Discipline

VLAN, Static Routing, DNS and DHC

CS5001

Assignment 2

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❖ Lab Assignment:

1) Cisco basic commands outcomes (5 Basic and 5 Advanced Commands).
2) VLAN and VTP Configurations (5 VLANs and Trunk Protocol Routings).
3) Static Routing and Access List (3 Static Routing and 3 ACLs).
4) DNS and DHCP (Basic Configurations).

❖ Solution:

Sol 1)

➢ *Basic Commands:*

Snos.	Commands	Use
1	enable secret	Set password to enter privileged exec (enable) mode.
2	no ip http server	Disable HTTP interface.
3	ipv6 unicast-routing	Activate the ipv6 interface.
4	no shutdown	Activate this interface.
5	ipv6 dhcp pool <name>	Used to create the dhcp pool for ip version 6 addresses.

1) *enable secret*

   It will enable a password and password encryption that based on the md5 hashing algorithm. This is a most recommended command to supply while enabling a password to any cisco network devices.

2) *no ip http server*

   To disable an HTTP server, use the no form of this command. Example:

   Router(config)# no ip http server

3) *ipv6 unicast-routing*

   Allow user to add ip version 6 and enables unicast routing.

4) *no shutdown*

To Activate the interface, changes the status from down to up.

5) *ipv6 dhcp pool <name>*

Configure dhcp for ipv6 and enter the pool information. By default, the dhcp for ipv6 is disabled that is why we use this command to state it up. We use this command in global configuration mode. Example:

Router(config)# ipv6 dhcp pool tadeeb

- *Advance Commands:*

Snos.	Commands	Use
1	ip access-group <number> <in|out>	Apply access-list to traffic going into/out of this interface.
2	aaa new-model	Enable new access control commands and functions.
3	show ipv6 neighbors	Use the show ipv6 neighbors command in User EXEC or Privileged EXEC mode to display IPv6 neighbor discovery (ND) cache information.
4	sntp server	The sntp server Global Configuration mode command configures the device to use the SNTP to request and accept Network Time Protocol (NTP) traffic from a specified server (meaning to accept system time from an SNTP server). Use the no form of this command to remove a server from the list of SNTP servers.
5	ipv6 Router Rip abc enable	Enables the dynamic routing protocol rip for ip version 6 naming group abc.

1) *ip access-group <number> <in | out>*

Apply access-list to traffic going into/out of this interface.

2) *aaa new-model*

Radius provides centralized authentication, authorization, accounting and management for users who connect and use a network service and this command use to create a new authentication model.

3) show ipv6 neighbors

Syntax show ipv6 neighbors [interface-id | ipv6-address | ipv6-hostname]
Parameters

- interface-id—Specifies the identifier of the interface from which IPv6 neighbor information is to be displayed.
- ipv6-address—Specifies the IPv6 address of the neighbor. This argument must be in the form documented in RFC4293 where the address is specified in hexadecimal using 16-bit values between colons.
- ipv6-hostname—Specifies the IPv6 host name of the remote networking device.

4) *sntp server*

Syntax sntp server {ip-address | hostname} [poll] [key keyid] no sntp server {ip-address | hostname

5) *ipv6 Router Rip abc enable*

The above command enables the dynamic routing protocol rip for ip version 6 naming group abc (In rip routing we need to create a group name).

Sol 2) VLAN and VTP Configurations

- *VLAN Configuration: -*

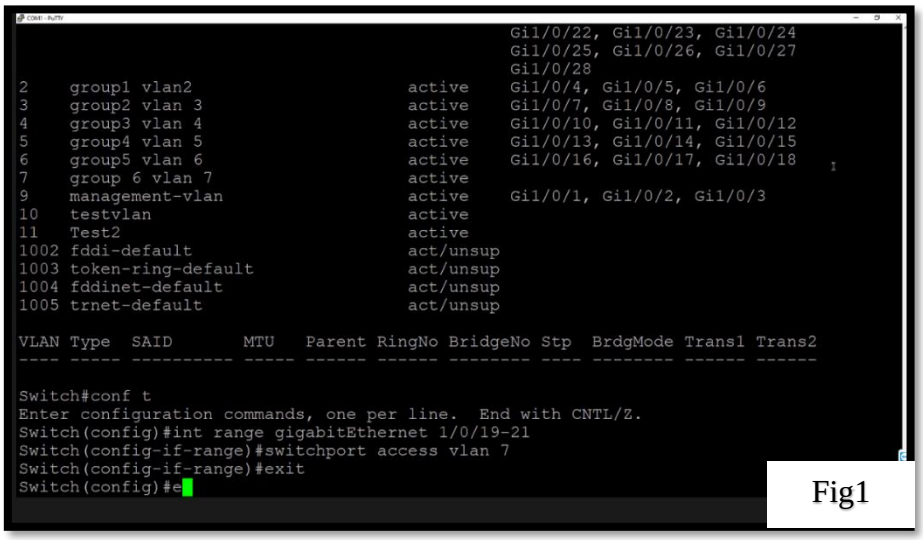


Fig1

switch(config)# vlan 7

switch(config-vlan)# name group 6 vlan 7

switch(config-vlan)# exit

switch(config)# interface range gigabitEthernet 1/0/19-21

switch(config-if-range)# switchport access vlan 7

switch(config-if-range)# exit

switch(config)# do sh vlan

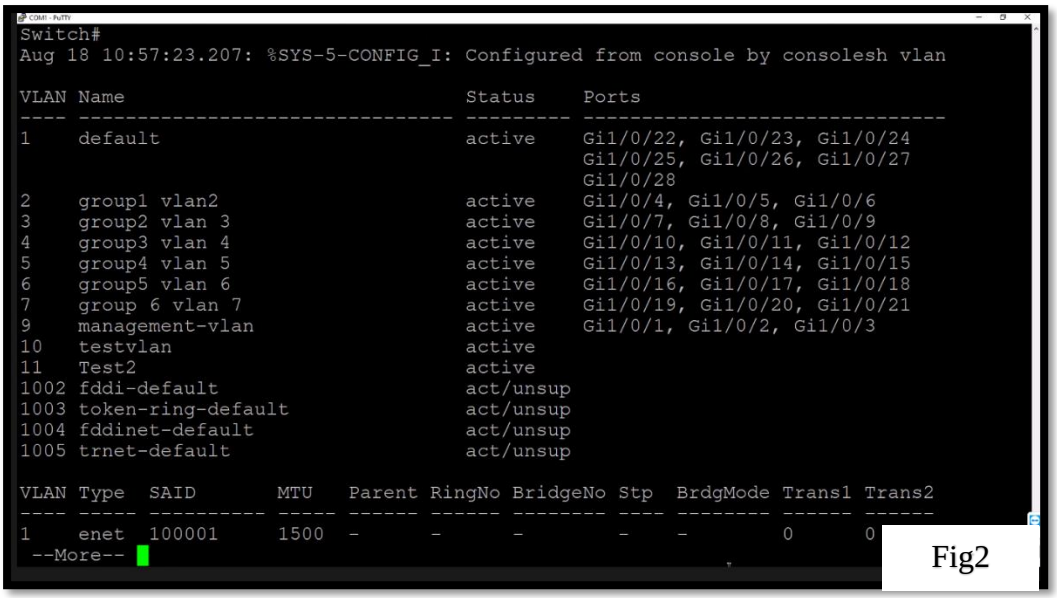


Fig2

When we just created the vlan our vlan was active with group 6 vlan 7, after adding ports, port number 19,20,21 is assigned to our vlan 7 which can be seen in fig 2.

switch(config)# vlan 6

switch(config-vlan)# name tadeeb1

switch(config-vlan)# exit

switch(config)# interface range gigabitEthernet 1/0/22-24

switch(config-if-range)# switchport access vlan 6

switch(config-if-range)# exit

switch(config)# do sh vlan

switch(config)# vlan 5

switch(config-vlan)# name tadeeb2

switch(config-vlan)# exit

switch(config)# interface range gigabitEthernet 1/0/25-27

switch(config-if-range)# switchport access vlan 5

switch(config-if-range)# exit

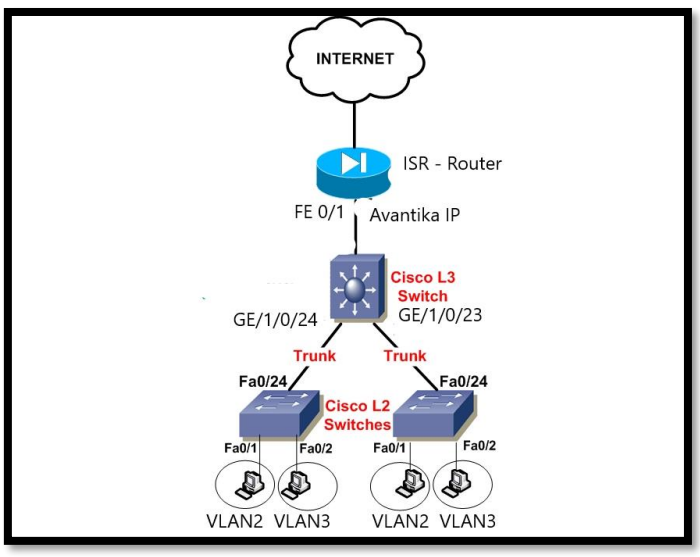
switch(config)# do sh vlan

```
switch(config)# vlan 4
switch(config-vlan)# name tadeeb3
switch(config-vlan)# exit
switch(config)#  interface range gigabitEthernet 1/0/4-6
switch(config-if-range)# switchport access vlan 4
switch(config-if-range)# exit
switch(config)#  do sh vlan
```

```
switch(config)# vlan 3
switch(config-vlan)# name tadeeb4
switch(config-vlan)# exit
switch(config)#  interface range gigabitEthernet 1/0/7-9
switch(config-if-range)# switchport access vlan 3
switch(config-if-range)# exit
switch(config)#  do sh vlan
```

- *VTP Configuration (VLAN Truncking Protocol):*

VTP protocol is used to carry VLAN information to all the switch into the VTP domain. In VTP there are two modes server and client. Server Mode provide VLAN information for client mode in a switch. Client Mode switch automatically synchronize VLAN information from the server switch.



```
! Create VLANs 7 and 8 in the switch database

Layer2-Switch# configure terminal
Layer2-Switch(config)# vlan 7
Layer2-Switch(config)# name Group6
Layer2-Switch(config-vlan)# exit

Layer2-Switch(config)# vlan 8
Layer2-Switch(config-vlan)# name Group 7
Layer2-Switch(config-vlan)# exit

! Assign Port Fe0/1 in VLAN 7

Layer2-Switch(config)# interface fastethernet0/1
Layer2-Switch(config-if)# switchport mode access
Layer2-Switch(config-if)# switchport access vlan 7
Layer2-Switch(config-if)# exit

! Assign Port Fe0/2 in VLAN 8


Layer2-Switch(config)# interface fastethernet0/2
Layer2-Switch(config-if)# switchport mode access
Layer2-Switch(config-if)# switchport access vlan 8
Layer2-Switch(config-if)# exit

! Create Trunk Port Fe0/24
Layer2-Switch(config)# interface fastethernet0/24
Layer2-Switch(config-if)# switchport trunk encapsulation dot1q
Layer2-Switch(config-if)# switchport mode trunk
Layer2-Switch(config-if)# exit
```

Hence, we have truncated layer 2 both the switch with fast ethernet port 0/24 this port will communicate to layer 3 truncated port for VLAN information.

```
! Enable Layer 3 routing
Layer3-Switch(config) # ip routing

! Create VLANs 7 and 8 in the switch database
Layer3-Switch# configure terminal
Layer3-Switch(config)# vlan 7
Layer3-Switch(config)# name Group 6

Layer3-Switch(config-vlan)# exit
```

```
! Create Trunk Ports GE0/24 GE0/43
Layer3-Switch(config)# interface GE0/24
Layer3-Switch(config-if)# switchport trunk encapsulation dot1q
Layer3-Switch(config-if)# switchport mode trunk
Layer3-Switch(config-if)# exit

Layer3-Switch(config)# interface GE0/23
Layer3-Switch(config-if)# switchport trunk encapsulation dot1q
Layer3-Switch(config-if)# switchport mode trunk
Layer3-Switch(config-if)# exit

! Configure Switch Vlan Interfaces (SVI)
Layer3-Switch(config)# interface vlan 7
Layer3-Switch(config-if)# ip address 192.168.1.192 255.255.255.224
Layer3-Switch(config-if)# no shut



Layer3-Switch(config)# interface vlan 8
Layer3-Switch(config-if)# ip address 192.168.1.224 255.255.255.224
Layer3-Switch(config-if)# no shut
```

Hence, we have created VTP between layer 2 switches which will communicate through layer 3 switch with their respective VLAN's. Also, we have initiated dhcp-ip to respective VLAN's i.e., 7 and 8 for which you'll see the dhcp configuration below:

Sol 3) Static Routing & Access List:

- *Static Routing:*

```
Layer3-Switch(config)# vlan 7
Layer3-Switch(config-vlan)# name group6
Layer3-Switch(config-vlan)# exit

Layer3-Switch(config)# int vlan 7
Layer3-Switch(config-if)# ip add 192.168.1.193 255.255.255.224
Layer3-Switch(config-if)# no shut
```

```
Layer3-Switch(config-if)# exit

Layer3-Switch(config)# ip dhcp pool vlan7
Layer3-Switch(dhcp-config)# network 192.168.1.192 255.255.255.224
Layer3-Switch(dhcp-config)# default-router 192.168.1.193
Layer3-Switch(dhcp-config)# dns-server 8.8.8.8
Layer3-Switch(dhcp-config)# exit

Layer3-Switch(config)# ip dhcp excluded-address 192.168.1.193
```

Hence, we have created all the parameters for Layer3-switch and now we will configure switch 2 from Layer3-switch only.

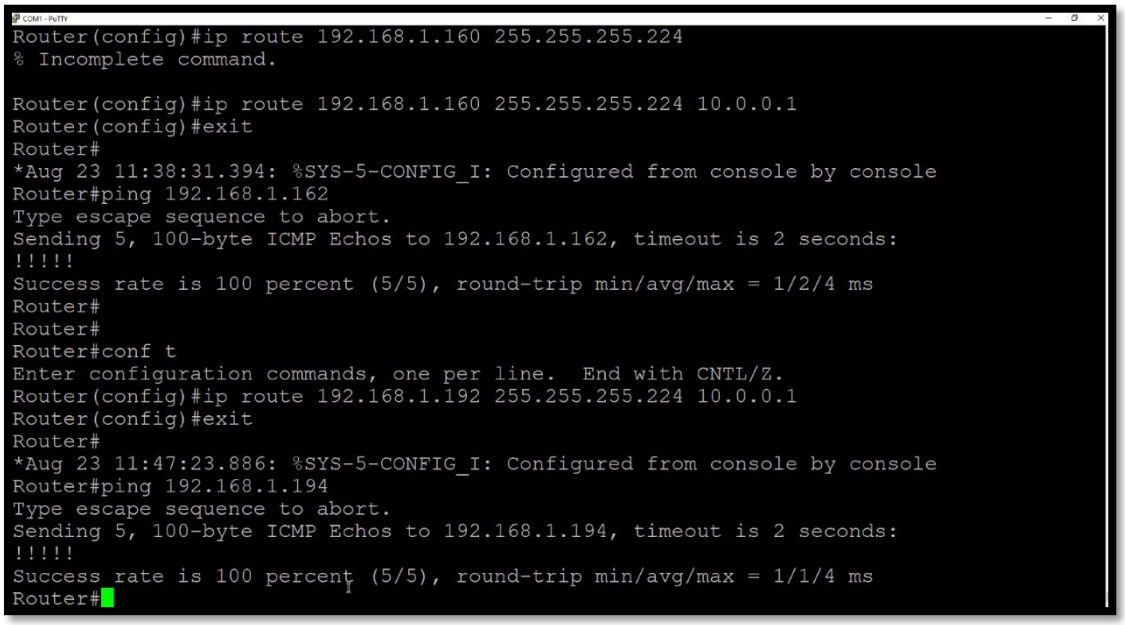
```
Layer3-Switch# telnet 192.168.1.3
Password: cisco
L2_1_SW# en
Password: cisco
L2_1_SW# conf t
L2_1_SW(config)# do sh vlan

Add any unassigned port to the vlan 7

L2_1_SW(config)# int gi 1/0/12
L2_1_SW(config-if)# switchport access vlan 7
L2_1_SW(config-if)# exit
```

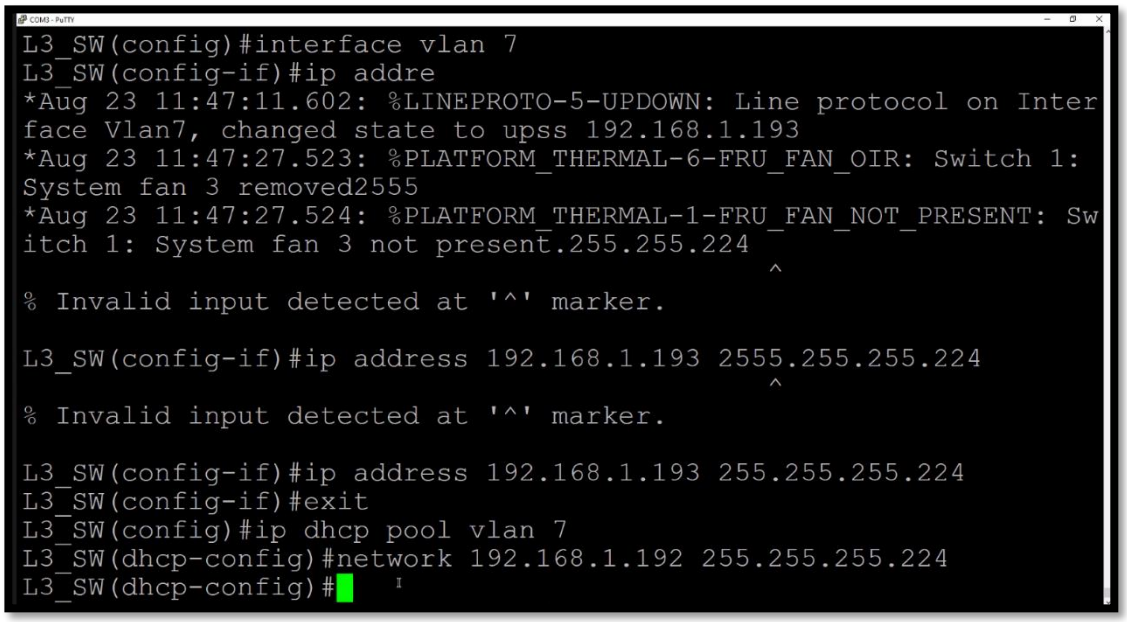
Now we have done everything and both the switches information of vlan are provided and we will static route the path.

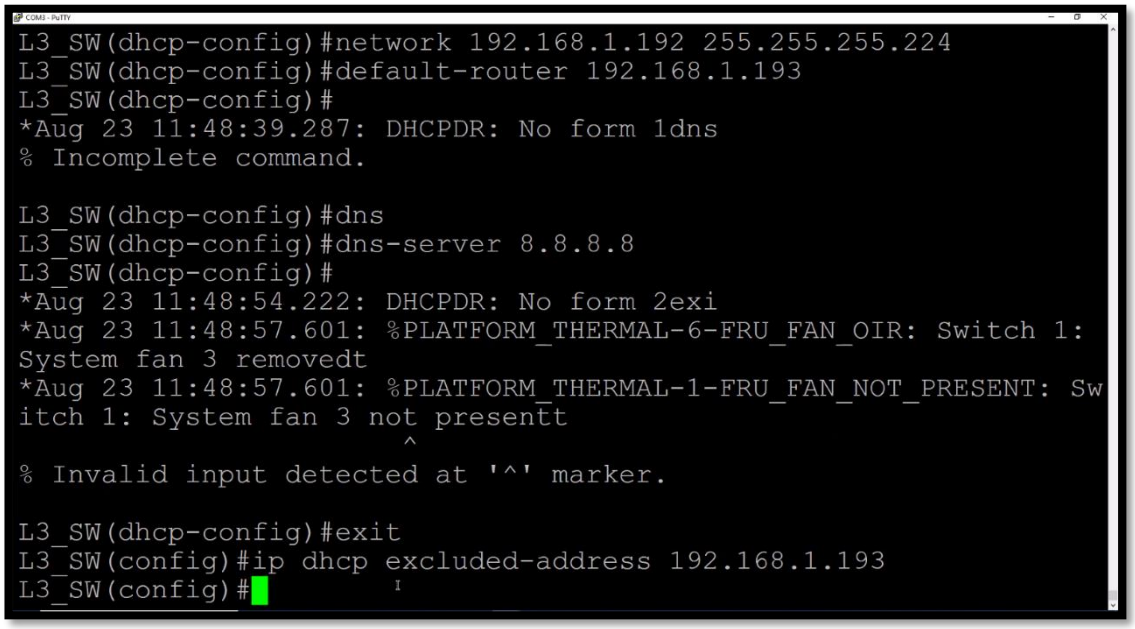
```
Router(config)# ip route 192.168.1.192 255.255.255.224 10.0.0.1

Router# Ping 192.168.1.194
```

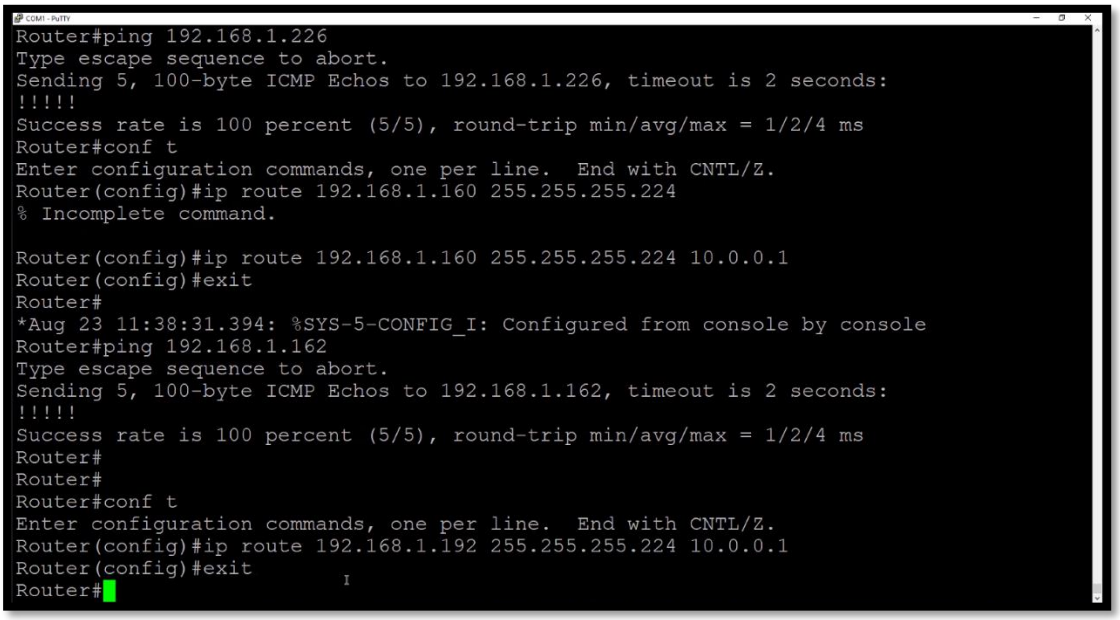
- *Output:*

  Below are the output snapshots of the configuration we did:

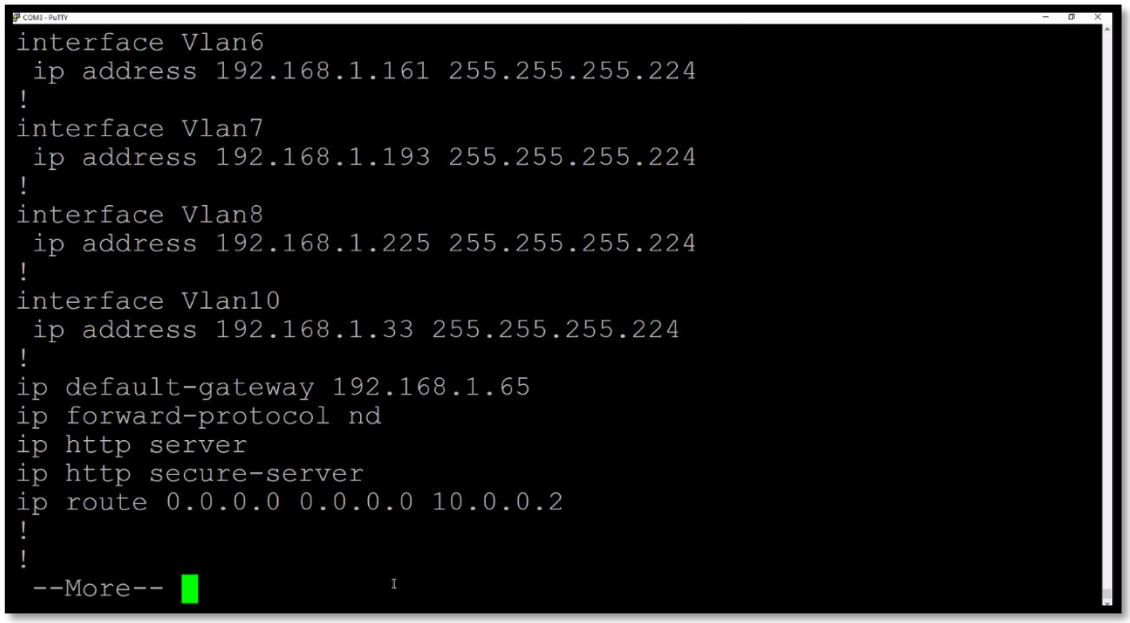

Router(config)#ip route 192.168.1.160 255.255.255.224
% Incomplete command.
Router(config)#ip route 192.168.1.160 255.255.255.224 10.0.0.1
Router(config)#exit
Router#
*Aug 23 11:38:31.394: %SYS-5-CONFIG_I: Configured from console by console
Router#ping 192.168.1.162
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.162, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
Router#
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 192.168.1.192 255.255.255.224 10.0.0.1
Router(config)#exit
Router#
*Aug 23 11:47:23.886: %SYS-5-CONFIG_I: Configured from console by console
Router#ping 192.168.1.194
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.194, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
Router#


L3_SW(config)#interface vlan 7
L3_SW(config-if)#ip addre
*Aug 23 11:47:11.602: %LINEPROTO-5-UPDOWN: Line protocol on Inter
face Vlan7, changed state to upss 192.168.1.193
*Aug 23 11:47:27.523: %PLATFORM_THERMAL-6-FRU_FAN_OIR: Switch 1:
System fan 3 removed2555
*Aug 23 11:47:27.524: %PLATFORM_THERMAL-1-FRU_FAN_NOT_PRESENT: Sw
itch 1: System fan 3 not present.255.255.224
^
% Invalid input detected at '^' marker.
L3_SW(config-if)#ip address 192.168.1.193 2555.255.255.224
^
% Invalid input detected at '^' marker.
L3_SW(config-if)#ip address 192.168.1.193 255.255.255.224
L3_SW(config-if)#exit
L3_SW(config)#ip dhcp pool vlan 7
L3_SW(dhcp-config)#network 192.168.1.192 255.255.255.224
L3_SW(dhcp-config)#


L3_SW(dhcp-config)#network 192.168.1.192 255.255.255.224
L3_SW(dhcp-config)#default-router 192.168.1.193
L3_SW(dhcp-config)#
*Aug 23 11:48:39.287: DHCPDR: No form 1dns
% Incomplete command.
L3_SW(dhcp-config)#dns
L3_SW(dhcp-config)#dns-server 8.8.8.8
L3_SW(dhcp-config)#
*Aug 23 11:48:54.222: DHCPDR: No form 2exi
*Aug 23 11:48:57.601: %PLATFORM_THERMAL-6-FRU_FAN_OIR: Switch 1:
System fan 3 removedt
*Aug 23 11:48:57.601: %PLATFORM_THERMAL-1-FRU_FAN_NOT_PRESENT: Sw
itch 1: System fan 3 not presentt
^
% Invalid input detected at '^' marker.
L3_SW(dhcp-config)#exit
L3_SW(config)#ip dhcp excluded-address 192.168.1.193
L3_SW(config)#



```
Router#ping 192.168.1.226
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.226, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 192.168.1.160 255.255.255.224
% Incomplete command.

Router(config)#ip route 192.168.1.160 255.255.255.224 10.0.0.1
Router(config)#exit
Router#
*Aug 23 11:38:31.394: %SYS-5-CONFIG_I: Configured from console by console
Router#ping 192.168.1.162
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.162, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
Router#
Router#
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 192.168.1.192 255.255.255.224 10.0.0.1
Router(config)#exit
Router#
```



```
interface Vlan6
 ip address 192.168.1.161 255.255.255.224
!
interface Vlan7
 ip address 192.168.1.193 255.255.255.224
!
interface Vlan8
 ip address 192.168.1.225 255.255.255.224
!
interface Vlan10
 ip address 192.168.1.33 255.255.255.224
!
ip default-gateway 192.168.1.65
ip forward-protocol nd
ip http server
ip http secure-server
ip route 0.0.0.0 0.0.0.0 10.0.0.2
!
!
 --More--
```

```
9, Gi1/0/20
                                                Gi1/0/21, Gi1/0/2
2, Gi1/0/23
                                                Gi1/0/25, Gi1/0/2
6, Gi1/0/27
                                                Gi1/0/28
3    group2                             active    Gi1/0/2, Gi1/0/5
4    group5                             active    Gi1/0/6
5    group4                             active    Gi1/0/7
6    group3                             active    Gi1/0/9
7    group6                             active
8    group7                             active    Gi1/0/8
10   VLAN0010                           active    Gi1/0/4
20   VLAN0020                           active
30   VLAN0030                           active
300  VLAN0300                           active
1002 fddi-default                       act/unsup
1003 trcrf-default                      act/unsup
1004 fddinet-default                    act/unsup
 --More--
```

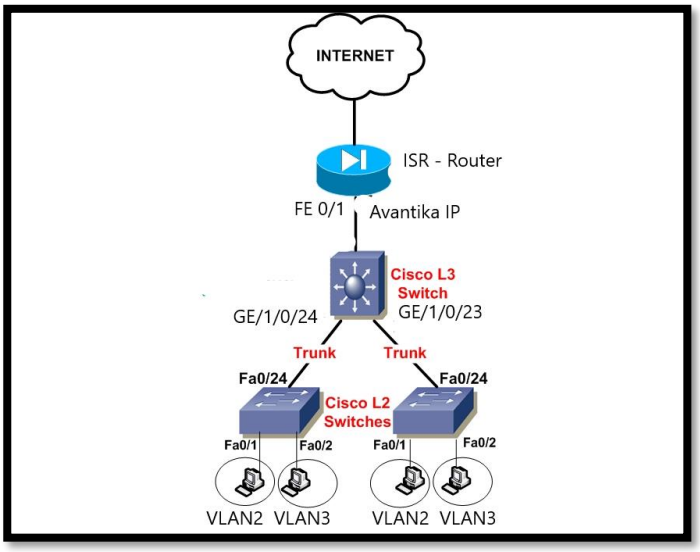
➢ *Access List*

- *ACL command Format: -*

Access-list [acl type] [permission] [protocol] host [IP address applying permission] host [providing Ip] port name

This is used to check whether our IP is pinging to the host or not but it is accessing the host.

- *Diagram:*



In the above diagram we can see that layer 3 switch is in VTP configuration (explained above in VTP part) with layer 2 switches as we are configuring for our group and my neighbor group **VLAN2 and VLAN3 will become VLAN7 & VLAN8**. Below is the ACL configuration.

! Create ACL to control traffic between VLAN 7 to VLAN 8

Layer3-Switch(config)# ip access-list extended ACL1020

Explanation	The above cmd will access the ACL group.

Layer3-Switch(config-ext-nacl)# permit ip host 192.168.1.193 host 192.168.1.225

Explanation	The above cmd state the permitted IP range who can send/receive data.

Layer3-Switch(config-ext-nacl)# deny ip 192.168.1.192 0.0.0.255 192.168.1.224 0.0.0.255

Explanation	The above cmd will deny the traffic coming from 192.168.1.224

Layer3-Switch(config-ext-nacl)# permit ip 192.168.1.192 0 0.0.0.255 any

Explanation	The above cmd will permit the traffic coming from any network to 192.168.1.192

Layer3-Switch(config-ext-nacl)# exit

- *ACL Configuration (Extras): -*

Router(config)# Access-list 110 deny ICMP host 192.168.1.3 host 192.168.2.3 echo

Explanation	The above command states that providing traffic filter over the router of extended ACL type denying the ICMP protocol (Internet Control Messaging Protocol - used for collision detection). Coming from Network host address 192.168.2.3 denied at our network host 192.168.1.3 at port echo.

Router(config)# Access-list 110 permit tcp any any

Explanation	The above extended ACL command used to permit our network hosts to send/receive data to another network hosts over tcp.

Sol 4) DNS and DHCP (Basic Configurations)

switch# config t

switch(config)# ip dhcp pool group 6

Explanation	Creates a DHCP pool called internal

switch(dhcp-config)# network 192.168.1.192 255.255.255.224

Explanation	Defines the range of addresses to be leased.

switch(dhcp-config)# default-router 192.168.1.192

Explanation	Defines the address of the default router for the client.

switch(dhcp-config)# dns-server 8.8.8.8

Explanation	Defines the address of the Domain Name System (DNS) server for the client.

switch(dhcp-config)# domain-name tadeebAvantika

Explanation	Defines the domain name for the client.

switch(dhcp-config)# lease 14 11 59

Explanation	Defines the lease time to be 14 days, 11 hours, 59 minutes.

switch(dhcp-config)# exit

Explanation	Returns to global configuration mode.

switch(config)# ip dhcp excluded-address 192.168.1.192

Explanation	Specifies the range of addresses not to be leased out to clients.

switch(config)# exit

switch# show run