



COMPUTER NETWORK

SECTION 02

PROJECT (TASK 6)

LECTURER : Ms. Hazinah Kutty Mammi

GROUP NAME : NetSecret

GROUP MEMBERS :

NAME	MATRICS NUM
PRAVIN SIVANATHAN	A21EC0123
SADIK AL MAHMUD	A20EC4049
ABDUL AZIM BIN ANUAR VEERA	A21EC0001
MOHAMMED HUSSEIN SALEH BA ABBAD	A21EC4015

1.0 Updated Subnets and Devices addressing

Step 1 (Dividing portions):

172.16.00100000.00000000

Network portion - Host portion

Step2 (Borrow bits):

Network lab: $2^x = 32$, $x = 6$ bits (Since 32 addresses are not enough because we still need 2 address for network address and broadcast address)

General purpose lab: $2^x = 31$, $x = 6$ bits,

Computer Security lab: $2^x = 25$, $x = 5$ bits.

IOT lab: $2^x = 25$, $x = 5$ bits.

VC1: 2 hosts, $2^x = 4$, $x = 3$ bits.

VC2: 2 hosts, $2^x = 4$, $x = 3$ bits.

RTA-RTB: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTC-RTB: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTB-RTF: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTB-ISP: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTF-ISP: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTF-RTD: 2 hosts, $2^x = 4$, $x = 2$ bits.

RTF-RTE: 2 hosts, $2^x = 4$, $x = 2$ bits.

Staff Rooms(Floor 1) : 6 hosts, $2^x = 6$, $x = 3$ bits.

Staff Rooms(Floor 2) : 6 hosts, $2^x = 6$, $x = 3$ bits.

DNS Server: 2 hosts, $2^x = 4$, $x = 2$ bits.

Step 3 (Borrow bits):

S#0 (Network Lab):

172.16.00100000.00000000 [32.0] NA

172.16.00100000.00111111 [32.63] BA

S#1 (General Purpose lab):

172.16.00100000.01000000 [32.64] NA

172.16.00100000.01111111 [32.127] BA

S#2 (IOT Lab):

172.16.00100000.10000000 [32.128] NA

172.16.00100000.10011111 [32.159] BA

S#3 (Computer Security Lab):

172.16.00100000.10100000 [32.160] NA

172.16.00100000.10111111 [32.191] BA

S#4 (VC1):

172.16.00100000.11000000 [32.192] NA

172.16.00100000.11000111 [32.199] BA

S#5 (VC2):

172.16.00100000.11001000 [32.200] NA

172.16.00100000.11001111 [32.207] BA

S#6 (RTA-RTB):

172.16.00100000.11010000 [32.208] NA

172.16.00100000.11010011 [32.211] BA

S#7 (RTC-RTB):

172.16.00100000.11010100 [32.212] NA

172.16.00100000.11010111 [32.215] BA

S#8 (RTB-RTF):

172.16.00100000.11011000 [32.216] NA

172.16.00100000.11011011 [32.219] BA

S#9 (RTB-ISP):

172.16.00100000.11011100 [32.220] NA

172.16.00100000.11011111 [32.223] BA

S#10 (RTF-ISP):

172.16.00100000.11100000 [32.224] NA

172.16.00100000.11100011 [32.227] BA

S#11 (RTF-RTD):

172.16.00100000.11100100 [32.228] NA

172.16.00100000.11100111 [32.231] BA

S#12 (RTF-RTE):

172.16.00100000.11101000 [32.232] NA

172.16.00100000.11101011 [32.235] BA

S#13 (SRf1):

172.16.00100000.11110000 [32.240] NA

172.16.00100000.11110111 [32.247] BA

S#14 (SRf2):

172.16.00100000.11111000 [32.248] NA

172.16.00100000.11111111 [32.255] BA

S#15 (DNS Server):

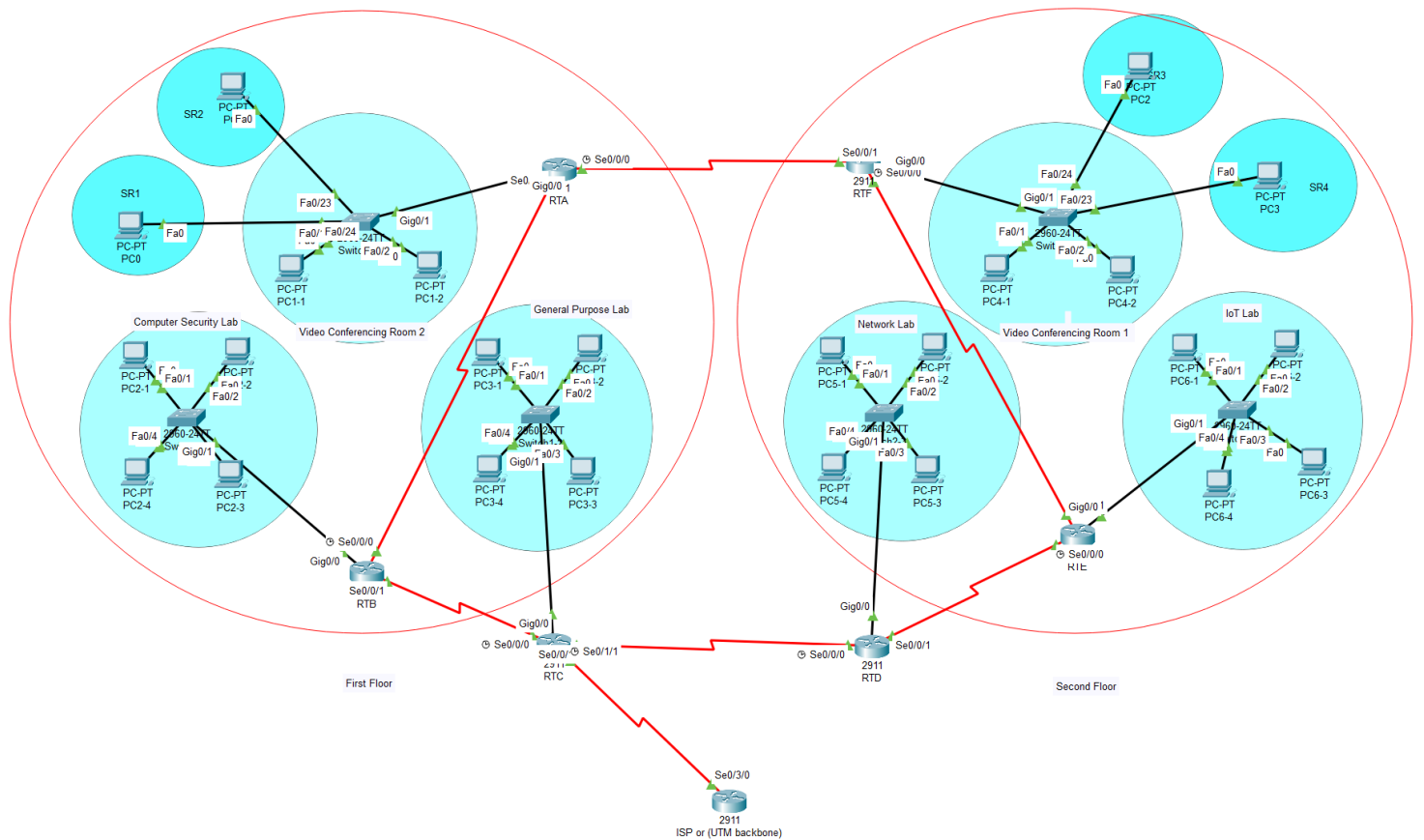
172.16.00100001.00000000 [33.0] NA

172.16.00100000.00000011 [33.3] BA

SUBNET	NETWORK ADDRESS	BROADCAST ADDRESS	USABLE ADD. RANGE	NUMBER OF USABLE IP ADDRESSES	SUBNET MASK
0	172.16.32.0	172.16.32.63	172.16.32.1 - 172.16.32.62	62	255.255.255.192
1	172.16.32.64	172.16.32.127	172.16.32.65 - 172.16.32.126	62	255.255.255.192
2	172.16.32.128	172.16.32.159	172.16.32.129 - 172.16.32.158	30	255.255.255.224
3	172.16.32.160	172.16.32.191	172.16.32.161 - 172.16.32.190	30	255.255.255.224
4	172.16.32.192	172.16.32.199	172.16.32.193 - 172.16.32.198	6	255.255.255.248
5	172.16.32.200	172.16.32.207	172.16.32.201 - 172.16.32.206	6	255.255.255.248
6	172.16.32.208	172.16.32.211	172.16.32.209 - 172.16.32.210	2	255.255.255.252
7	172.16.32.212	172.16.32.215	172.16.32.213 - 172.16.32.214	2	255.255.255.252
8	172.16.32.216	172.16.32.219	172.16.32.217 - 172.16.32.218	2	255.255.255.252
9	172.16.32.220	172.16.32.223	172.16.32.221 - 172.16.32.222	2	255.255.255.252

10	172.16.32.224	172.16.32.227	172.16.32.225 - 172.16.32.226	2	255.255.255.252
11	172.16.32.228	172.16.32.231	172.16.32.229 - 172.16.32.230	2	255.255.255.252
12	172.16.32.232	172.16.32.235	172.16.32.233 - 172.16.32.234	2	255.255.255.252
13	172.16.32.240	172.16.32.247	172.16.32.241- 172.16.32.246	6	255.255.255.248
14	172.16.32.248	172.16.32.255	172.16.32.249- 172.16.32.254	6	255.255.255.248
15	172.16.33.0	172.16.33.3	172.16.33.1- 172.16.33.2	2	255.255.255.252

Updated Topology



In our Topology we've used RTD as DHCPv4 server, thus both its interfaces work as helpers for other relay agents inside the topology.

Configurations on implementing DHCPV4 server

Network Lab :

```
Router(config)#ip dhcp excluded-address 172.16.32.5
Router(config)#ip dhc
Router(config)#ip dhcp pool Network-LAB
Router(dhcp-config)#network 172.16.32.0 255.255.255.192
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 172.16.32.5
```


IOT Lab:

```
Router(config)#ip dhcp excluded-address 172.16.32.133
Router(config)#ip dhcp pool IoT-LAB
Router(dhcp-config)#network 172.16.32.128 255.255.255.224
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.133
```

VC1 and SRF2

```
Router(config)#ip dhcp excluded-address 172.16.32.195
Router(config)#ip dhcp excluded-address 172.16.32.249
Router(config)#ip dhcp pool VC1
Router(dhcp-config)#network 172.16.32.192 255.255.255.248
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.195
Router(dhcp-config)#exit
Router(config)#ip dhcp pool SRF2
Router(dhcp-config)#network 172.16.32.248 255.255.255.248
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.249
Router(dhcp-config)#exit
```

General Lab:

```
Router(config)#ip dhcp excluded-address 172.16.32.69
Router(config)#ip dhcp pool GENERAL-LAB
Router(dhcp-config)#network 172.16.32.64 255.255.255.192
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.69
```

Computer Security Lab:

```
Router(config)#ip dhcp excluded-address 172.16.32.165
Router(config)#ip dhc
Router(config)#ip dhcp pool COMPSECURITY-LAB
Router(dhcp-config)#network 172.16.32.160 255.255.255.224
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.165
```

VC2 and SRF1:

```
Router(config)#ip dhcp excluded-address 172.16.32.203
Router(config)#ip dhcp excluded-address 172.16.32.241
Router(config)#ip dh
Router(config)#ip dhcp pool VC2
Router(dhcp-config)#network 172.16.32.200 255.255.255.248
Router(dhcp-config)#def
Router(dhcp-config)#default-router 172.16.32.203
Router(dhcp-config)#exit
Router(config)#ip dh
Router(config)#ip dhcp pool SRF1
Router(dhcp-config)#network 172.16.32.240 255.255.255.248
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 172.16.32.241
Router(dhcp-config)#
```

Configuring the relay agent

RTA:

```
Router(config)#int gig0/0
Router(config-if)#ip helper
Router(config-if)#ip helper-address 172.16.32.217
Router(config-if)#exit
Router(config)#int gig0/0.12
Router(config-subif)#ip helper-address 172.16.32.217
Router(config-subif)#exit
Router(config)#int gig0/0.99
Router(config-subif)#ip helper-address 172.16.32.217
Router(config-subif)#
```

RTB:

```
Router(config)#int gig0/0
Router(config-if)#
Router(config-if)#ip helper
Router(config-if)#ip helper-address 172.16.32.217
Router(config-if)#exit
Router(config)#int gig0/0.10
Router(config-subif)#ip helper
Router(config-subif)#ip helper-address 172.16.32.217
Router(config-subif)#
```

RTC:

```
Router(config)#int gig0/0
Router(config-if)#ip helper
Router(config-if)#ip helper-address 172.16.32.217
Router(config-if)#exit
Router(config)#int gig0/0.13
Router(config-subif)#ip helper
Router(config-subif)#ip helper-address 172.16.32.217
Router(config-subif)#
```

RTF:

```
Router(config)#int gig0/0
Router(config-if)#ip helper-ad
Router(config-if)#ip helper-address 172.16.32.222
Router(config-if)#exit
Router(config)#int gig0/0.12
Router(config-subif)#ip helper
Router(config-subif)#ip helper-address 172.16.32.222
Router(config-subif)#exit
Router(config)#int gig0/0.99
Router(config-subif)#ip helper
Router(config-subif)#ip helper-address 172.16.32.222
Router(config-subif)#
```

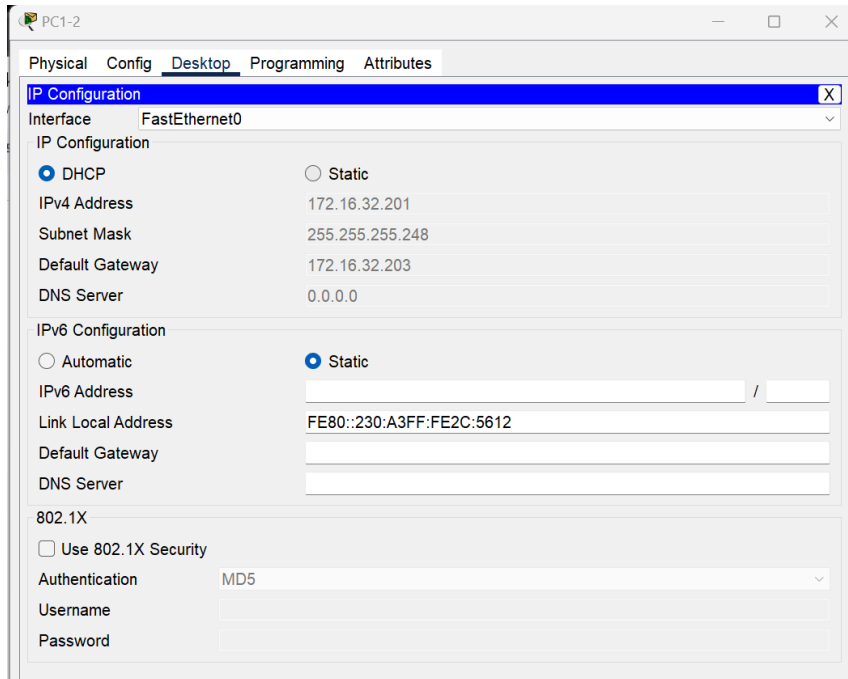
RTE:

```
Router(config)#int gig0/0
Router(config-if)#ip helper 172.16.32.222
Router(config-if)#exit
Router(config)#int gig0/0.14
Router(config-subif)#ip helper-ad
Router(config-subif)#ip helper-address 172.16.32.222
Router(config-subif)#exit
Router(config)#int gig0/0
Router(config-if)#ip helper-address 172.16.32.222
Router(config-if)#
Router(config-if)#
```

DHCP Request

RTA:

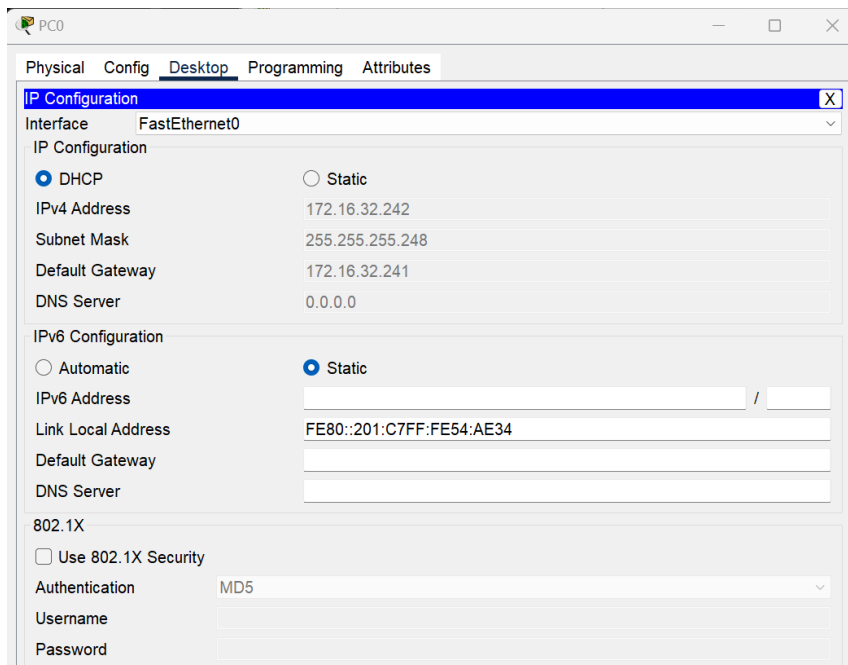
1. VC2_PC1-2



The screenshot shows the configuration window for PC1-2. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The IPv4 Address is 172.16.32.201, Subnet Mask is 255.255.255.248, Default Gateway is 172.16.32.203, and DNS Server is 0.0.0.0. Under 'IPv6 Configuration', the 'Automatic' radio button is unselected and the 'Static' radio button is selected. The IPv6 Address is empty, Link Local Address is FE80::230:A3FF:FE2C:5612, Default Gateway is empty, and DNS Server is empty. Under '802.1X', the 'Use 802.1X Security' checkbox is unselected, Authentication is MD5, Username is empty, and Password is empty.

Section	Field	Value
IP Configuration	Interface	FastEthernet0
	IP Configuration	<input checked="" type="radio"/> DHCP <input type="radio"/> Static
	IPv4 Address	172.16.32.201
	Subnet Mask	255.255.255.248
	Default Gateway	172.16.32.203
IPv6 Configuration	IPv6 Configuration	<input type="radio"/> Automatic <input checked="" type="radio"/> Static
	IPv6 Address	
	Link Local Address	FE80::230:A3FF:FE2C:5612
	Default Gateway	
	DNS Server	
802.1X	Use 802.1X Security	<input type="checkbox"/>
	Authentication	MD5
	Username	
	Password	

2. SR1_PC1

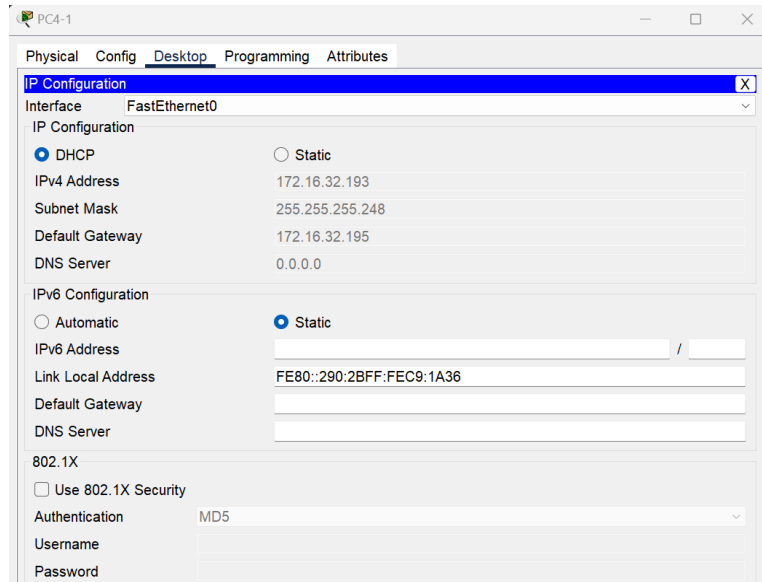


The screenshot shows the configuration window for SR1_PC1. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The IPv4 Address is 172.16.32.242, Subnet Mask is 255.255.255.248, Default Gateway is 172.16.32.241, and DNS Server is 0.0.0.0. Under 'IPv6 Configuration', the 'Automatic' radio button is unselected and the 'Static' radio button is selected. The IPv6 Address is empty, Link Local Address is FE80::201:C7FF:FE54:AE34, Default Gateway is empty, and DNS Server is empty. Under '802.1X', the 'Use 802.1X Security' checkbox is unselected, Authentication is MD5, Username is empty, and Password is empty.

Section	Field	Value
IP Configuration	Interface	FastEthernet0
	IP Configuration	<input checked="" type="radio"/> DHCP <input type="radio"/> Static
	IPv4 Address	172.16.32.242
	Subnet Mask	255.255.255.248
	Default Gateway	172.16.32.241
IPv6 Configuration	IPv6 Configuration	<input type="radio"/> Automatic <input checked="" type="radio"/> Static
	IPv6 Address	
	Link Local Address	FE80::201:C7FF:FE54:AE34
	Default Gateway	
	DNS Server	
802.1X	Use 802.1X Security	<input type="checkbox"/>
	Authentication	MD5
	Username	
	Password	

RTF:

1. VC2_PC4-1



PC4-1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 172.16.32.193

Subnet Mask 255.255.255.248

Default Gateway 172.16.32.195

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::290:2BFF:FEC9:1A36

Default Gateway

DNS Server

802.1X

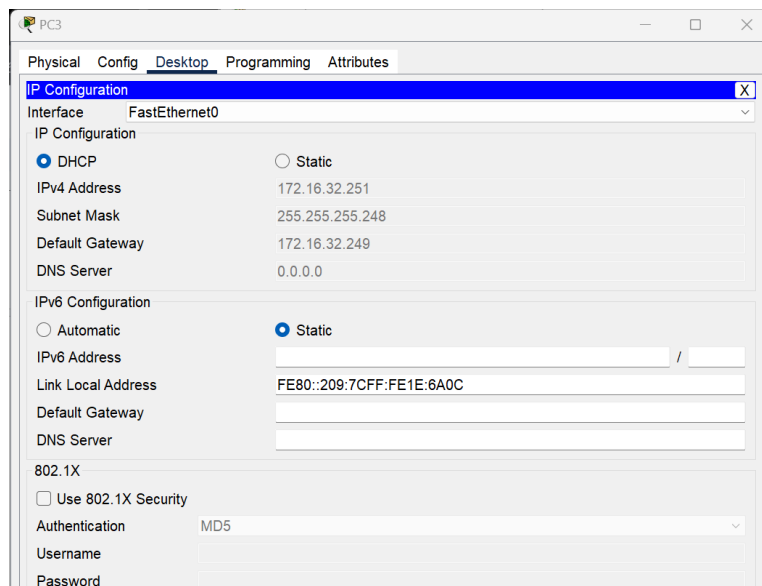
☐ Use 802.1X Security

Authentication MD5

Username

Password

2. SR4_PC3



PC3

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 172.16.32.251

Subnet Mask 255.255.255.248

Default Gateway 172.16.32.249

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::209:7CFF:FE1E:6A0C

Default Gateway

DNS Server

802.1X

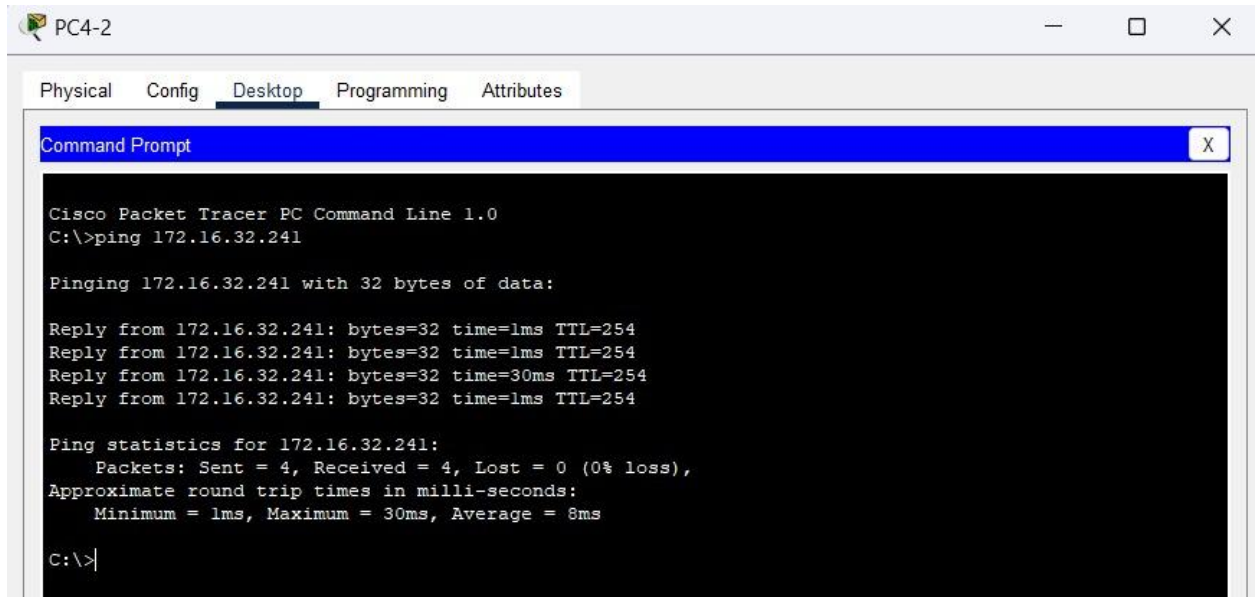
☐ Use 802.1X Security

Authentication MD5

Username

Password

END TO END CONNECTIVITY



PC4-2

Physical Config Desktop Programming Attributes

Command Prompt

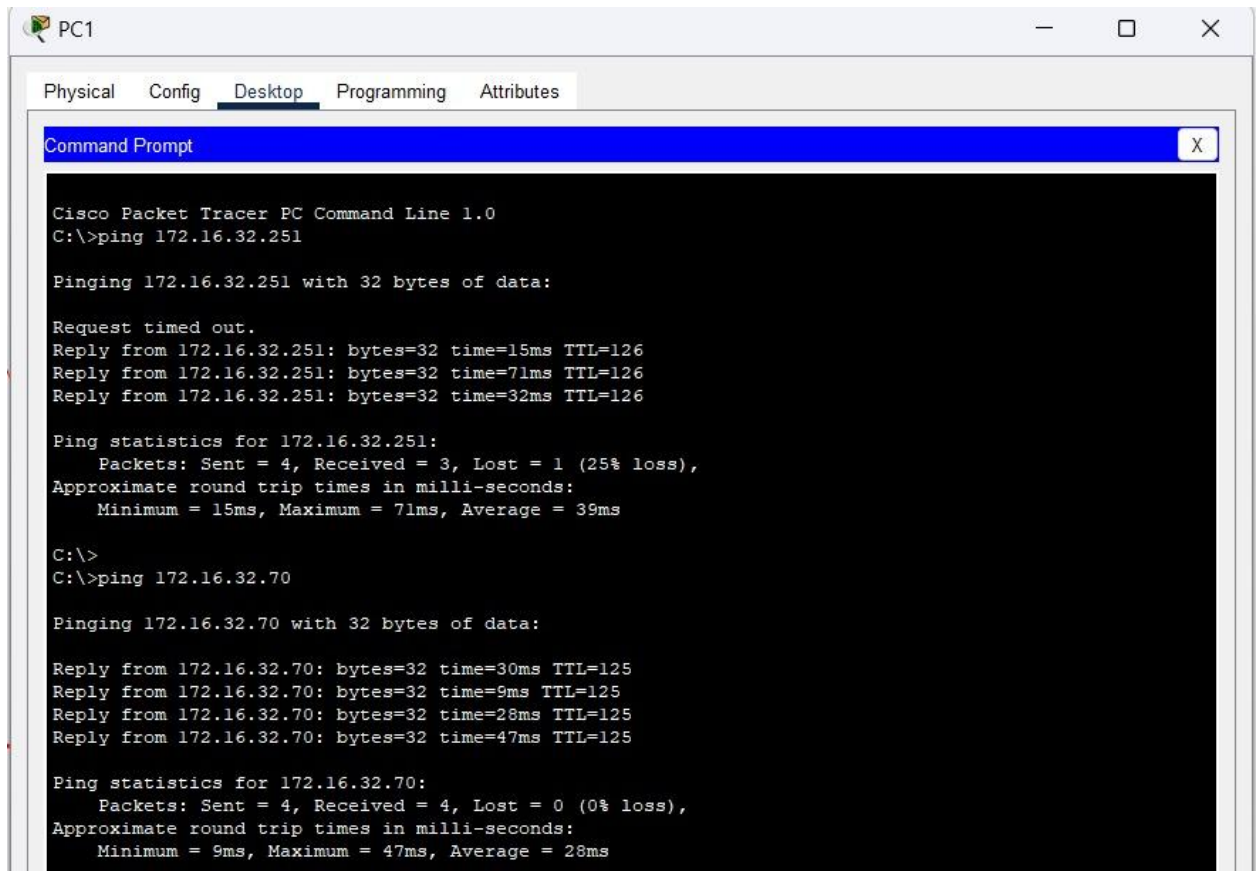
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.32.241

Pinging 172.16.32.241 with 32 bytes of data:

Reply from 172.16.32.241: bytes=32 time=1ms TTL=254
Reply from 172.16.32.241: bytes=32 time=1ms TTL=254
Reply from 172.16.32.241: bytes=32 time=30ms TTL=254
Reply from 172.16.32.241: bytes=32 time=1ms TTL=254

Ping statistics for 172.16.32.241:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 30ms, Average = 8ms

C:\>
```



PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.32.251

Pinging 172.16.32.251 with 32 bytes of data:

Request timed out.
Reply from 172.16.32.251: bytes=32 time=15ms TTL=126
Reply from 172.16.32.251: bytes=32 time=71ms TTL=126
Reply from 172.16.32.251: bytes=32 time=32ms TTL=126

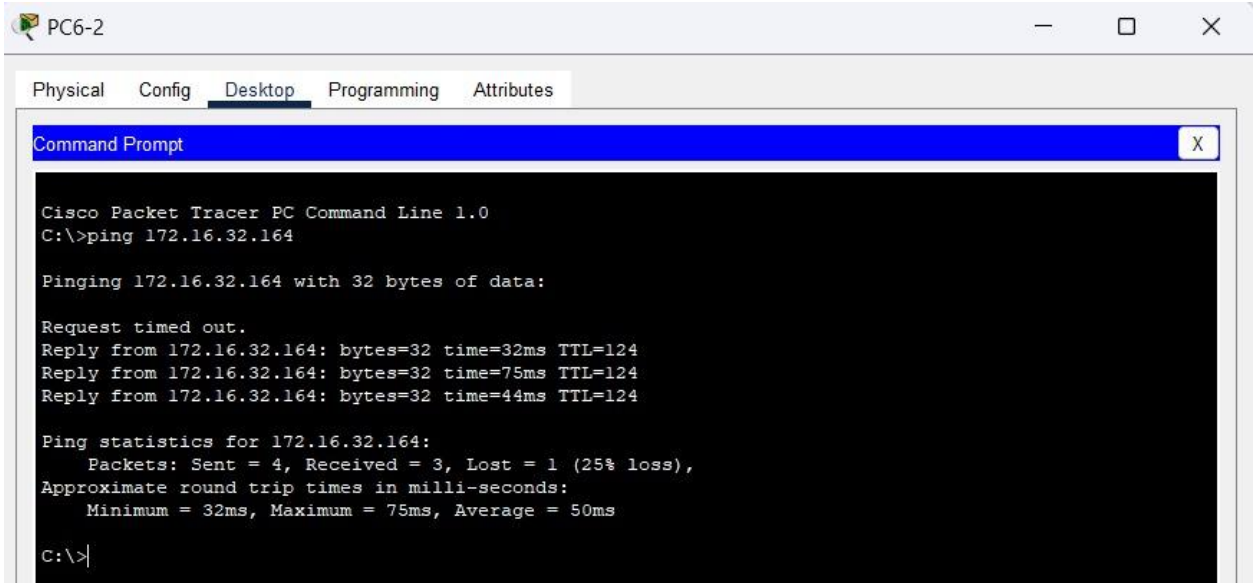
Ping statistics for 172.16.32.251:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 15ms, Maximum = 71ms, Average = 39ms

C:\>
C:\>ping 172.16.32.70

Pinging 172.16.32.70 with 32 bytes of data:

Reply from 172.16.32.70: bytes=32 time=30ms TTL=125
Reply from 172.16.32.70: bytes=32 time=9ms TTL=125
Reply from 172.16.32.70: bytes=32 time=28ms TTL=125
Reply from 172.16.32.70: bytes=32 time=47ms TTL=125

Ping statistics for 172.16.32.70:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 9ms, Maximum = 47ms, Average = 28ms
```



APPENDIX

MEETING MINUTES

MEETING 1



DATE	23 June 2023
TIME	2:00 PM - 4:00 PM
VENUE	Google meet
OBJECTIVE	<ol style="list-style-type: none">1. Read the task 5 questions and understand the needs.2. Update the topology by adding staff rooms.3. Update the addressing table and subnetting calculations.4. Distribute each lab for each member to update.
ATTENDANCE	4 / 4