Experiment No. 01 - Basic switch router and End Devices configuration.

Switch Configuration

Switch>enable

Switch#config t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname switch1

switch1(config)#line console 0

switch1(config-line)#password cisco

switch1(config-line)#login

switch1(config-line)#enable secret class

switch1(config)#line vty 0 15

switch1(config-line)#password remote

switch1(config-line)#exit

switch1(config)#

switch1(config)#banner motd "WELCOME TO SWITCH1"

switch1(config)#exit

switch1#

%SYS-5-CONFIG_I: Configured from console by console

switch1#service password

switch1#config t

Enter configuration commands, one per line. End with CNTL/Z.

switch1(config)#service

switch1(config)#service pass

switch1(config)#service password-encryption

switch1(config)#exit

switch1#

switch1#

switch1#copy running

switch1#copy running-config start

switch1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]switch1#exit

Physical Config CLI Attributes

IOS Command Line Interface

```
switch1#show running-config
Building configuration...

Current configuration : 1246 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname switch1
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
```

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 no ip address
 shutdown
!
banner motd ^CWELCOME TO SWITCH1^C
!
!
!
line con 0
 password 7 0822455D0A16
 login
!
line vty 0 4
 password 7 08334943060D00
 login
line vty 5 15
 password 7 08334943060D00
 login
!
!
!
!
end
```

Router Configuration

Router>enable

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R1

R1(config)#interface

R1(config)#interface Gigabit

R1(config)#interface GigabitEthernet 0/0/0

R1(config-if)#ip address 192.168.1.1 255.255.255.0

R1(config-if)#no shutdown

R1(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#exit

R1(config)#interface gigabit

R1(config)#interface gigabitEthernet 0/0/1

R1(config-if)#ip address 192.168.2.1 255.255.255.0

R1(config-if)#no shutdown

R1(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1,

changed state to up

R1(config-if)#exit

R1(config)#

R1#

Experiment No: 02- Configure and verify VLANs on a Switched network

Switch#config t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#vlan 10

Switch(config-vlan)#name computer

Switch(config-vlan)#exit

Switch(config)#interface range fa0/1-7

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 10

Switch(config-if-range)#exit

Switch(config)#vlan 20

Switch(config-vlan)#name electronics

Switch(config-vlan)#exit

Switch(config)#interface range fa0/8-14

Switch(config-if-range)# switchport mode access

Switch(config-if-range)# switchport access vlan 20

Switch(config-if-range)# exit

Switch(config)#exit

Switch#

```
Switch#show vlan brief

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

Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch#show running-config
Building configuration...

Current configuration : 1872 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Switch
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/3
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/4
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/5
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/6
 switchport access vlan 10
```

Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
interface FastEthernet0/6
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/7
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/8
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/9
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/10
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/11
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/12
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/13
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/14
 switchport access vlan 20
 switchport mode access
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
```

Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 no ip address
 shutdown
!
!
!
!
line con 0
 password 7 0822455D0A16
 login
!
line vty 0 4
 login
line vty 5 15
 login
!
!
!
!
end


Switch#
Switch#
```

PC0

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.5

Pinging 192.168.10.5 with 32 bytes of data:

Reply from 192.168.10.5: bytes=32 time=1ms TTL=128
Reply from 192.168.10.5: bytes=32 time<1ms TTL=128
Reply from 192.168.10.5: bytes=32 time=1ms TTL=128
Reply from 192.168.10.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.10.7

Pinging 192.168.10.7 with 32 bytes of data:

Reply from 192.168.10.7: bytes=32 time<1ms TTL=128
Reply from 192.168.10.7: bytes=32 time<1ms TTL=128
Reply from 192.168.10.7: bytes=32 time=1ms TTL=128
Reply from 192.168.10.7: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Experiment No: 03- Configuration and testing of Inter-VLAN Routing on a switched network.

Router(config)#interface g0/0/0.10

Router(config-subif)#encapsulation dot1q 10

Router(config-subif)#ip address 192.168.10.1 255.255.255.0

Router(config-subif)#no shutdown

Router(config-subif)#exit

Router(config)#interface g0/0/0.20

Router(config-subif)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1.20, changed state to up

Router(config-subif)#encapsulation dot1q 20

Router(config-subif)#ip address 192.168.20.1 255.255.255.0

Router(config-subif)#no shutdown

Router(config-subif)#exit

Router(config)#exit

Router#

```
Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   unassigned      YES manual up                    up
GigabitEthernet0/0/0.10192.168.10.1    YES manual up                    up
GigabitEthernet0/0/0.20unassigned      YES unset  up                    up
GigabitEthernet0/0/1   unassigned      YES manual up                    up
GigabitEthernet0/0/1.20192.168.20.1    YES manual up                    up
GigabitEthernet0/0/2   unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
Vlan10                 unassigned      YES unset  down                  down
Router#
```

```
Router>enable
Router#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
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

     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0/0.10
L       192.168.10.1/32 is directly connected, GigabitEthernet0/0/0.10
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0/1.20
L       192.168.20.1/32 is directly connected, GigabitEthernet0/0/1.20
```

Router1

Physical Config CLI Attributes

IOS Command Line Interface

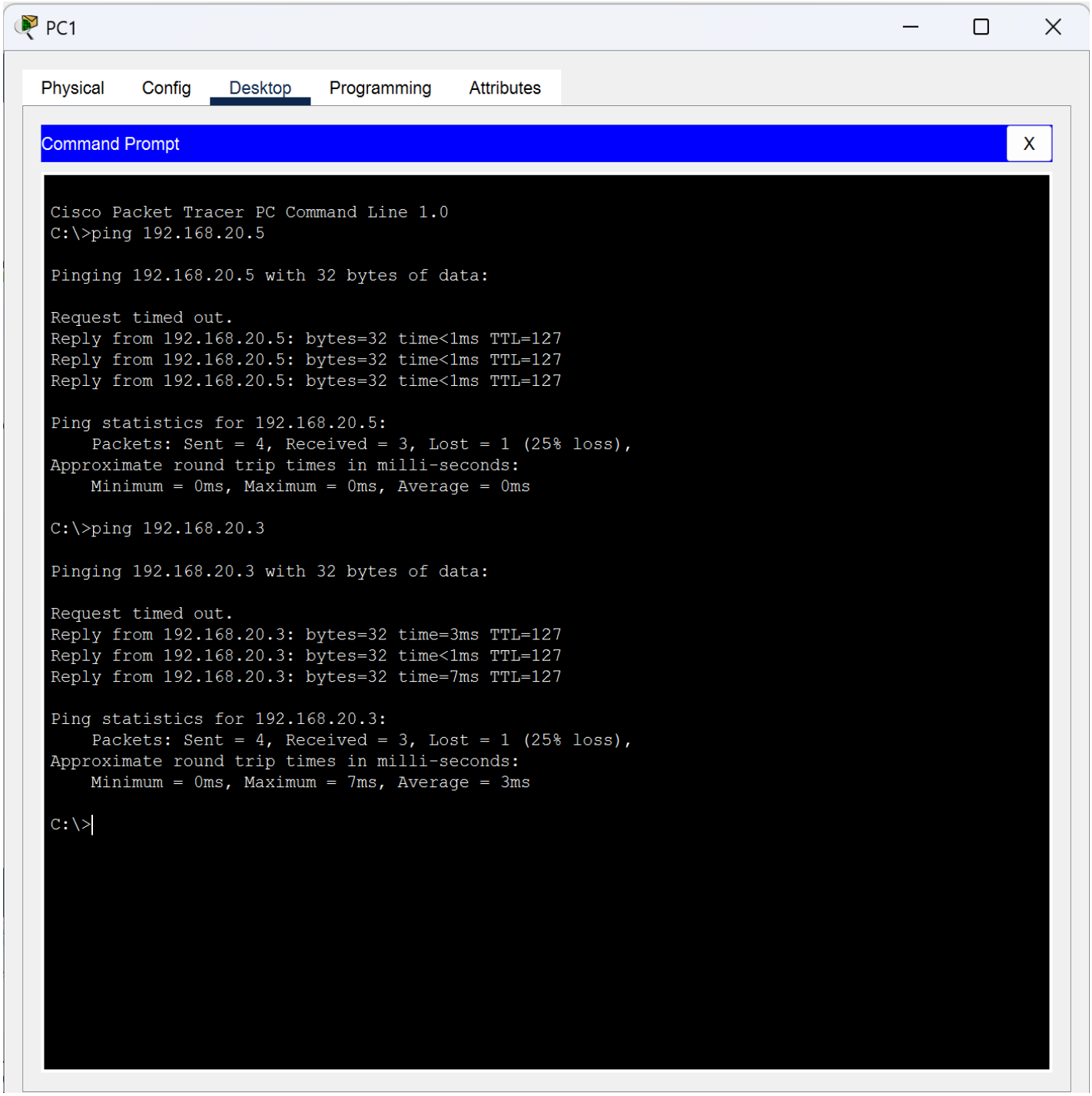
```
Router#show running-config
Building configuration...

Current configuration : 982 bytes
!
version 15.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0/0
 description computer
 no ip address
```

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface GigabitEthernet0/0/0
 description computer
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/0.10
 encapsulation dot1Q 10
 ip address 192.168.10.1 255.255.255.0
!
interface GigabitEthernet0/0/0.20
 no ip address
!
interface GigabitEthernet0/0/1
 description electronics
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/1.20
 encapsulation dot1Q 20
 ip address 192.168.20.1 255.255.255.0
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
interface Vlan10
 mac-address 0050.0f68.9d01
 no ip address
!
ip classless
!
ip flow-export version 9
!
!
!
```


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.5
Pinging 192.168.20.5 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.5: bytes=32 time<1ms TTL=127
Reply from 192.168.20.5: bytes=32 time<1ms TTL=127
Reply from 192.168.20.5: bytes=32 time<1ms TTL=127
Ping statistics for 192.168.20.5:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=3ms TTL=127
Reply from 192.168.20.3: bytes=32 time<1ms TTL=127
Reply from 192.168.20.3: bytes=32 time=7ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 7ms, Average = 3ms
C:\>

Experiment No: 04- Configure and verify Ether Channel on a Switched Network.

Switch0(config)# interface range fa0/1 - 2

Switch0(config-if-range)# shutdown

Switch0(config-if-range)# switchport mode trunk

Switch0(config-if-range)# no shutdown

Switch0(config)# interface range fa0/1 - 2

Switch0(config-if-range)# channel-group 1 mode active

Switch0(config-if-range)# exit

Switch1(config)# interface range fa0/1 - 2

Switch1(config-if-range)# switchport mode trunk

Switch1(config-if-range)# channel-group 1 mode passive

Switch1(config-if-range)# exit

```
Switch#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/1(I) Fa0/2(P)
Switch#
```

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch>enable
Switch#show running-config
Building configuration...

Current configuration : 1233 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Switch
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface Port-channel1
 switchport mode trunk
!
interface FastEthernet0/1
 switchport mode trunk
 channel-group 1 mode active
!
interface FastEthernet0/2
 switchport mode trunk
 channel-group 1 mode active
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
```

Copy Paste

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 no ip address
 shutdown
!
!
!
!
line con 0
!
line vty 0 4
 login
line vty 5 15
 login
!
!
!
!
end


Switch#
```

Experiment No: 05-Configure the DHCP server with a pool of IP addresses and verify with clients

Router>enable

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface g0/0/0

Router(config-if)#ip address 192.168.10.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

Router(config-if)#ip dhcp excluded-address 192.168.10.1 192.168.10.10

Router(config)#ip dhcp pool VLAN10_pool

Router(dhcp-config)#network 192.168.10.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.10.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#exit

Router(config)#interface g0/0/1

Router(config-if)#ip address 192.168.20.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

Router(config-if)#ip dhcp excluded-address 192.168.20.1 255.255.255.0

Router(config)#ip dhcp pool VLAN20_pool

Router(dhcp-config)#network 192.168.20.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.20.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#exit

Router(config)#exit

Router#

```
Router#show ip dhcp pool

Pool VLAN10_pool :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 0
 Excluded addresses             : 2
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.10.1         192.168.10.1     - 192.168.10.254    0    / 2     / 254

Pool VLAN20_pool :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 0
 Excluded addresses             : 2
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.20.1         192.168.20.1     - 192.168.20.254    0    / 2     / 254
Router#
```

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show running-config
Building configuration...

Current configuration : 998 bytes
!
version 16.6.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
ip dhcp excluded-address 192.168.10.1 192.168.10.10
ip dhcp excluded-address 192.168.20.1 255.255.255.0
!
ip dhcp pool VLAN10_pool
 network 192.168.10.0 255.255.255.0
 default-router 192.168.10.1
 dns-server 8.8.8.8
ip dhcp pool VLAN20_pool
 network 192.168.20.0 255.255.255.0
 default-router 192.168.20.1
 dns-server 8.8.8.8
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
```

Physical Config CLI Attributes

IOS Command Line Interface

```
interface GigabitEthernet0/0/0
 ip address 192.168.10.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/1
 ip address 192.168.20.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Copy Paste

Experiment No: 06- Configuration and implementation of Static Routing

Router1>enable

Router1#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router1(config)#interface Gigabit

Router1(config)#interface GigabitEthernet 0/0/0

Router1(config-if)#ip address 192.168.1.1 255.255.255.0

Router1(config-if)#no shutdown

Router1(config-if)#

Router1(config)#exit

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

Router1(config)#interface gigabitEthernet 0/0/1

Router1(config-if)#ip address 10.0.0.1 255.255.255.252

Router1(config-if)#no shutdown

Router1(config-if)#exit

Router1(config)#exit

Router1#

Router1#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router1(config)# ip route 192.168.2.0 255.255.255.0 10.0.0.2

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

```
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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/30 is directly connected, GigabitEthernet0/0/1
L       10.0.0.1/32 is directly connected, GigabitEthernet0/0/1
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0/0
S    192.168.2.0/24 [1/0] via 10.0.0.2

Router#
```

Router2(config)# interface g0/0

Router2(config-if)# ip address 10.0.0.2 255.255.255.252

Router2(config-if)# no shutdown

Router2(config)# interface g0/1

Router2(config-if)# ip address 192.168.2.1 255.255.255.0

Router2(config-if)# no shutdown

Router2(config)# ip route 192.168.1.0 255.255.255.0 10.0.0.1

```
Router>enable
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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/30 is directly connected, GigabitEthernet0/0/1
L       10.0.0.2/32 is directly connected, GigabitEthernet0/0/1
S    192.168.1.0/24 [1/0] via 10.0.0.1
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0/0

Router#
```

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface GigabitEthernet0/0/0
 ip address 192.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/1
 ip address 10.0.0.2 255.255.255.252
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
ip route 192.168.1.0 255.255.255.0 10.0.0.1
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Experiment No: 07-To configure and implement Dynamic Routing

1. Routing Protocol: RIP

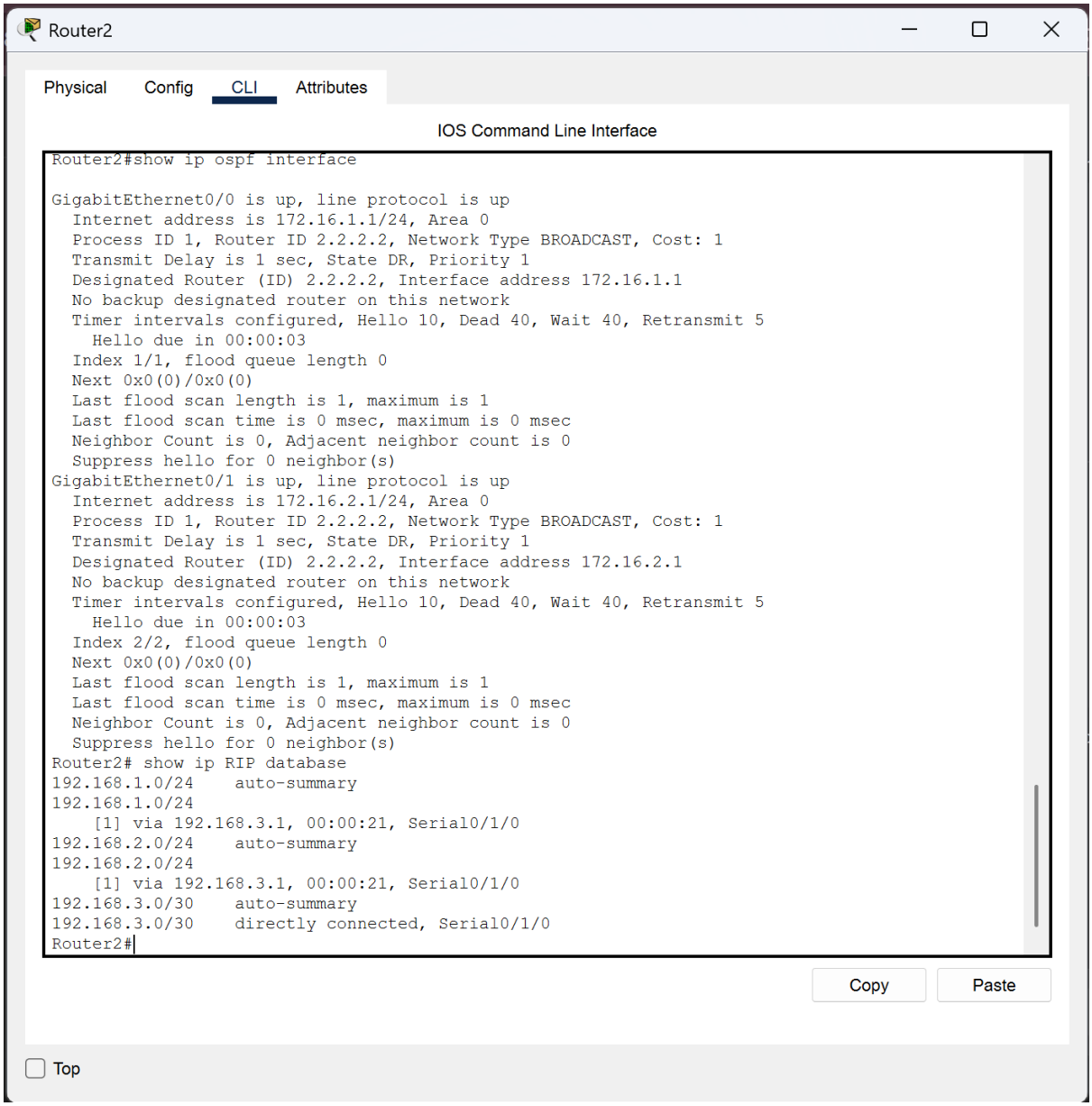
```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router2
Router2(config)#interface Gigabit
Router2(config)#interface GigabitEthernet 0/0
Router2(config-if)#ip address 172.16.1.1 255.255.255.0
Router2(config-if)#no shutdown
Router2(config-if)#
Router2(config-if)#exit
Router2(config)#
Router2(config)#interface GigabitEthernet 0/1
Router2(config-if)#ip address 172.16.2.1 255.255.255.0
Router2(config-if)#no shutdown

Router2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed
state to up

Router2(config-if)#exit
Router2(config)#interface Serial
Router2(config)#interface Serial 0/1/0
Router2(config-if)#ip address 192.168.3.2 255.255.255.252
Router2(config-if)#no shutdown

Router2(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

Router2(config-if)#exit
Router2(config)#
Router2(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
router rip
version 2
no auto-summary
network 192.168.3.0
network 172.16.1.0
 network 172.16.2.0
```

2.Routing Protocol: OSPF

Router2>enable
Router2#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router2(config)#router ospf 1
Router2(config-router)#router
Router2(config-router)#router-id 2.2.2.2
Router2(config-router)#network 172.16.1.0 0.0.255.255 area 0
Router2(config-router)#network 172.16.2.0 0.0.255.255 area 0
Router2(config-router)#network 198.168.3.0 0.0.0.3 area 0
Router2(config-router)#exit
Router2(config)#exit
Router2#

```
Router1#show ip ospf interface

GigabitEthernet0/0 is up, line protocol is up
  Internet address is 192.168.1.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.1.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
  Internet address is 192.168.2.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.2.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/1/0 is up, line protocol is up
  Internet address is 192.168.3.1/30, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT-TO-POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  Index 3/3, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Suppress hello for 0 neighbor(s)
Router1#
```

```
  Suppress hello for 0 neighbor(s)
Router1# show ip RIP database
192.168.1.0/24    auto-summary
192.168.1.0/24    directly connected, GigabitEthernet0/0
192.168.2.0/24    auto-summary
192.168.2.0/24    directly connected, GigabitEthernet0/1
192.168.3.0/30    auto-summary
192.168.3.0/30    directly connected, Serial0/1/0
Router1#
```



3.Routing Protocol: EIGRP

Router2#

Router2#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router2(config)#router eigrp 100

Router2(config-router)#eigrp router

Router2(config-router)#eigrp router-id 2.2.2.2

Router2(config-router)#network 172.16.1.0 0.0.255.255

Router2(config-router)#network 172.16.2.0 0.0.255.255

Router2(config-router)#network 198.168.3.0 0.0.0.3

Router2(config-router)#no auto-summary

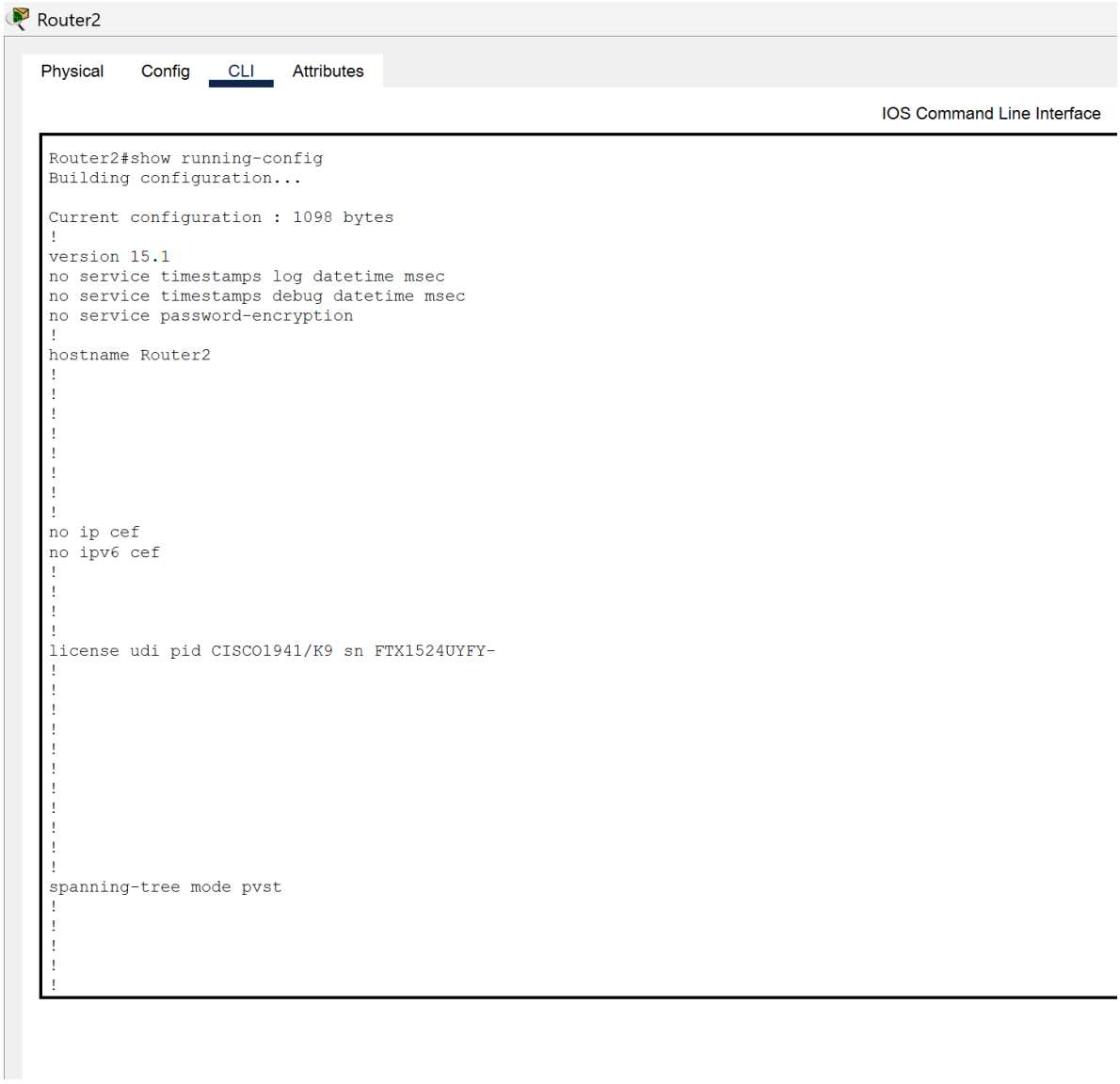
Router2(config-router)#exit

Router2(config)#exit

Router2#

```
Router2#show ip eigrp neighbours
                                  ^
% Invalid input detected at '^' marker.

Router2#show ip eigrp neighbors
IP-EIGRP neighbors for process 100

Router2#
```

```
Router1#show ip eigrp neighbors
IP-EIGRP neighbors for process 100

Router1#
```



Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
interface GigabitEthernet0/0
 ip address 172.16.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 172.16.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/1/0
 ip address 192.168.3.2 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router eigrp 100
 eigrp router-id 2.2.2.2
 network 172.16.0.0
 network 198.168.3.0 0.0.0.3
!
router ospf 1
 router-id 2.2.2.2
 log-adjacency-changes
 network 172.16.0.0 0.0.255.255 area 0
 network 198.168.3.0 0.0.0.3 area 0
!
router rip
 version 2
 network 172.168.0.0
 network 192.168.3.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
```

Experiment No: 08-To configure and implement Access Control Lists

Router>enable

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R1

R1(config)#interface Gigabit

R1(config)#interface GigabitEthernet 0/0/0

R1(config-if)#ip address 192.168.1.1 255.255.255.0

R1(config-if)#no shutdown

R1(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#exit

R1(config)#interface gigabit

R1(config)#interface gigabitEthernet 0/0/1

R1(config-if)#ip address 10.0.0.1 255.255.255.0

R1(config-if)#no shutdown

R1(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#exit

R1(config)#access-list 110

R1(config)#access-list 110 deny ip host 192.168.1.20 host 10.0.0.10

R1(config)#access-list 110 permit ip any any

R1(config)#interface gigabitEthernet 0/0/1

R1(config-if)#ip access-group 110 out

R1(config-if)#exit

R1(config)#exit R1# %SYS-5-CONFIG_I: Configured from console by console

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
R1#show access-lists
Extended IP access list 110
    10 deny ip host 192.168.1.20 host 10.0.0.10 (6 match(es))
    20 permit ip any any (1 match(es))

R1#show running-config
Building configuration...

Current configuration : 781 bytes
!
version 16.6.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
```

Copy Paste

Top

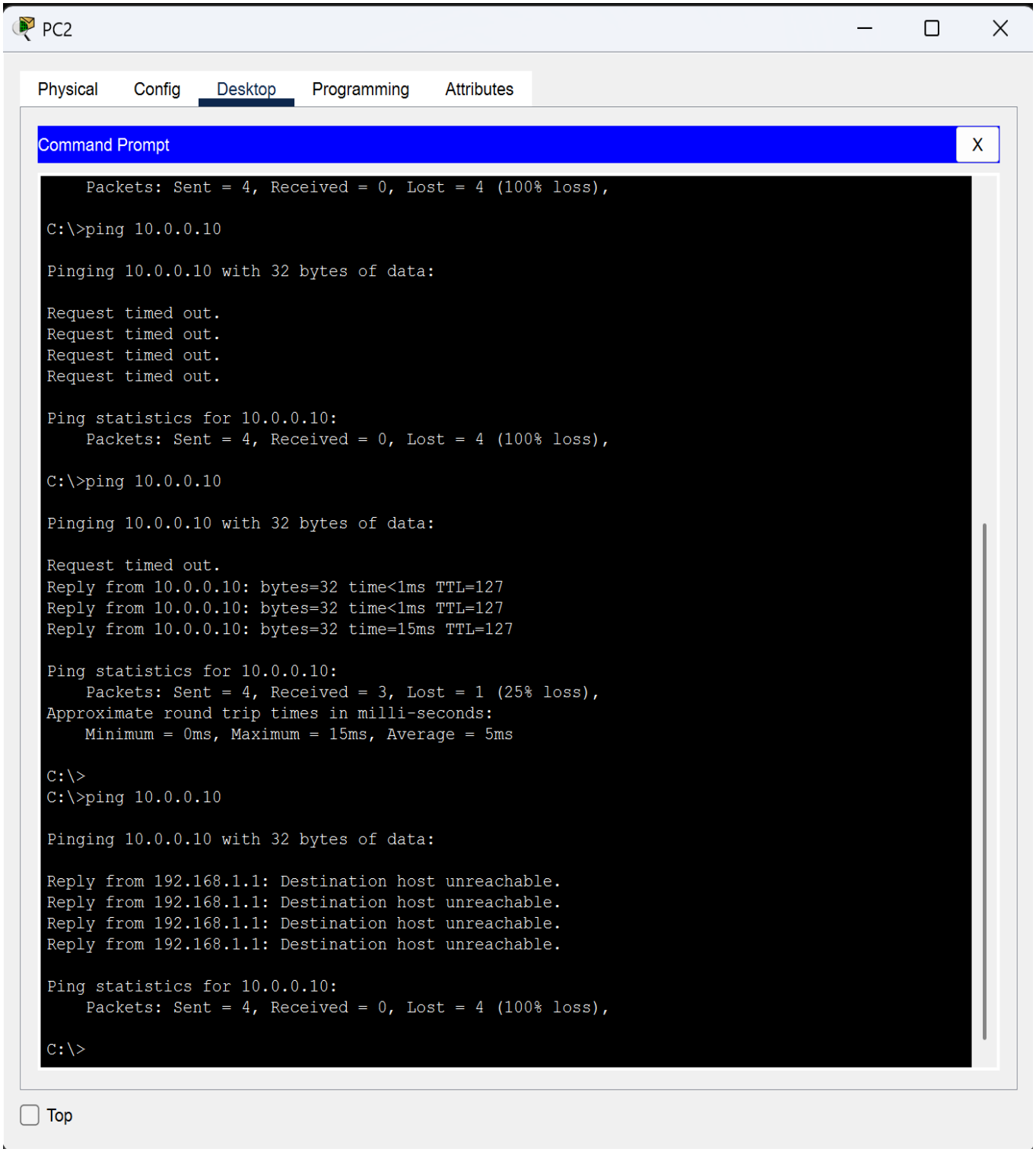
Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
!
interface GigabitEthernet0/0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/1
 ip address 10.0.0.1 255.255.255.0
 ip access-group 110 out
 duplex auto
 speed auto
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
!
ip flow-export version 9
!
!
access-list 110 deny ip host 192.168.1.20 host 10.0.0.10
access-list 110 permit ip any any
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Top


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.10: bytes=32 time<1ms TTL=127
Reply from 10.0.0.10: bytes=32 time<1ms TTL=127
Reply from 10.0.0.10: bytes=32 time=15ms TTL=127
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 15ms, Average = 5ms
C:\>
C:\>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
Top

Experiment No: 09-To configure and implement Network Address Translation for IPv4

Switch>enable

Switch# config t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname Switch1

Switch1(config)#line console 0

Switch1(config-line)#password cisco

Switch1(config-line)#login

Switch1(config-line)#exit

Switch1(config)#enable secret class

Switch1(config)#exit

Switch1#

%SYS-5-CONFIG_I: Configured from console by console

Switch1#config t

Enter configuration commands, one per line. End with CNTL/Z.

Switch1(config)#service pass

Switch1(config)#service password-encryption

Switch1(config)#exit

Switch1#

%SYS-5-CONFIG_I: Configured from console by console

Switch1#copy running-

Switch1#copy running-config startup

Switch1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

Switch1#

Switch1#config t

Enter configuration commands, one per line. End with CNTL/Z.

Switch1(config)#vlan 10

Switch1(config-vlan)#name Static

Switch1(config-vlan)#exit

Switch1(config)#vlan 20

Switch1(config-vlan)#name dynamic

Switch1(config-vlan)#exit

Switch1(config)#vlan 30

Switch1(config-vlan)#name PAT

Switch1(config-vlan)#exit

Switch1(config)#interface Fast

Switch1(config)#interface FastEthernet 0/1

Switch1(config-if)#switchport mode access

Switch1(config-if)#switchport access vlan 10

Switch1(config-if)#no shutdown

Switch1(config-if)#exit

Switch1(config)#interface FastEthernet 0/2

Switch1(config-if)#switchport mode access

Switch1(config-if)#switchport access vlan 20

Switch1(config-if)#no shutdown

Switch1(config-if)#exit

Switch1(config)#interface FastEthernet 0/3

Switch1(config-if)#switchport mode access

Switch1(config-if)#switchport access vlan 30

Switch1(config-if)#no shutdown

Switch1(config-if)#exit

Switch1(config)#interface Gigabit

Switch1(config)#interface GigabitEthernet 0/1

Switch1(config-if)#switchport mode trunk

Switch1(config-if)#switchport trunk allowed vlan 10,20,30

Switch1(config-if)#no shutdown

Switch1(config-if)#end

Switch1#

Switch1#write memory

Building configuration...

[OK]

Switch1#

```
Switch1#
Switch1#
Switch1#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
10   Static                            active    Fa0/1
20   dynamic                           active    Fa0/2
30   PAT                               active    Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch1#
```

Router>enable

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname Router

Router(config)#interface Gigabit

Router(config)#interface GigabitEthernet 0/0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#exit

Router(config)#interface Gigabit

Router(config)#interface GigabitEthernet 0/0.10

Router(config-subif)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

Router(config-subif)#encapsulation dot1Q 10

Router(config-subif)#ip address 192.168.1.1 255.255.255.0

Router(config-subif)#ip nat inside

Router(config-subif)#no shutdown

Router(config-subif)#exit

Router(config)#interface GigabitEthernet 0/0.20

Router(config-subif)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

Router(config-subif)#encapsulation dot1Q 20

Router(config-subif)#ip address 192.168.2.1 255.255.255.0

Router(config-subif)#ip nat inside

Router(config-subif)#no shutdown

Router(config-subif)#exit

Router(config)#interface GigabitEthernet 0/0.30

Router(config-subif)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to up

Router(config-subif)#encapsulation dot1Q 30

Router(config-subif)#ip address 192.168.3.1 255.255.255.0

Router(config-subif)#ip nat inside

Router(config-subif)#no shutdown

Router(config-subif)#exit

Router(config)#interface GigabitEthernet 0/1

Router(config-if)#ip address 200.1.1.1 255.255.255.0

Router(config-if)#ip nat outside

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#exit

Router(config)#ip nat inside source static 192.168.1.10 200.1.1.10

Router(config)#

Router(config)#ip nat pool CYN_POOL 200.1.1.20 200.1.1.10 netmask 255.255.255.0

Router(config)#access-list 2 permit 192.168.2.0 0.0.0.255

Router(config)#ip nat inside source list 2 pool DYN_POOL

Router(config)#

Router(config)#access-list 3 permit 192.168.3.0 0.0.0.255

Router(config)#ip nat inside source list 3 interface Giga

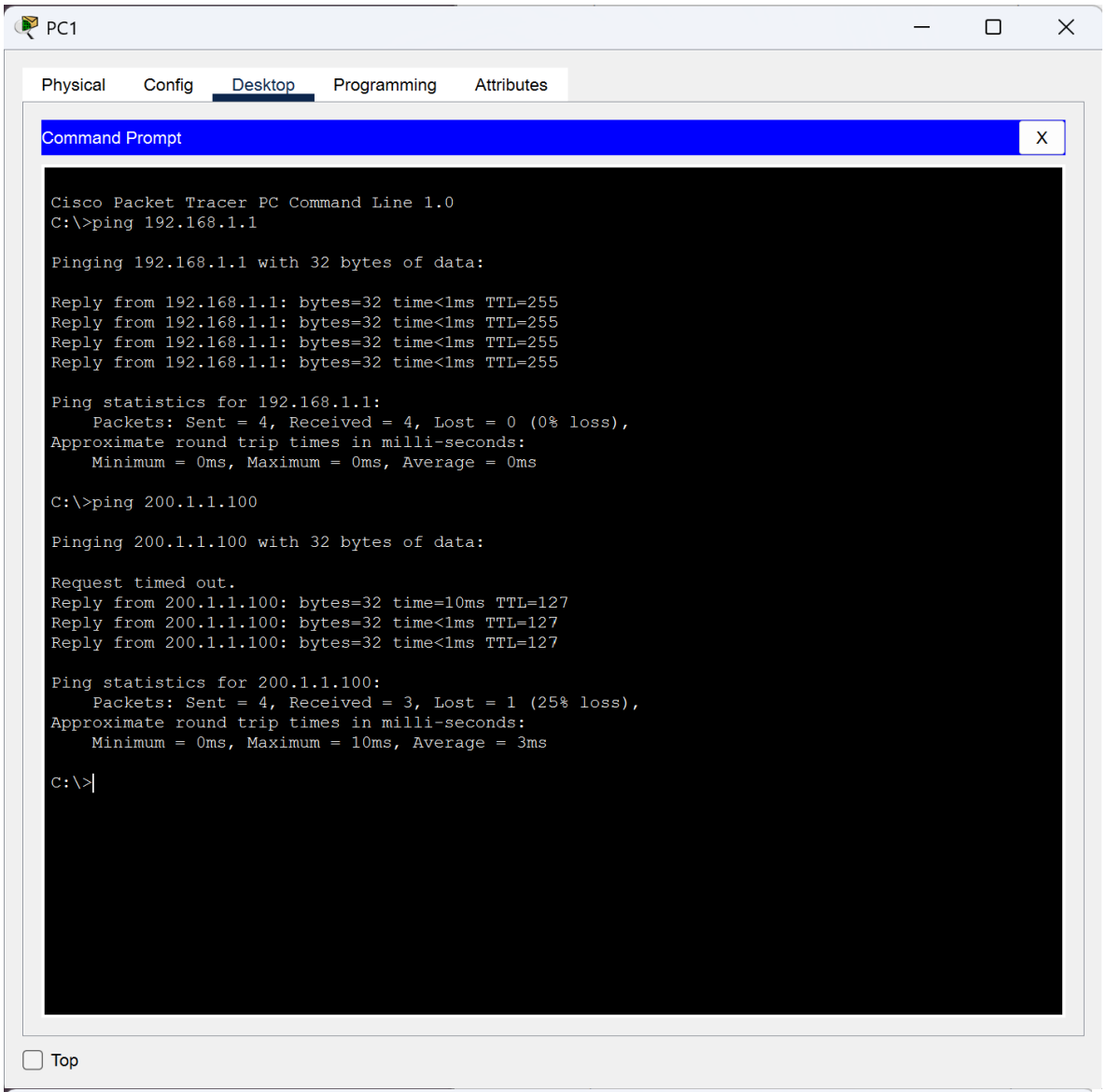
Router(config)#ip nat inside source list 3 interface GigabitEthernet 0/1 overload

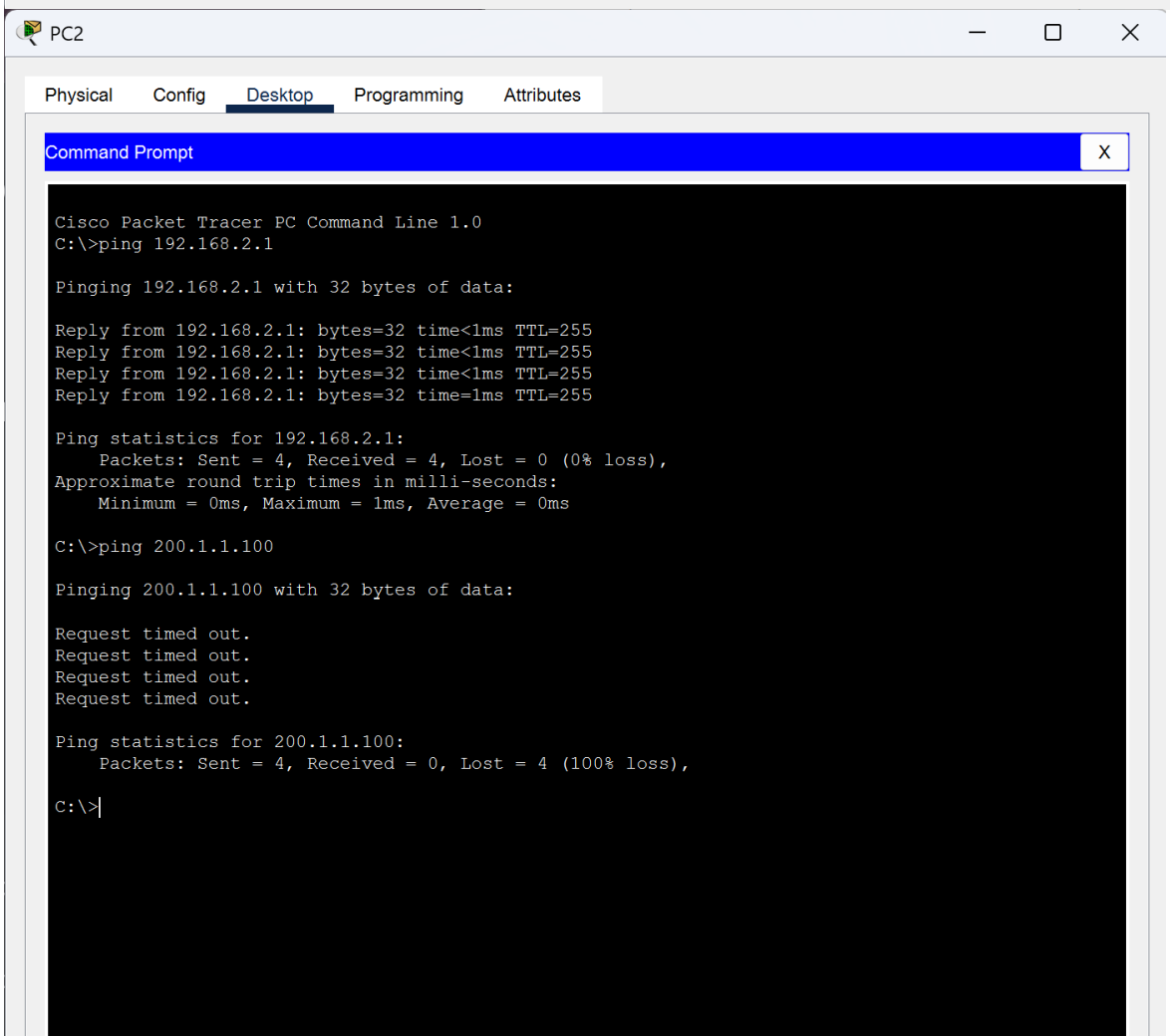
Router(config)#end

```
Router#write memory
Building configuration...
[OK]
Router#show ip nat statistics
Total translations: 5 (1 static, 4 dynamic, 4 extended)
Outside Interfaces: GigabitEthernet0/1
Inside Interfaces: GigabitEthernet0/0.10 , GigabitEthernet0/0.20 , GigabitEthernet0/0.30
Hits: 7  Misses: 12
Expired translations: 4
Dynamic mappings:
-- Inside Source
access-list 2 pool DYN_POOL refCount 0
Router#show ip nat translations
Pro  Inside global     Inside local       Outside local      Outside global
icmp 200.1.1.1:5       192.168.3.10:5     200.1.1.100:5      200.1.1.100:5
icmp 200.1.1.1:6       192.168.3.10:6     200.1.1.100:6      200.1.1.100:6
icmp 200.1.1.1:7       192.168.3.10:7     200.1.1.100:7      200.1.1.100:7
icmp 200.1.1.1:8       192.168.3.10:8     200.1.1.100:8      200.1.1.100:8
---  200.1.1.10        192.168.1.10       ---                ---

Router#
```

From PCs, ping the Web Server (200.1.1.100):

- **PC1 > ping 200.1.1.100 — translation via Static NAT (source will show as 200.1.1.10)**
- **PC2 > ping 200.1.1.100 — translation via Dynamic NAT (will allocate one IP from pool)**
- **PC3 > ping 200.1.1.100 — translation via PAT (will use 200.1.1.1 with different ports)**


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 200.1.1.100
Pinging 200.1.1.100 with 32 bytes of data:
Request timed out.
Reply from 200.1.1.100: bytes=32 time=10ms TTL=127
Reply from 200.1.1.100: bytes=32 time<1ms TTL=127
Reply from 200.1.1.100: bytes=32 time<1ms TTL=127
Ping statistics for 200.1.1.100:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 10ms, Average = 3ms
C:\>
Top


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.1
Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time=1ms TTL=255
Ping statistics for 192.168.2.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 200.1.1.100
Pinging 200.1.1.100 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 200.1.1.100:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>

Router

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show running-conf
Router#show running-config
Building configuration...

Current configuration : 1270 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO1941/K9 sn FTX1524PR1V-
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
```

Copy Paste

Top

Router

Physical Config CLI Attributes

IOS Command Line Interface

```
!
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0.10
 encapsulation dot1Q 10
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
!
interface GigabitEthernet0/0.20
 encapsulation dot1Q 20
 ip address 192.168.2.1 255.255.255.0
 ip nat inside
!
interface GigabitEthernet0/0.30
 encapsulation dot1Q 30
 ip address 192.168.3.1 255.255.255.0
 ip nat inside
!
interface GigabitEthernet0/1
 ip address 200.1.1.1 255.255.255.0
 ip nat outside
 duplex auto
 speed auto
!
interface Vlan1
 no ip address
 shutdown
!
ip nat pool CYN_POOL 200.1.1.20 200.1.1.10 netmask 255.255.255.0
ip nat inside source list 2 pool DYN_POOL
ip nat inside source list 3 interface GigabitEthernet0/1 overload
ip nat inside source static 192.168.1.10 200.1.1.10
ip classless
!
ip flow-export version 9
!
```

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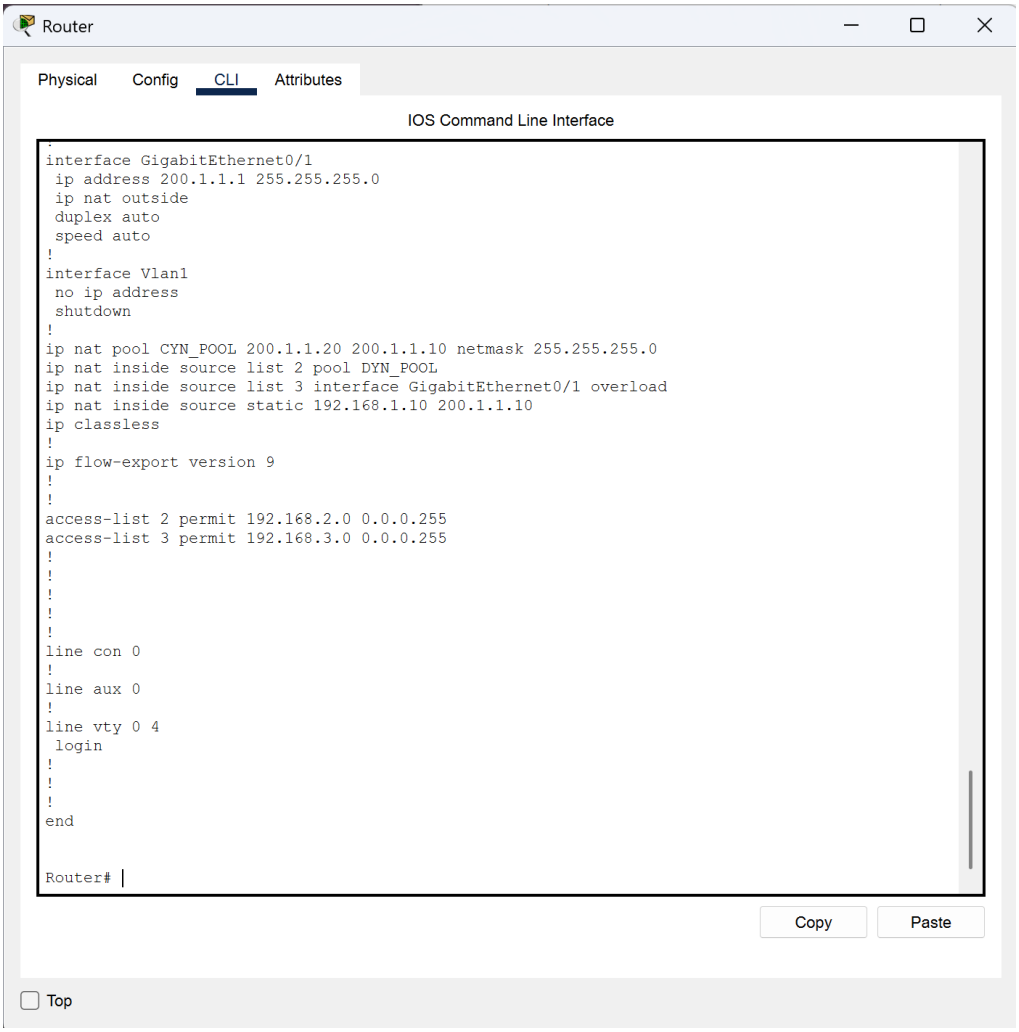
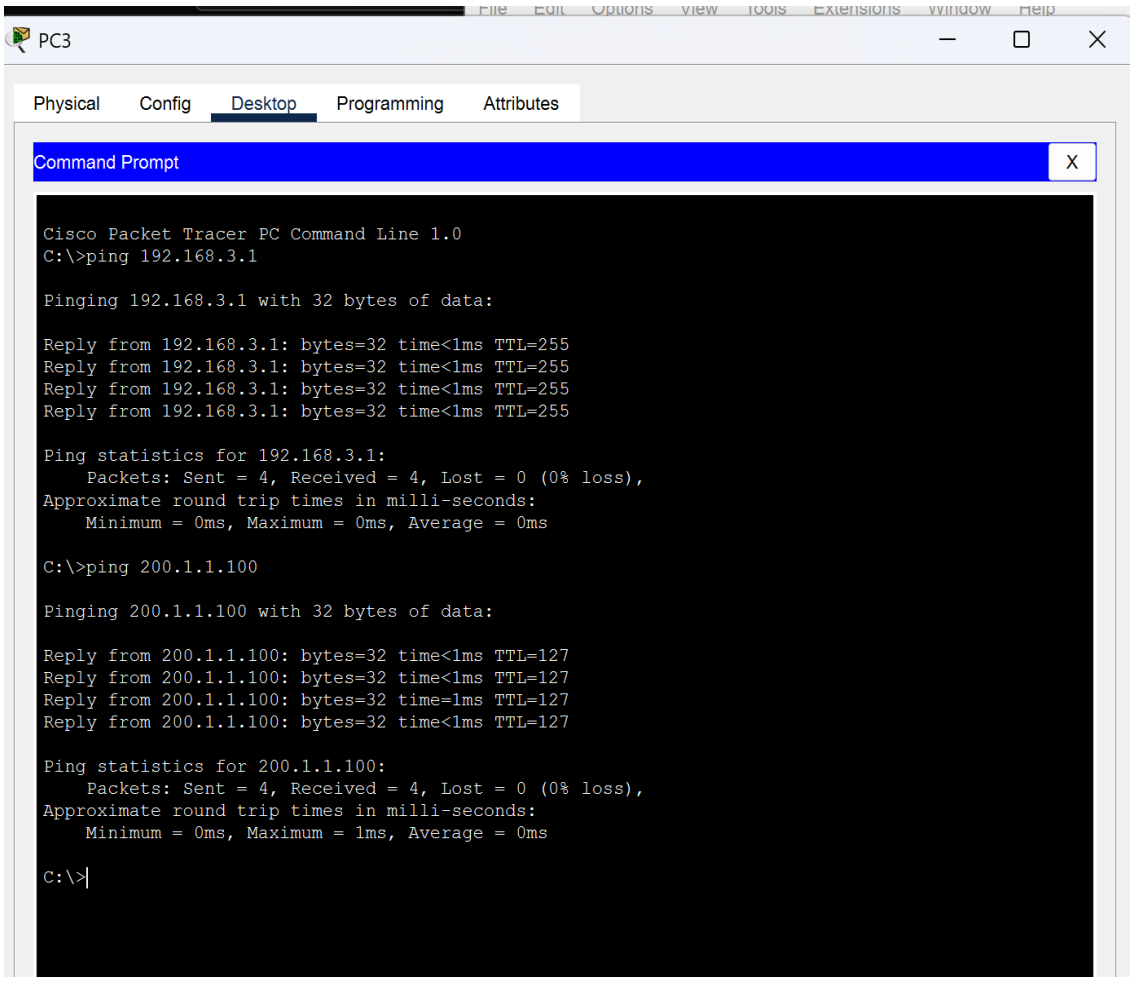
Top


Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface GigabitEthernet0/1
 ip address 200.1.1.1 255.255.255.0
 ip nat outside
 duplex auto
 speed auto
!
interface Vlan1
 no ip address
 shutdown
!
ip nat pool CYN_POOL 200.1.1.20 200.1.1.10 netmask 255.255.255.0
ip nat inside source list 2 pool DYN_POOL
ip nat inside source list 3 interface GigabitEthernet0/1 overload
ip nat inside source static 192.168.1.10 200.1.1.10
ip classless
!
ip flow-export version 9
!
!
access-list 2 permit 192.168.2.0 0.0.0.255
access-list 3 permit 192.168.3.0 0.0.0.255
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
Router#
Copy
Paste
Top


PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.1
Pinging 192.168.3.1 with 32 bytes of data:
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Reply from 192.168.3.1: bytes=32 time<1ms TTL=255
Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 200.1.1.100
Pinging 200.1.1.100 with 32 bytes of data:
Reply from 200.1.1.100: bytes=32 time<1ms TTL=127
Reply from 200.1.1.100: bytes=32 time<1ms TTL=127
Reply from 200.1.1.100: bytes=32 time=1ms TTL=127
Reply from 200.1.1.100: bytes=32 time<1ms TTL=127
Ping statistics for 200.1.1.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>

Experiment No: 10- Setting up switch security mechanisms to protect network infrastructure from attacks such as MAC flooding, DHCP snooping, and unauthorized access

Switch> enable

Switch# configure terminal

Switch(config)# hostname S1

S1(config)# no ip domain-lookup

S1(config)# enable secret class

S1(config)# service password-encryption

S1(config)# line console 0

S1(config-line)# password cisco

S1(config-line)# login

S1(config-line)# exit

S1(config)# interface range fa0/1 - 2

S1(config-if-range)# switchport port-security

S1(config-if-range)# switchport port-security maximum 2

S1(config-if-range)# switchport port-security violation restrict

S1(config-if-range)# switchport port-security mac-address sticky

S1(config-if-range)# exit

S1(config)# ip dhcp snooping

S1(config)# ip dhcp snooping vlan 10

S1(config)# interface fa0/3

S1(config-if)# ip dhcp snooping trust

S1(config-if)# exit

S1(config)# interface range fa0/1 - 2, fa0/10

S1(config-if-range)# ip dhcp snooping limit rate 10

S1(config-if-range)# exit

S1(config)# interface range fa0/11 - 24

S1(config-if-range)# shutdown

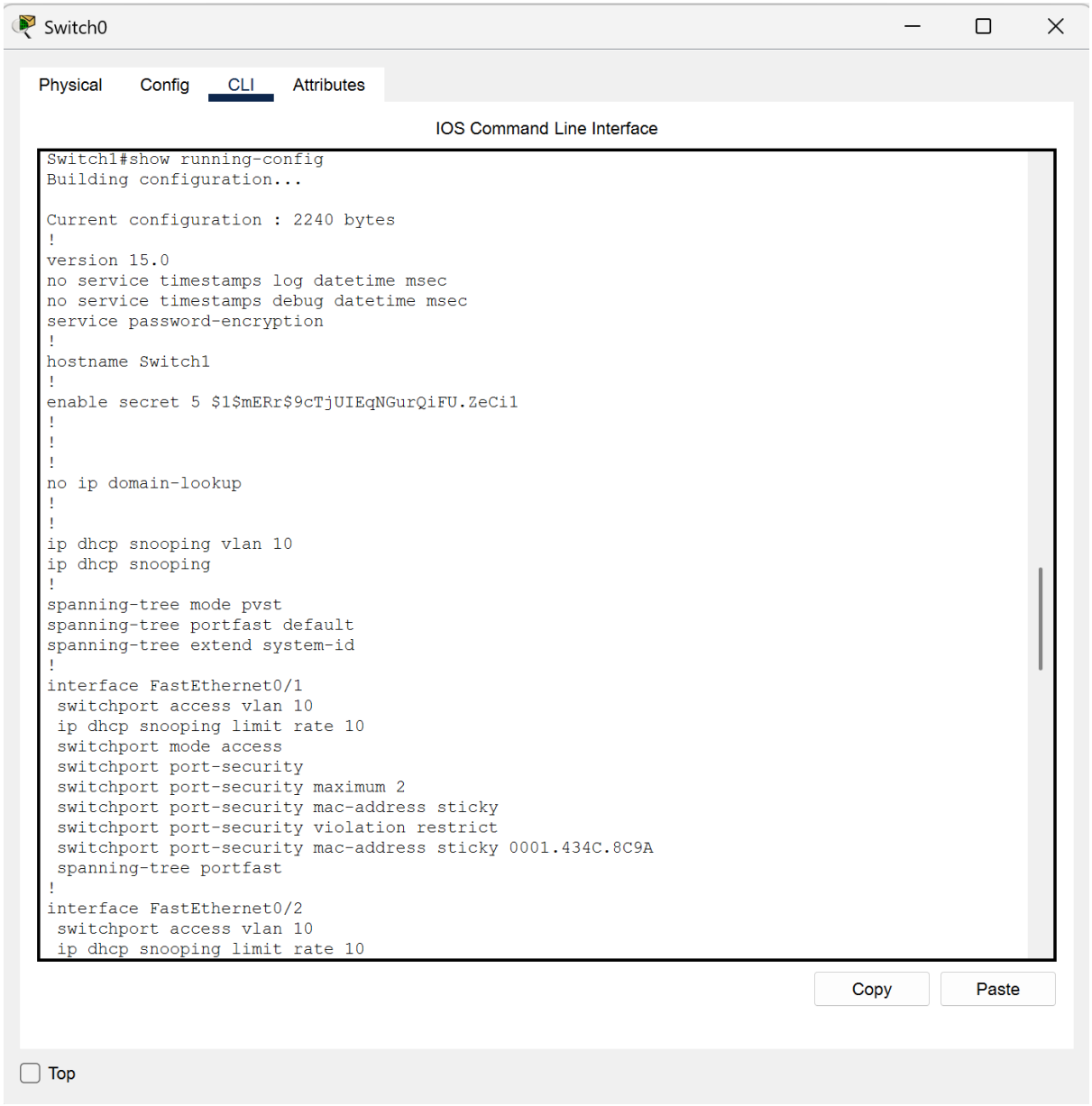
S1(config-if-range)# exit

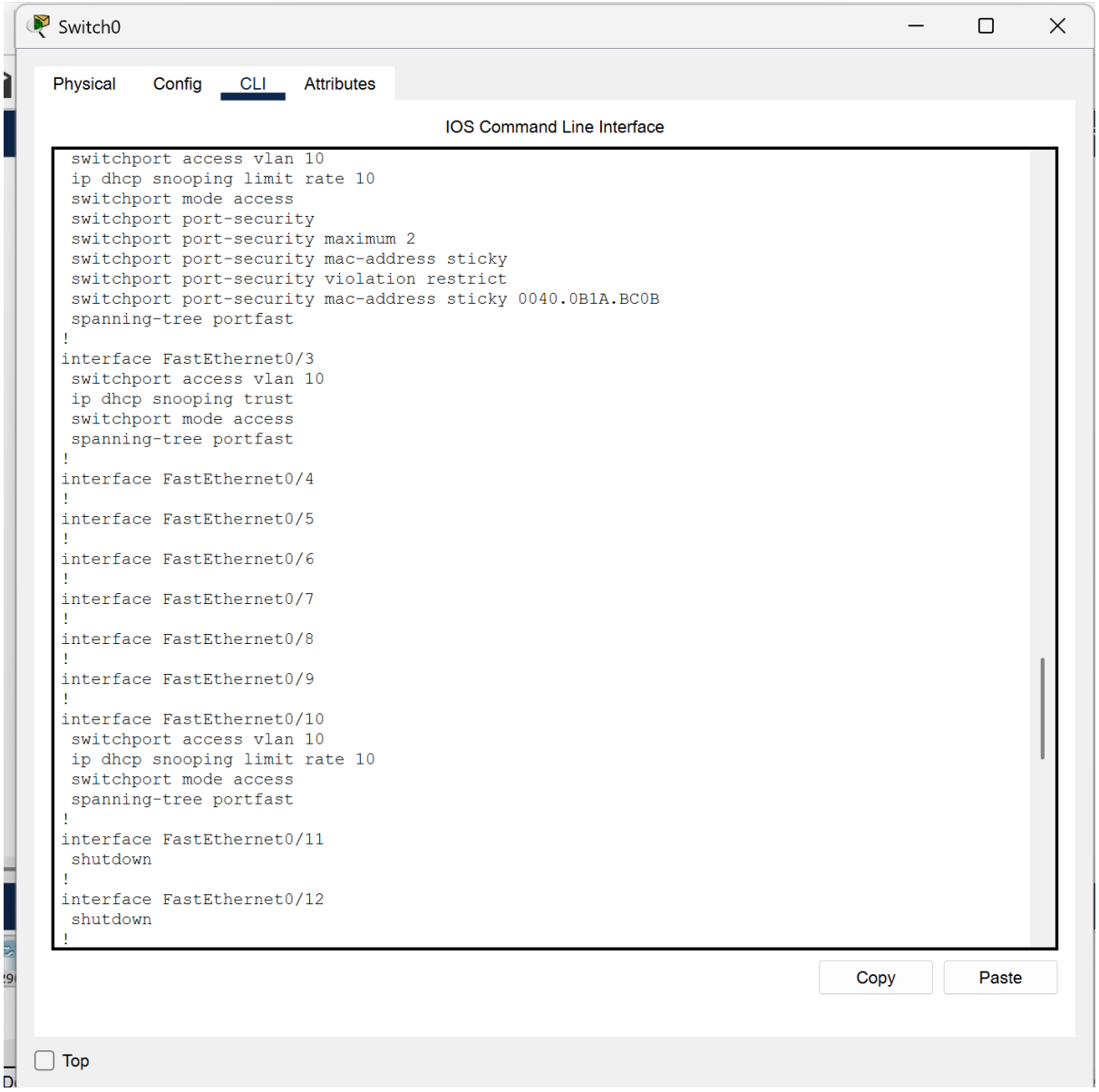
S1(config)# spanning-tree portfast default

S1(config)# spanning-tree bpduguard default

S1# copy running-config startup-config

Destination filename [startup-config]?




Switch0
Physical
Config
CLI
Attributes
IOS Command Line Interface
switchport access vlan 10
ip dhcp snooping limit rate 10
switchport mode access
switchport port-security
switchport port-security maximum 2
switchport port-security mac-address sticky
switchport port-security violation restrict
switchport port-security mac-address sticky 0040.0B1A.BC0B
spanning-tree portfast
!
interface FastEthernet0/3
switchport access vlan 10
ip dhcp snooping trust
switchport mode access
spanning-tree portfast
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
switchport access vlan 10
ip dhcp snooping limit rate 10
switchport mode access
spanning-tree portfast
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
Copy
Paste
Top


Switch0
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
shutdown
!
!
!
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
login
line vty 5 15
login
!
!
!
!
end

```
Switch1#show spanning-tree summary
Switch is in pvst mode
Root bridge for: USERS
Extended system ID           is enabled
Portfast Default             is enabled
PortFast BPDU Guard Default  is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default            is disabled
EtherChannel misconfig guard is disabled
UplinkFast                   is disabled
BackboneFast                 is disabled
Configured Pathcost method used is short

Name                   Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0010                    0         0        0          4          4

---------------------- -------- --------- -------- ---------- ----------
2 vlans                     0         0        0          4          4

Switch1#show ip
Switch1#show ip dhcp sn
Switch1#show ip dhcp snooping
Switch DHCP snooping is enabled
DHCP snooping is configured on following VLANs:
10
Insertion of option 82 is enabled
Option 82 on untrusted port is not allowed
Verification of hwaddr field is enabled
Interface                  Trusted    Rate limit (pps)
-----------------------    -------    ----------------
FastEthernet0/3            yes        unlimited
FastEthernet0/1            no         10
FastEthernet0/10           no         10
FastEthernet0/2            no         10
Switch1#
```

```
Switch1#show port-security interface fa0/1
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Restrict
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 2
Total MAC Addresses        : 1
Configured MAC Addresses   : 0
Sticky MAC Addresses       : 1
Last Source Address:Vlan   : 0000.0000.0000:0
Security Violation Count   : 0

Switch1#show port-security interface fa0/1
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Restrict
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 2
Total MAC Addresses        : 1
Configured MAC Addresses   : 0
Sticky MAC Addresses       : 1
Last Source Address:Vlan   : 0001.434C.8C9A:10
Security Violation Count   : 0

Switch1#
```