

Lab Task 1: Design an IP Address Scheme

1. The network 172.16.10.0/24 was divided into 8 subnets

Subnet Number	Network Address	Usable Host Address Range	Broadcast Address
1	172.16.10.0	172.16.10.1 - 172.16.10.30	172.16.10.31
2	172.16.10.32	172.16.10.33 - 172.16.10.62	172.16.10.63
3	172.16.10.64	172.16.10.65 - 172.16.10.94	172.16.10.95
4	172.16.10.96	172.16.10.97 - 172.16.10.126	172.16.10.127
5	172.16.10.128	172.16.10.129 - 172.16.10.158	172.16.10.159
6	172.16.10.160	172.16.10.161 - 172.16.10.190	172.16.10.191
7	172.16.10.192	172.16.10.193 - 172.16.10.222	172.16.10.223
8	172.16.10.224	172.16.10.225 - 172.16.10.254	172.16.10.255

2. The value of the new subnet mask is 255.255.255.224
3. 30 usable hosts exist per subnet

Lab Task 2: Implement VLANs and Trunk

S1-Office1 & S2-Office1

```
1. en
conf t
vlan 10
name Management
exit
vlan 20
name Marketing
exit
vlan 30
name Accounting
exit
vlan 100
name Native
exit

2. int range fa0/1-10
switchport mode access
switchport access vlan 10
exit
int range fa0/11-20
switchport mode access
switchport access vlan 20
exit
int range fa0/21-24
switchport mode access
switchport access vlan 30
exit
```

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3 to 5 on S1-Office1

```
int gi0/1
switchport mode trunk
switchport trunk native vlan 100
exit
do sho vlan brief
do sho int trunk
```

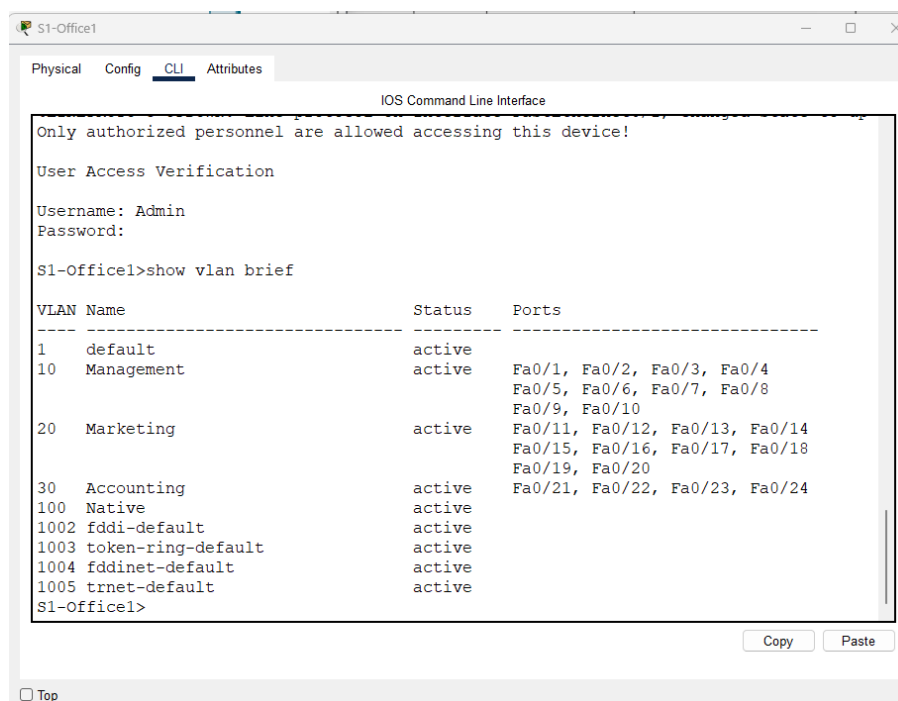
```
int gi0/2
switchport mode trunk
switchport trunk native vlan 100
exit
do sho vlan brief
do sho int trunk
```

on S2-Office1

```
int gi0/1
switchport mode trunk
switchport trunk native vlan 100
exit
do sho vlan brief
do sho int trunk
```

S1-Office1 & S2-Office1

```
int range fa0/1-24
switchport nonegotiate
exit
do wr
```



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```
S1-Office1
Physical Config CLI Attributes
IOS Command Line Interface

30 Accounting active Fa0/19, Fa0/20
100 Native active Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
S1-Office1>sho interfaces trunk
Port Mode Encapsulation Status Native vlan
Gig0/1 on 802.1q trunking 100
Gig0/2 on 802.1q trunking 100

Port Vlans allowed on trunk
Gig0/1 1-1005
Gig0/2 1-1005

Port Vlans allowed and active in management domain
Gig0/1 1,10,20,30,100
Gig0/2 1,10,20,30,100

Port Vlans in spanning tree forwarding state and not pruned
Gig0/1 1,10,20,30,100
Gig0/2 1,10,20,30,100
S1-Office1>
```

```
S2-Office1>sho vlan brief

VLAN Name Status Ports
-----
1 default active Gig0/2
10 Management active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10
20 Marketing active Fa0/11, Fa0/12, Fa0/13, Fa0/14
Fa0/15, Fa0/16, Fa0/17, Fa0/18
Fa0/19, Fa0/20
30 Accounting active Fa0/21, Fa0/22, Fa0/23, Fa0/24
100 Native active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
S2-Office1>
```

```
S2-Office1>sho int trunk
Port Mode Encapsulation Status Native vlan
Gig0/1 on 802.1q trunking 100

Port Vlans allowed on trunk
Gig0/1 1-1005

Port Vlans allowed and active in management domain
Gig0/1 1,10,20,30,100

Port Vlans in spanning tree forwarding state and not pruned
Gig0/1 1,10,20,30,100
S2-Office1>
```

Lab Task 3: Assign IP Address

1. 172.16.10.1 (from subnet 1) was assigned to the R3 / S1-Office3
On R3:
en
conf t
int gi0/0
ip address 172.16.10.1 255.255.255.224
desc To S1-Office3
no shut
exit
do wr
2. 172.16.10.33 (from subnet 2) was assigned to the R3 / S1-Office2
On R3:
int gi0/1
ip address 172.16.10.33 255.255.255.224
desc To S1-Office2
no shut
exit
3. 172.16.10.65 was assigned on the R1 side, and 172.16.10.66 was assigned on the R2 side
On R1:
en
conf t
int se0/0/1
ip addr 172.16.10.65 255.255.255.224
desc To R2
no shut
ex
On R2:
en
conf t
int se0/0/1
ip addr 172.16.10.66 255.255.255.224
desc To R1
no shut
ex
4. 172.16.10.97 was assigned on the R1 side, and 172.16.10.98 was assigned on the R3 side
On R1:
int se0/0/0
ip addr 172.16.10.97 255.255.255.224
desc To R3
no shut
ex

```
do wr
On R3:
int se0/0/0
ip addr 172.16.10.98 255.255.255.224
desc To R1
no shut
ex
```

5. 172.16.10.130 was assigned on the R2 side, and 172.16.10.129 was assigned on the R3 side

```
On R2:
int se0/0/0
ip addr 172.16.10.130 255.255.255.224
desc To R3
no shut
ex
do wr
On R3:
int se0/0/1
ip addr 172.16.10.129 255.255.255.224
desc To R2
no shut
ex
do wr
```

6. 172.16.10.161, set as the default gateway

CEO1: 172.16.10.190

CEO2: 172.16.10.189

7. 172.16.10.193, set as the default gateway

Copywriter1: 172.16.10.222

Copywriter2: 172.16.10.221

8. 172.16.10.225, set as the default gateway

Dialer1: 172.16.10.254

Dialer2: 172.16.10.253

9. IP addresses were assigned to end devices in Offices 2 and 3

172.16.10.33 was set as the default gateway

Employee1: 172.16.10.62

Employee2: 172.16.10.61

Guest: 172.16.10.60

172.16.10.1 was set as the default gateway

Email Server: 172.16.10.30

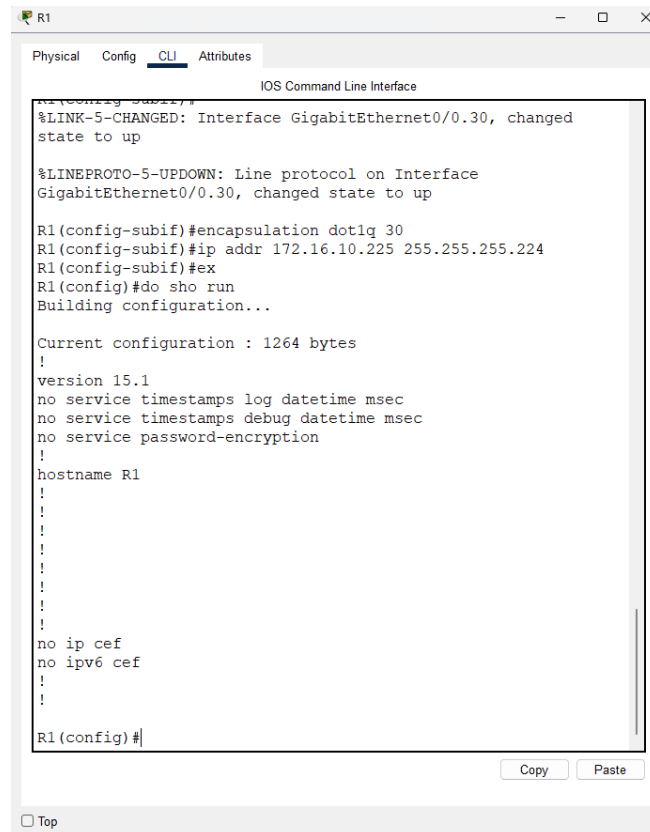
Syslog/NTP Server: 172.16.10.29

Admin: 172.16.10.28

Lab Task 4: Configure R1 for Inter-Vlan Routing

1. R1
en
conf t
int gi0/0
no shut
ex
2. To 4 on R1
int gi0/0.10
encapsulation dot1q 10
ip addr 172.16.10.161 255.255.255.224
ex
int gi0/0.20
encapsulation dot1q 20
ip addr 172.16.10.193 255.255.255.224
ex
int gi0/0.30
encapsulation dot1q 30
ip addr 172.16.10.225 255.255.255.224
ex

5.do sho run



```
R1
Physical Config CLI Attributes
IOS Command Line Interface
R1(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

R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip addr 172.16.10.225 255.255.255.224
R1(config-subif)#ex
R1(config)#do sho run
Building configuration...

Current configuration : 1264 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
R1(config)#
```

6. On S1-Office1 & S2-Office1

en

conf t

int gi0/1

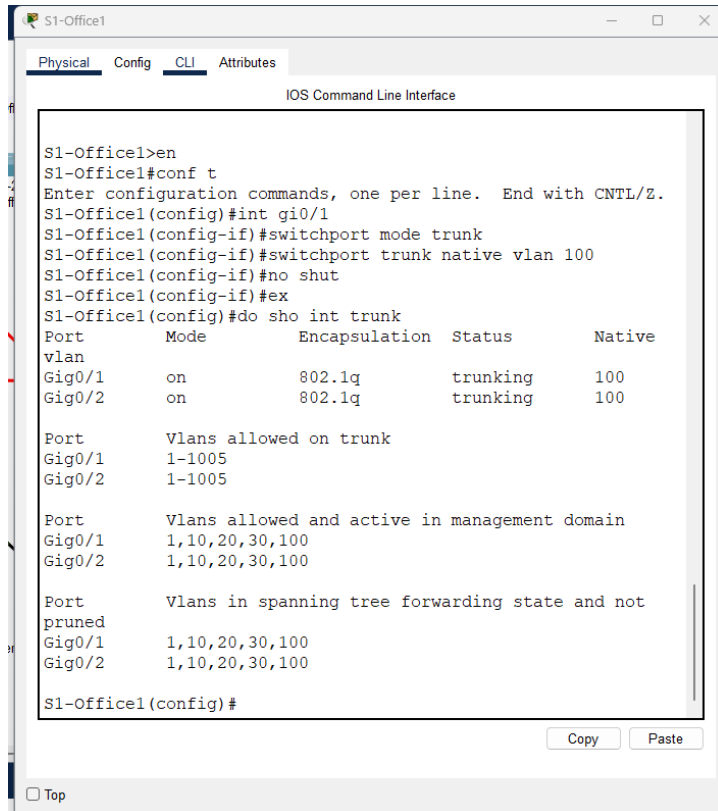
switchport mode trunk

switchport trunk native vlan 100

no shut

ex

7. On S1-Office1: do sho int trunk



The screenshot shows a network simulator window titled "S1-Office1" with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following commands and output:

```
S1-Office1>en
S1-Office1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1-Office1(config)#int gi0/1
S1-Office1(config-if)#switchport mode trunk
S1-Office1(config-if)#switchport trunk native vlan 100
S1-Office1(config-if)#no shut
S1-Office1(config-if)#ex
S1-Office1(config)#do sho int trunk
```

Port	Mode	Encapsulation	Status	Native
Gig0/1	on	802.1q	trunking	100
Gig0/2	on	802.1q	trunking	100

Port	Vlans allowed on trunk
Gig0/1	1-1005
Gig0/2	1-1005

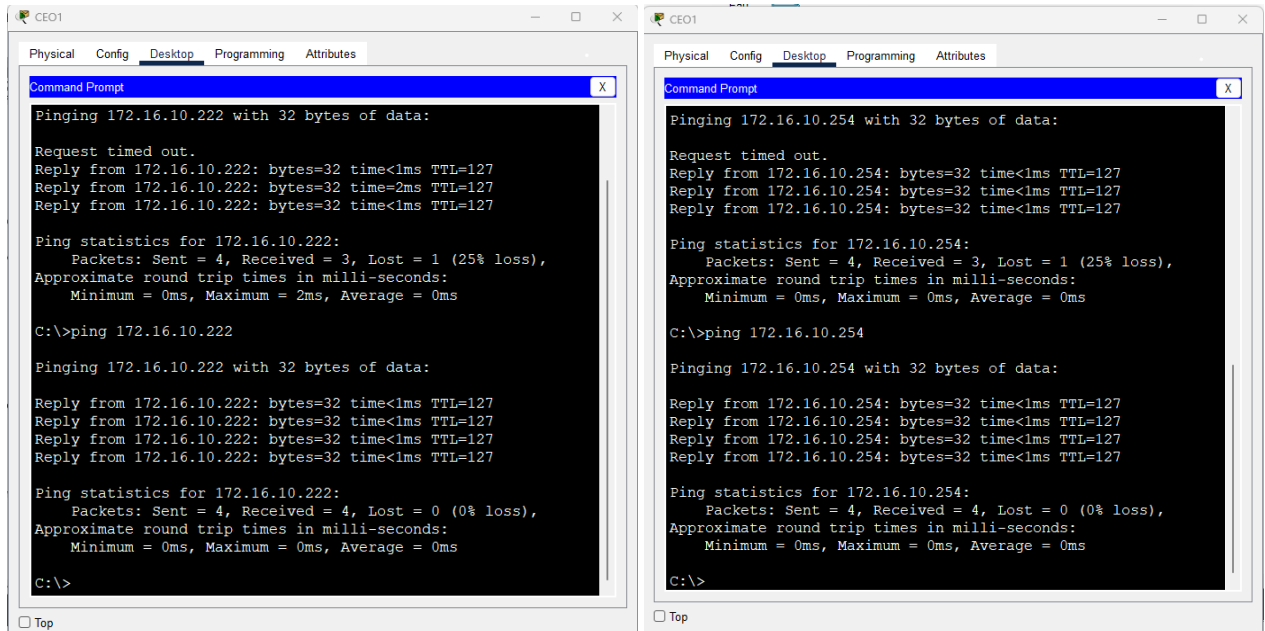
Port	Vlans allowed and active in management domain
Gig0/1	1,10,20,30,100
Gig0/2	1,10,20,30,100

Port	Vlans in spanning tree forwarding state and not pruned
Gig0/1	1,10,20,30,100
Gig0/2	1,10,20,30,100

```
S1-Office1(config)#
```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons, and a "Top" link.

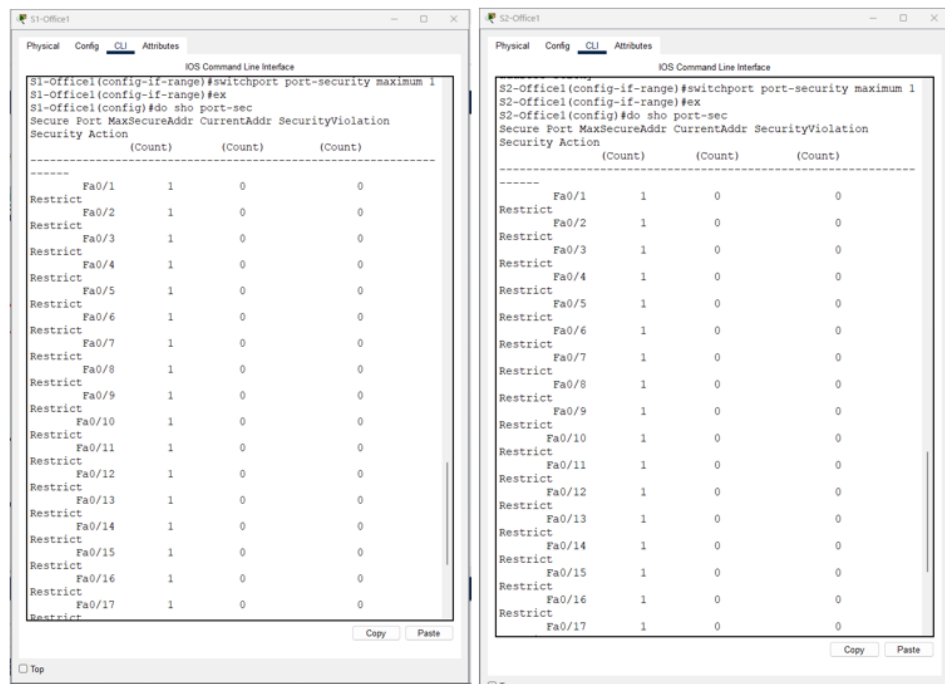
8. I was able to successfully ping Copywriter1 (172.16.10.222) and Dialer1 (172.16.10.254) from the CEO1 PC



Lab Task 5: Secure Switch Physical Ports

S1-Office1 and S2-Office1

- en
conf t
int range fa0/1-24
switchport port-security
switchport port-security violation restrict
- switchport port-security mac-address sticky
switchport port-security maximum 1
ex
- do sho port-sec



4. On S1-Office1
int range fa0/2-10
shut
ex
int range fa0/12-20
shut
ex
int range fa0/22-24
shut
ex
do wr

On S2-Office1:
int range fa0/2-10
shut
ex
int range fa0/12-20
shut
ex
int range fa0/22-24
shut
ex
int gi0/2
shut
ex
do wr

Lab Task 6: Configure OSPF

1.R1, R2,R3
en
conf t
int se0/0/0
no shut
ex
int se0/0/1
no shut
ex

2. On R3 only:
int range gi0/0-1
no shut
ex

3.R1, R2,R3
router ospf 1
auto-cost reference-bandwidth 1000

On R1:

```
router-id 1.1.1.1
network 172.16.10.64 0.0.0.31 area 0
network 172.16.10.96 0.0.0.31 area 0
network 172.16.10.160 0.0.0.31 area 0
network 172.16.10.192 0.0.0.31 area 0
network 172.16.10.224 0.0.0.31 area 0
```

On R2:

```
router-id 2.2.2.2
network 172.16.10.64 0.0.0.31 area 0
network 172.16.10.128 0.0.0.31 area 0
```

On R3:

```
router-id 3.3.3.3
network 172.16.10.96 0.0.0.31 area 0
network 172.16.10.128 0.0.0.31 area 0
network 172.16.10.32 0.0.0.31 area 0
network 172.16.10.0 0.0.0.31 area 0
```

4. On R1

```
passive-int gi0/0
passive-int gi0/0.10
passive-int gi0/0.20
passive-int gi0/0.30
```

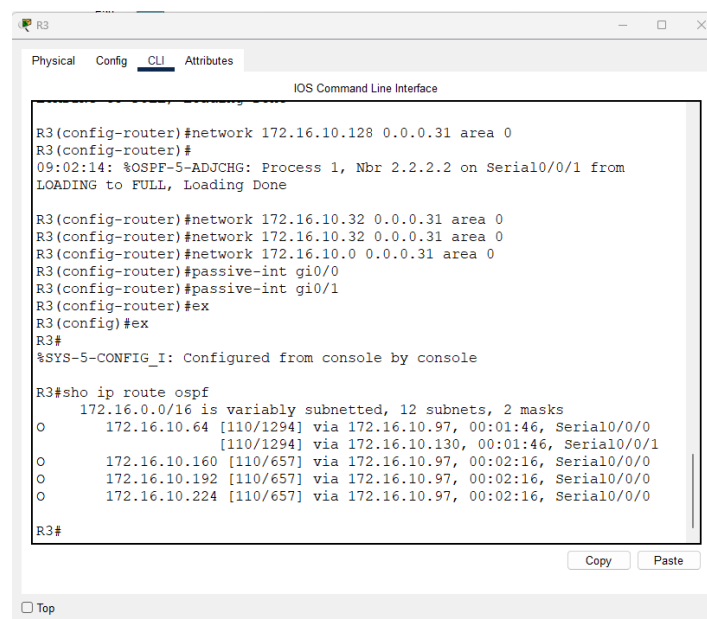
On R3:

```
passive-int gi0/0
passive-int gi0/1
```

5 ex

ex

```
sho ip route ospf
sho ip ospf neighbor
sho ip protocols
wr
```



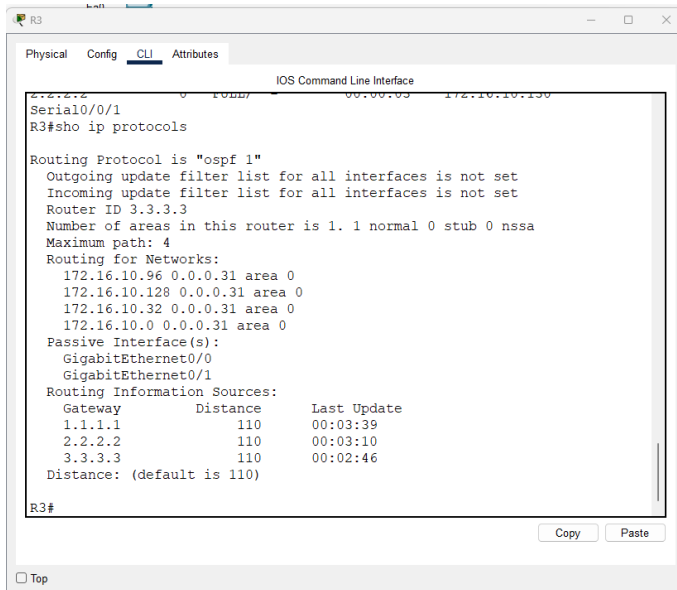
```
R3
Physical Config CLI Attributes
IOS Command Line Interface

R3(config-router)#network 172.16.10.128 0.0.0.31 area 0
R3(config-router)#
09:02:14: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/1 from
LOADING to FULL, Loading Done

R3(config-router)#network 172.16.10.32 0.0.0.31 area 0
R3(config-router)#network 172.16.10.32 0.0.0.31 area 0
R3(config-router)#network 172.16.10.0 0.0.0.31 area 0
R3(config-router)#passive-int gi0/0
R3(config-router)#passive-int gi0/1
R3(config-router)#ex
R3(config)#ex
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#sho ip route ospf
      172.16.0.0/16 is variably subnetted, 12 subnets, 2 masks
O       172.16.10.64 [110/1294] via 172.16.10.97, 00:01:46, Serial0/0/0
          [110/1294] via 172.16.10.130, 00:01:46, Serial0/0/1
O       172.16.10.160 [110/657] via 172.16.10.97, 00:02:16, Serial0/0/0
O       172.16.10.192 [110/657] via 172.16.10.97, 00:02:16, Serial0/0/0
O       172.16.10.224 [110/657] via 172.16.10.97, 00:02:16, Serial0/0/0

R3#
```



Lab Task 7: Extended ACL

R3

1. en

conf t

access-list 100 deny ip host 172.16.10.62 host 172.16.10.29

access-list 100 permit ip any any

int gi0/1

ip access-group 100 in

ex

2. ex

sho access-lists

sho run

wr

3. From the Guest PC, I was able to ping the email server and NTP Server
(Still need to figure this out)

Lab Task 8: Initial and Security Settings for Network Devices

On All Routers and Switches

From 1 to 5

en

conf t

username Admin password ACDC1973

line console 0

login local

exit

enable password beatles1960

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service password-encryption

banner motd #Only authorized personnel are allowed accessing this device!#

ex

wr

ex

Lab Task 9: Secure Remote Access

R1,R2,R3

1. ip domain-name Cyber.com

2. crypto key generate rsa

2048

3. ip ssh version 2

4. line vty 0 4

login local

motd-banner

transport input ssh

exit

5. ex

sho ip ssh

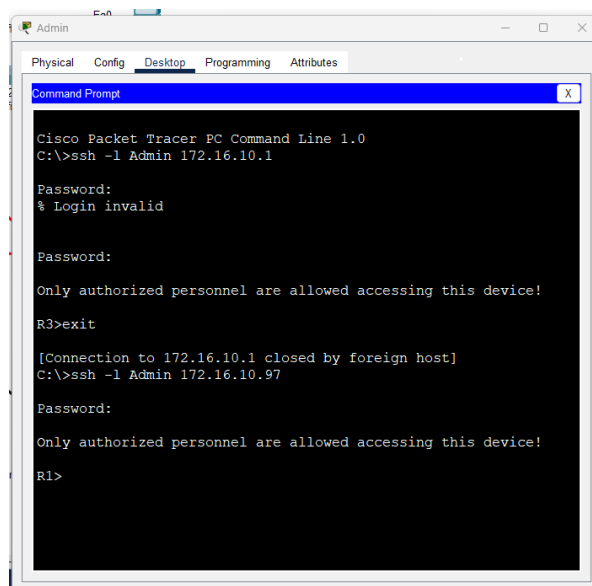
sho run

wr

6. Using the command ssh -l Admin IP-Address, I was able to successfully SSH into the routers

7. From the Admin PC, I was able to successfully ping CEO1 and Employee1

8. From Employee2 Pc, I was able to successfully ping Copywriter1 and Dialer1



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ssh -l Admin 172.16.10.1

Password:
% Login invalid

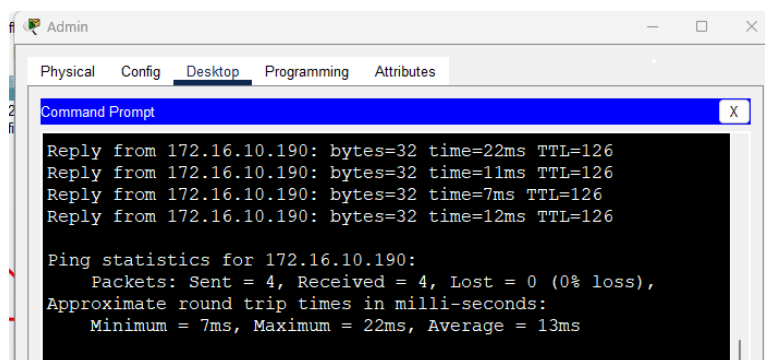
Password:

Only authorized personnel are allowed accessing this device!
R3>exit

[Connection to 172.16.10.1 closed by foreign host]
C:\>ssh -l Admin 172.16.10.97

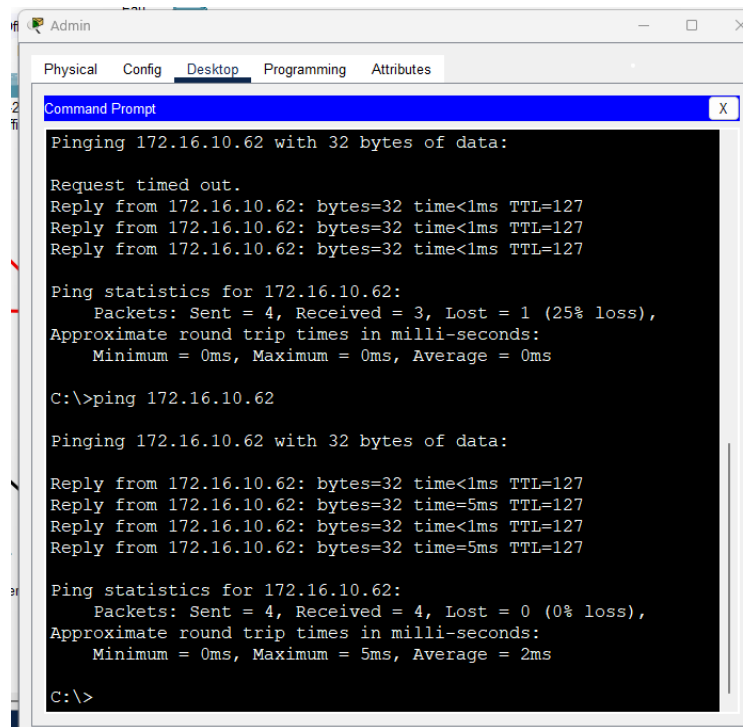
Password:

Only authorized personnel are allowed accessing this device!
R1>
```



```
Reply from 172.16.10.190: bytes=32 time=22ms TTL=126
Reply from 172.16.10.190: bytes=32 time=11ms TTL=126
Reply from 172.16.10.190: bytes=32 time=7ms TTL=126
Reply from 172.16.10.190: bytes=32 time=12ms TTL=126

Ping statistics for 172.16.10.190:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 22ms, Average = 13ms
```



```
Admin
Physical Config Desktop Programming Attributes
Command Prompt X

Pinging 172.16.10.62 with 32 bytes of data:

Request timed out.
Reply from 172.16.10.62: bytes=32 time<1ms TTL=127
Reply from 172.16.10.62: bytes=32 time<1ms TTL=127
Reply from 172.16.10.62: bytes=32 time<1ms TTL=127

Ping statistics for 172.16.10.62:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

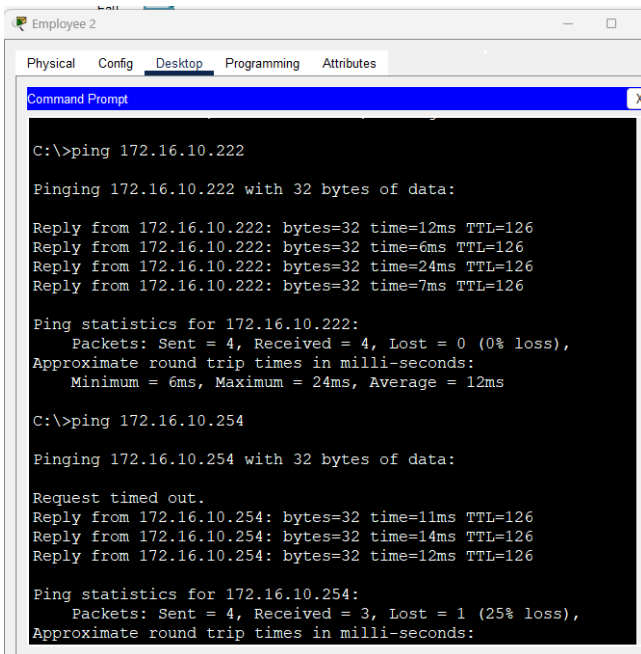
C:\>ping 172.16.10.62

Pinging 172.16.10.62 with 32 bytes of data:

Reply from 172.16.10.62: bytes=32 time<1ms TTL=127
Reply from 172.16.10.62: bytes=32 time=5ms TTL=127
Reply from 172.16.10.62: bytes=32 time<1ms TTL=127
Reply from 172.16.10.62: bytes=32 time=5ms TTL=127

Ping statistics for 172.16.10.62:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 2ms

C:\>
```



```
Employee 2
Physical Config Desktop Programming Attributes
Command Prompt X

C:\>ping 172.16.10.222

Pinging 172.16.10.222 with 32 bytes of data:

Reply from 172.16.10.222: bytes=32 time=12ms TTL=126
Reply from 172.16.10.222: bytes=32 time=6ms TTL=126
Reply from 172.16.10.222: bytes=32 time=24ms TTL=126
Reply from 172.16.10.222: bytes=32 time=7ms TTL=126

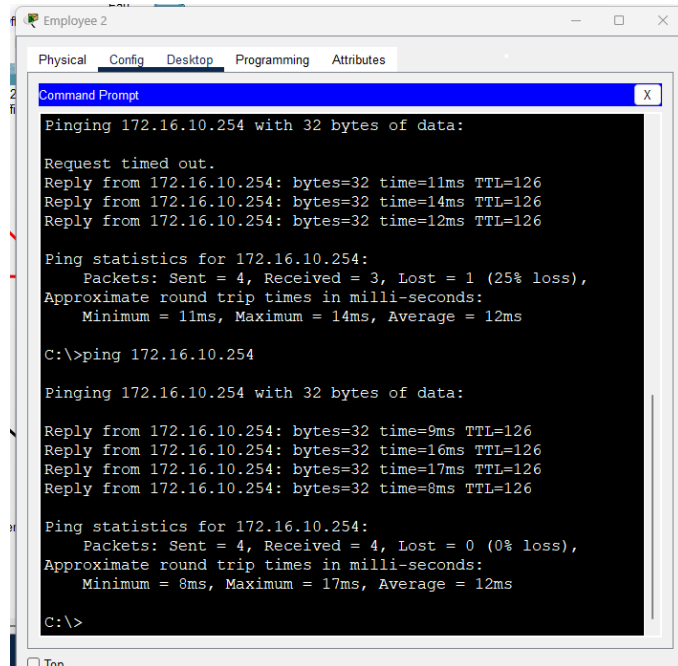
Ping statistics for 172.16.10.222:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms, Maximum = 24ms, Average = 12ms

C:\>ping 172.16.10.254

Pinging 172.16.10.254 with 32 bytes of data:

Request timed out.
Reply from 172.16.10.254: bytes=32 time=11ms TTL=126
Reply from 172.16.10.254: bytes=32 time=14ms TTL=126
Reply from 172.16.10.254: bytes=32 time=12ms TTL=126

Ping statistics for 172.16.10.254:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
```



```
Employee 2
Physical Config Desktop Programming Attributes
Command Prompt X

Pinging 172.16.10.254 with 32 bytes of data:

Request timed out.
Reply from 172.16.10.254: bytes=32 time=11ms TTL=126
Reply from 172.16.10.254: bytes=32 time=14ms TTL=126
Reply from 172.16.10.254: bytes=32 time=12ms TTL=126

Ping statistics for 172.16.10.254:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 14ms, Average = 12ms

C:\>ping 172.16.10.254

Pinging 172.16.10.254 with 32 bytes of data:

Reply from 172.16.10.254: bytes=32 time=9ms TTL=126
Reply from 172.16.10.254: bytes=32 time=16ms TTL=126
Reply from 172.16.10.254: bytes=32 time=17ms TTL=126
Reply from 172.16.10.254: bytes=32 time=8ms TTL=126

Ping statistics for 172.16.10.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 17ms, Average = 12ms

C:\>
```