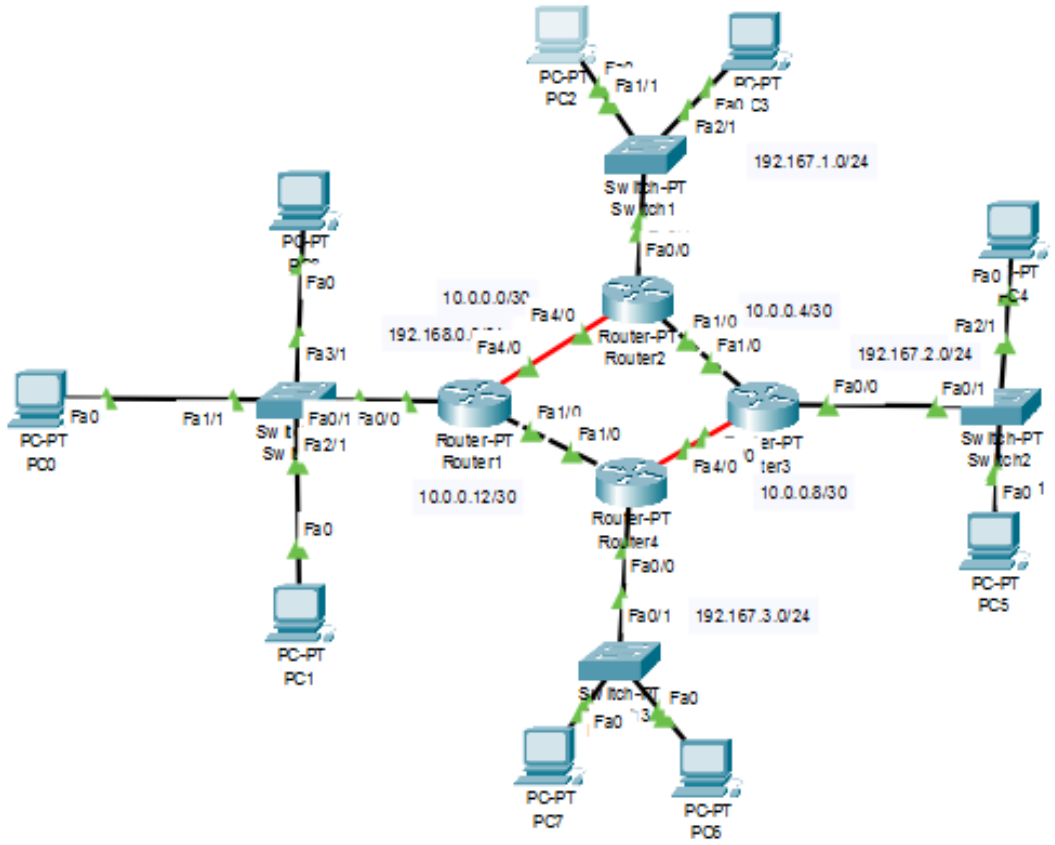
LAB 4

Topology:



Details:

1- DHCP.
2-Routing protocol: ospf.
3-ospf authentication.
4-access control list.

I-Permit only 192.168.0.2 to reach 192.168.3.0/24.
II-Permit only 192.168.0.3 to reach 192.168.2.0/24.
III-Permit only 192.168.2.2 to reach 192.168.1.2 on port 80 and 443 "TCP".
IV-Deny only 192.168.2.3 to reach 192.168.1.2.
V-Deny only 192.168.3.2 and 192.168.3.3 to reach 192.168.2.0/24 on port 21 "TCP".
VI-Deny only 192.168.3.2 and 192.168.3.3 to reach 192.168.2.2 on port 80 "TCP".

5-Testing and pings between devices.

1-Switch configuration:

Switch0
Switch (config)# Hostname SW0 SW0 (config)# lin con 0 SW0 (config-line)# logging synchronous SW0 (config-line)# no exec-timeout SW0 (config-line)# exit SW0 (config)# ip default-gateway 192.168.0.1

Switch1
Switch (config)# Hostname SW1 SW1 (config)# lin con 0 SW1 (config-line)# logging synchronous SW1 (config-line)# no exec-timeout SW1 (config-line)# exit SW0 (config)# ip default-gateway 192.168.1.1

Switch2
Switch (config)# Hostname SW2 SW2 (config)# lin con 0 SW2 (config-line)# logging synchronous SW2 (config-line)# no exec-timeout SW2 (config-line)# exit SW2 (config)# ip default-gateway 192.168.2.1

Switch3
Switch (config)# Hostname SW0 SW3 (config)# lin con 0 SW3 (config-line)# logging synchronous SW3 (config-line)# no exec-timeout SW3 (config-line)# exit SW3 (config)# ip default-gateway 192.168.3.1

2-Router configuration:

Router1

```
Router (config)# Hostname R1
R1 (config)# lin con 0
R1 (config-line)# logging synchronous
R1 (config-line)# no exec-timeout
R1 (config-line)# int fa0/0
R1 (config -if)# no sh
R1 (config -if)#ip add 192.168.0.1 255.255.255.0
R1 (config -if)# int fa1/0
R1 (config -if)# no sh
R1 (config -if)#ip add 10.0.0.13 255.255.255.252
R1(config-if)#ip ospf authentication message-digest
R1(config-if)#ip ospf message-digest-key 1 md5 cisco123
R1 (config -if)# int fa4/0
R1 (config -if)# no sh
R1 (config -if)#ip add 10.0.0.1 255.255.255.252
R1(config-if)#ip ospf authentication message-digest
R1(config-if)#ip ospf message-digest-key 1 md5 cisco123
R1 (config- if)# exit
R1(config)#ro ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 192.168.0.0 0.0.0.255 a 0
R1(config-router)#network 10.0.0.0 0.0.0.3 a 0
R1(config-router)#network 10.0.0.12 0.0.0.3 a 0
R1(config-router)# passive-interface fa0/0
R1(config)# ip access-list extended 100
R1(config-ext-nacl)# permit ip host 192.168.0.2 192.168.3.0 0.0.0.255
R1(config-ext-nacl)# permit ip host 192.168.0.3 192.168.2.0 0.0.0.255
R1(config-ext-nacl)# deny ip host 192.168.0.3 any
R1(config-ext-nacl)# deny ip host 192.168.0.2 any
R1(config-ext-nacl)# permit ip any any
R1(config-ext-nacl)#do sh ip access-list
Extended IP access list 100
    10 permit ip host 192.168.0.2 192.168.3.0 0.0.0.255
    20 permit ip host 192.168.0.3 192.168.2.0 0.0.0.255
    30 deny ip host 192.168.0.3 any
    40 deny ip host 192.168.0.2 any
    50 permit ip any any

R1 (config-ext-nacl)# int fa0/0
R1(config-if)#ip access-group 100 in
```

Ping from pc0 (102.168.0.2) to 192.168.3.0:

```
C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Reply from 192.168.3.2: bytes=32 time=39ms TTL=126
Reply from 192.168.3.2: bytes=32 time=15ms TTL=126
Reply from 192.168.3.2: bytes=32 time=10ms TTL=126
Reply from 192.168.3.2: bytes=32 time=11ms TTL=126
```

Ping from pc0 (102.168.0.2) to other network:

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
```

Ping from pc1 (102.168.0.3) to 192.168.2.0:

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=10ms TTL=125
Reply from 192.168.2.2: bytes=32 time=12ms TTL=125
Reply from 192.168.2.2: bytes=32 time=1ms TTL=125
Reply from 192.168.2.2: bytes=32 time=10ms TTL=125
```

Ping from pc1 (102.168.0.3) to other network:

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
Reply from 192.168.0.1: Destination host unreachable.
```

Ping from pc8 (102.168.0.4) to 192.168.2.0:

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=12ms TTL=125
Reply from 192.168.2.2: bytes=32 time=22ms TTL=125
Reply from 192.168.2.2: bytes=32 time=12ms TTL=125
```

Ping from pc8 (102.168.0.2) to 192.168.3.0:

```
C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Reply from 192.168.3.2: bytes=32 time<1ms TTL=126
Reply from 192.168.3.2: bytes=32 time<1ms TTL=126
```

Router2
Router (config)# Hostname R2 R2 (config)# lin con 0 R2 (config-line)# logging synchronous R2 (config-line)# no exec-timeout R2 (config-line)# int fa0/0 R2 (config -if)# no sh R2 (config -if)#ip add 192.168.1.1 255.255.255.0 R2 (config -if)# int fa1/0 R2 (config -if)# no sh R2 (config -if)#ip add 10.0.0.5 255.255.255.252 R2 (config-if)#ip ospf authentication message-digest R2 (config-if)#ip ospf message-digest-key 1 md5 cisco123 R2 (config -if)# int fa4/0 R2 (config -if)# no sh R2 (config -if)#ip add 10.0.0.2 255.255.255.252 R2 (config-if)#ip ospf authentication message-digest R2 (config-if)#ip ospf message-digest-key 1 md5 cisco123 R2 (config- if)# exit R2 (config)#ro ospf 1 R2 (config-router)#router-id 2.2.2.2 R2 (config-router)#network 192.168.1.0 0.0.0.255 a 0 R2 (config-router)#network 10.0.0.0 0.0.0.3 a 0 R2 (config-router)#network 10.0.0.14 0.0.0.3 a 0 R1(config-router)# passive-interface fa0/0

Router3

```
Router (config)# Hostname R3
R3 (config)# lin con 0
R3 (config-line)# logging synchronous
R3 (config-line)# no exec-timeout
R3 (config-line)# int fa0/0
R3 (config -if)# no sh
R3 (config -if)#ip add 192.168.2.1 255.255.255.0
R3 (config -if)# int fa1/0
R3 (config -if)# no sh
R3 (config -if)#ip add 10.0.0.6 255.255.255.252
R3 (config-if)#ip ospf authentication message-digest
R3 (config-if)#ip ospf message-digest-key 1 md5 cisco123
R3 (config -if)# int fa4/0
R3 (config -if)# no sh
R3 (config -if)#ip add 10.0.0.9 255.255.255.252
R3 (config-if)#ip ospf authentication message-digest
R3 (config-if)#ip ospf message-digest-key 1 md5 cisco123
R3 (config- if)# exit
R3 (config)#ro ospf 1
R3 (config-router)#router-id 3.3.3.3
R3 (config-router)#network 192.168.2.0 0.0.0.255 a 0
R3 (config-router)#network 10.0.0.4 0.0.0.3 a 0
R3 (config-router)#network 10.0.0.8 0.0.0.3 a 0
R3 (config-router)# passive-interface fa0/0
R3 (config)# ip access-list extended 100
R3 (config-ext-nacl)# permit tcp host 192.168.2.2 host 192.168.1.2 eq 80
R3 (config-ext-nacl)# permit tcp host 192.168.2.2 host 192.168.1.2 eq 443
R3 (config-ext-nacl)# deny ip host 192.168.2.2 host 192.168.1.2
R3 (config-ext-nacl)# permit ip any any
R3 (config-ext-nacl)#do sh ip access-list
Extended IP access list 100
    10 permit tcp host 192.168.2.2 host 192.168.1.2 eq www
    20 permit tcp host 192.168.2.2 host 192.168.1.2 eq 443
    30 deny ip host 192.168.2.2 host 192.168.1.2
    40 permit ip any any
R3 (config-ext-nacl)# int fa0/0
R3 (config-if)#ip access-group 100 in
R3 (config-if)#exit
R3 (config)# ip access-list extended 100
R3 (config-ext-nacl)# 35 deny ip host 192.168.2.3 host 192.168.1.2
R3 (config-ext-nacl)#do sh ip access-list
Extended IP access list 100
```

10 permit tcp host 192.168.2.2 host 192.168.1.2 eq www
20 permit tcp host 192.168.2.2 host 192.168.1.2 eq 443
30 deny ip host 192.168.2.2 host 192.168.1.2
35 deny ip host 192.168.2.3 host 192.168.1.2
40 permit ip any any

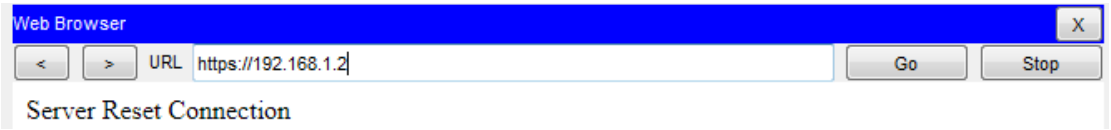
Connect from pc4 (102.168.2.2) to pc2 (102.168.1.2) on port 80:

R3 (config-ext-nacl)#do sh ip access-list

Extended IP access list 100

10 permit tcp host 192.168.2.2 host 192.168.1.2 eq www (1 match(es))
20 permit tcp host 192.168.2.2 host 192.168.1.2 eq 443
30 deny ip host 192.168.2.2 host 192.168.1.2
35 deny ip host 192.168.2.3 host 192.168.1.2
40 permit ip any any

Connect from pc4 (102.168.2.2) to pc2 (102.168.1.2) on port 443:

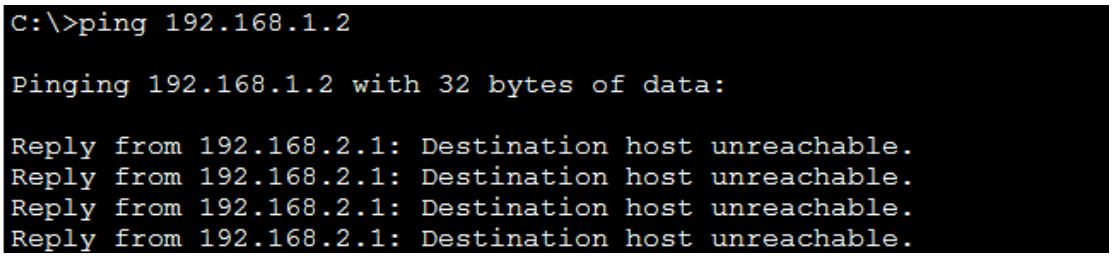


R3 (config-ext-nacl)#do sh ip access-list

Extended IP access list 100

10 permit tcp host 192.168.2.2 host 192.168.1.2 eq www (1 match(es))
20 permit tcp host 192.168.2.2 host 192.168.1.2 eq 443 (1 match(es))
30 deny ip host 192.168.2.2 host 192.168.1.2
35 deny ip host 192.168.2.3 host 192.168.1.2
40 permit ip any any

Ping from pc4 (102.168.2.2) to pc2 (102.168.1.2) on port 443:



Ping from pc5 (102.168.2.3) to pc2 (102.168.1.2) on port 443:

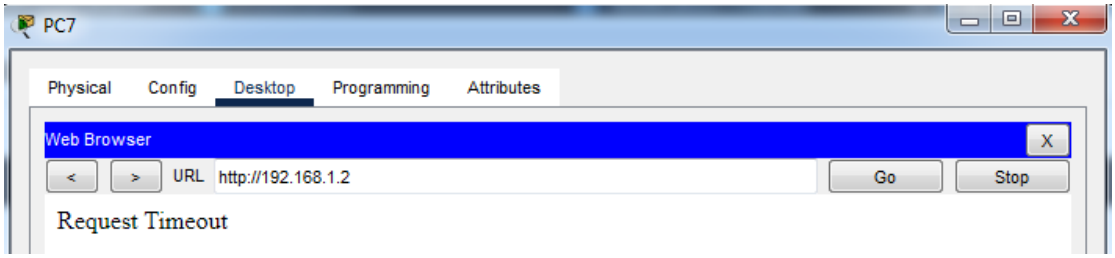
```
Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
```

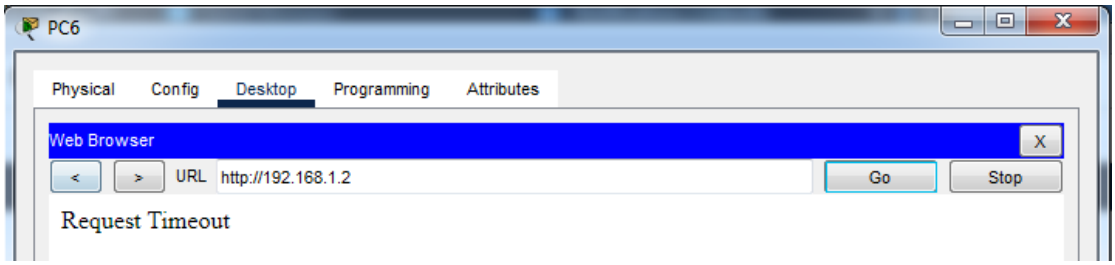
Router4

```
Router (config)# Hostname R4
R4 (config)# lin con 0
R4 (config-line)# logging synchronous
R4 (config-line)# no exec-timeout
R4 (config-line)# int fa0/0
R4 (config -if)# no sh
R4 (config -if)#ip add 192.168.3.1 255.255.255.0
R4 (config -if)# int fa1/0
R4 (config -if)# no sh
R4 (config -if)#ip add 10.0.0.14 255.255.255.252
R4 (config-if)#ip ospf authentication message-digest
R4 (config-if)#ip ospf message-digest-key 1 md5 cisco123
R4 (config -if)# int fa4/0
R4 (config -if)# no sh
R4 (config -if)#ip add 10.0.0.10 255.255.255.252
R4 (config-if)#ip ospf authentication message-digest
R4 (config-if)#ip ospf message-digest-key 1 md5 cisco123
R4 (config- if)# exit
R4 (config)#ro ospf 1
R4 (config-router)#router-id 4.4.4.4
R4 (config-router)#network 192.168.3.0 0.0.0.255 a 0
R4 (config-router)#network 10.0.0.12 0.0.0.3 a 0
R4 (config-router)#network 10.0.0.8 0.0.0.3 a 0
R4 (config-router)# passive-interface fa0/0
R4 (config)# ip access-list extended 100
R4 (config-ext-nacl)# deny tcp host 192.168.3.2 192.168.2.0 0.0.0.255 eq 21
R4 (config-ext-nacl)# deny tcp host 192.168.3.3 192.168.2.0 0.0.0.255 eq 21
R4 (config-ext-nacl)# permit ip any any
R4 (config-ext-nacl)# 21 deny tcp host 192.168.3.2 host 192.168.1.2 eq 80
R4 (config-ext-nacl)# 22 deny tcp host 192.168.3.3 host 192.168.1.2 eq 80
R4 (config-ext-nacl)#do sh ip access-list
Extended IP access list 100
    10 deny tcp host 192.168.3.2 192.168.2.0 0.0.0.255 eq ftp
    20 deny tcp host 192.168.3.3 192.168.2.0 0.0.0.255 eq ftp
    21 deny tcp host 192.168.3.2 host 192.168.1.2 eq www
    22 deny tcp host 192.168.3.3 host 192.168.1.2 eq www
    30 permit ip any any
R4 (config-ext-nacl)# int fa0/0
R4 (config-if)#ip access-group 100 in
```

Connect from pc7 (102.168.3.2) to pc2 (192.168.1.2) on port 80:



Connect from pc6 (102.168.3.3) to pc2 (192.168.1.2) on port 80:



R4 (config-if)#do sh ip access-list

Extended IP access list 100

10 deny tcp host 192.168.3.2 192.168.2.0 0.0.0.255 eq ftp
20 deny tcp host 192.168.3.3 192.168.2.0 0.0.0.255 eq ftp
21 deny tcp host 192.168.3.2 host 192.168.1.2 eq www (12 match(es))
22 deny tcp host 192.168.3.3 host 192.168.1.2 eq www (12 match(es))
30 permit ip any any