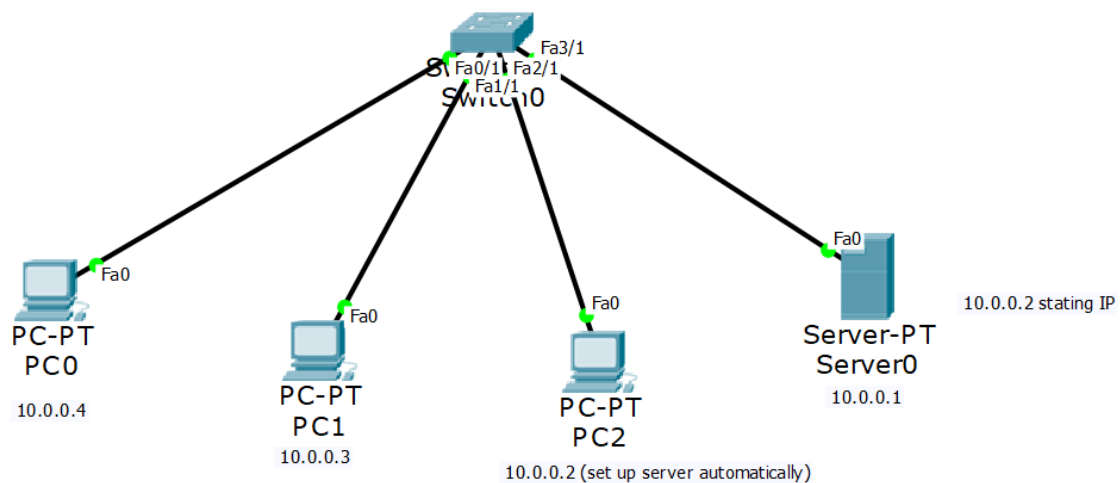


LAB4: Configure DHCP within a LAN and outside LAN.

4A: Within a LAN.

Topology:



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

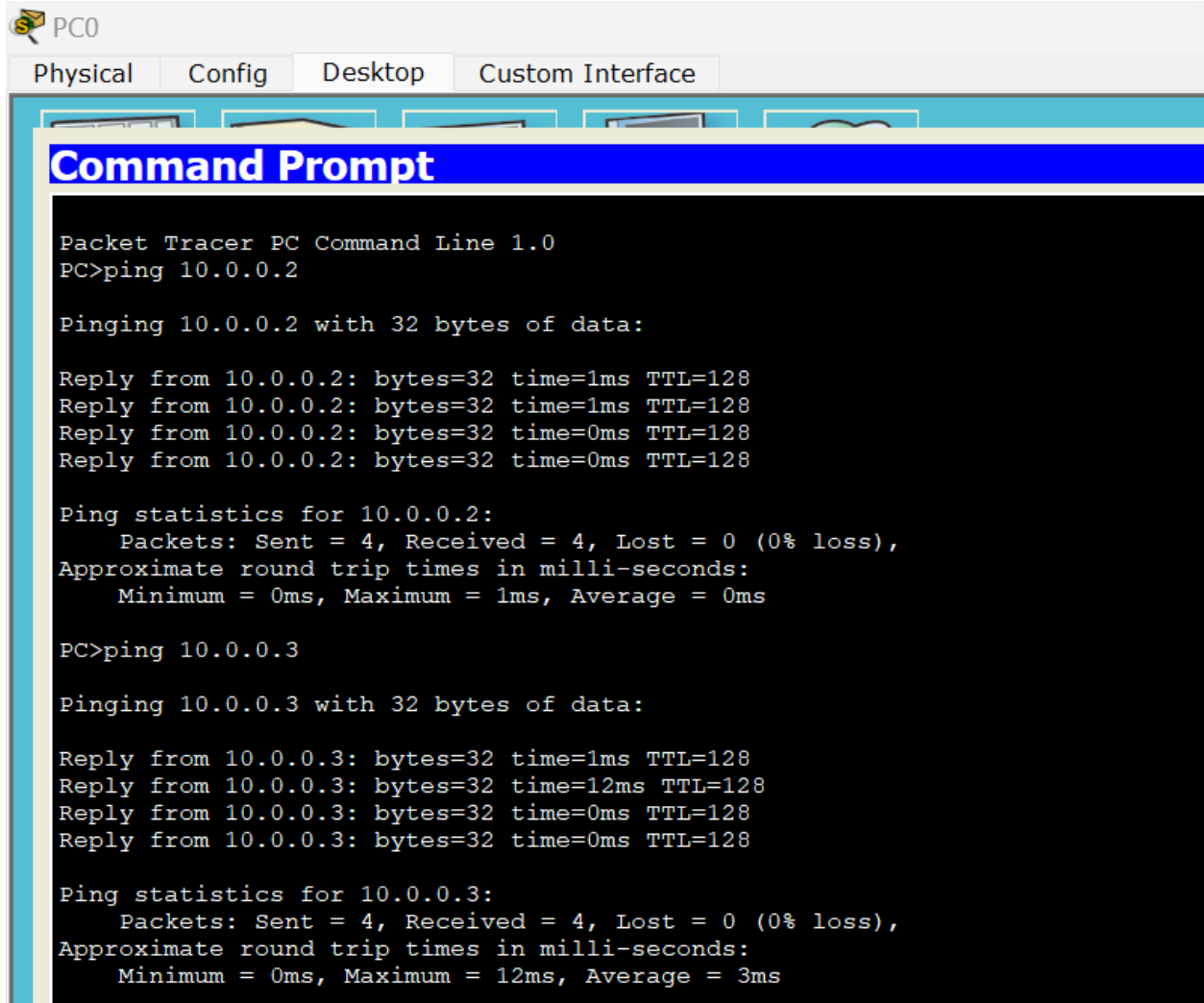
Subnet Mask: 255 0 0 0

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 Server
serverPool	10.0.0.20	0.0.0.0	10.0.0.2	255.0.0.0	512	0.0.0.0



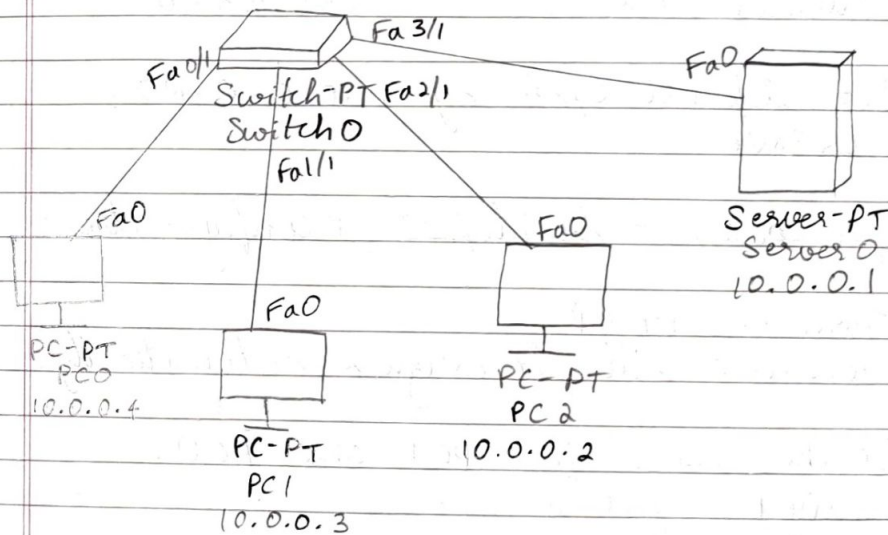
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Lab 4:

Aim: Configure DHCP within a LAN and outside LAN.

4A :-

Topology:



Procedure

1. The network is started by selecting end devices PC-PTs, PC0, PC1 and PC2. Select Server-PT too.
2. Select a generic switch, Switch-PT and place all of them on the workspace.

3. Connect PCs and Server to switch using copper Straight-Through cable.
4. Set the IP address of server 0
Desktop → IP configuration → IP Address = 10.0.0.1
Click on subnet mask.
5. Server 0 → Services → DHCP → On

Set start IP address as 10.0.0.2
Subnet Mask : 255.0.0.0
6. Set Default Gateway : 10.0.0.20
↳ Save
7. Open PC2, → Desktop → IP Configuration

Turn on DHCP
10.0.0.2 will be assigned automatically.
8. Do the same for PC1 and PC0.
PC1 : 10.0.0.3
PC0 : 10.0.0.4

Ping Output:

In PC0

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:

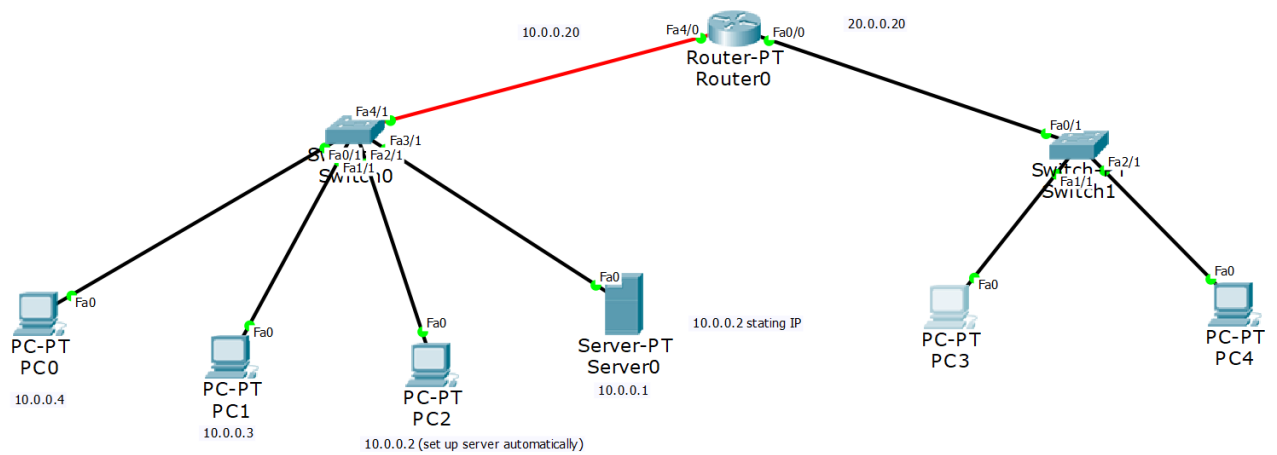
Minimum = 0ms, Maximum = 1ms, Average = 0ms.

Observation :-

- We observe that IP addresses are set automatically to PC0, PC1 and PC2 when we enable DHCP IP configuration.
- This is useful for large networks with 100s of PCs.
- For all PCs Gateway is automatically set to 10.0.0.20.

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Topology:



Server 0 :

Server0 Configuration Window - DHCP Settings

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

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

Activate Windows
Go to Settings to activate Windows.

Router 0 :

Router0

PhysicalConfigCLI

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

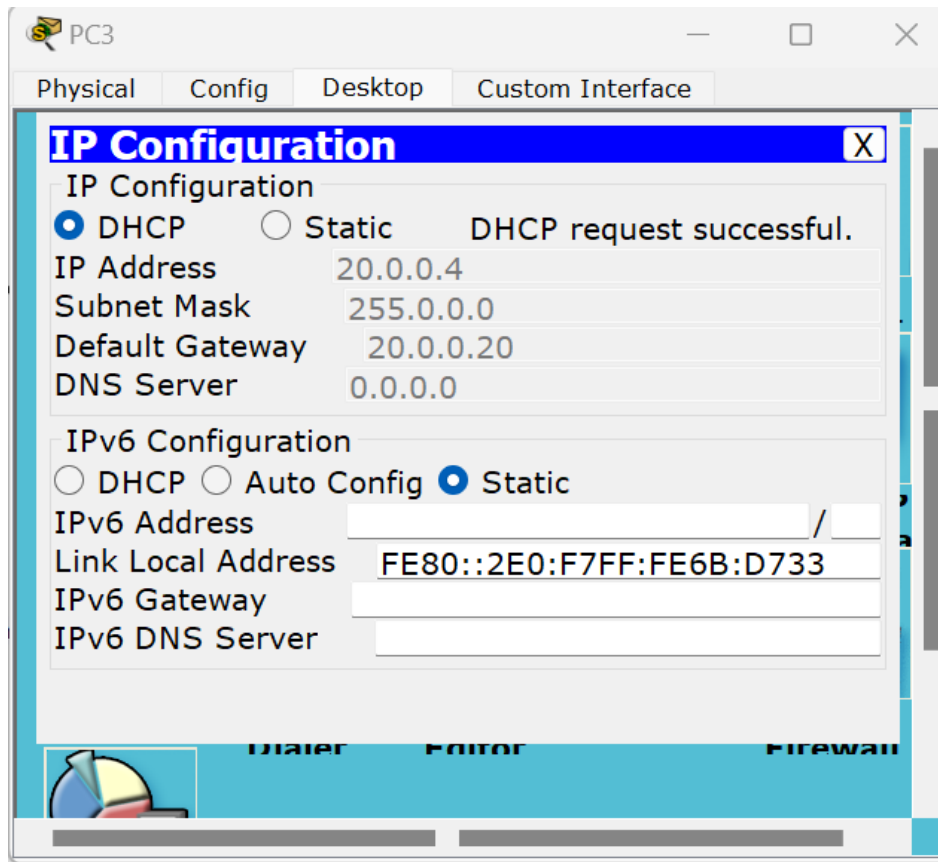
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%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:



Command Prompt:

```
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
```


Procedure :-

1. To the topology created in 4A, connect a ~~Re~~ Generic Router 0 using copper Straight through wire.
2. To a Switch 1, connect 2 PCs, PC0 and PC1.
3. Connect the step 2 topology to Router 0.
4. In Router 0, open CLI.
Set IP addresses for interfaces.
Fa 4/0 : 10.0.0.20
Fa 0/0 : 20.0.0.20
5. In Router 0,
interface fastEthernet 0/0
Router(config-if) # ip helper-address 10.0.0.1
Router(config-if) # no shut
6. In Server 0,
→ Config → Settings → Gateway: 10.0.0.20
7. In Server 0,
→ Services → DHCP → Pool Name: server Pool1
Set Default Gateway : 20.0.0.20

Start IP Address : 20.0.0.2
Subnet Mask : 255.0.0.0

→ Add.

8. PC 3

↳ Desktop ↳ IP Configuration ↳ DHCP
20.0.0.2 set automatically for PC 3

PC 4

20.0.0.3 set automatically.

Ping Output
On PC 0

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

Observation:

→ IP address is set Automatic

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

Observation :

- IP addresses are set automatically on PC3 & PC4 by Server 0.
- PC3 : 20.0.0.2
PC4 : 20.0.0.3
- We can successfully ping PC3 from PC0 with no loss.

✓
12/7/2023