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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI TEKNOLOGI MAKLUMAT DAN KOMUNIKASI

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BITS 2343 COMPUTER NETWORK

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1.0 Introduction

This mini project requires a simulation network to be developed according to the specified requirements. To develop and test the network, the software Packet Tracer was used. A website called draw.net which provides free diagram software online was used to draw the complete network schematic diagram. In the following chapters, a summary will be given to address the successes and failures of the mini project and the topology diagram and addressing table will also be discussed. Furthermore, the final router and switch configurations as well as proof that each requirement was met will be provided.

2.0 Summary

The aim for this mini project is to develop a simulated network with many different configurations. These configurations include access control lists, VLANs and dynamically assigned Internet Protocol (IP) addresses through the specified DHCP servers. Although there were many errors made throughout the development of the network, all requirements were met successfully.

All devices were assigned with IP address blocks as specified, VLANs were configured and switch ports were assigned to those VLANs. Next, routers were configured for InterVLAN routing and with suitable routing protocol and Access Control List (ACL). Moreover, DHCP servers were configured for the network. Finally, Web Server, DNS server and the Mail Server were also configured in addition to customising the homepage.

3.0 Topology Diagram and Addressing Table

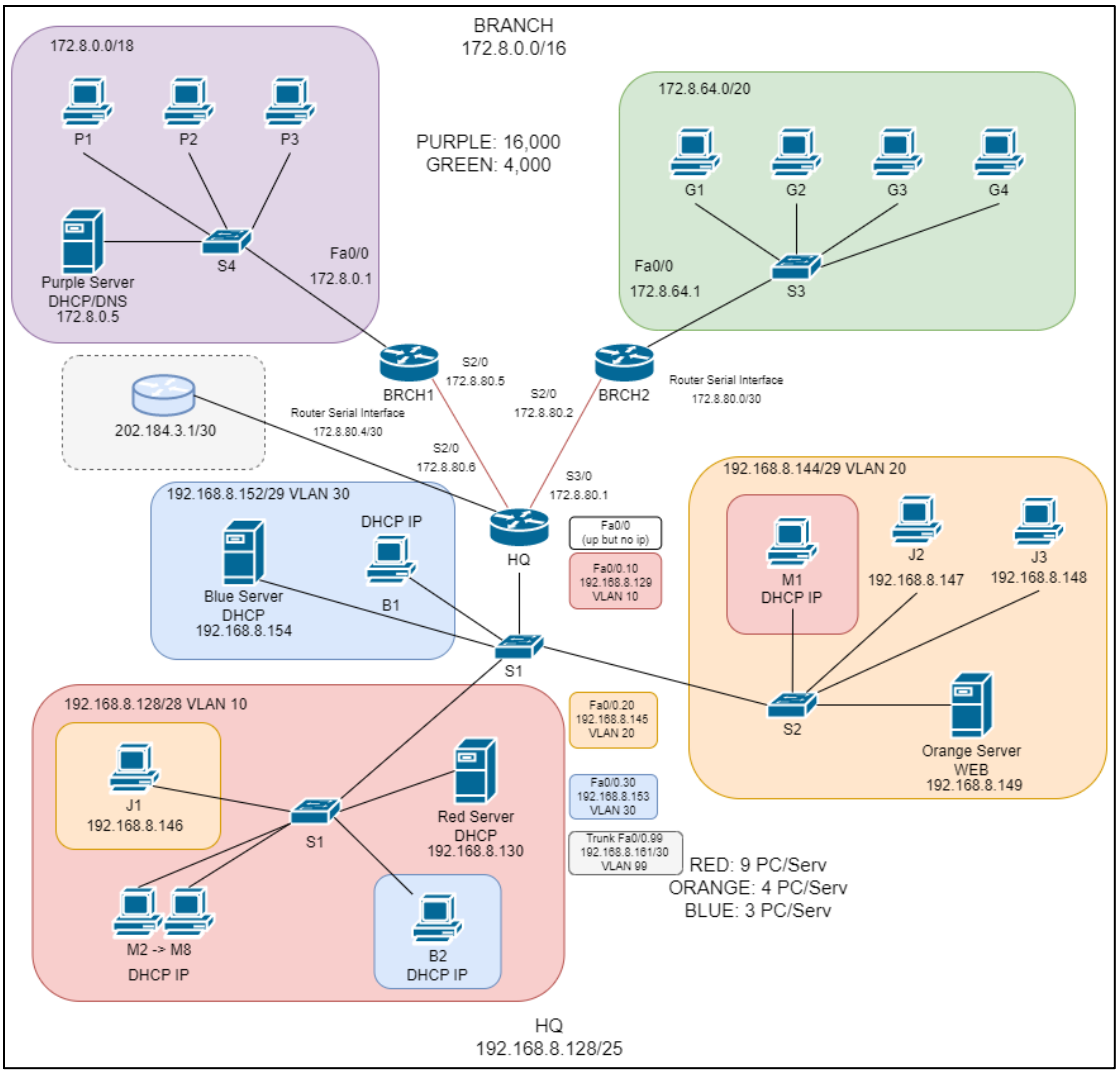


Figure 3.1: The Topology Diagram with Corresponding Addresses

Device	Interface	IP Address	Subnet Mask	Default
BRCH1	Fa0/0	172.8.0.1	255.255.192.0	N/A
	S2/0	172.8.80.5	255.255.255.252	N/A
BRCH2	Fa0/0	172.8.64.1	255.255.240.0	N/A
	S2/0	172.8.80.2	255.255.255.252	N/A
HQ	Fa0/0	N/A	N/A	N/A
	Fa0/0.10	192.168.8.129	255.255.255.240	N/A
	Fa0/0.20	192.168.8.145	255.255.255.248	N/A
	Fa0/0.30	192.168.8.153	255.255.255.248	N/A
	Fa0/0.99	192.168.8.161	255.255.255.252	N/A
	S2/0	172.8.80.1	255.255.255.252	N/A
	S3/0	172.8.80.6	255.255.255.252	N/A
Red Server	Fa0/1	192.168.8.130	255.255.255.240	192.168.8.129
M1	Fa0/2	DHCP Assigned	255.255.255.240	192.168.8.129
M2	Fa0/3	DHCP Assigned	255.255.255.240	192.168.8.129
M3	Fa0/4	DHCP Assigned	255.255.255.240	192.168.8.129
M4	Fa0/5	DHCP Assigned	255.255.255.240	192.168.8.129
M5	Fa0/6	DHCP Assigned	255.255.255.240	192.168.8.129
M6	Fa0/7	DHCP Assigned	255.255.255.240	192.168.8.129
M7	Fa0/8	DHCP Assigned	255.255.255.240	192.168.8.129
M8	Fa0/9	DHCP Assigned	255.255.255.240	192.168.8.129
Orange Server	Fa0/11	192.168.8.149	255.255.255.248	192.168.8.145
J1	Fa0/12	192.168.8.146	255.255.255.248	192.168.8.145
J2	Fa0/13	192.168.8.147	255.255.255.248	192.168.8.145
J3	Fa0/14	192.168.8.148	255.255.255.248	192.168.8.145
Blue Server	Fa0/16	192.168.8.154	255.255.255.248	192.168.8.153
B1	Fa0/17	DHCP Assigned	255.255.255.248	192.168.8.153
B2	Fa0/18	DHCP Assigned	255.255.255.248	192.168.8.153

Purple Server	Fa0/2	172.8.0.5	255.255.192.0	172.8.0.1
P1	Fa0/3	DHCP Assigned	255.255.192.0	172.8.0.1
P2	Fa0/4	DHCP Assigned	255.255.192.0	172.8.0.1
P3	Fa0/5	DHCP Assigned	255.255.192.0	172.8.0.1
G1	Fa0/2	DHCP Assigned	255.255.240.0	172.8.64.1
G2	Fa0/3	DHCP Assigned	255.255.240.0	172.8.64.1
G3	Fa0/4	DHCP Assigned	255.255.240.0	172.8.64.1
G4	Fa0/5	DHCP Assigned	255.255.240.0	172.8.64.1
Loopback	Loopback0	202.184.3.1	255.255. 255.252	N/A

Table 3.1: Addressing Table

4.0 Routers and Switch Final Configuration

4.1 Router Configuration

This mini project has required a lot of configurations to be done at both layer three and layer two devices. In this mini project the routers used were Router-PT and ports were added for the serial connections. The switches used were 2960-4TT. Shown below, are the final configurations for the routers HQ, BRCH1 and BRCH2 as well as switches S01, S1 and S2.

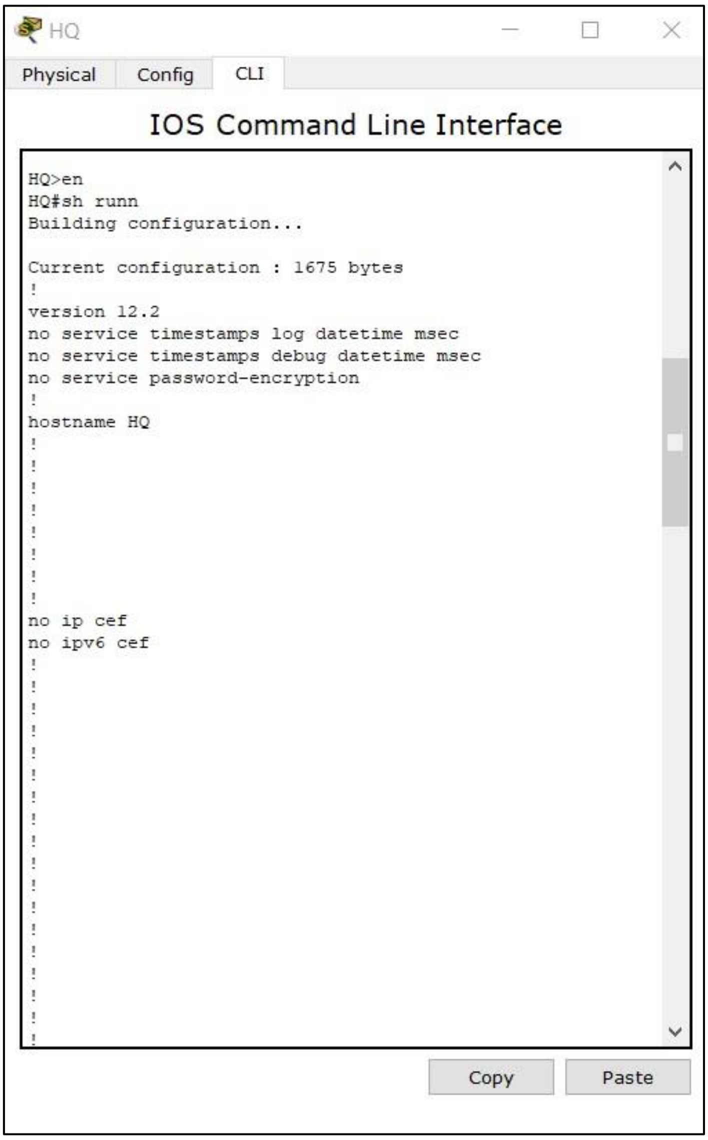
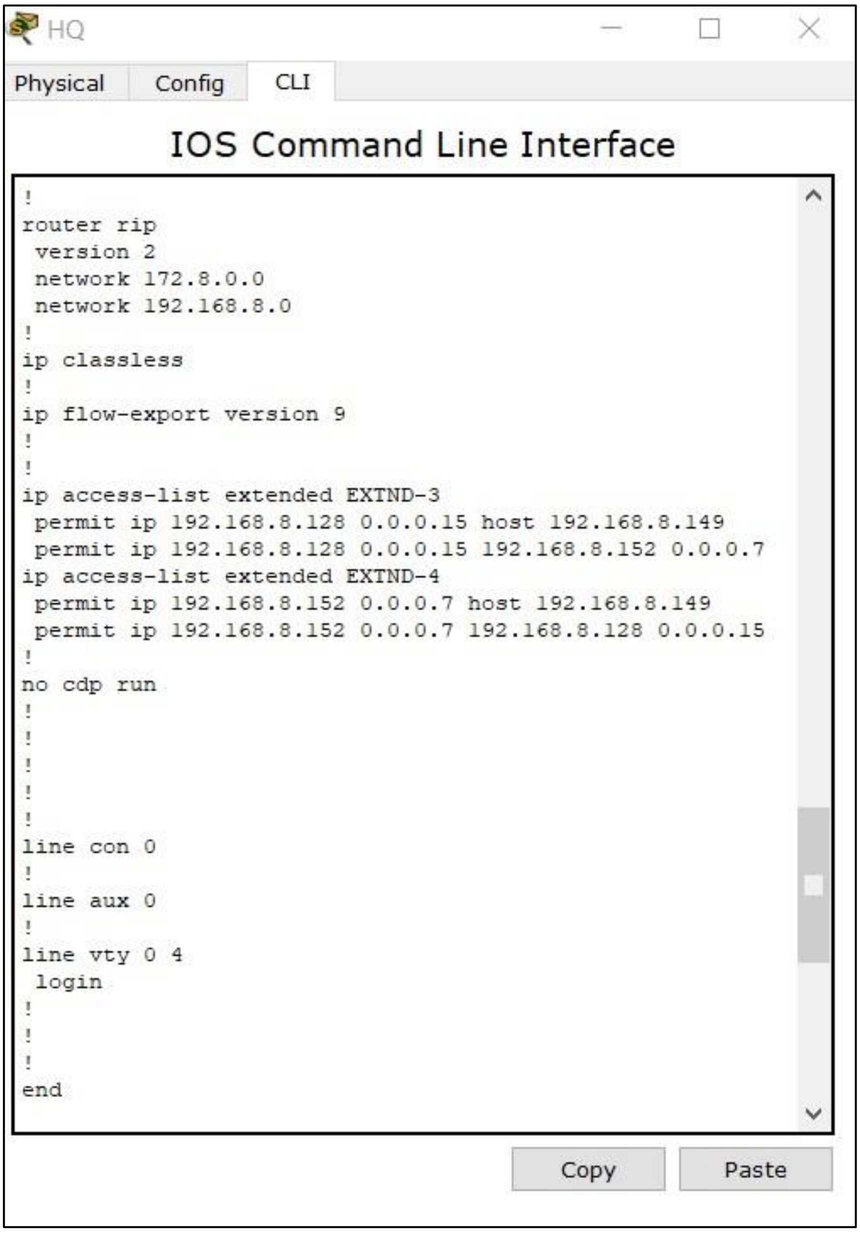


Figure 4.01: Final HQ Router Configuration Part 1

Figure 4.02: Final HQ Router Configuration Part 2




```
!
router rip
 version 2
 network 172.8.0.0
 network 192.168.8.0
!
ip classless
!
ip flow-export version 9
!
!
ip access-list extended EXTND-3
 permit ip 192.168.8.128 0.0.0.15 host 192.168.8.149
 permit ip 192.168.8.128 0.0.0.15 192.168.8.152 0.0.0.7
ip access-list extended EXTND-4
 permit ip 192.168.8.152 0.0.0.7 host 192.168.8.149
 permit ip 192.168.8.152 0.0.0.7 192.168.8.128 0.0.0.15
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Figure 4.03: Final HQ Router Configuration Part 3

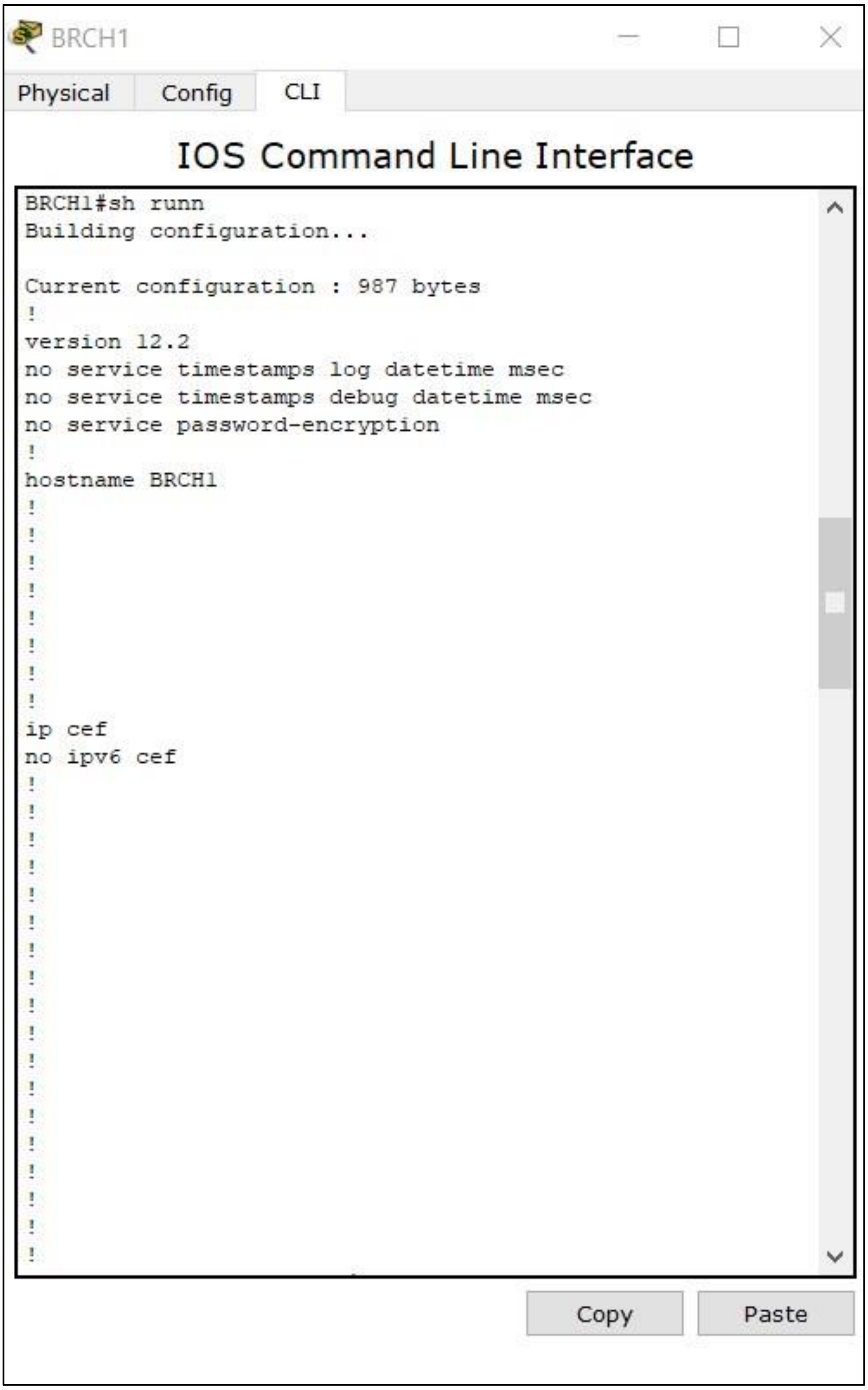


Figure 4.04: Final BRCH1 Router Configuration Part 1


```
interface FastEthernet0/0
 ip address 172.8.0.1 255.255.192.0
 ip access-group EXTND-1 in
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 172.8.80.5 255.255.255.252
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
 version 2
 network 172.8.0.0
 network 192.168.8.0
 no auto-summary
```

Figure 4.05: Final BRCH1 Router Configuration Part 2

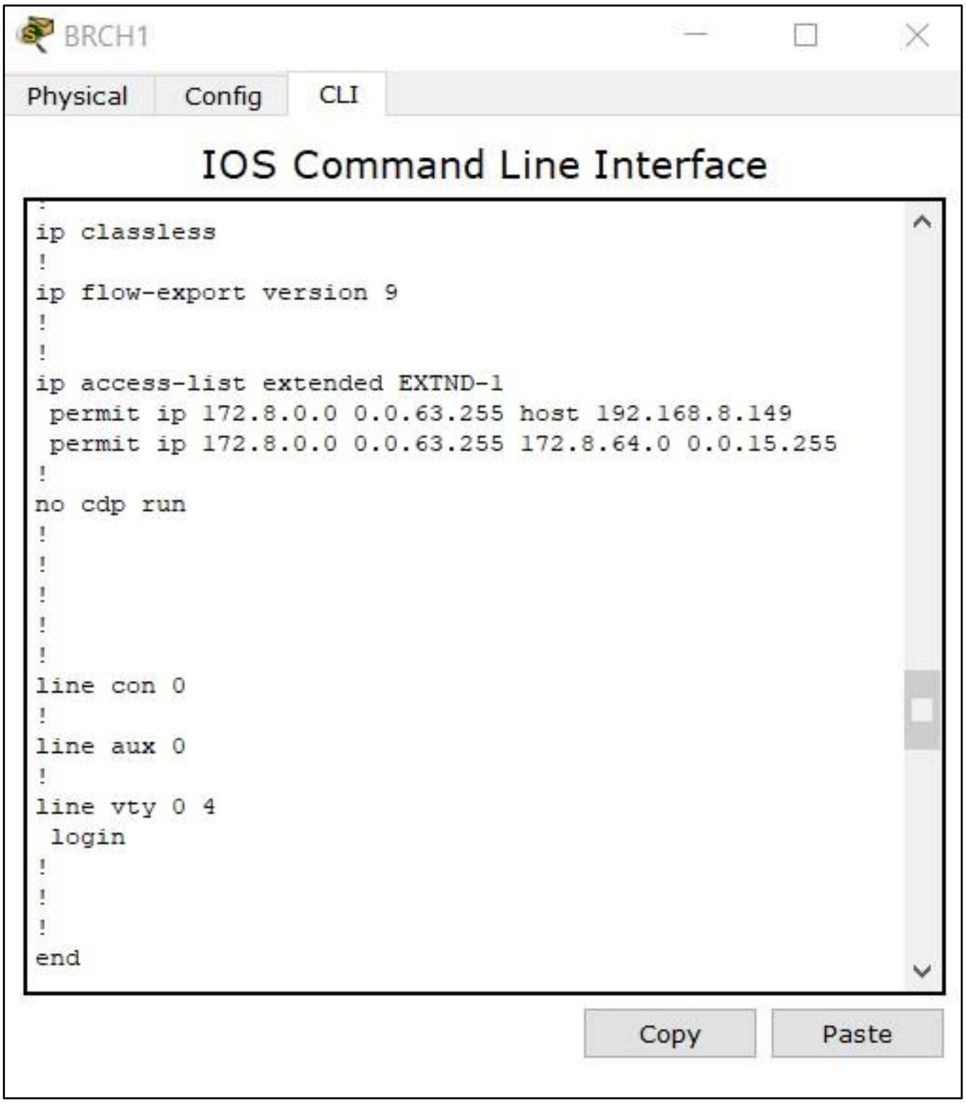


Figure 4.06: Final BRCH1 Router Configuration Part 3

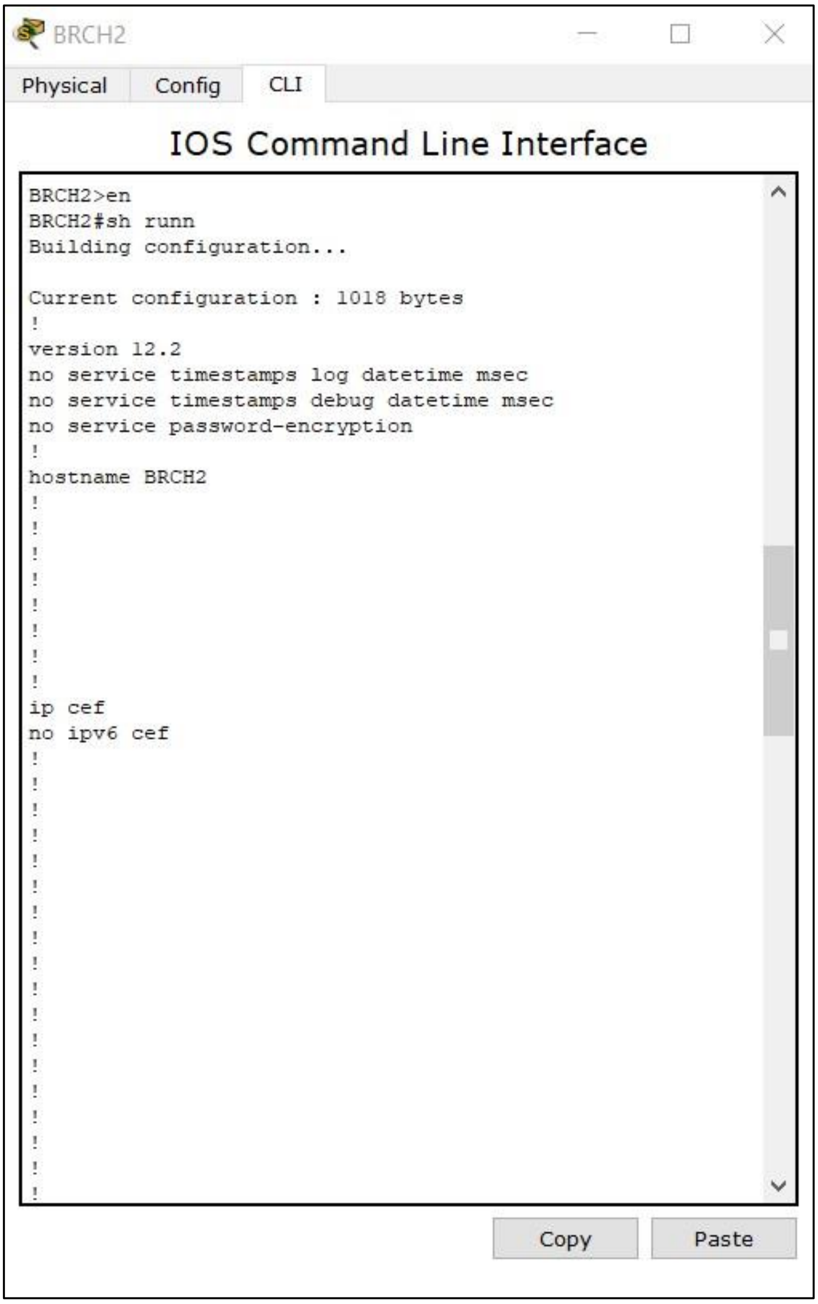
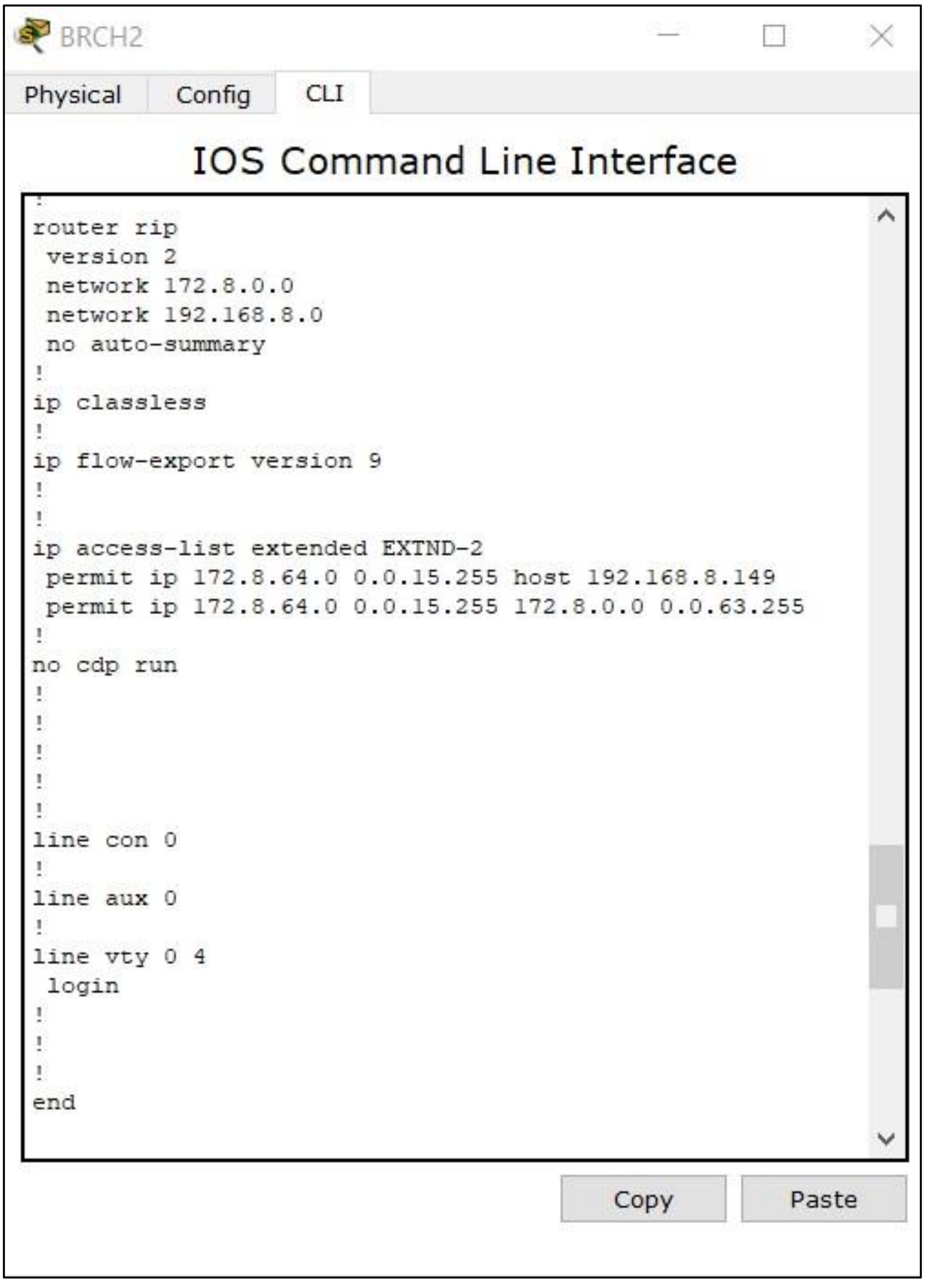


Figure 4.07: Final BRCH2 Router Configuration Part 1

Figure 4.08: Final BRCH2 Router Configuration Part 2



BRCH2

Physical Config CLI

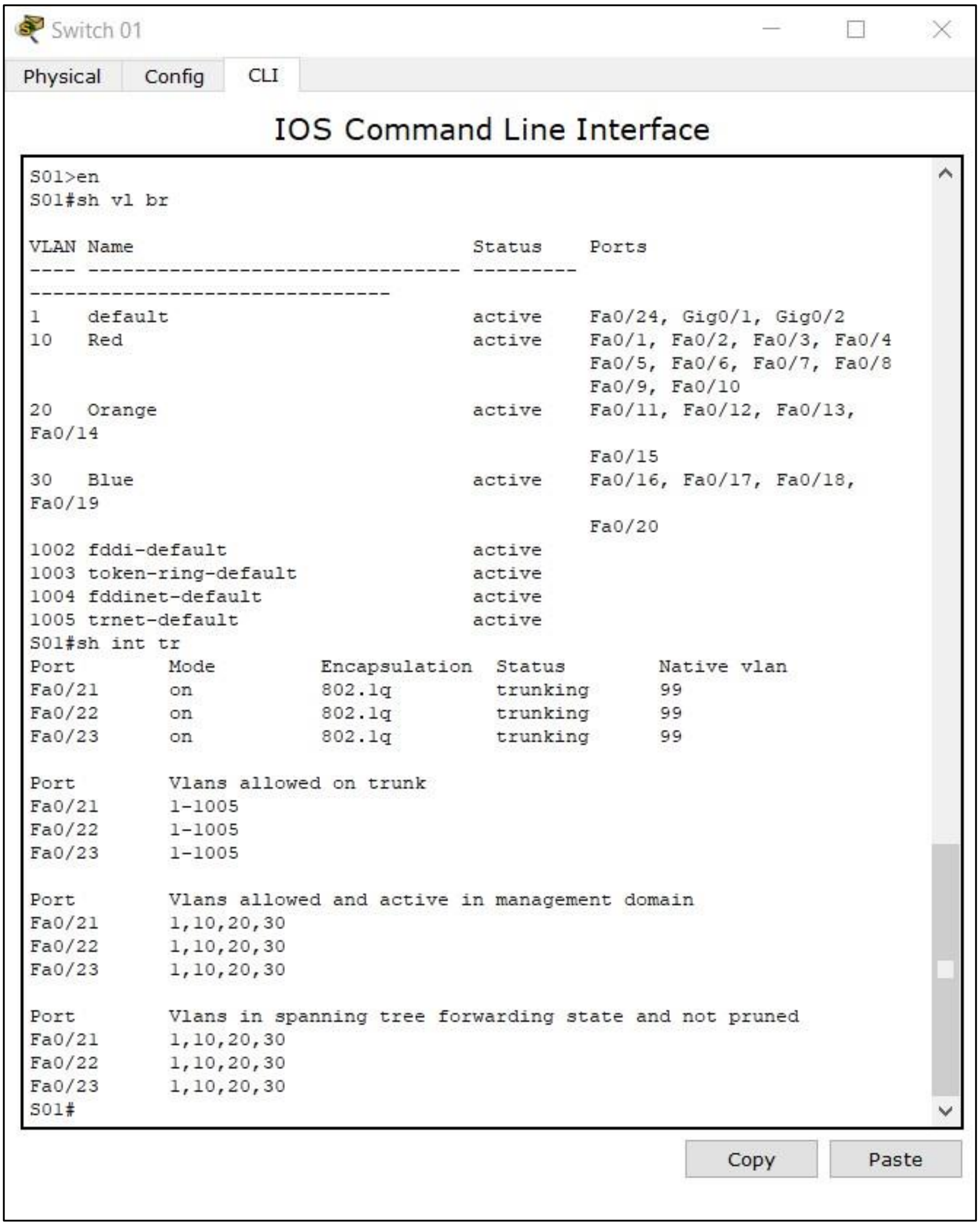
IOS Command Line Interface

```
!
router rip
 version 2
 network 172.8.0.0
 network 192.168.8.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
ip access-list extended EXTND-2
 permit ip 172.8.64.0 0.0.15.255 host 192.168.8.149
 permit ip 172.8.64.0 0.0.15.255 172.8.0.0 0.0.63.255
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Copy Paste

Figure 4.09: Final BRCH2 Router Configuration Part 3

4.2 Switch Configuration




```
S01>en
S01#sh vl br

VLAN Name                             Status    Ports
---- -------------------------------- ---------
-------------------------------
1    default                          active    Fa0/24, Gig0/1, Gig0/2
10   Red                              active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10
20   Orange                           active    Fa0/11, Fa0/12, Fa0/13,
Fa0/14
                                                Fa0/15
30   Blue                             active    Fa0/16, Fa0/17, Fa0/18,
Fa0/19
                                                Fa0/20
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S01#sh int tr
Port        Mode         Encapsulation  Status        Native vlan
Fa0/21      on           802.1q         trunking      99
Fa0/22      on           802.1q         trunking      99
Fa0/23      on           802.1q         trunking      99

Port        Vlans allowed on trunk
Fa0/21      1-1005
Fa0/22      1-1005
Fa0/23      1-1005

Port        Vlans allowed and active in management domain
Fa0/21      1,10,20,30
Fa0/22      1,10,20,30
Fa0/23      1,10,20,30

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/21      1,10,20,30
Fa0/22      1,10,20,30
Fa0/23      1,10,20,30
S01#
```

Figure 4.10: Final S01 Switch Configuration

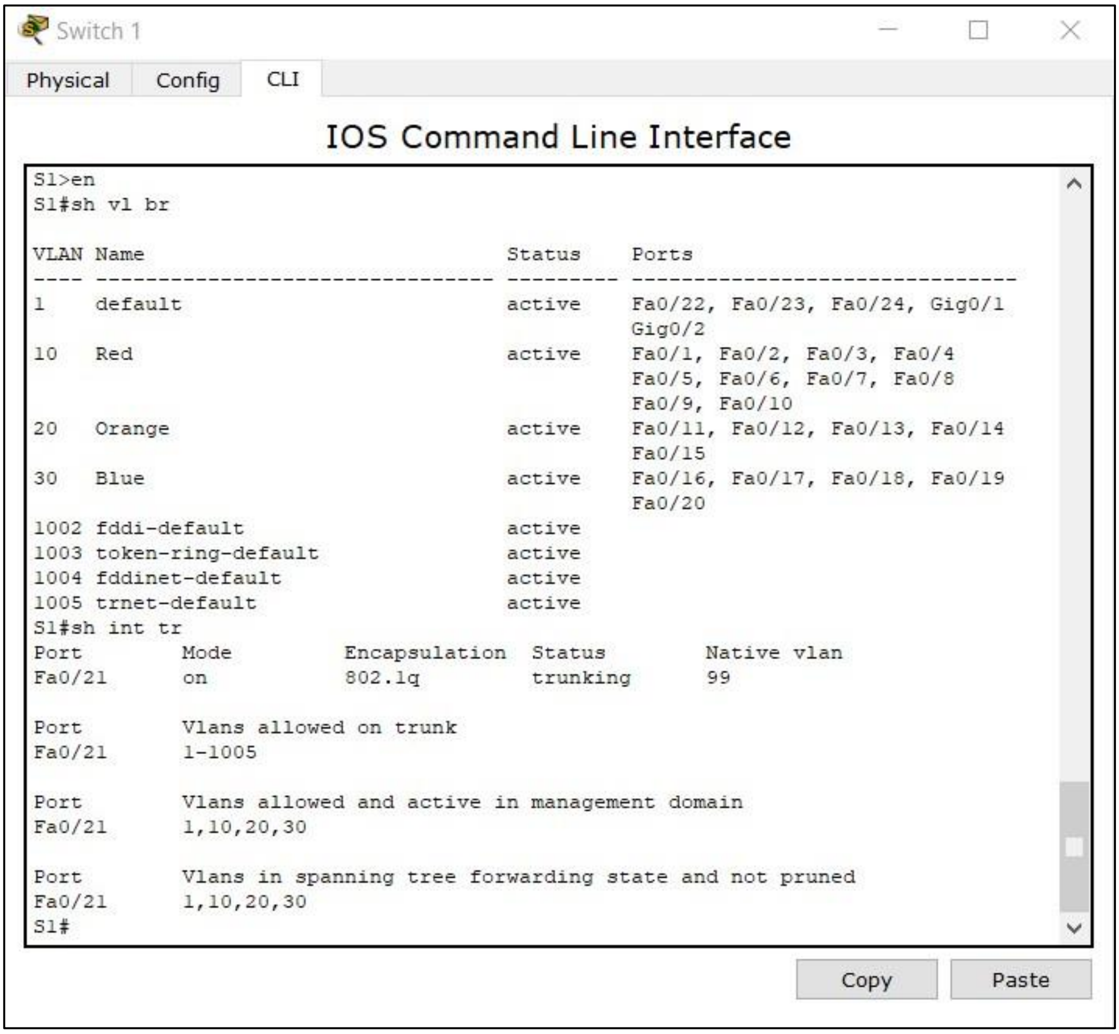


Figure 4.11: Final S1 Switch Configuration

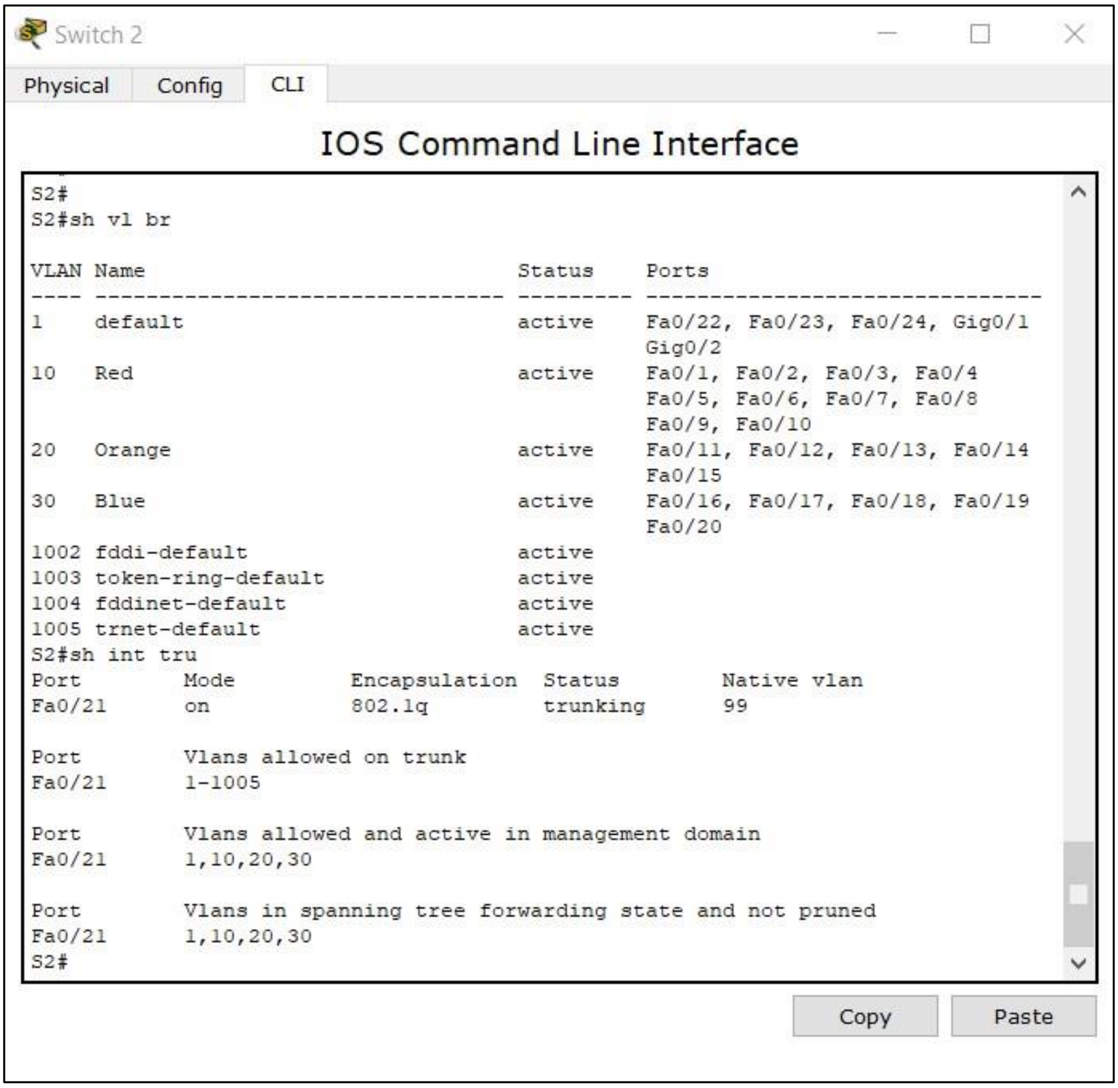


Figure 4.12: Final S2 Switch Configuration

5.0 Requirement 1

For this mini project, the network addresses were provided but the x value had to be replaced with our group number. The network addresses provided were 192.168.X.128/25 for the HQ networks and 172.X.0.0/16 for the branches network. As we are group 8, all x values were replaced with 8. Thus, for our mini project the HQ and branches addresses are 192.168.8.128/25 and 172.X.0.0/16 respectively.

For the branches network, there are four subnetworks, two of which are indicated by the purple and green coloured backgrounds. The other two subnetworks are the serial interfaces between the HQ router and the BRCH1 and BRCH2 routers. The purple network requires 16000 addresses whereas the green needs 4000 and the serial connections require 4 addresses. Thus, using VLSM we assign the subnetworks addresses from the 172.8.0.0/16 address block.

For the HQ network, there are 3 VLANs which require addresses. The Red, Orange and Blue VLAN have 9, 4 and 3 hosts which means they require 12, 7 and 6 addresses each respectively when including the network, broadcast and gateway address. Thus, using VLSM we assign the subnetworks addresses from the 192.168.8.128/25 address block. The following table shows IP addressing scheme for both the branch network and the HQ network.

Network	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
Purple	172.8.0.0/18	172.8.0.1	172.8.63.254	172.8.63.255
Green	172.8.64.0/20	172.8.64.1	172.8.79.254	172.8.79.255
BRCH1_HQ	172.8.80.0/30	172.8.80.1	172.8.80.2	172.8.80.3
BRCH2_HQ	172.8.80.4/30	172.8.80.5	172.8.80.6	172.8.80.7
Red VLAN	192.168.8.128/28	192.168.8.129	192.168.8.142	192.168.8.143
Orange VLAN	192.168.8.144/29	192.168.8.145	192.168.8.150	192.168.8.151
Blue VLAN	192.168.8.152/29	192.168.8.153	192.168.8.158	192.168.8.159

Table 5.1: IP Addressing Scheme

Once the IP addressing scheme has been designed and calculated, the IP addressing table was then filled out accordingly. Table 3.1 depicts the final addressing table, which also includes the ISP address which is loopback interface at the HQ router. The IP addressing table takes into account that requirement 6 specifies that only the Orange VLAN has statically assigned IP addresses whereas all other hosts will have their IP addresses dynamically assigned using a DHCP server.

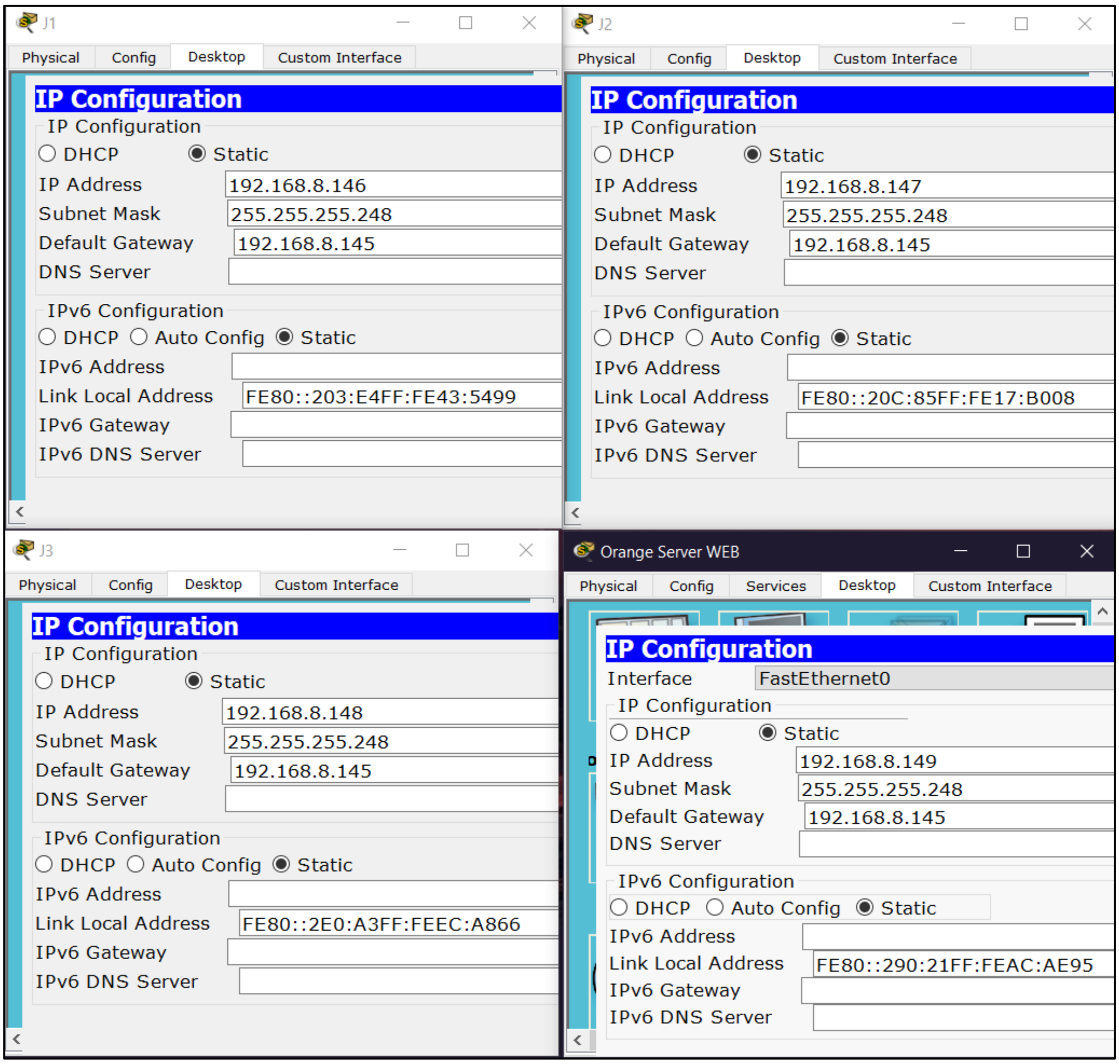


Figure 5.1: Evidence Showing Orange VLAN has Statically Assigned IP Addresses According to the Addressing Table

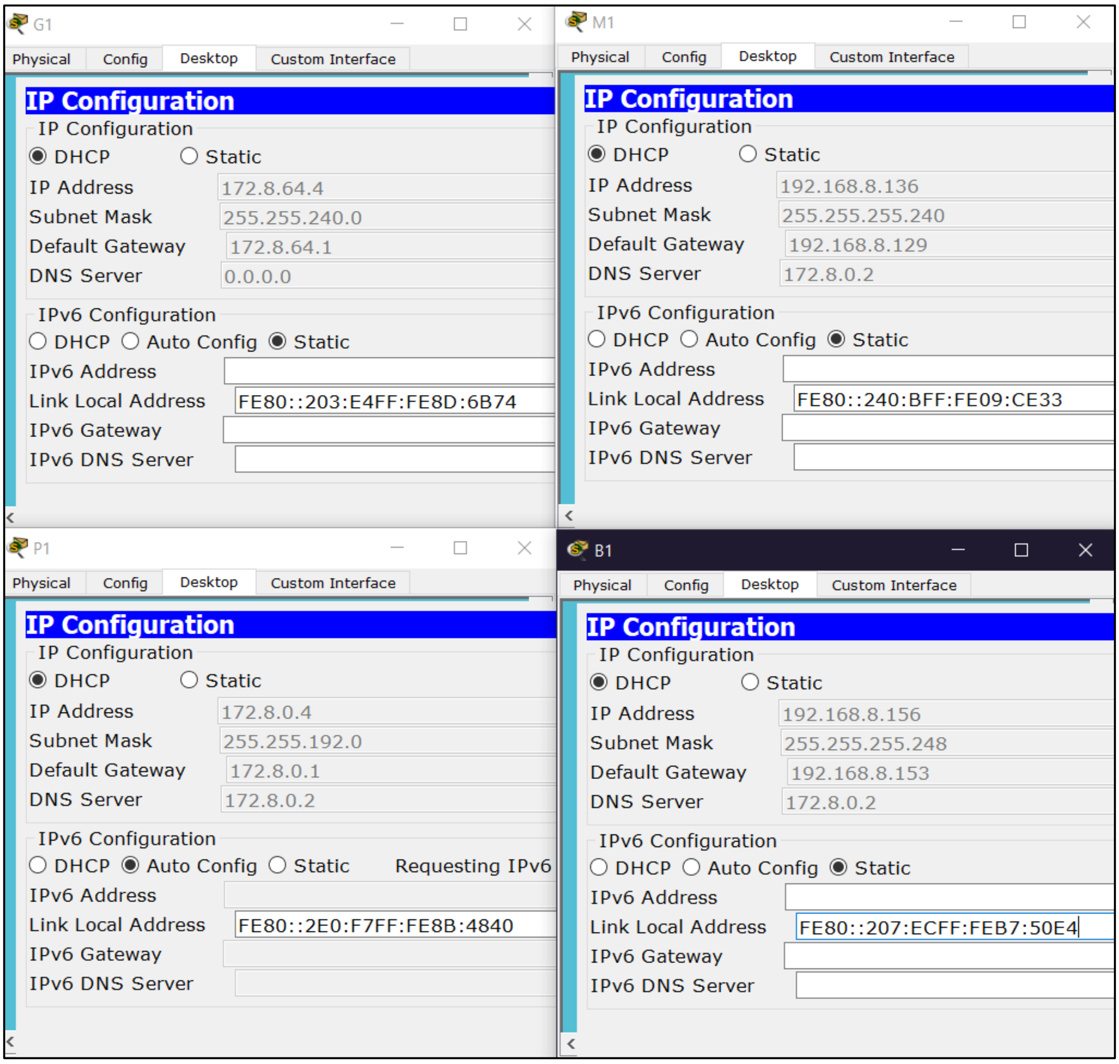


Figure 5.2: Evidence Showing All Other Networks Have Dynamically Assigned IP Addresses Through DHCP Server According to the Addressing Table

6.0 Requirement 2

Requirement 2 states that the Red, Orange and Blue VLANs are to be configure. We gave the VLAN IDs 10, 20, 30 and 99 to the Red, Orange, Blue and Native VLANs respectively. As requirement 3 requires the switch ports be assigned to the VLANs, planning is required when connecting the devices to the corresponding ports on the switch. Below is a table of the initial port assignments for switches S01, S1 and S2. Switches 2960-4TT were used for the network.

Ports	Assignment	Network
Fa0/1-10	VLAN 10 - Red	192.168.8.128/28
Fa0/11-15	VLAN 20 - Orange	192.168.8.144/29
Fa0/16-20	VLAN 30 - Blue	192.168.8.152/29
Fa0/21-23	802.1q Trunks (Native VLAN 99)	192.168.8.160/30

Table 6.1: Initial Port Assignments (Switches 01, 1 and 2)

The command **vlan** *vlan-id* in global configuration mode was used to add a vlan and the command **name** *vlan-name* was used to name the VLANs. Using the command **show vlan brief,** we can identify that the vlans for every host have been configured. The **show vlan brief** command can be shortened to **sh vl br,** which is the command used in the figures below.

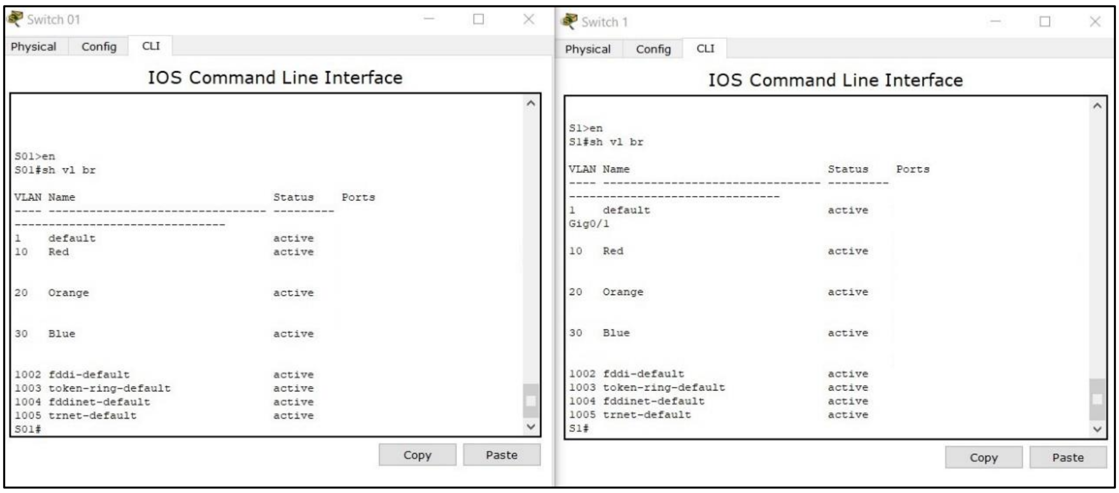


Figure 6.1: Evidence that VLANs Have Been Configured (S01 and S1)

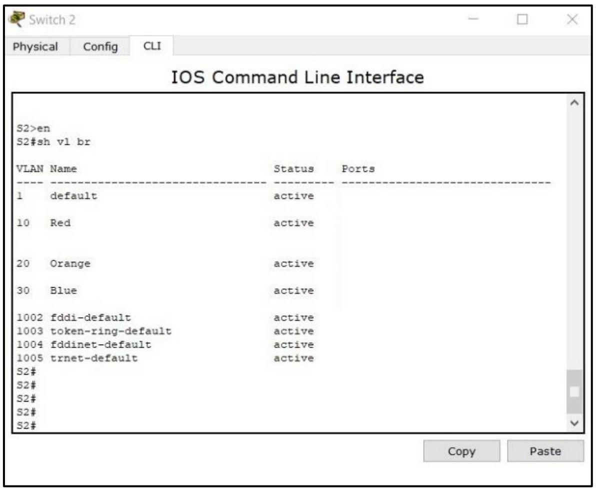


Figure 6.2: Evidence that VLANs Have Been Configured (S2)

As mentioned earlier, the Orange hosts have statically assigned IP addresses. Figure 5.1 is proof that they were configured according to the addressing table with the correct IP address, subnet mask and gateway address. All hosts were connected to the corresponding switches according to the initial port assignments as shown in Table 6.1.

7.0 Requirement 3

To assign switch ports to the VLANs on S01, S1 and S2, we use the **switchport access vlan** *vlan-id* command. Table 6.1 shows the initial port assignments for switches in the HQ network where we have assigned a range for each assignment. Thus, we used the **interface range** command to simplify the task. After assigning the appropriate ports to each VLAN and connecting the hosts accordingly, we use the **sh vl br** command to verify that they have been assigned appropriately.

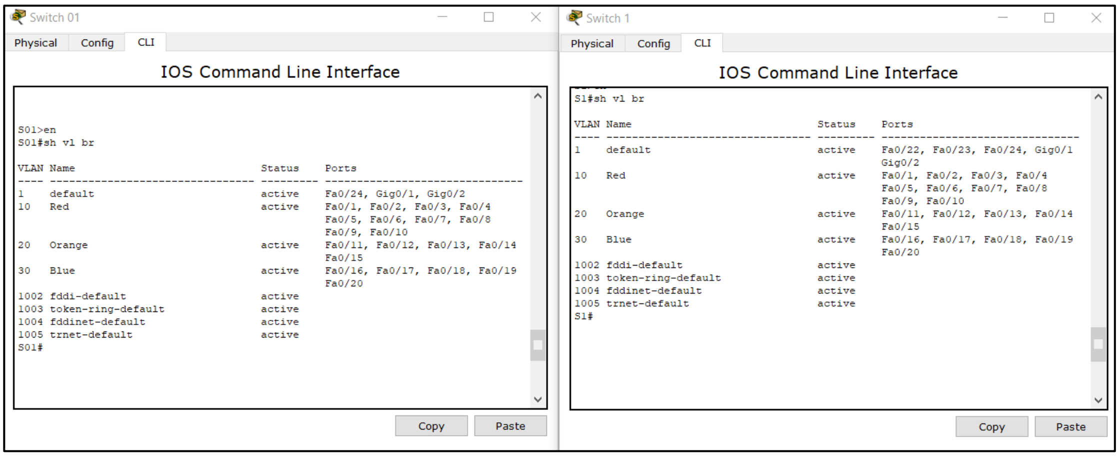


Figure 7.1: Evidence that Switch Ports have Been Assigned (S01 and S1)

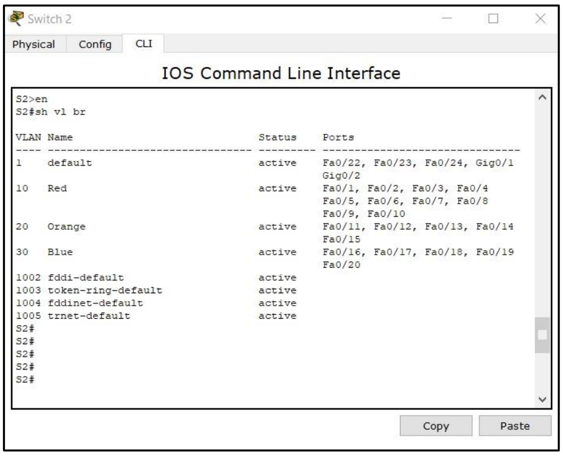


Figure 7.2: Evidence that Switch Ports have Been Assigned (S2)

Next, to allow the VLANs to exchange information or packets, we need to configure the trunk ports. We are using 802.1Q encapsulation with VLAN 99 as the Native VLAN. Again, we use the **interface range** command in the global configuration mode to enable us to simplify the configuration on the trunk ports. As shown in Table 6.1, the interface range used is Fa0/21-23 for the trunk ports. Thus, for S01, trunk ports were configured for all three of the assigned ports. For S1 and S2, only Fa0/21 was configured for the trunk port. To verify the configuration of trunk ports, we use the command **show interface trunk** or we can use the shortened version which is **sh int tr.**

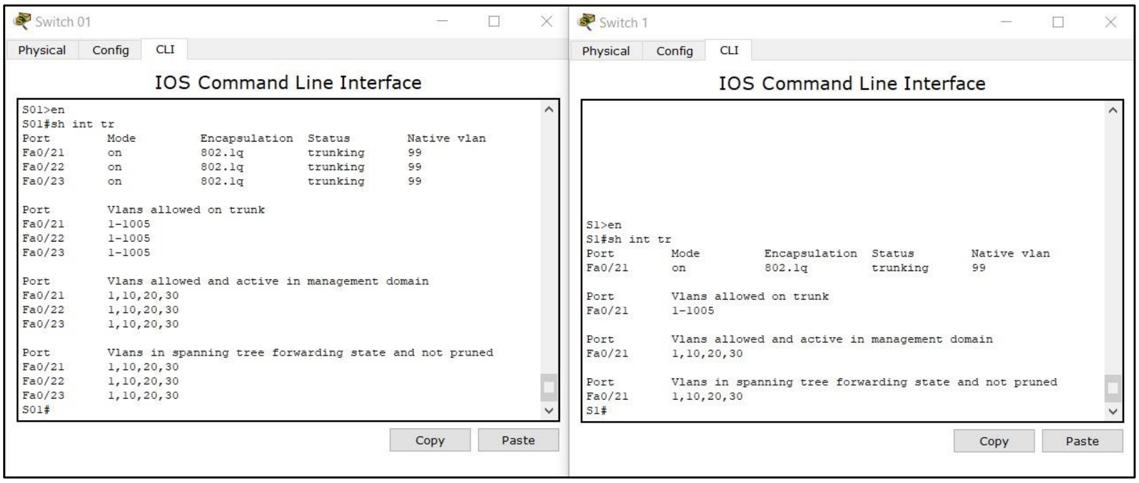


Figure 7.3: Evidence that Trunk Ports have Been Configured (S01 and S1)

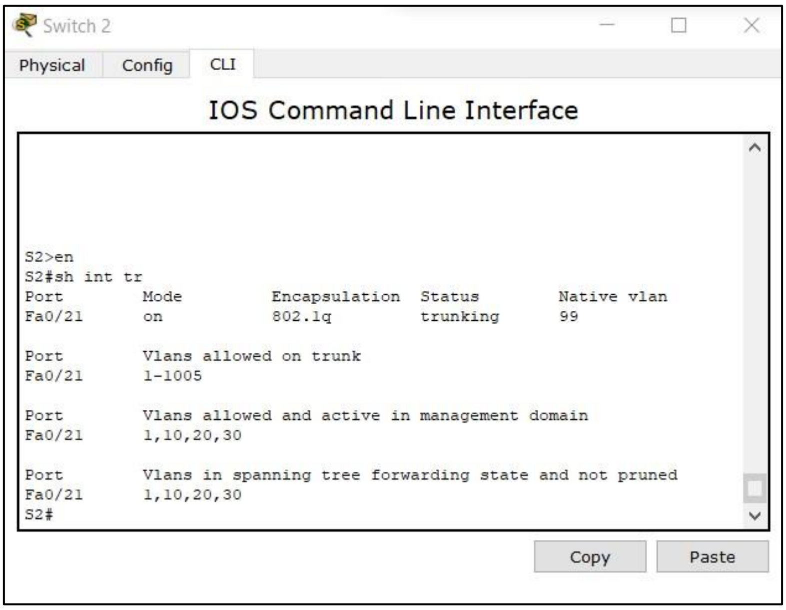


Figure 7.4: Evidence that Trunk Ports have Been Configured (S2)

8.0 Requirement 4

Connectivity between VLANs requires routing at the network layer using layer three devices such as a router. We use the approach where we create Fast Ethernet connections between the router and the distribution layer switch and configure the connections as dot1q trunks. This will allow inter-VLAN traffic to be carried to and from the routing device on a single trunk. To do this, we need the router to be configured with multiple addresses by creating virtual interfaces (called subinterfaces) on one of the router Fast Ethernet ports and configuring them to be dot1q aware. We are configuring the interface Fa0/0 as the trunk port from the router.

First, we need to enter the interface for Fa0/0 using the command **int fa0/0** from the global configuration mode. For configuring the trunk for the VLAN 10 (Red VLAN), we enter the subinterface using the command **int fa0/10.** Next, we use the command **encapsulation dot1q 10** to establish trunking encapsulation and associate a VLAN with the subinterface followed by the command **ip add 192.168.8.129 255.255.255.248** to assign an IP address from the VLAN 10 to this interface. We repeat the steps for VLANs 20, 30 and 99 replacing the VLAN ID 10 accordingly. Once the configuration for the trunk port at the HQ router is done, we assign the IP addresses for the serial connections. For verification that the ip addresses have been configured correctly, we use the command **sh ip int br** which is the shortened version of the command **show ip interface brief.**

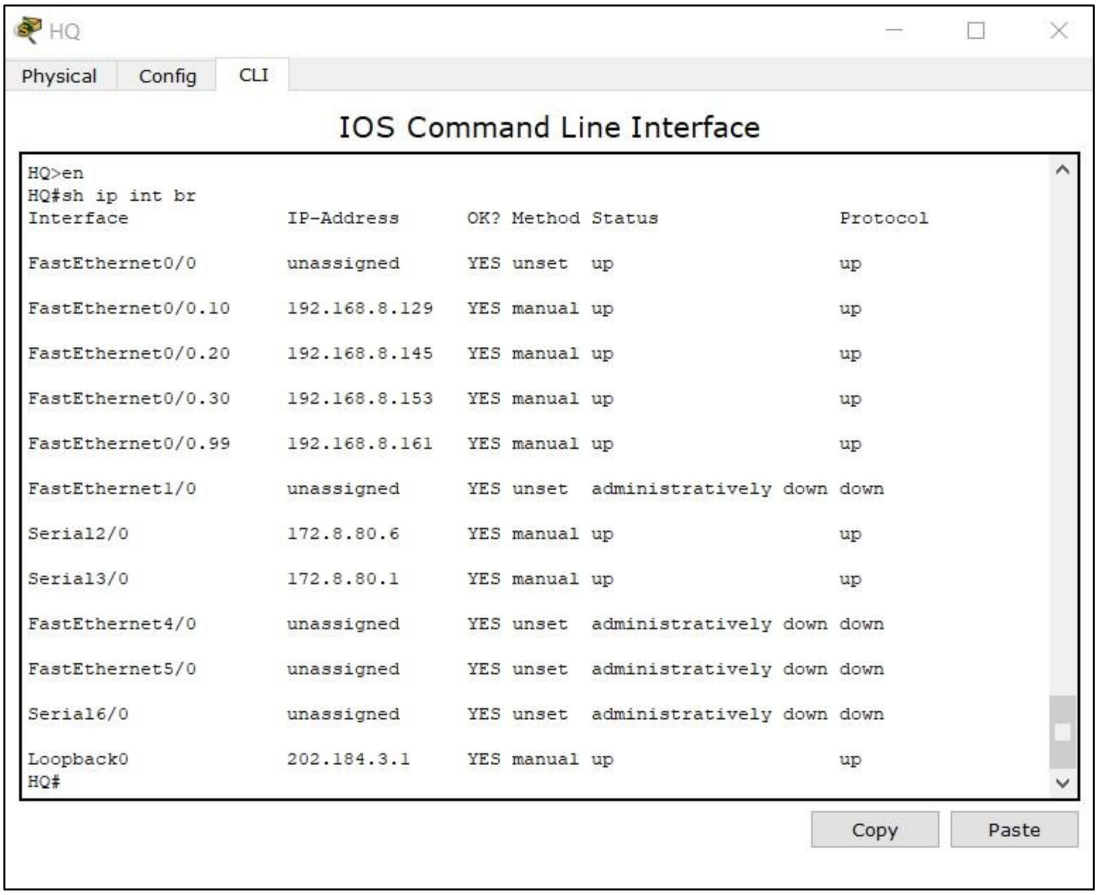


Figure 8.1: Evidence that HQ Router has been Configured According to The Addressing Table

9.0 Requirement 5

RIPv2 is a Distance Vector Routing Protocol that uses hop counts as its metric. The maximum number of hops is set to be 15 and any router farther than 15 hops away is considered unreachable. RIPv2 improves on its predecessor RIPv1 by sending subnet mask with the updates. This feature is the reason the RIPv2 is considered a classless routing protocol. For our network, we need RIPv2 as we subnet the network addresses that were provided.

To enable RIPv2, we have to use the command **router rip** followed by the command **version 2.** Both of these commands can be shortened to **rou rip** and **ver 2** respectively. After the command **version 2,** we need to use the command **network** *network-address* for each network the router is connected to followed by **no auto-sum** to ensure the addresses are not summarised and no subnet will be overlooked. To verify that router rip has been enabled, we can use the command **sh runn** which is the shortened versioned of the command **show running-configuration.**

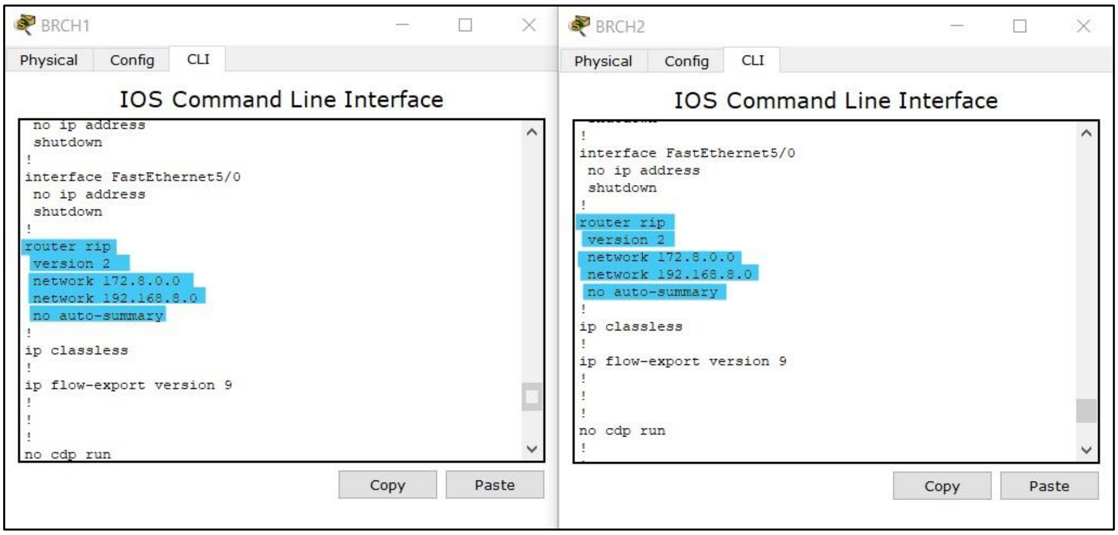


Figure 9.01: Evidence that Routers Have Been Configured with RIPv2 Protocol (BRCH1 and BRCH2)

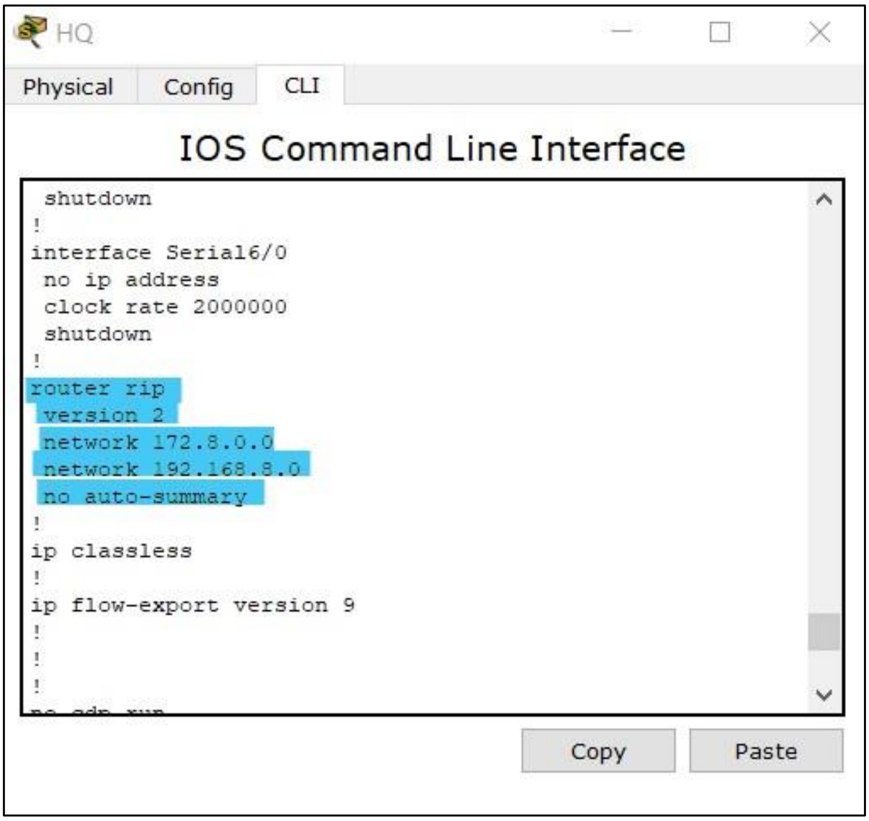


Figure 9.02: Evidence that Routers Have Been Configured with RIPv2 Protocol (HQ)

Next, the requirements state that the purple and green networks should only be able to communicate between them and to the Orange Web Server. To do this we are going to apply an extended Access Control List (ACL). Extended ACL can deny or permit based on source and destination address not just destination address like standard ACL. With the extended ACL there is an implicit *deny any any* line which denies traffic from any source to any destination.

Thus, at the purple branch, we need to create an extended ACL and permit traffic from the source purple network to the host Orange Web Server and to the green network. For the green network, we need to permit traffic from the green network to the host Web Server and the purple network. In this way, the branches can communicate with each other and the Web Server but nothing else.

To do this, we first need to create an extended ACL list. As mentioned earlier, extended ACL needs to be applied closest to the source. Thus, both ACLs will be applied inbound at BRCH1 and BRCH2 routers Fast Ethernet 0/0 port for the purple and green network respectively. Named access lists will be used for this mini-project.

For the purple network, we go to BRCH1 router and using the command **ip access-list extended EXTND-1** from the global configuration mode to create the access list. Next, use the commands **permit ip 172.8.0.0 0.0.63.255 host 192.168.8.149** and **permit ip 172.8.0.0 0.0.63.255 172.8.64.0 0.0.15.255.** Once we are back in global configuration mode, we need to apply the access list inbound at the interface fa0/0 using the command **int fa0/0** followed by **ip access-group EXTND-1 in.**

For the green network, we go to BRCH2 router and using the command **ip access-list extended EXTND-2** from the global configuration mode to create the access list. Next, use the commands **permit ip 172.8.64.0 0.0.15.255 host 192.168.8.149** and **permit ip 172.8.64.0 0.0.15.255 172.8.0.0 0.0.63.255.** Once we are back in global configuration mode, we need to apply the access list inbound at the interface fa0/0 using the command **int fa0/0** followed by **ip access-group EXTND-2 in.**

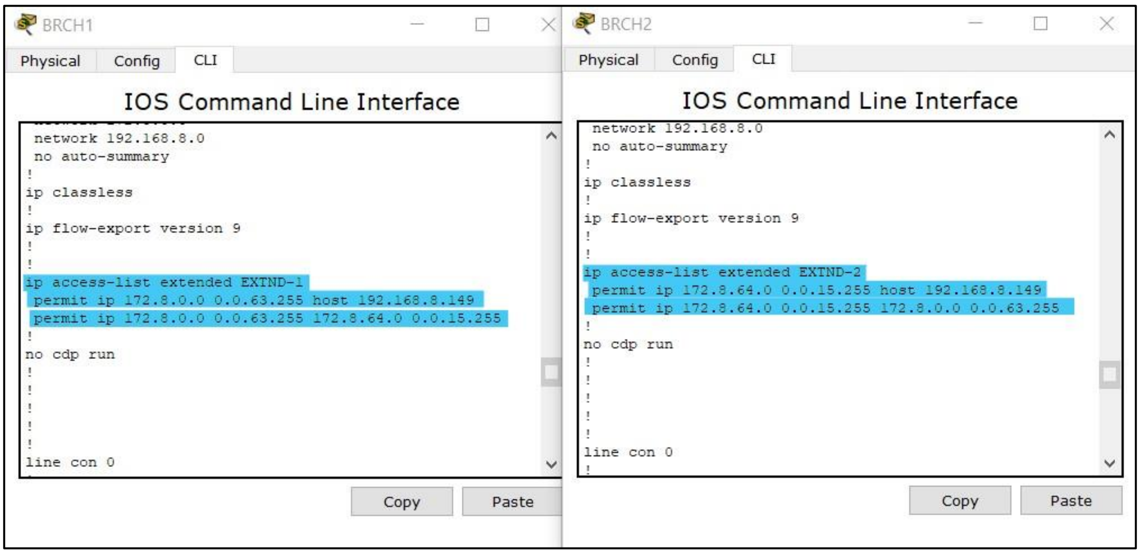


Figure 9.03: Evidence that Routers Have Been Configured with ACL

Next, to verify that the ACL works, we try to ping various devices in the network. Only the devices located in the green or purple network and the Orange Web Server should succeed. The addresses for the green and purple network are DHCP assigned from the purple DHCP server, which will be discussed later in the following chapter. 172.8.64.2 is a green host address, 172.8.0.4 is a purple network host address, 192.168.8.149 is the Orange Web Server address and the 192.168.8.134 is the address for a red host.

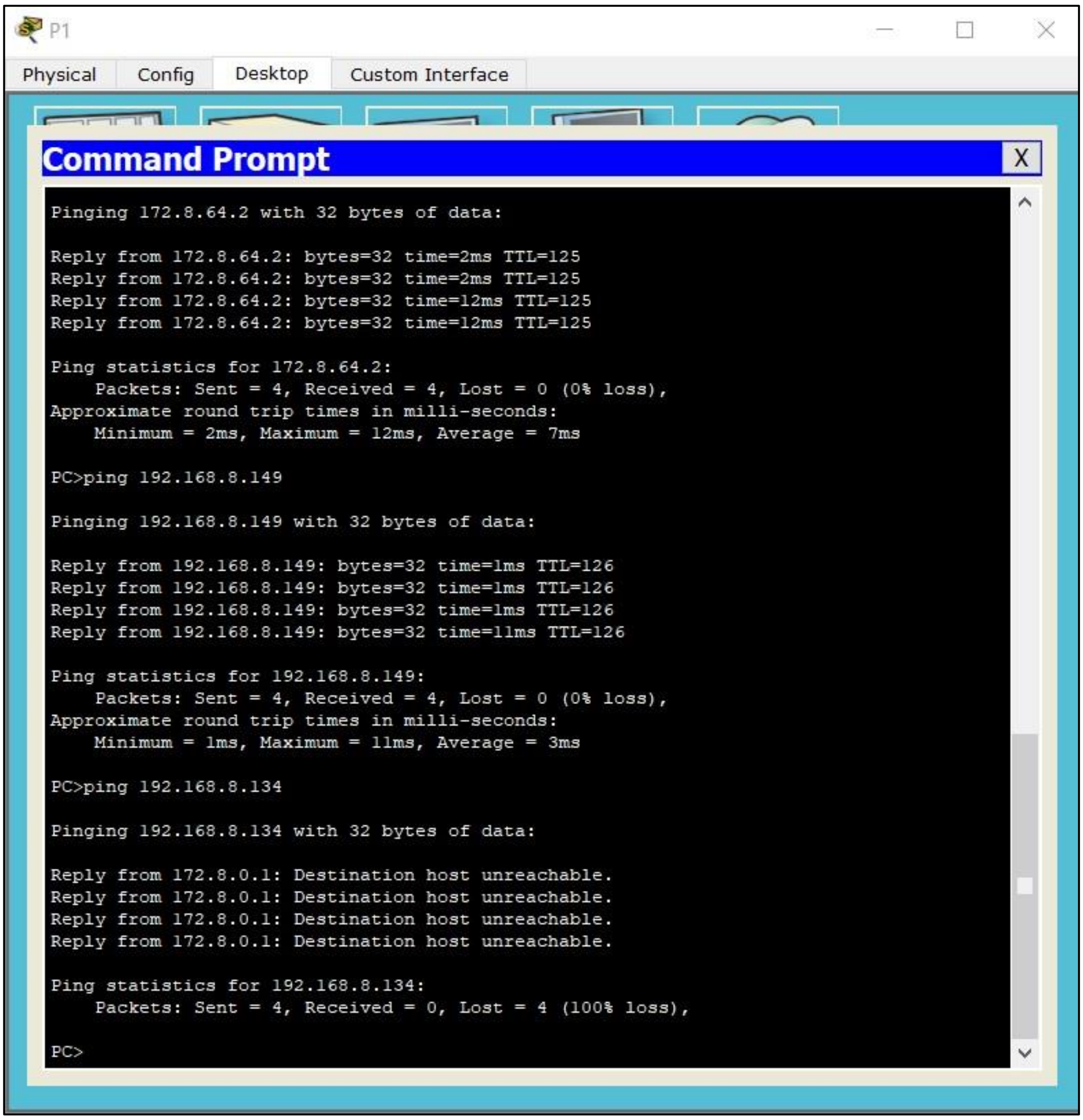


Figure 9.04: Using Ping to Verify ACL From Purple Network Host

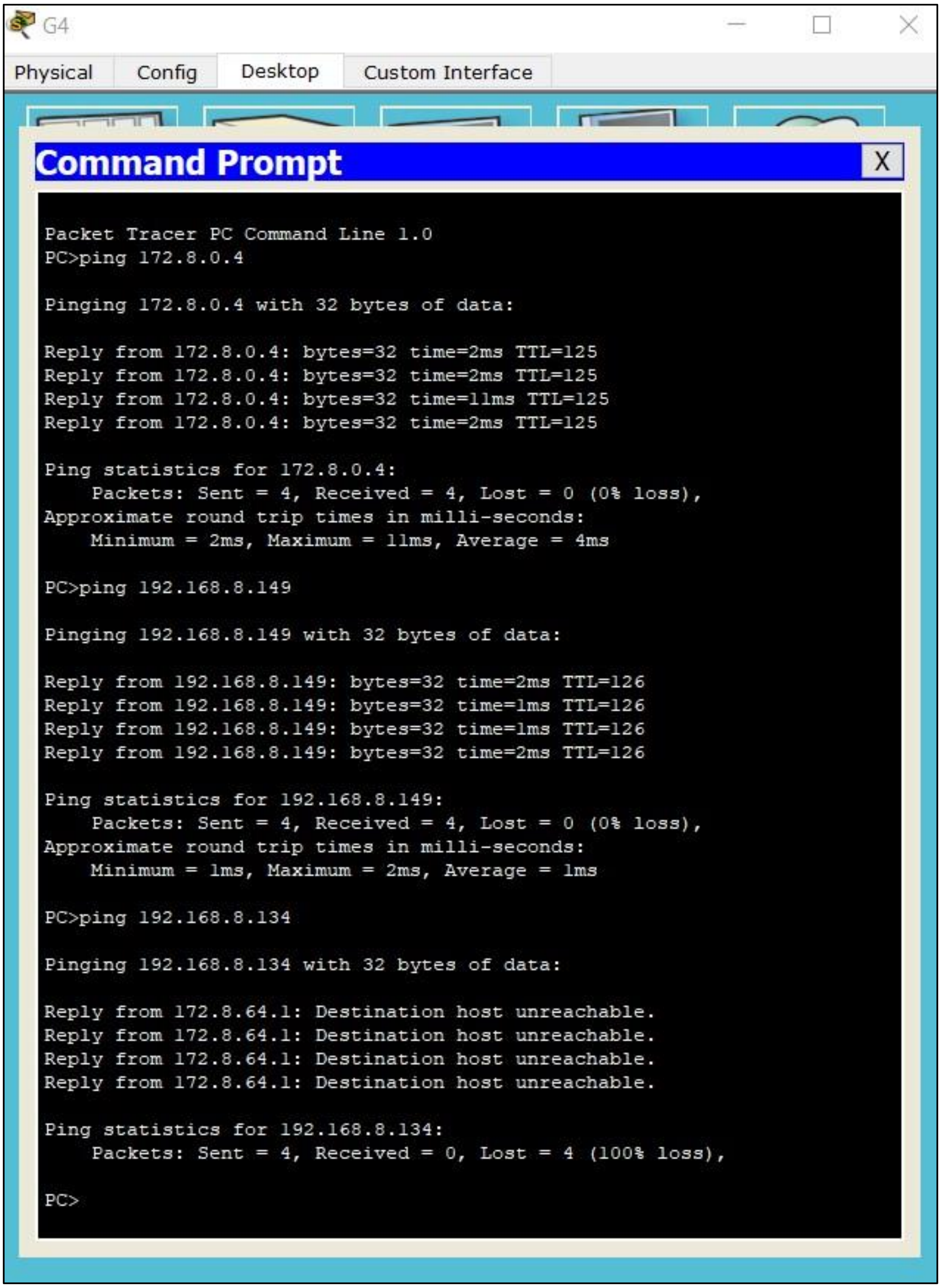


Figure 9.05: Using Ping to Verify ACL From Green Network Host

As shown in Figures 9.4 and 9.5, the purple and green hosts can communicate with each other and the Orange Web Server but cannot communicate with any other host.

The requirement also states that we need to identify the route each host passes through to communicate with other hosts in the branches network. To do this, we can use the command **tracert** from the command prompt of one of the host workstations. For a green network device, the route is shown below.

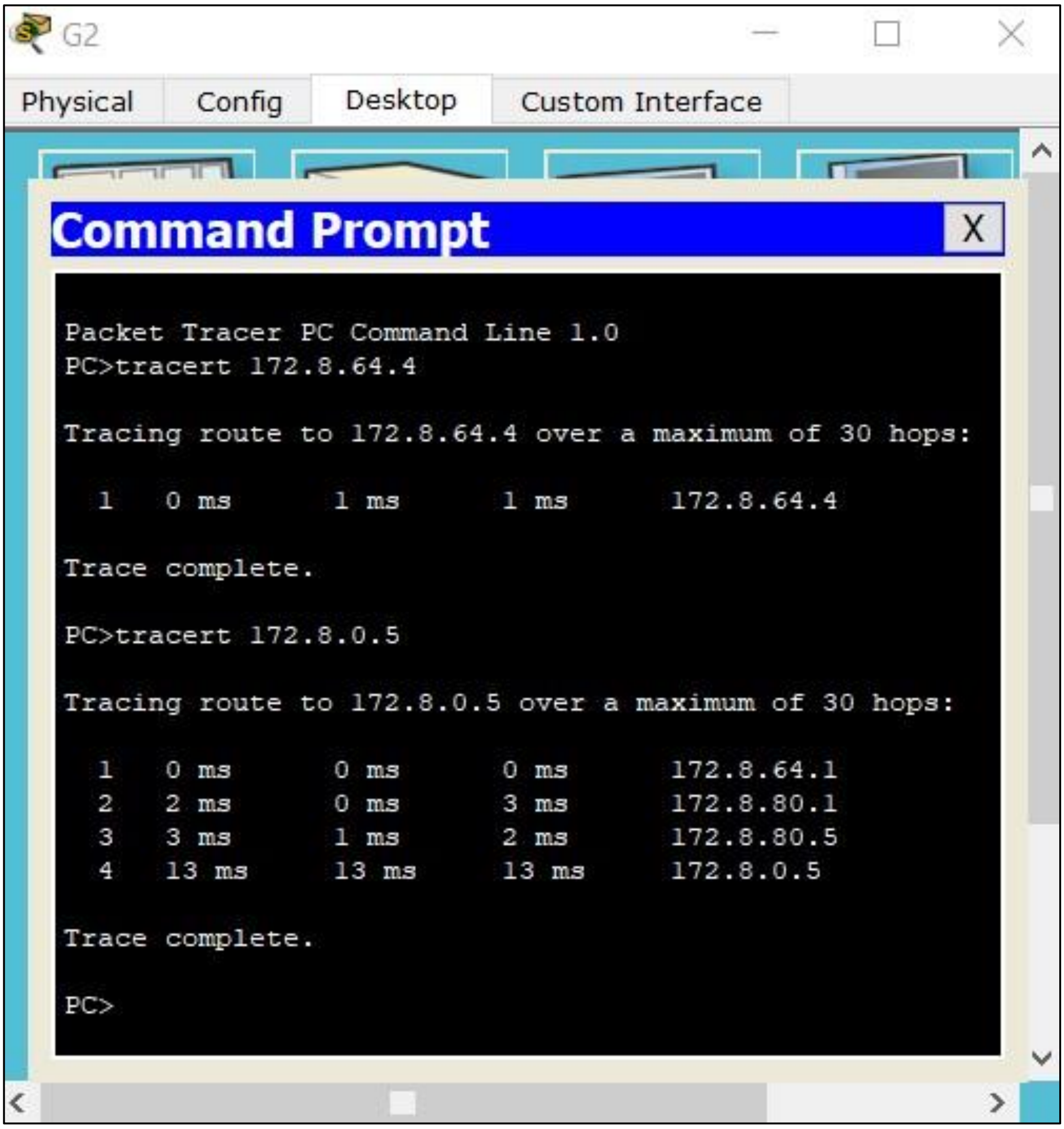


Figure 9.06: Using Tracert from Green Host

In Figure 9.06, for the first tracert command, the destination IP address is within the green network. Thus, it only goes to the default gateway which 172.8.64.1 before reaching the destination address. The second tracert command has a destination IP address of host on the purple network. It has to go to the default gateway before reaching the serial interface of the HQ router which has an address of 172.8.80.1. Then, it hops to the next serial interface at HQ router which has an address of 172.8.80.5 before reaching the destination address.

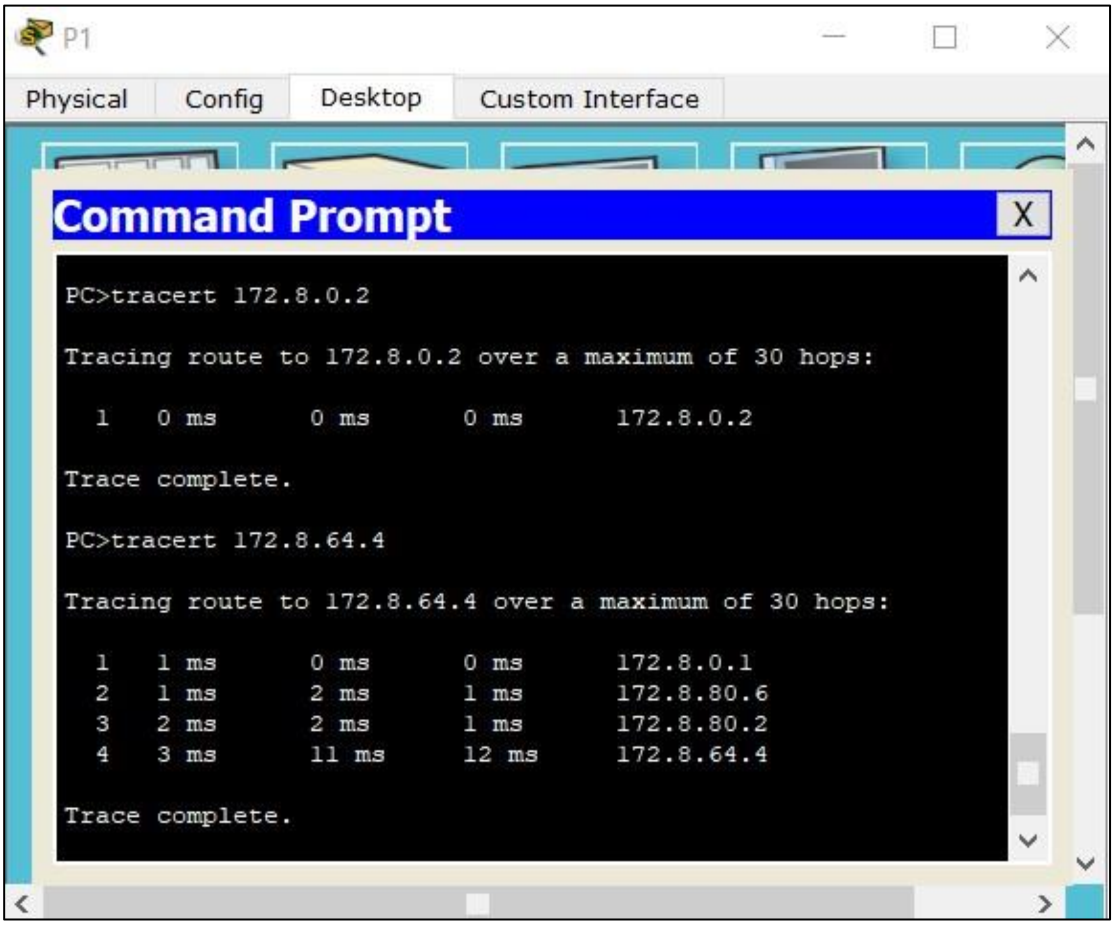


Figure 9.07: Using Tracert from Purple Host

In Figure 9.07, the first tracert command has a destination IP address is within the purple network. Thus, it only goes to the default gateway which 172.8.0.1 before reaching the destination address. The second tracert command has a destination IP address of host on the green network. It has to go to the default gateway before reaching the serial interface of the HQ router which has an address of 172.8.80.6. Then, it hops to the next serial interface at HQ router which has an address of 172.8.80.2 before reaching the destination address.

The last specification for requirement 5 states that the Red and Blue VLANs should be able to communicate only with each other and the Orange Web Server. We use similar steps to when we were creating ACLs for the green and purple network. The ACLs will be applied to the HQ router as that is the closest to the source addresses. We need to create two separate access-lists however as we will apply the lists to different subinterfaces. The commands to create and apply the ACL for the Red VLAN are as follows: **ip access-list extended EXTEND-3** followed by **permit ip 192.168.8.128 0.0.0.15 host 192.168.8.149** and then **permit ip 192.168.8.128 0.0.0.15 192.168.8.152 0.0.0.7** before **exit** then **int fa0/0.10** and **ip access-group EXTND-3 in.** For the Blue VLAN the commands are as follows: **ip access-list extended EXTEND-4** followed by **permit ip 192.168.8.152 0.0.0.7 host 192.168.8.149** and then **permit ip 192.168.8.152 0.0.0.7 192.168.8.128 0.0.0.15** before **exit** then **int fa0/0.30** and **ip access-group EXTND-4 in.** To verify the configurations, use **sh runn.**

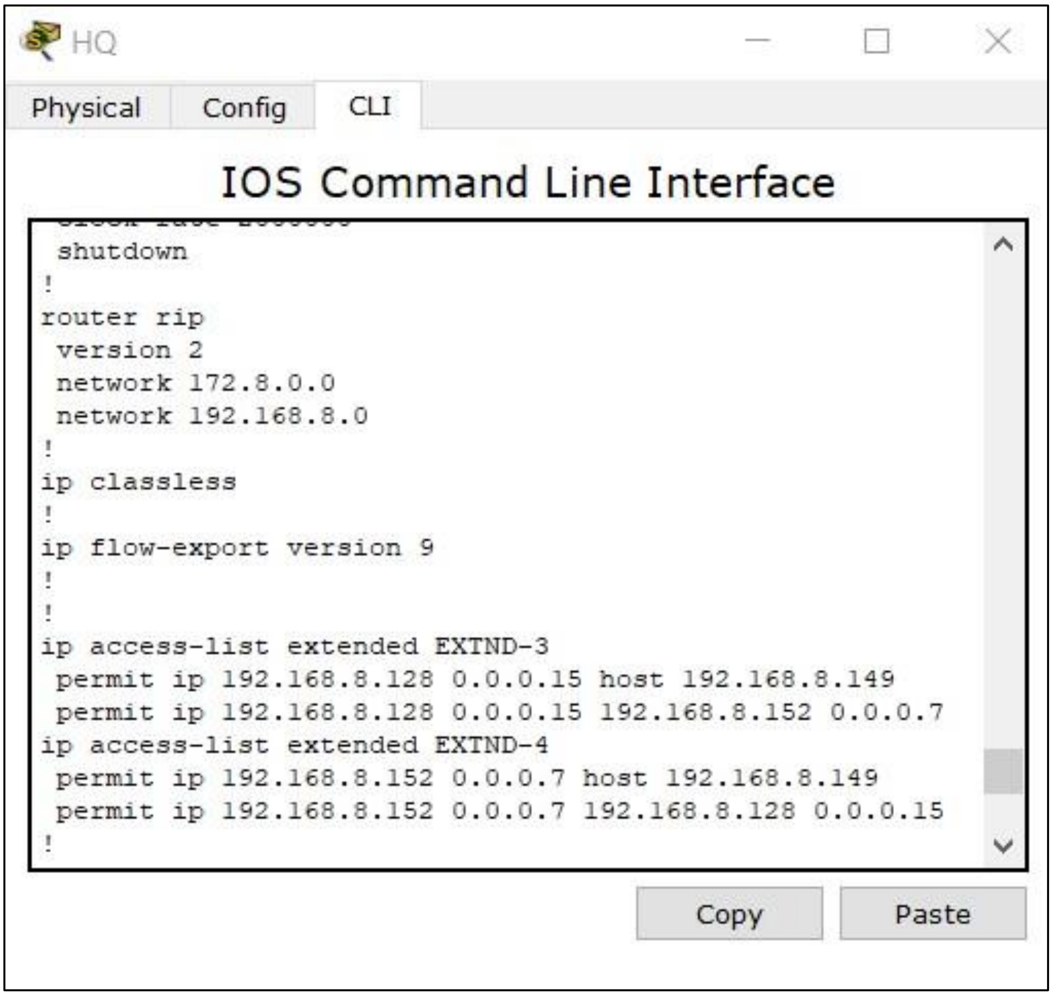


Figure 9.08: Verifying Access-List Configurations at HQ Router

Next, to verify that the ACL for the Red and Blue VLANs work, we try to ping various devices from the command prompt. Only pings for devices located in the Red or Blue VLANs and the Orange Web Server should succeed. The addresses for the Red and Blue VLANs are DHCP assigned from the their rspective DHCP server, which will be discussed later in the following chapter. 192.168.8.156 is a Blue VLAN address, 192.168.8.137 is a Red VLAN address, 192.168.8.149 is the Orange Web Server address and the 192.168.8.148 is the address for an orange host.

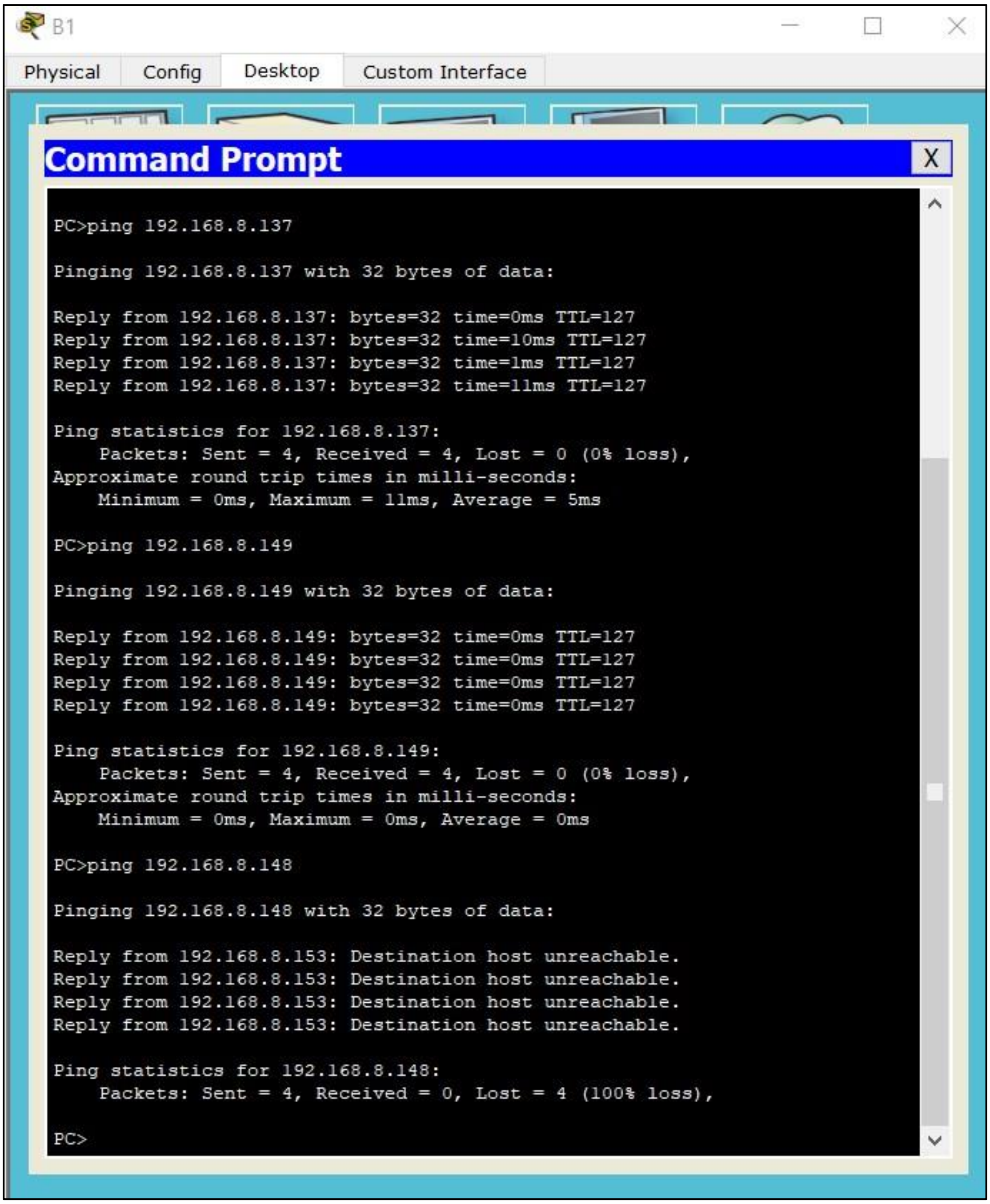


Figure 9.09: Using Ping to Verify Access-List Configurations from Blue Host

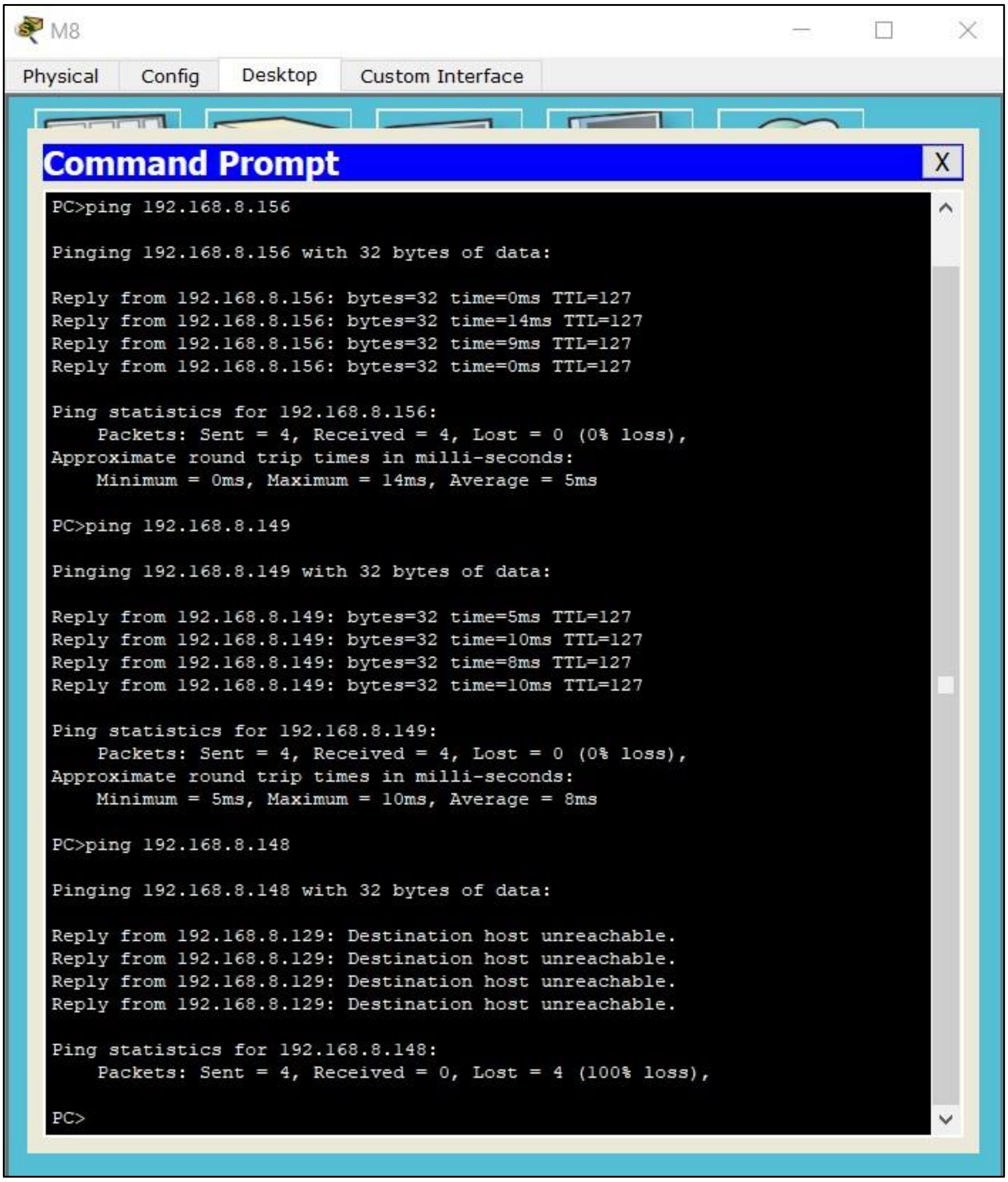


Figure 9.10: Using Ping to Verify Access-List Configurations from Red Host

As shown in Figures 9.09 and 9.10, the orange host is unreachable and the message came from the respective Blue and Red default gateways.

10.0 Requirement 6

Based on the IP addressing scheme, each subnetwork has available addresses to assign to the hosts within that network. However, to configure them all statically is tedious and time consuming, especially when the number of hosts are high such as for the purple and green network which need 16000 and 4000 addresses respectively. Thus, DHCP servers are used to dynamically assign IP addresses.

First, the DHCP service must be turned on which can be done by going to the DHCP servers and then services then DHCP. Then, the different pools must be added by providing a pool name, default gateway, starting IP address, subnet mask and max user for this project. It is important to note that the starting address must be inputted carefully as there cannot be any overlapping IP addresses. The different fields are filled in based on the IP addressing scheme and the addressing table which are depicted in Table 5.1 ad Table 3.1 respectively. Shown below are the final configuration for the DHCP servers in the entire network.

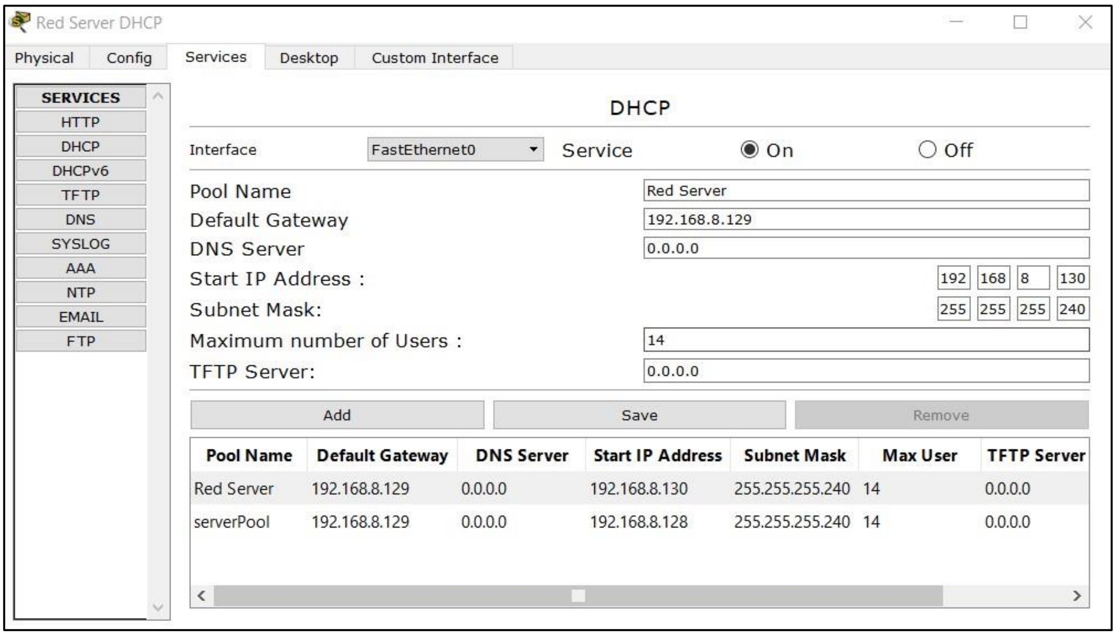


Figure 10.1: Red DHCP Server Configuration

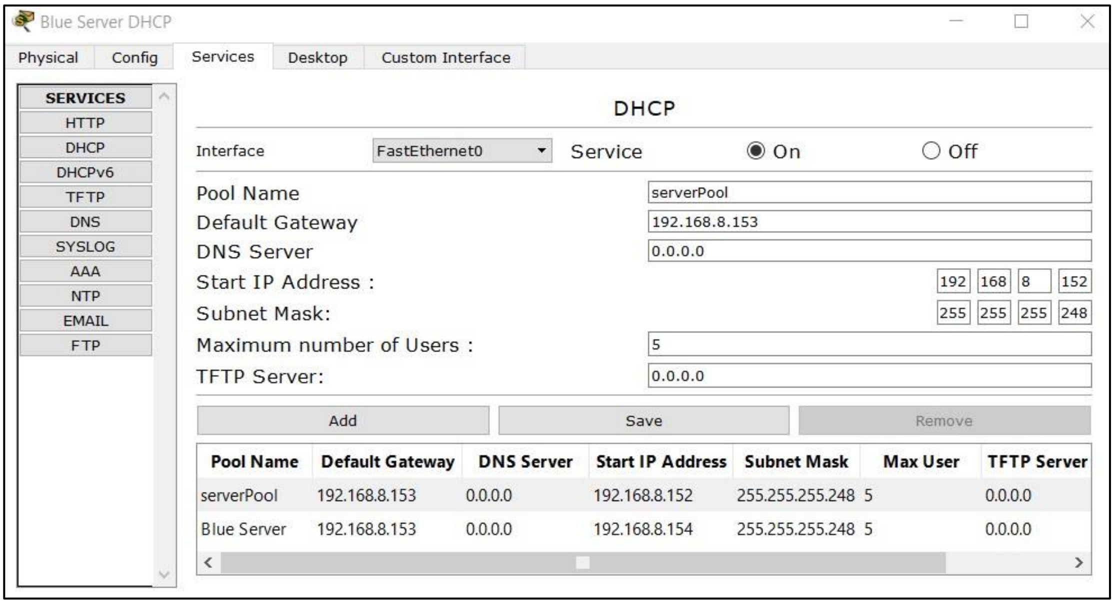


Figure 10.2: Blue DHCP Server Configuration

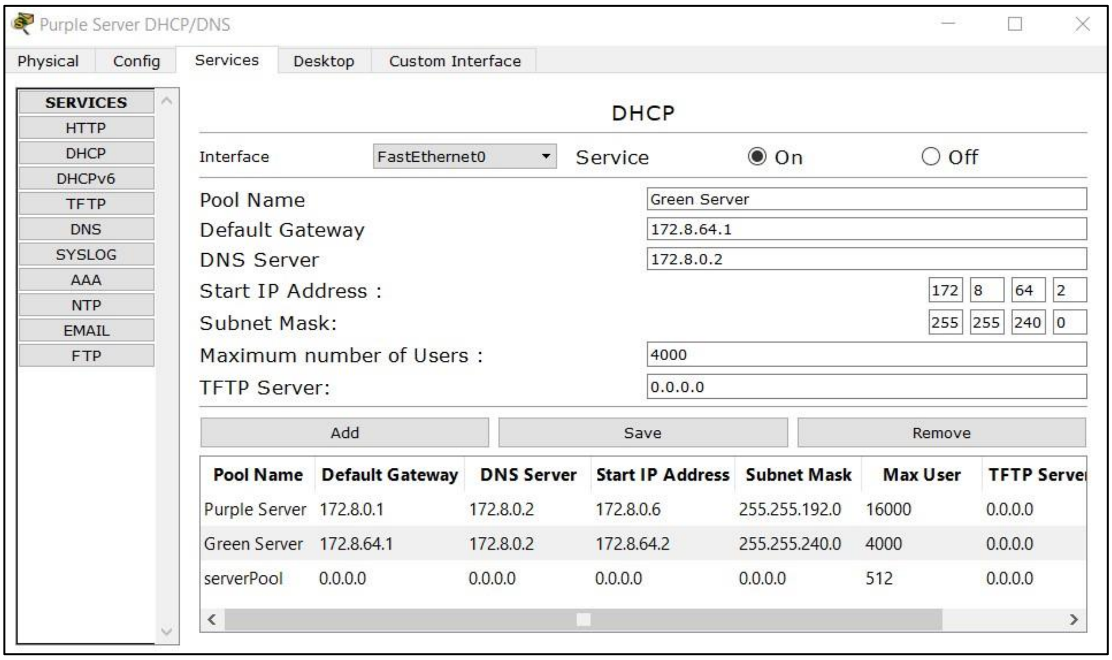


Figure 10.3: Purple DHCP Server Configuration

Next, to ensure that the DHCP requests by the hosts are successful, we need to use the **ip helper-address** *DHCP-server-ip-address* command in order to configure the routers as a DHCP relay agent. Only the BRCH2 router needs to be configured as a DHCP relay agent as the green hosts are not within the same subnetwork as the DHCP server. We can verify that the configurations have been done correctly by using the **sh runn** command.

Figure 10.4: BRCH2 Router as a DHCP Relay Agent

Shown below are some examples of hosts with addresses from the DHCP servers as specified in the requirement and according to the IP addressing scheme which is shown in Table 5.1.

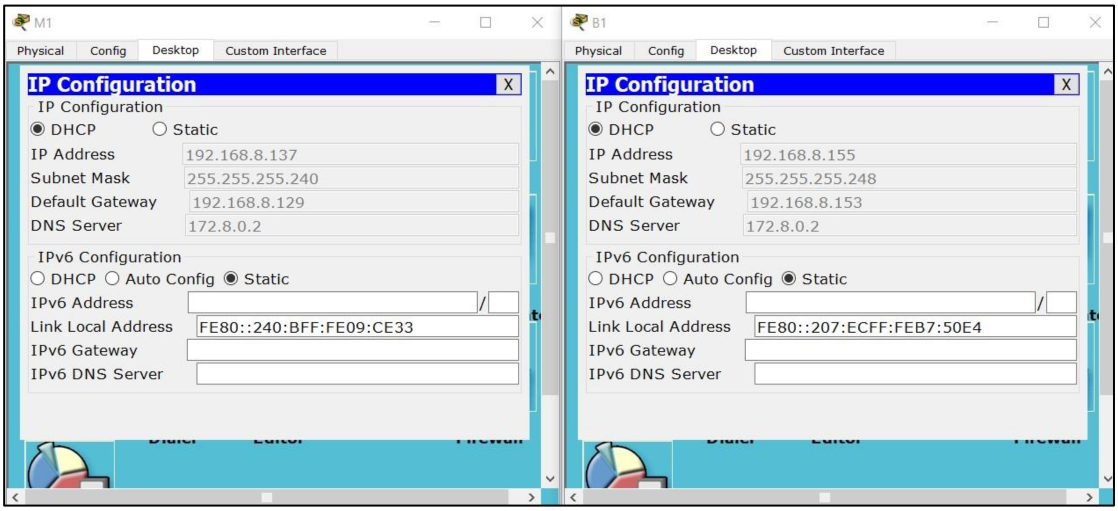


Figure 10.5: Evidence of IP Address Assignment from DHCP Server

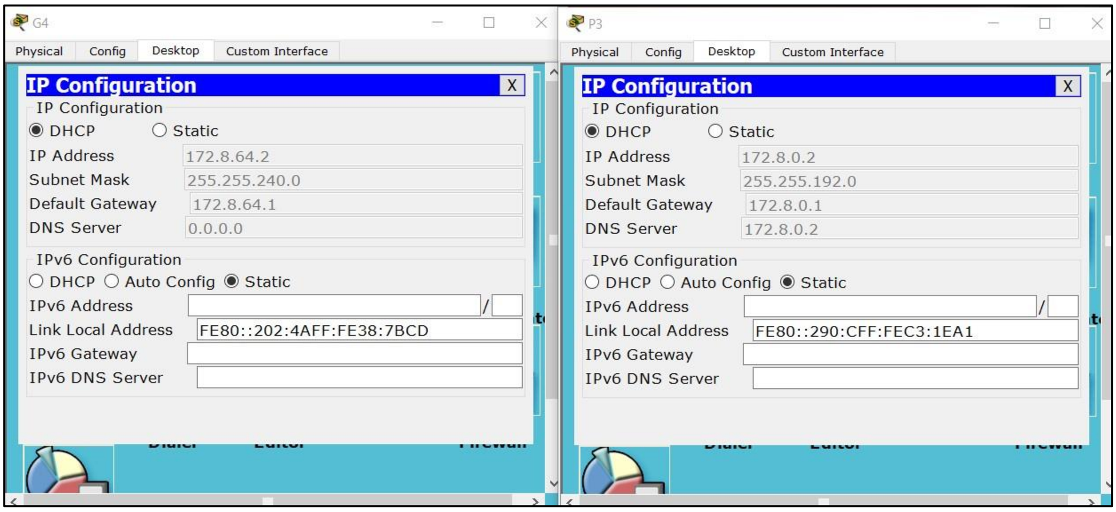


Figure 10.5: Evidence of IP Address Assignment from DHCP Server

11.0 Requirement 7

The DNS Server is located at the purple network. Thus, only the green and purple hosts will be able to access it due to the ACLs configured in Chapter 9. The Web Server is located on the Orange VLAN. However, all networks have access to this due to the ACLs permit command. The Mail Server will be set up on the Orange Web Server. This is so that there is some form of communication available between the BRANCHES and HQ network. Figure 11.1 show the configuration for the DNS Server.

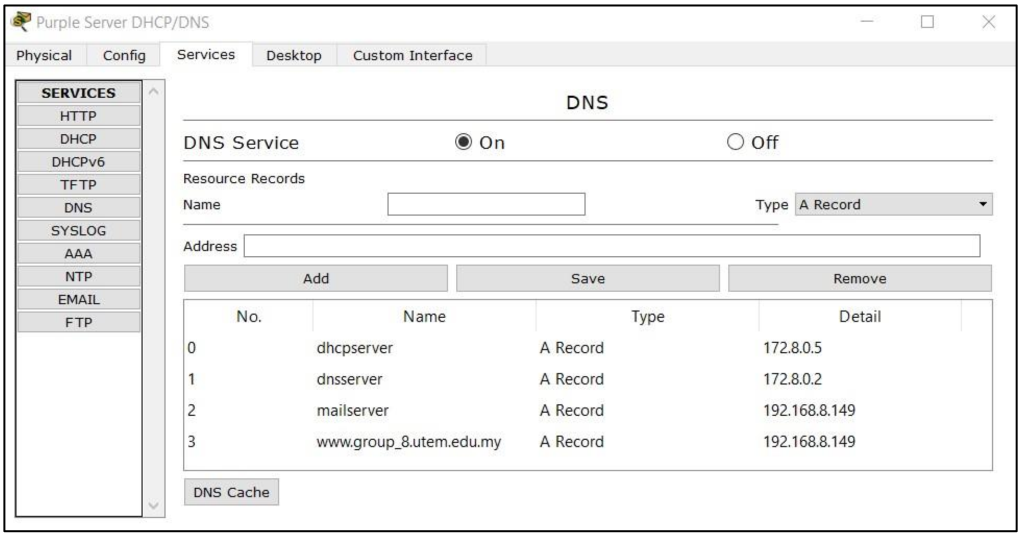


Figure 11.1: DNS Server Configuration

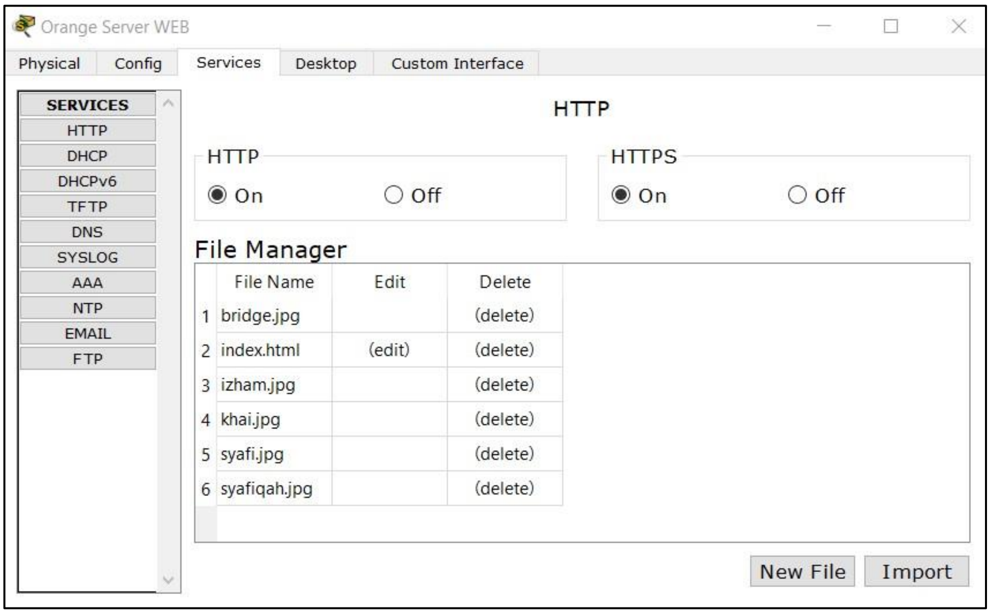


Figure 11.2: Web Server Configuration

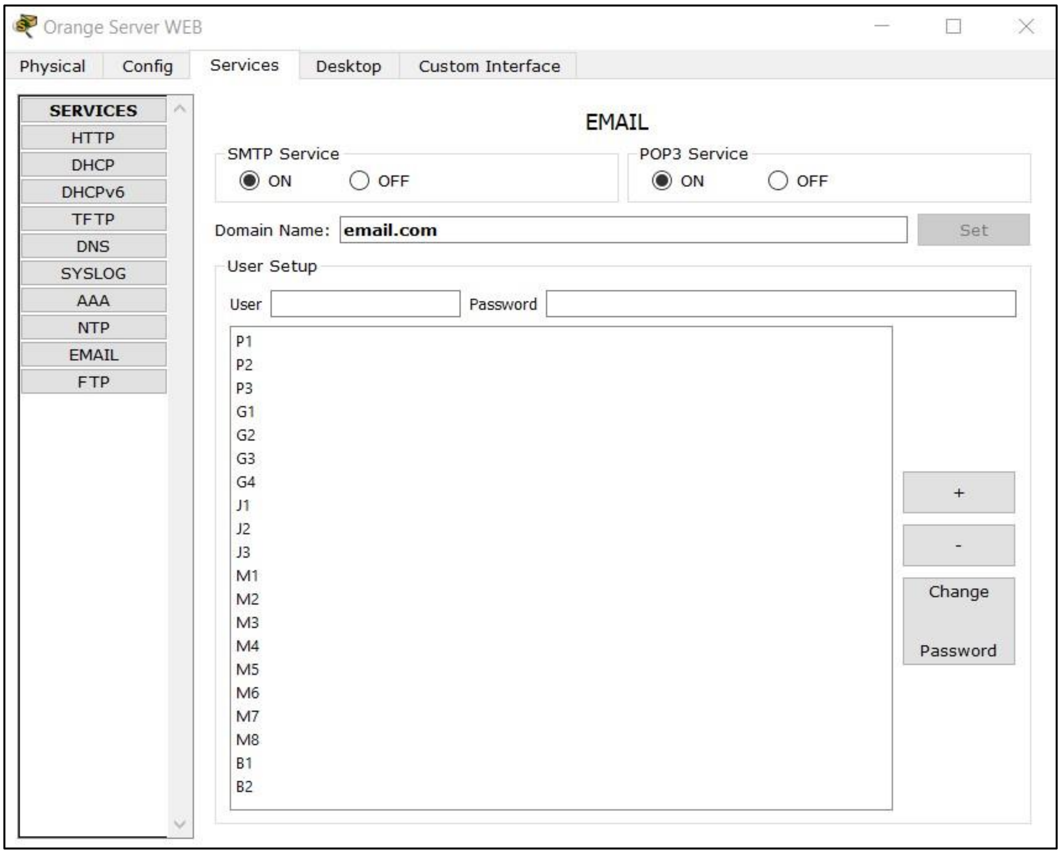


Figure 11.3: Mail Server Configuration

For the hosts to actually communicate with each other however, email configuration must be done for each host. Shown below are some examples of the host mail configurations.

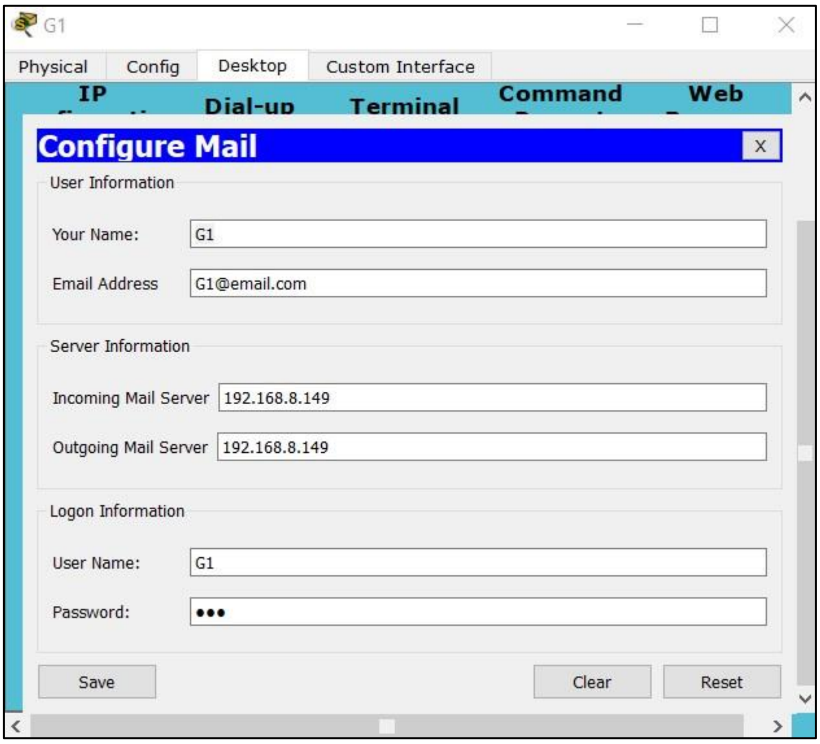


Figure 11.4: Mail Configuration for G1

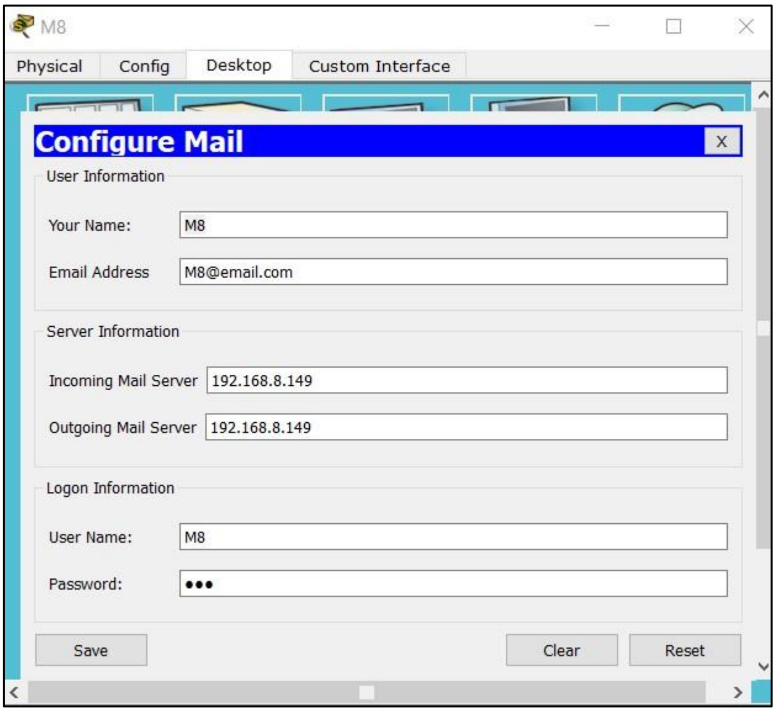


Figure 11.5: Mail Configuration for M8

As the Mail Server is located at 192.168.8.149, all hosts can access this which enables communication between the BRANCHES and HQ network. Shown below, an email is sent from G1 host and received by the J1 host.

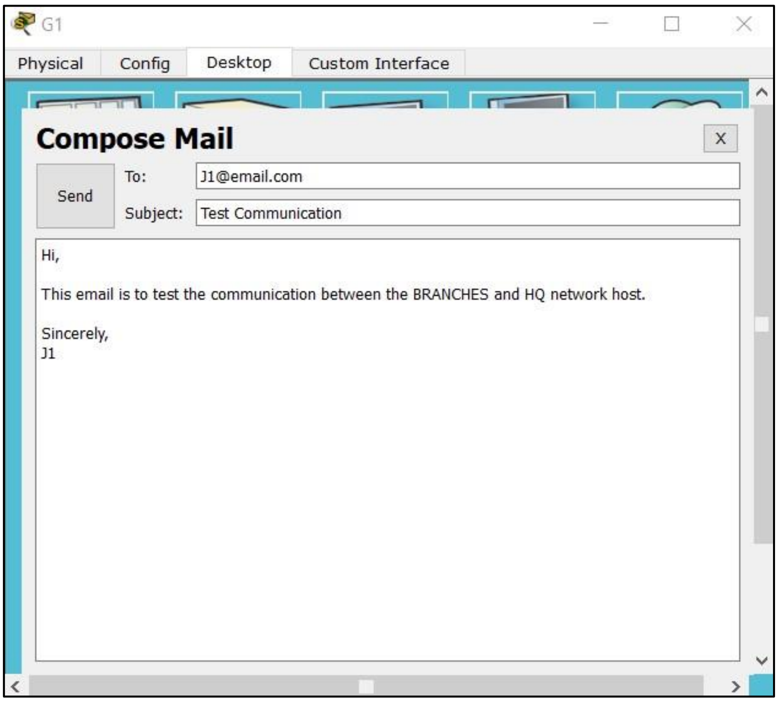


Figure 11.6: Composing Email from G1

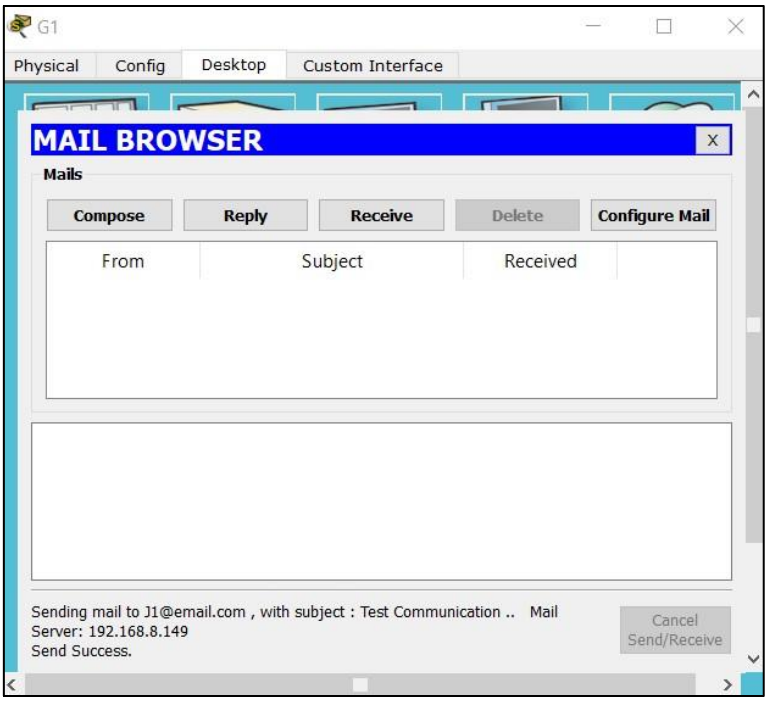


Figure 11.7: Sent Email from G1

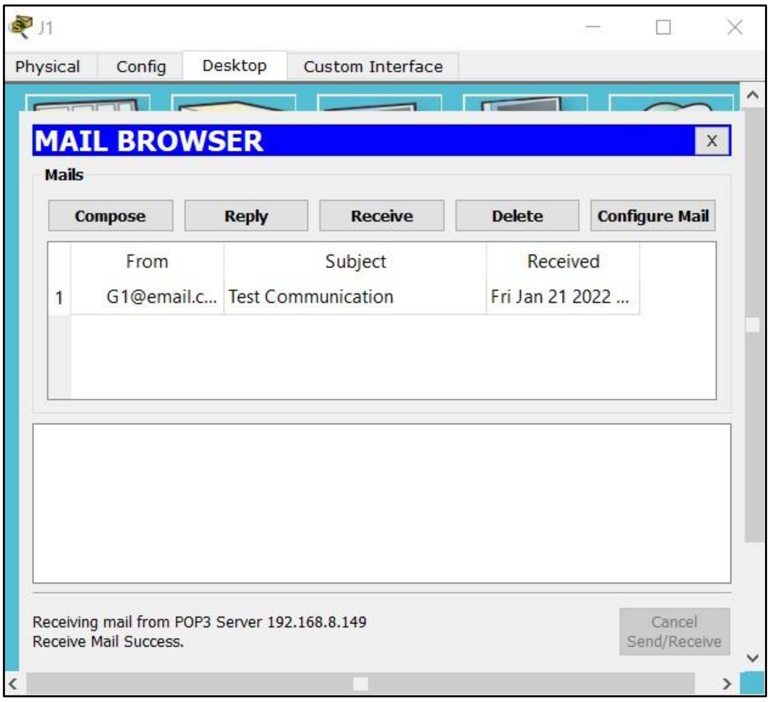


Figure 11.8: Mail Received by J1

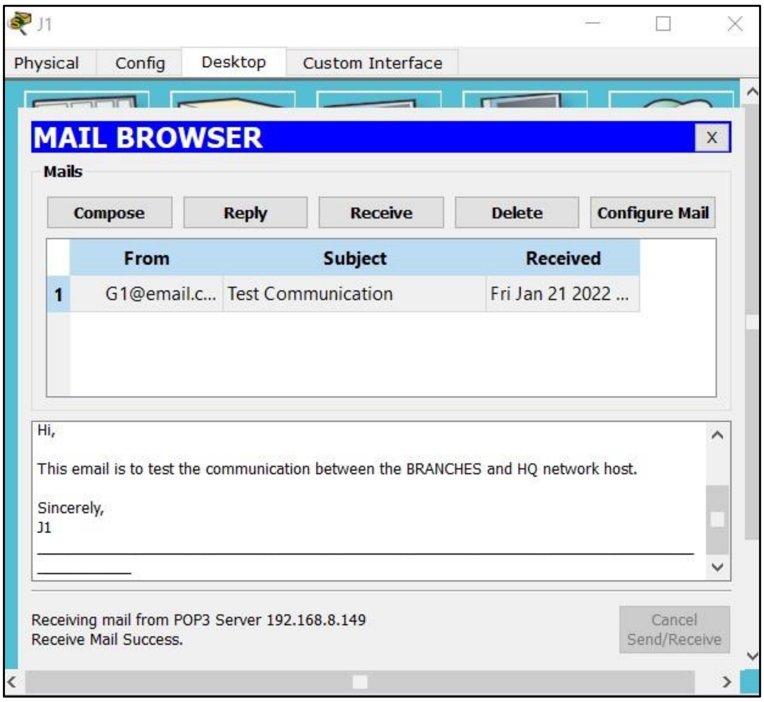


Figure 11.9: Mail Received by J1 Verified

12.0 Requirement 8

To build a webpage, html code was used. All group member names were added and two different colours were used. Individual pictures were also added as stated in the requirement. The pictures can be accessed by the links under the main body of text.

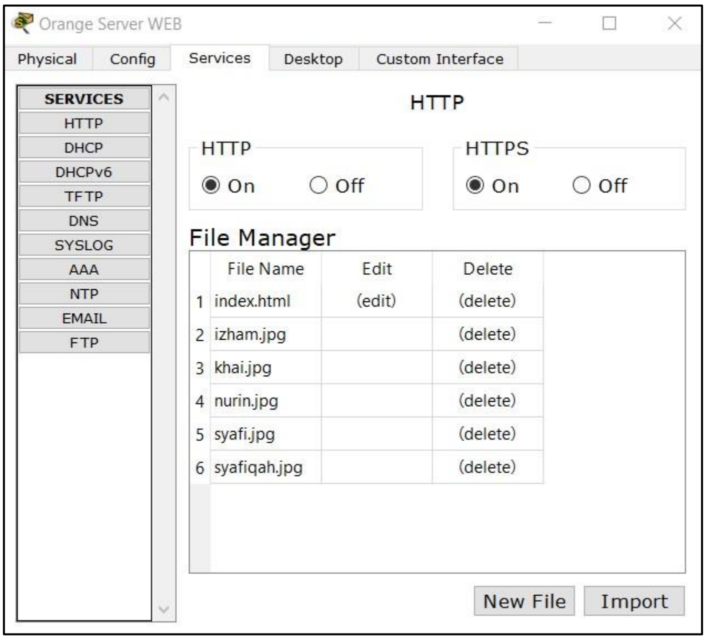


Figure 12.1: Adding Image Files

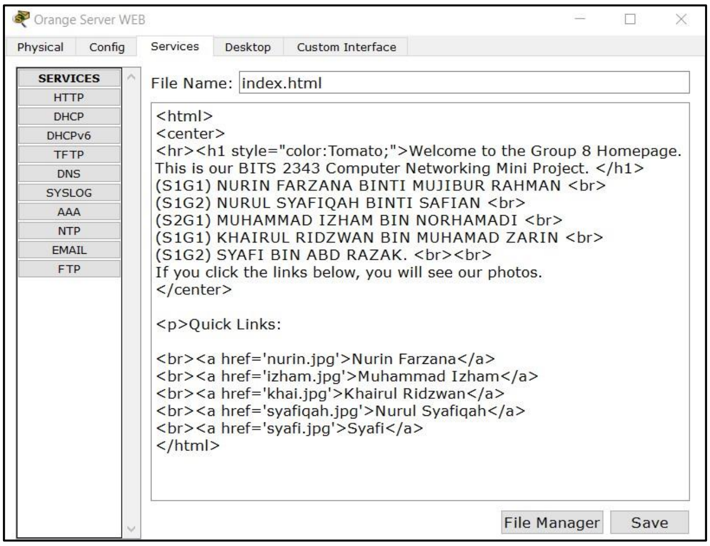


Figure 12.2: Editing HTML Code

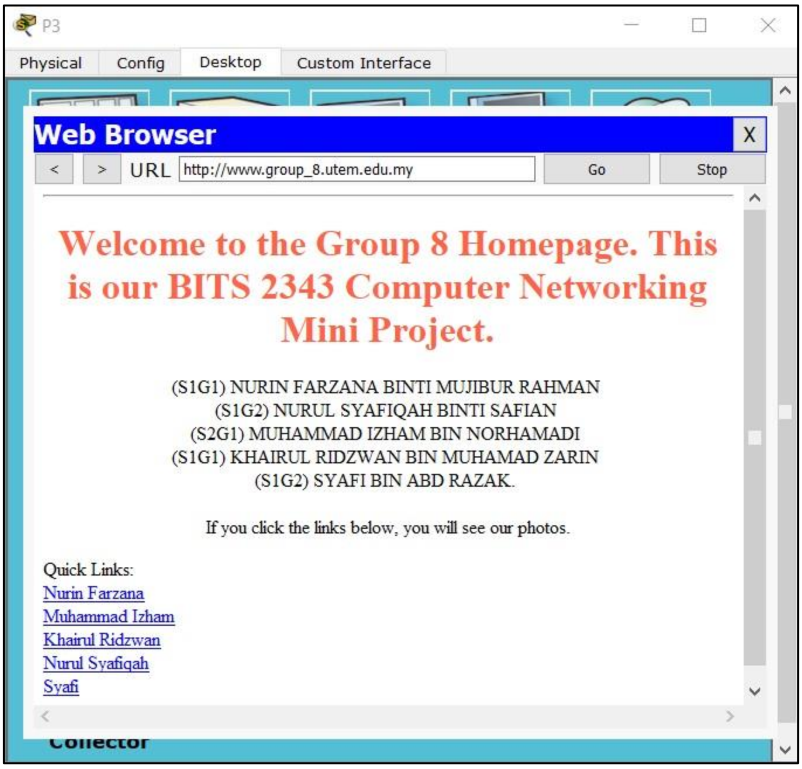


Figure 12.3: Searching for Webpage from P3

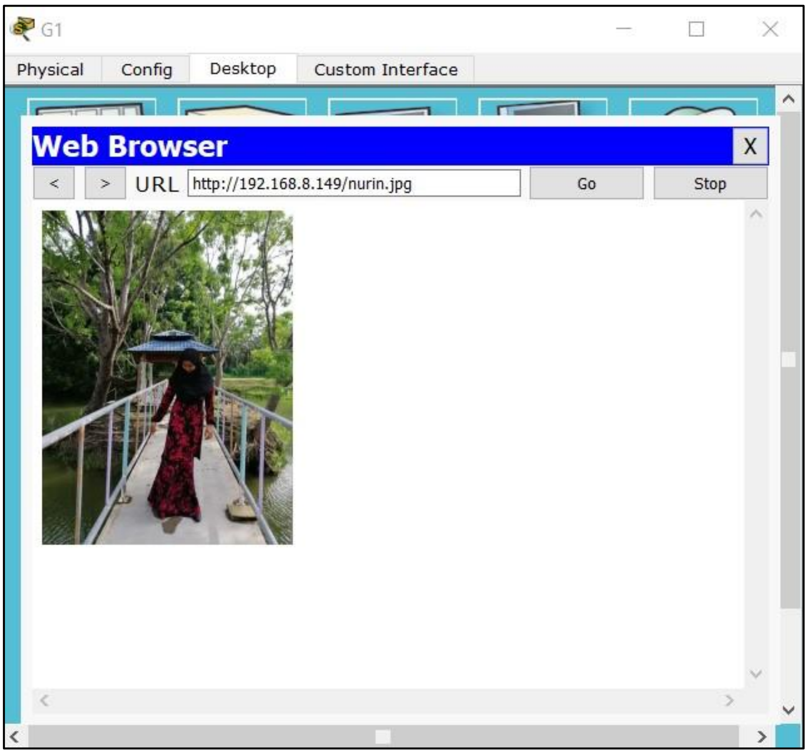


Figure 12.4: Group Member Images from Web Page from G1

13.0 Conclusion

In conclusion, the mini project was a success as all requirements were met satisfactorily. As a group, we were able to demonstrate our proficiency in developing a simulated network using packet tracer. We were able to implement access control lists as well as virtual local area network (VLAN) networks. Moreover, we displayed our ability to set up DHCP, DNS and Mail servers successfully.