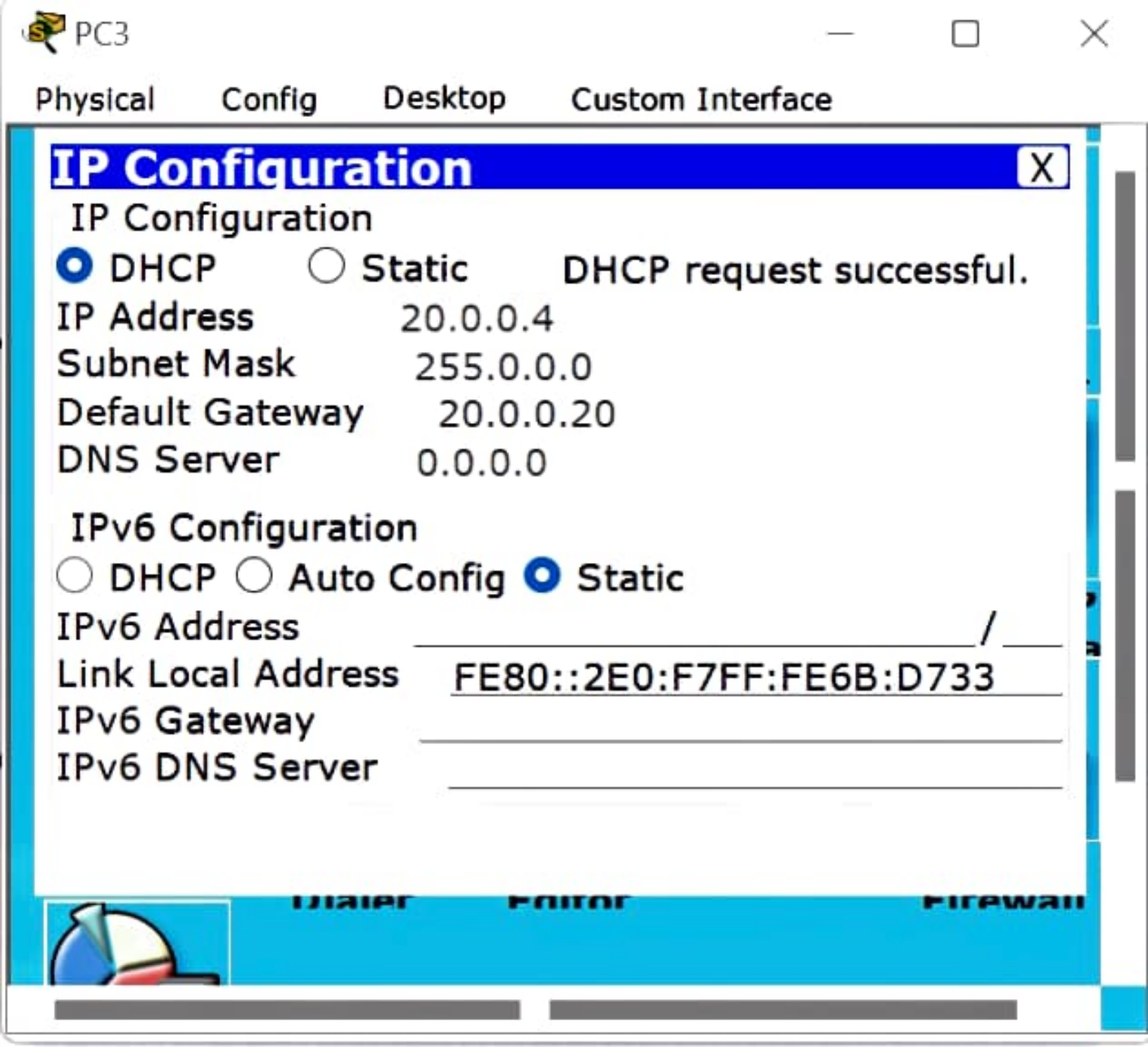
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server
serverPool1	20.0.0.20	0.0.0.0	20.0.0.2	255.0.0.0	512	0.0.0.0
serverPool	10.0.0.20	0.0.0.0	10.0.0.2	255.0.0.0	512	0.0.0.0

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
```


PC3
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
DHCP request successful.
IP Address 20.0.0.4
Subnet Mask 255.0.0.0
Default Gateway 20.0.0.20
DNS Server 0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address FE80::2E0:F7FF:FE6B:D733
IPv6 Gateway
IPv6 DNS Server

```
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
```