Princess Sumaya University for Technology

King Abdullah II School of Engineering

Computer Engineering Department

Computer Networks Lab Report

22449

project

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First Semester 2024/2025

Abstract

In this project, Cisco Packet Tracer is used to design, configure, and implement a network architecture. The architecture includes: 11 PCs, a server, three ISR4331 routers, and three 2960 switches. Using VLANs, the network is logically divided to provide effective security and traffic control. For dynamic inter-VLAN routing, routing protocols like EIGRP were set up, and NAT and ACLs were put in place to offer safe external access. The project exhibits real-world expertise in network architecture, addressing, and security setups.

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Introduction

Reliable communication in modern networking depends on effective design and safe execution. Using Cisco Packet Tracer, this project mimics a real-world network environment with an emphasis on VLAN segmentation, routing protocol interconnection, and the use of access control for increased security. To satisfy organisational needs and enable scalable communication, the configuration takes care of several networking components, such as DHCP, NAT, and ACLs.

Objectives

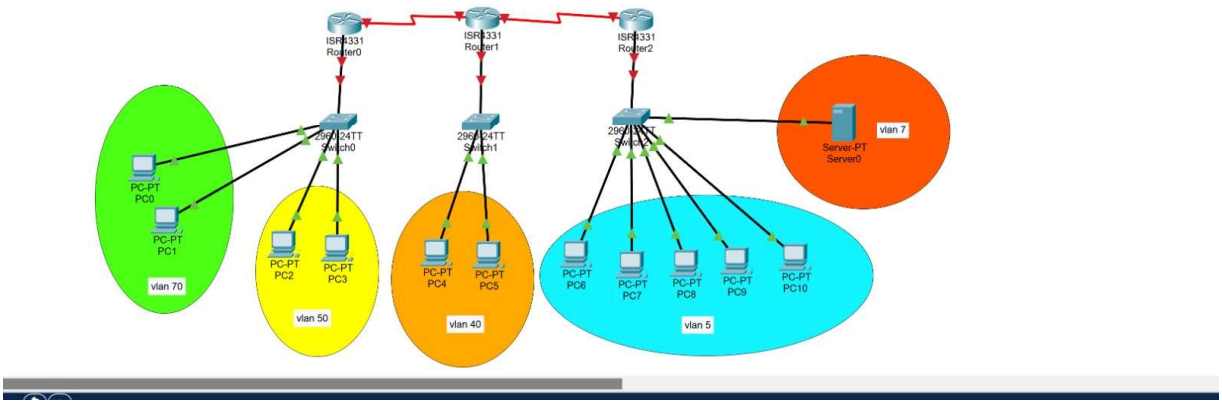
- Create a network topology that includes a server, 11 PCs, three routers, and three switches.
- Configuring VLANs to divide the network logically.
- Use EIGRP to set up inter-VLAN routing for dynamic connectivity.
- To automatically allocate IP addresses to particular VLANs, set up DHCP.
- To allow safe connection between private and public networks, configure NAT and PAT.
- Use ACLs to efficiently control traffic and prevent unwanted access.
- Verify connectivity and make sure the project's requirements are being followed.

Theory

Important networking concepts are applied in this project:
1. VLANs (Virtual LANs): Used to reduce broadcast domains and improve security by logically segmenting the network.
2. EIGRP (Enhanced Interior Gateway Routing Protocol): A link-state routing system that permits network-wide dynamic routing.
3. DHCP (Dynamic Host Configuration Protocol): By assigning IP addresses to devices dynamically, it makes IP address management easier.
4. NAT (Network Address Translation): By translating private and public IP addresses, it permits communication between them.
5. ACLs (Access Control Lists): Implement traffic filtering to uphold security regulations

Procedure and Discussions

Topology



Configurations

VLANs

Switch 0:

Connecting PC0 and PC1 to VLAN 70 aka Computer_ENG

Connecting PC2 and PC3 to VLAN 50 aka NIS_ENG

```
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 70
Switch(config-vlan)#name Computer_ENG
Switch(config-vlan)#exit
Switch(config)#vlan 50
Switch(config-vlan)#name NIS_ENG
Switch(config-vlan)#exit
Switch(config)#interface range fastethernet 0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 70
Switch(config-if-range)#exit
Switch(config)#interface range fastethernet 0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 50
Switch(config-if-range)#exit
Switch(config)#interface fastethernet 0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Then verified the configuration using show vlan brief

```
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gig0/1, Gig0/2
50   NIS_ENG                          active    Fa0/4, Fa0/5
70   Computer_ENG                     active    Fa0/2, Fa0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

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Switch1:

Connecting PC4 and PC5 to VLAN 40 aka IOT_ENG

```
Switch(config)#vlan 40
Switch(config-vlan)#name IOT_ENG
Switch(config-vlan)#exit
Switch(config)#interface range fastethernet 0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 40
Switch(config-if-range)#exit
Switch(config)#interface fastethernet 0/1
Switch(config-if)#switch mode trunk
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/4, Fa0/5, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                Fa0/24, Gig0/1, Gig0/2
40   IOT_ENG                          active    Fa0/1, Fa0/2, Fa0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

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Switch2:

Connecting PC6-PC10 to VLAN 5
Connecting SRV0 to VLAN 7

```
Switch>enable
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#valn 5
               ^
% Invalid input detected at '^' marker.

Switch(config)#vlan 5
Switch(config-vlan)#exit
Switch(config)#vlan 7
Switch(config-vlan)#exit
Switch(config)#interface fastethernet 0/2-6
                                      ^
% Invalid input detected at '^' marker.

Switch(config)#interface range fastethernet 0/2-6
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 5
Switch(config-if-range)#exit
Switch(config)#interface range fastethernet 0/7
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 7
Switch(config-if-range)#exit
Switch(config)#interface fastethernet 0/1
Switch(config-if)#switchport access trunk
                                    ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig0/1, Gig0/2
5    VLAN0005                          active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                                                 Fa0/6
7    VLAN0007                          active    Fa0/7
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

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Router Configuration

Router0:

Assigned the IP addresses in the router configuration

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface gigabitethernet 0/0/0.70
Router(config-subif)#encapsulation dot1Q 70
Router(config-subif)#ip address 70.0.0.1 255.0.0.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface gigabitethernet 0/0/0.50
Router(config-subif)#encapsulation dot1Q 50
Router(config-subif)#ip address 50.0.0.1 255.0.0.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 205.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#
```

Router1:

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface gigabitethernet 0/0/0.40
Router(config-subif)#encapsulation dot1Q 40
Router(config-subif)#ip address 40.0.0.1
% Incomplete command.
Router(config-subif)#ip address 40.0.0.1 255.0.0.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 205.0.0.2 255.0.0.0
Router(config-if)#no shutdaown
                          ^
% Invalid input detected at '^' marker.

Router(config-if)#no shutdown
```

```
Router(config-if)#interface gigabitethernet 0/0/0
Router(config-if)#ip address 51.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface serial 0/1/1
Router(config-if)#ip address 203.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#exit
Router(config)#
```

Router2:

```
Router(config)#interface gigabitethernet 0/0/0.5
Router(config-subif)#encapsulation dot1Q 5
Router(config-subif)#ip address 172.16.5.1 255.255.255.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface gigabitethernet 0/0/0.7
Router(config-subif)#ip address 172.16.7.1 255.255.255.0

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

Router(config-subif)#interface gigabitethernet 0/0/0.7
Router(config-subif)#encapsulation dot1Q 7
Router(config-subif)#ip address 172.16.7.1 255.255.255.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface serial 0/1/1 203.0.0.2 255.0.0.0
                                       ^
% Invalid input detected at '^' marker.

Router(config)#interface serial 0/1/1
Router(config-if)#ip address 203.0.0.2 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#exit
Router(config)#interface gigabitethernet 0/0/0
Router(config-if)#no shutdown
```

```
Router(config-if)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 203.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
```

DHCP

Configured router0 as DHCP server for both VLAN 70 and VLAN 50

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp excluded-address 70.0.0.1
Router(config)#ip dhcp excluded-address 50.0.0.1
Router(config)#ip dhcp pool Computer_ENG
Router(dhcp-config)#network 70.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 70.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#ip dhcp pool NIS_ENG
Router(dhcp-config)#network 50.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 50.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#service dhcp
Router(config)#
```

Verified configuration using show ip dhcp pool

```
Router#show ip dhcp pool

Pool Computer_ENG :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 16777214
 Leased addresses               : 0
 Excluded addresses             : 2
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                  Leased/Excluded/Total
 70.0.0.1             70.0.0.1        - 70.255.255.254    0    / 2     / 16777214

Pool NIS_ENG :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 16777214
 Leased addresses               : 0
 Excluded addresses             : 2
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                  Leased/Excluded/Total
 50.0.0.1             50.0.0.1        - 50.255.255.254    0    / 2     / 16777214
Router#
```

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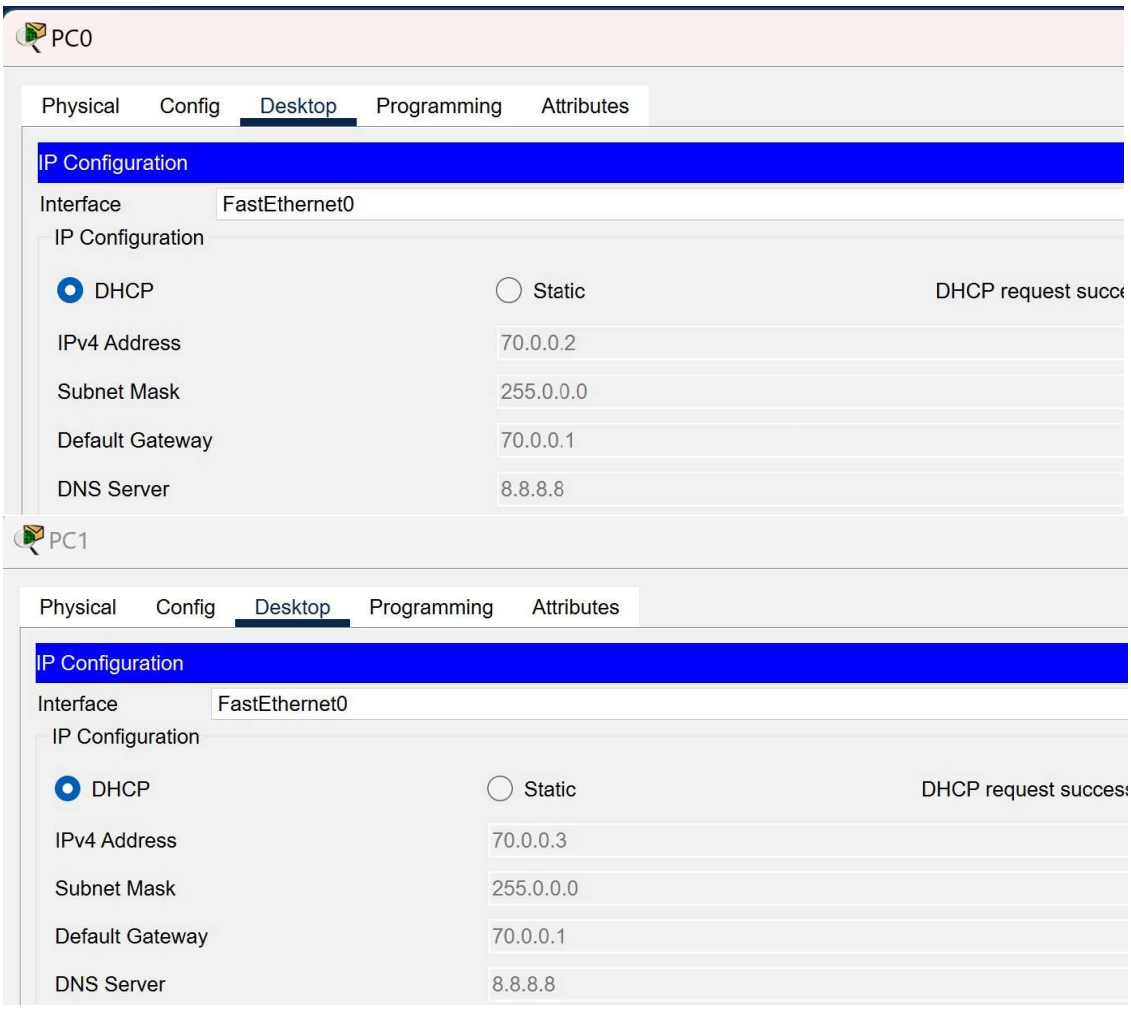
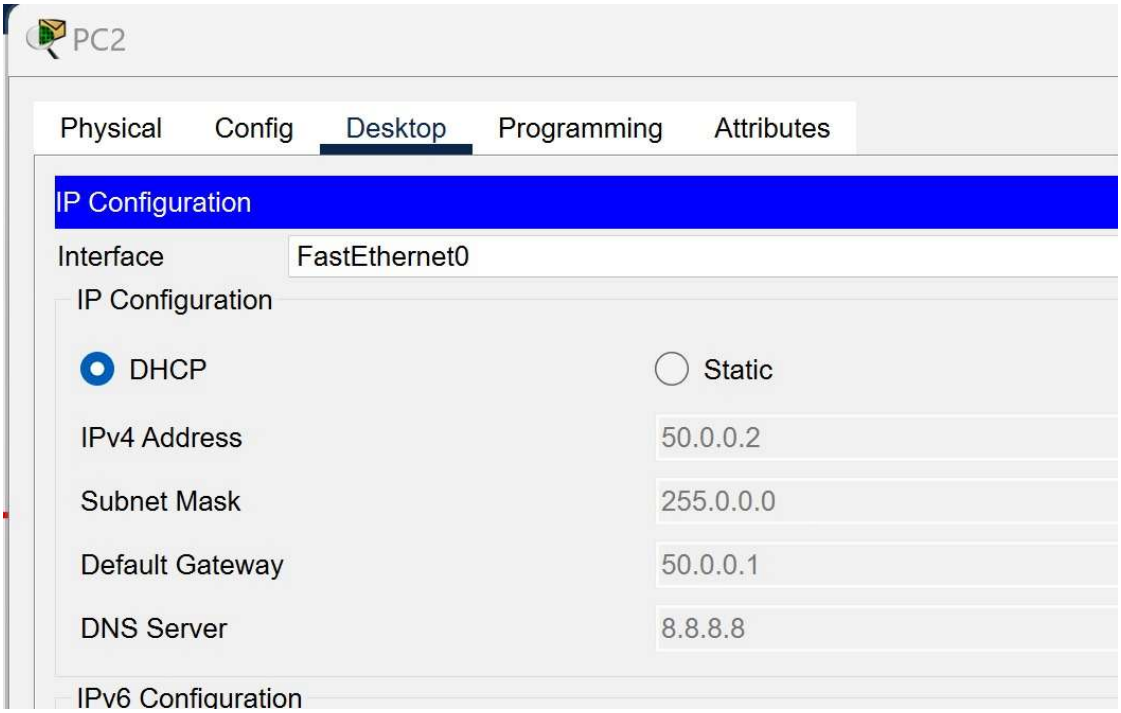
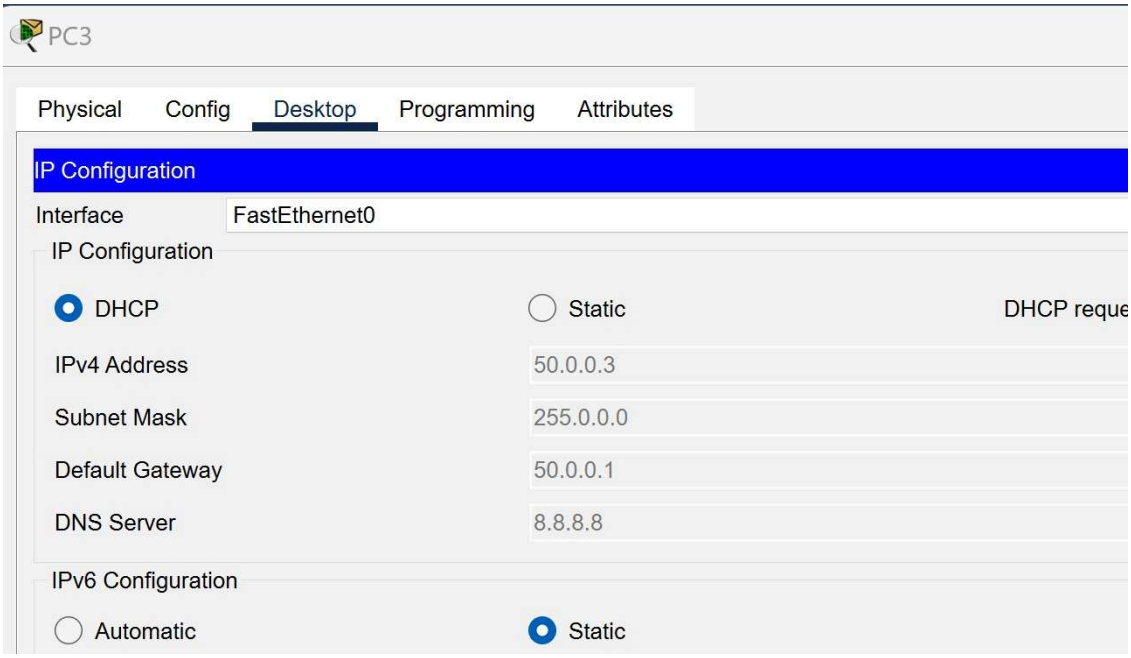
PC IP addresses

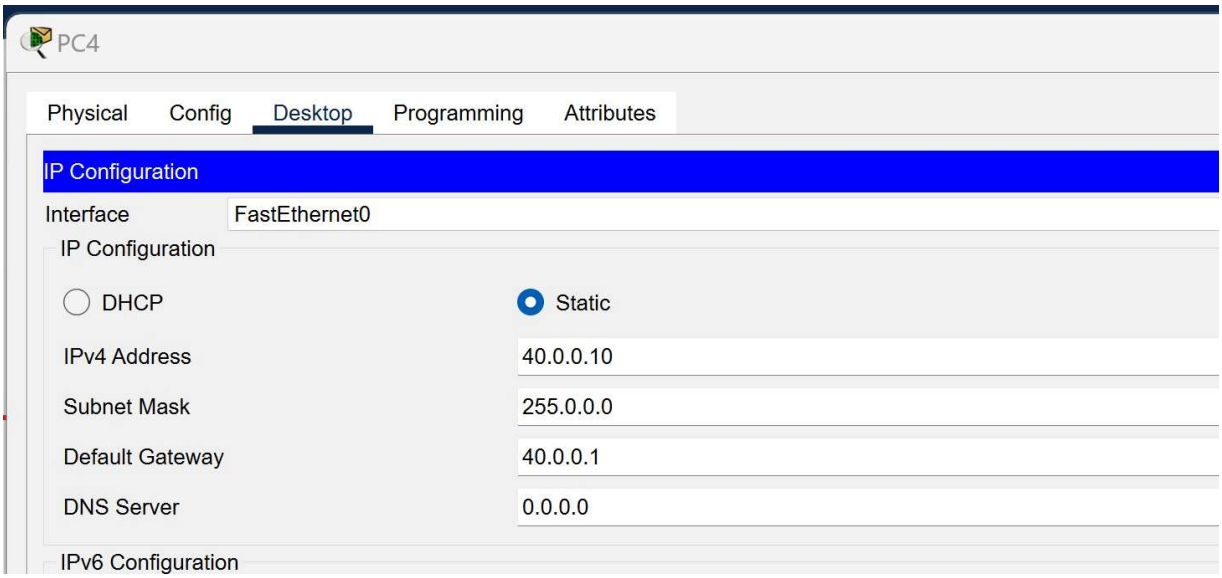
PC0 – PC3

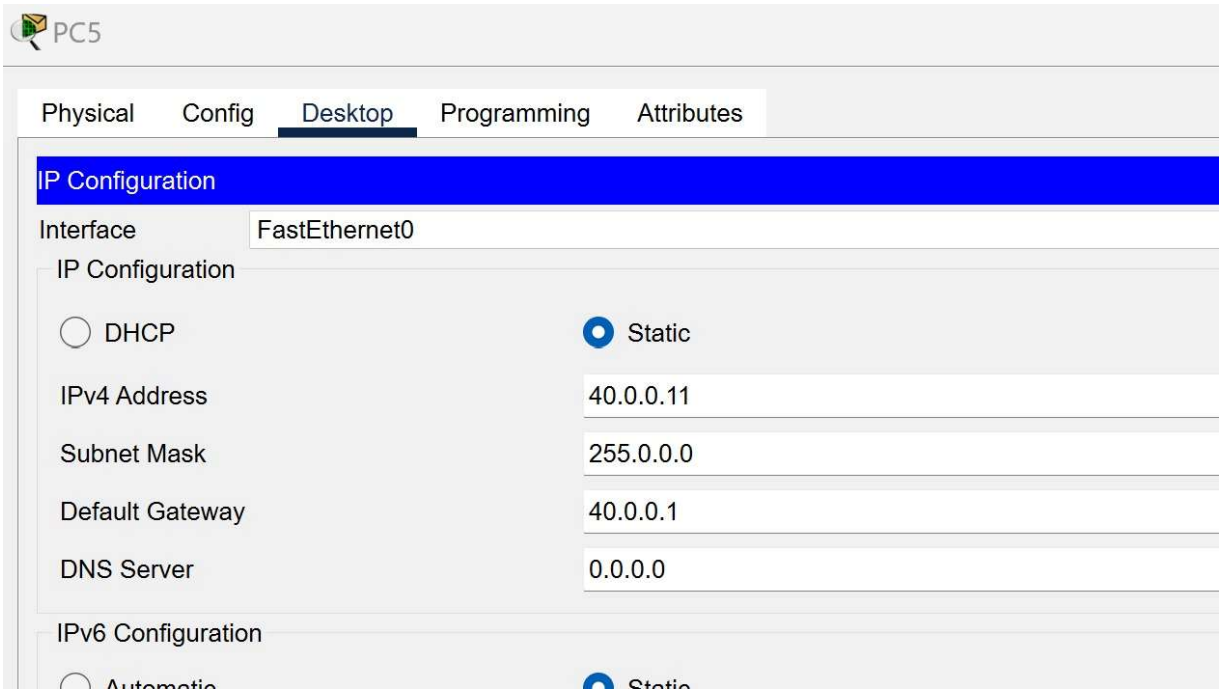


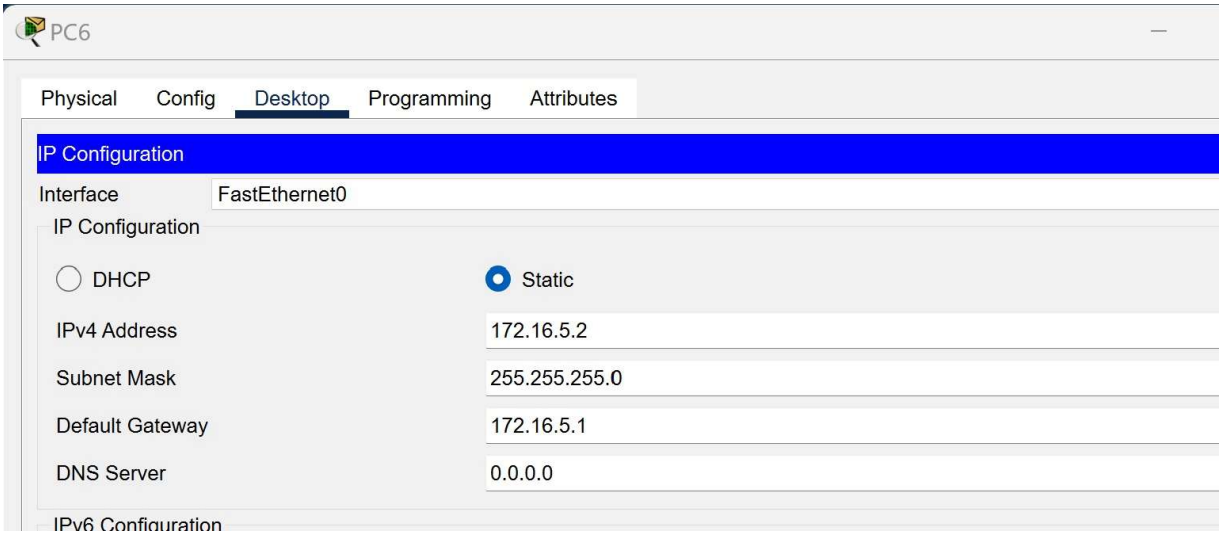

PC2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
50.0.0.2
Subnet Mask
255.0.0.0
Default Gateway
50.0.0.1
DNS Server
8.8.8.8
IPv6 Configuration

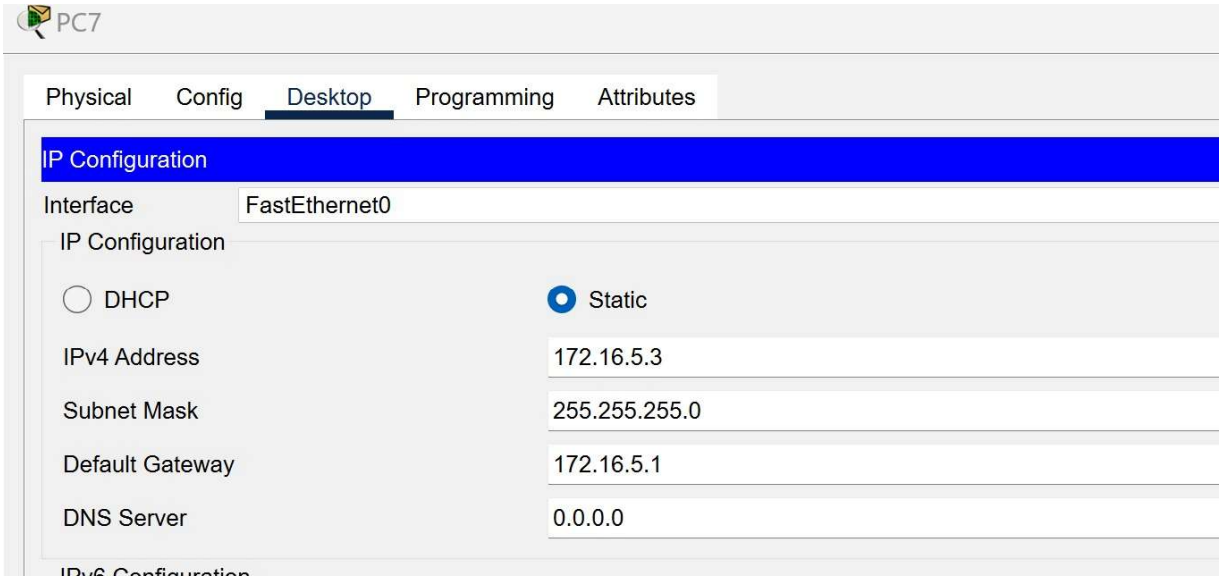

PC3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP reque
IPv4 Address
50.0.0.3
Subnet Mask
255.0.0.0
Default Gateway
50.0.0.1
DNS Server
8.8.8.8
IPv6 Configuration
Automatic
Static

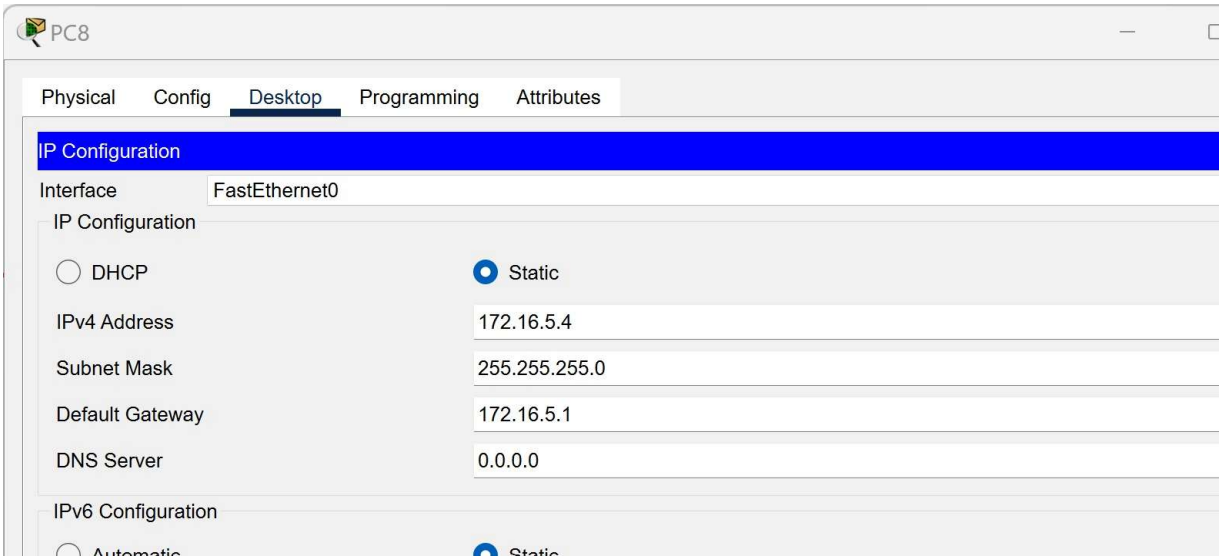
PC4 – PC10 + SRV0

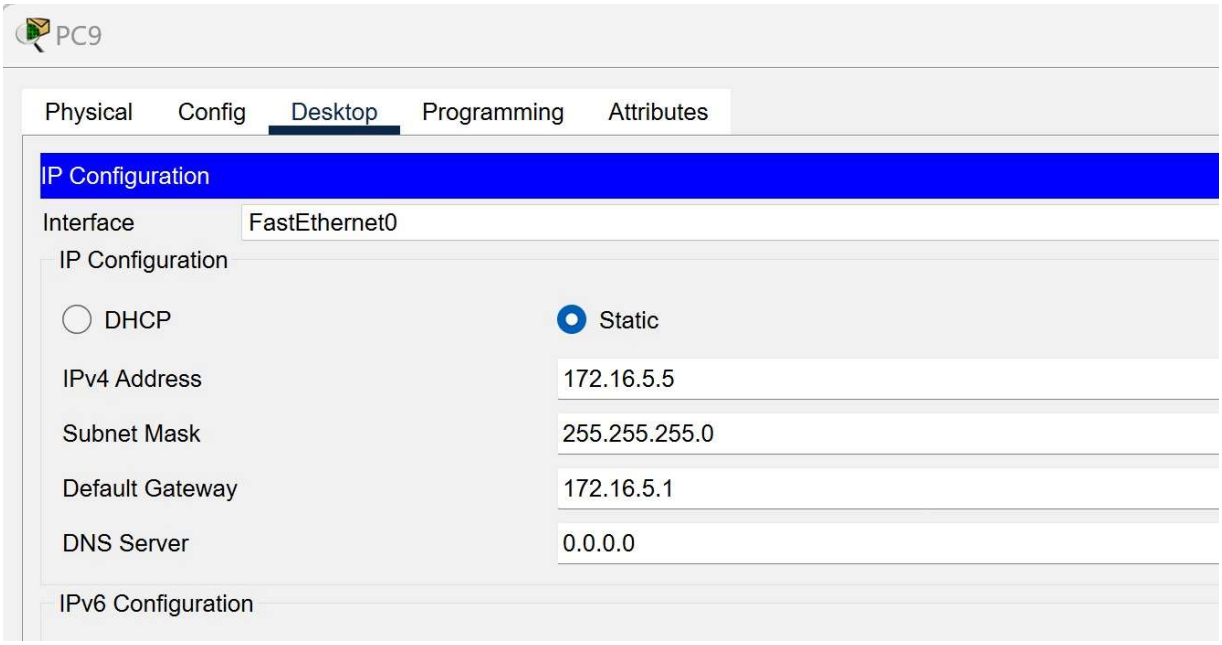


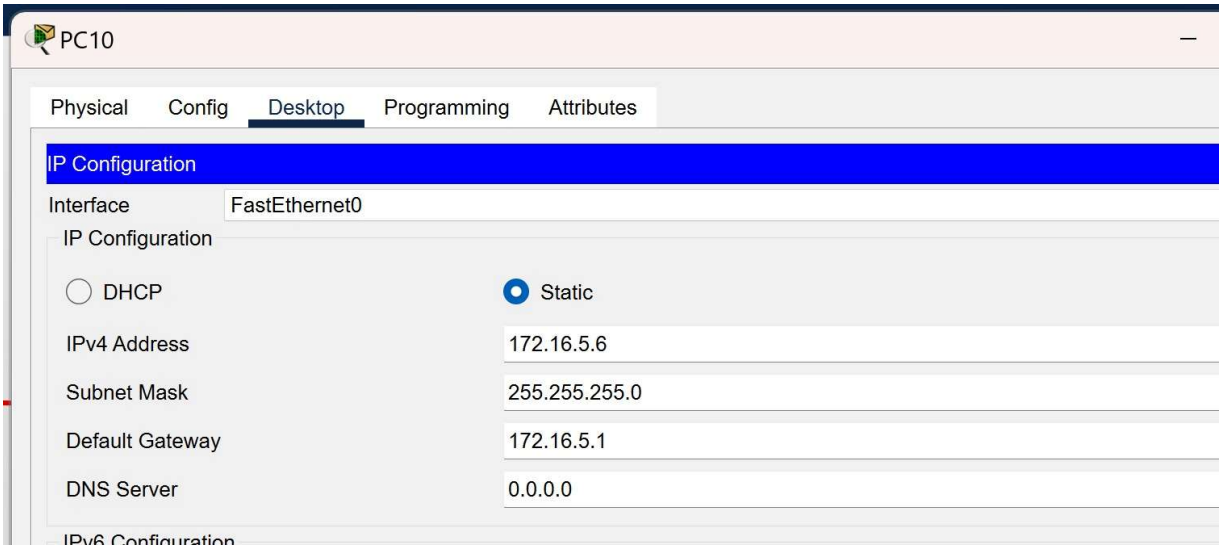


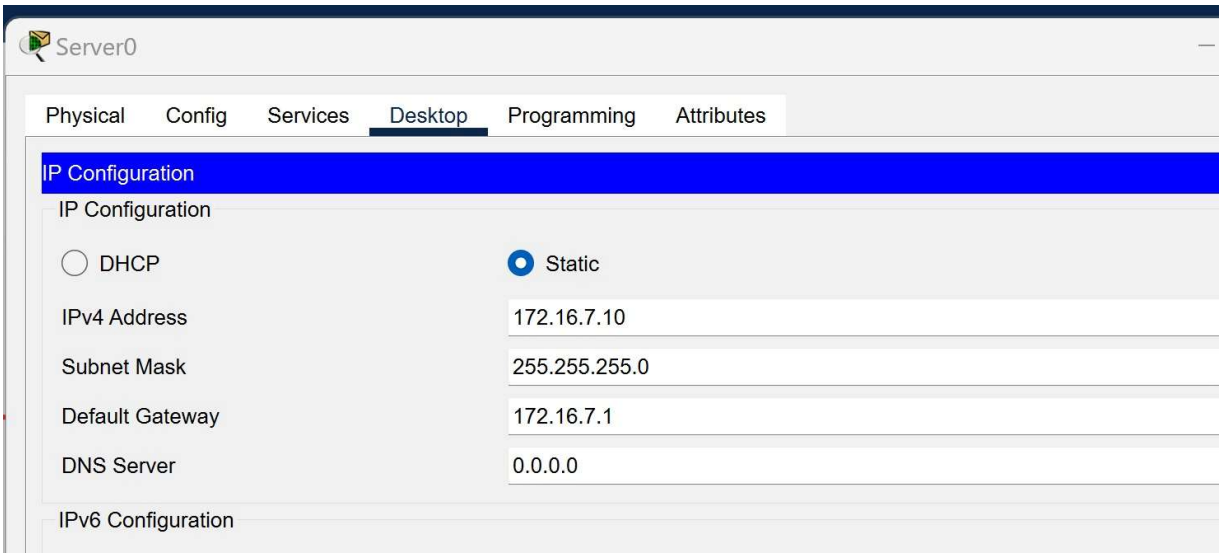

PC6
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
172.16.5.2
Subnet Mask
255.255.255.0
Default Gateway
172.16.5.1
DNS Server
0.0.0.0
IPv6 Configuration


PC7
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
172.16.5.3
Subnet Mask
255.255.255.0
Default Gateway
172.16.5.1
DNS Server
0.0.0.0


PC8
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
172.16.5.4
Subnet Mask
255.255.255.0
Default Gateway
172.16.5.1
DNS Server
0.0.0.0
IPv6 Configuration


PC9
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
172.16.5.5
Subnet Mask
255.255.255.0
Default Gateway
172.16.5.1
DNS Server
0.0.0.0
IPv6 Configuration


PC10
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
172.16.5.6
Subnet Mask
255.255.255.0
Default Gateway
172.16.5.1
DNS Server
0.0.0.0


Server0
Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IPv4 Address
172.16.7.10
Subnet Mask
255.255.255.0
Default Gateway
172.16.7.1
DNS Server
0.0.0.0
IPv6 Configuration

Routing Protocol (EIGRP)

Configuring EIGRP on the 3 routers excluding private network

Router0:

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 1
Router(config-router)#network 70.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#network 205.0.0.0
Router(config-router)#exit
Router(config)#show ip route
                ^
% Invalid input detected at '^' marker.

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: L - local, C - connected, S - static, 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

     50.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       50.0.0.0/8 is directly connected, GigabitEthernet0/0/0.50
L       50.0.0.1/32 is directly connected, GigabitEthernet0/0/0.50
     70.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       70.0.0.0/8 is directly connected, GigabitEthernet0/0/0.70
L       70.0.0.1/32 is directly connected, GigabitEthernet0/0/0.70
C    205.0.0.0/8 is directly connected, Serial0/1/0
     205.0.0.0/32 is subnetted, 1 subnets
L       205.0.0.1/32 is directly connected, Serial0/1/0

Router#
```

Copy Pa

Router1:

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 1
Router(config-router)#network 205.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 205.0.0.1 (Serial0/1/0) is up: new adjacency

Router(config-router)#network 40.0.0.0
Router(config-router)#network 203.0.0.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: L - local, C - connected, S - static, 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

     40.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       40.0.0.0/8 is directly connected, GigabitEthernet0/0/0.40
L       40.0.0.1/32 is directly connected, GigabitEthernet0/0/0.40
D    50.0.0.0/8 [90/2172416] via 205.0.0.1, 00:01:01, Serial0/1/0
     51.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       51.0.0.0/8 is directly connected, GigabitEthernet0/0/0
L       51.0.0.1/32 is directly connected, GigabitEthernet0/0/0
D    70.0.0.0/8 [90/2172416] via 205.0.0.1, 00:01:01, Serial0/1/0
C    203.0.0.0/8 is directly connected, Serial0/1/1
     203.0.0.0/32 is subnetted, 1 subnets
L       203.0.0.1/32 is directly connected, Serial0/1/1
C    205.0.0.0/8 is directly connected, Serial0/1/0
 --More--
```

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Router2:

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 1
Router(config-router)#network 203.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 203.0.0.1 (Serial0/1/0) is up: new adjacency

Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: L - local, C - connected, S - static, 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

D    40.0.0.0/8 [90/2172416] via 203.0.0.1, 00:00:12, Serial0/1/0
D    50.0.0.0/8 [90/2684416] via 203.0.0.1, 00:00:12, Serial0/1/0
D    70.0.0.0/8 [90/2684416] via 203.0.0.1, 00:00:12, Serial0/1/0
     172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.16.5.0/24 is directly connected, GigabitEthernet0/0/0.5
L       172.16.5.1/32 is directly connected, GigabitEthernet0/0/0.5
C       172.16.7.0/24 is directly connected, GigabitEthernet0/0/0.7
L       172.16.7.1/32 is directly connected, GigabitEthernet0/0/0.7
C    203.0.0.0/8 is directly connected, Serial0/1/0
     203.0.0.0/32 is subnetted, 1 subnets
L       203.0.0.2/32 is directly connected, Serial0/1/0
D    205.0.0.0/8 [90/2681856] via 203.0.0.1, 00:00:12, Serial0/1/0
 --More--
```

Hostname

Router0:

```
Router(config)#hostname yara
yara(config)#
```

Switch0:

```
Switch(config)#hostname bahaa
bahaa(config)#
```

Passwords

Enable:

```
yara(config)#enable secret proj
yara(config)#
```

```
Switch(config)#hostname bahaa
bahaa(config)#enable secret proj
bahaa(config)#
```

Console:

```
yara(config)#line console 0
yara(config-line)#password proj
yara(config-line)#login
yara(config-line)#exit
yara(config)#
```

```
bahaa(config)#line console 0
bahaa(config-line)#password proj
bahaa(config-line)#login
bahaa(config-line)#exit
bahaa(config)#
```

VTY:

```
yara(config)#line vty 0 4
yara(config-line)#password proj
yara(config-line)#login
yara(config-line)#exit
yara(config)#
```

```
bahaa(config)#line vty 0 4
bahaa(config-line)#password proj
bahaa(config-line)#login
bahaa(config-line)#exite
                   ^
% Invalid input detected at '^' marker.

bahaa(config-line)#exit
bahaa(config)#
```

Telnet Configuration

Making the switch accessible for remote configuration from other VLANs in the topology

```
Switch>
Switch>enable
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#line vty 0 4
Switch(config-line)#transport input telnet
Switch(config-line)#password proj
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#
```

NAT

Configured static NAT on server SV0 using router public IP as its own while making it's IP private

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip nat inside source static 172.16.7.10 203.0.0.2
Router(config)#interface gigabitehternet 0/0/0.7
                                 ^
% Invalid input detected at '^' marker.

Router(config)#interface gigabitethernet 0/0/0.7
Router(config-subif)#ip nat insaide
                                ^
% Invalid input detected at '^' marker.

Router(config-subif)#ip nat inside
Router(config-subif)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
```

PAT

ALL PCs in VLAN 5 use PAT for communication with other networks with the public IP 182.40.0.4, On router 2 we did the following

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip nat pool proj 182.40.0.4 182.40.0.4 netmask 255.255.255.255
Router(config)#access-list 5 permit 172.16.5.0 0.0.0.255
Router(config)#ip nat inside source list 5 pool proj overload
Router(config)#interface g0/0/0.5
Router(config-subif)#ip nat inside
Router(config-subif)#exit
Router(config)#interface s0/1/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
```

Verification

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 70.0.0.2

Pinging 70.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 70.0.0.2: bytes=32 time=2ms TTL=125
Reply from 70.0.0.2: bytes=32 time=17ms TTL=125
Reply from 70.0.0.2: bytes=32 time=17ms TTL=125

Ping statistics for 70.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 17ms, Average = 12ms

C:\>
```

Standard ACL

First we configured a numbered standard ACL which denied PC$ from accessing VLAN 70, on router0 aka Yara we did the following

```
yara>enable
Password:
yara#config t
Enter configuration commands, one per line.  End with CNTL/Z.
yara(config)#access-list 1 deny host 40.0.0.10
yara(config)#access-list permit any
                         ^
% Invalid input detected at '^' marker.

yara(config)#access-list 1 permit any
yara(config)#interface gigabitethernet 0/0/0.70
yara(config-subif)#ip access-group 1 out
yara(config-subif)#exit
yara(config)#
```

Verification

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 70.0.0.3

Pinging 70.0.0.3 with 32 bytes of data:

Reply from 205.0.0.1: Destination host unreachable.
Reply from 205.0.0.1: Destination host unreachable.
Reply from 205.0.0.1: Destination host unreachable.
Reply from 205.0.0.1: Destination host unreachable.

Ping statistics for 70.0.0.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

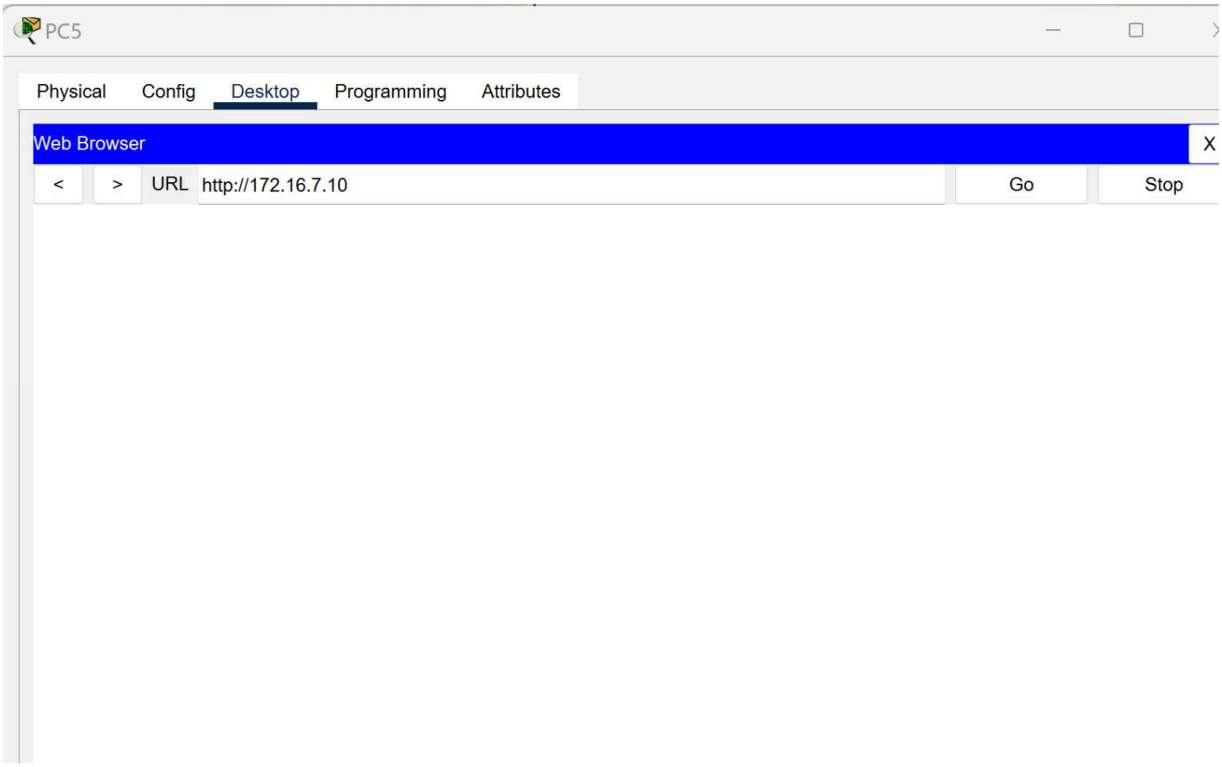
Extended ACL

Next we configured a named extended ACL which denies PC5 to access HTTP/HTTPS service form the server

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip access-list extended NOHTTP
Router(config-ext-nacl)#deny tcp host 40.0.0.11 host 172.16.7.10 eq 80
Router(config-ext-nacl)#deny tcp host 40.0.0.11 host 172.16.7.10 eq 443
Router(config-ext-nacl)#premit ip any any
                        ^
% Invalid input detected at '^' marker.

Router(config-ext-nacl)#permit ip any any
```

```
Router(config)#interface serial 0/1/1
Router(config-if)#ip access-group NOHTTP in
Router(config-if)#
```



Conclusions

This project effectively put into practice a network topology that complied with all requirements. VLANs were used for logical network segmentation, EIGRP was used for dynamic routing, and ACLs and NAT configurations were used for network security. ACLs were used to enforce access limits, while DHCP made managing IP addresses easier. The project exhibits a thorough comprehension of security protocols, addressing, routing, and network design.

References

Slides on E-learning