CCNP Routing

OSPF PROTOCOL

LAP2

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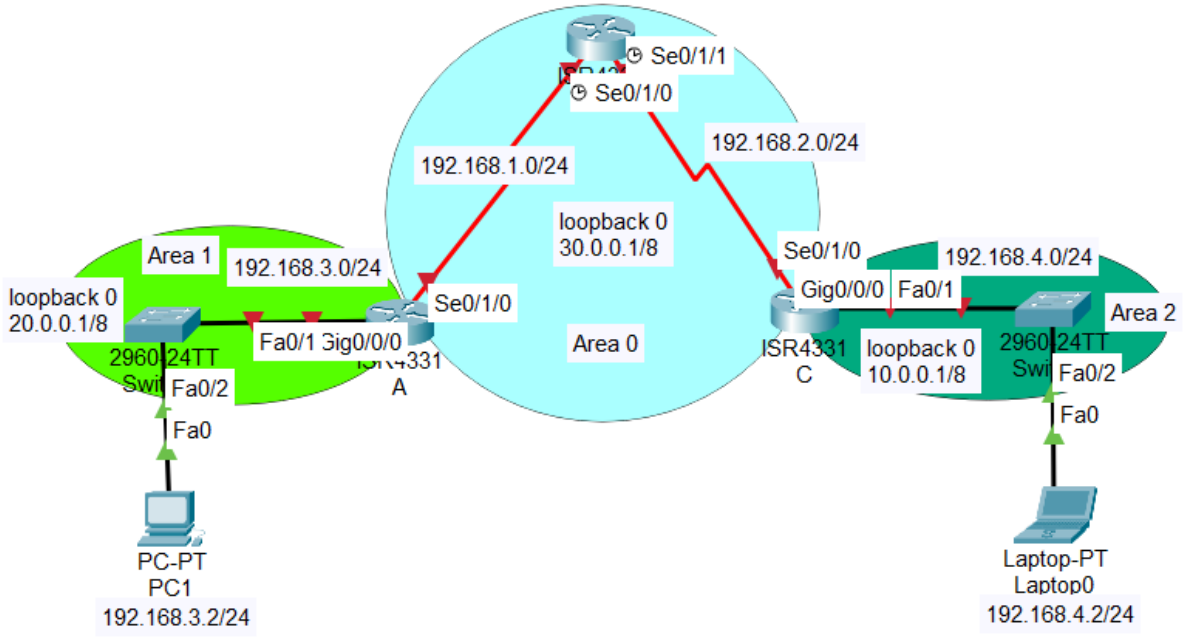
Lab 2: OSPF With Three Routers

The physical topology is as shown in lab 2 Advanced OSPF Lab.



Lab Exercise

Your task is to configure the network in lab 2 - Advanced OSPF Lab to allow full connectivity using OSPF. Router A should see routes for and be able to ping the loopback interface on router C and vice versa. Please feel free to try the lab without following the Lab Walk-Through section. Text written in courier new font indicates commands that can be entered on the router.

Purpose

Being able to configure and troubleshoot three routers will enable you to easily tackle issues that will arise in the lab.

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Lab Objectives

- Use the IP addressing.
- Set telnet access for the router to use the local login permissions of username **Ahmed**
- and the password **Allam**.
- Configure the enable password to be **cisco**.
- Configure IP addressing on all three routers.
- Configure OSPF areas 0, 1, and 2.
- Finally, test that the link is up and working by sending a ping across the link.

Configurations Topology

Device	Interface	Ip	Subnet mask
Router A	Se0/1/0	192.168.1.2	255.255.255.0
	Gig0/0/0	192.168.3.1	255.255.255.0
	Loopback 0	20.0.0.1	255.0.0.0
Router B	Se0/1/0	192.168.1.1	255.255.255.0
	Se0/1/1	192.168.2.1	255.255.255.0
	Loopback 0	30.0.0.1	255.0.0.0
Router C	Se0/1/0	192.168.2.2	255.255.255.0
	Gig0/0/0	192.168.4.1	255.255.255.0
	Loopback 0	10.0.0.1	255.0.0.0
PC1	Fa0	192.168.3.2	255.255.255.0
Laptop 0	Fa0	192.168.4.2	255.255.255.0

- To set telnet access and To set enable password in Routers A, B, C

Router A

```
Router>
Router>enable
Router#configure terminal
 Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RouterA
RouterA(config)#line vty 0 4
RouterA(config-line)#login local
RouterA(config-line)#username Ahmed password Allam
RouterA(config)#enable secret cisco
RouterA(config)#
```

Router B

```
Router>
Router>enable
Router#configure terminal
 Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RouterB
RouterB(config)#line vty 0 4
RouterB(config-line)#login local
RouterB(config-line)#username Ahmed password Allam
RouterB(config)#enable secret cisco
RouterB(config)#
```

Router C

```
Router>
Router>enable
Router#configure terminal
 Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RouterC
RouterC(config)#line vty 0 4
RouterC(config-line)#login local
RouterC(config-line)#username Ahmed password Allam
RouterC(config)#enable secret cisco
RouterC(config)#
```

- To configure OSPF on a router, there are two steps: first, enable the routing protocol and second, specify the networks to be advertised by OSPF:

Router A

```
RouterA(config)#router ospf 10
RouterA(config-router)#network 192.168.1.0 0.0.0.255 area 0
RouterA(config-router)#network 192.168.3.0 0.0.0.255 area 1
RouterA(config-router)#network 20.0.0.0 0.255.255.255 area 1
RouterA(config-router)#exit
RouterA(config)#
```

Router B

```
RouterB(config)#router ospf 12
RouterB(config-router)#network 192.168.1.0 0.0.0.255 area 0
RouterB(config-router)#
00:37:00: %OSPF-5-ADJCHG: Process 12, Nbr 20.0.0.1 on Serial0/1/0 from
LOADING to FULL, Loading Done
```

RouterB(config-router)#network 192.168.2.0 0.0.0.255 area 0
RouterB(config-router)#network 30.0.0.0 0.255.255.255 area 0
RouterB(config-router)#

Router C

RouterC(config)#router ospf 10
RouterC(config-router)#network 192.168.2.0 0.0.0.255 area 0
RouterC(config-router)#ne
00:45:57: %OSPF-5-ADJCHG: Process 10, Nbr 30.0.0.1 on Serial0/1/0 from LOADING to FULL, Loading Done
RouterC(config-router)#network 192.168.4.0 0.0.0.255 area 2
RouterC(config-router)#network 10.0.0.0 0.255.255.255 area 2
RouterC(config-router)#exit

- Check the protocol settings:

```
RouterA#sh ip protocols

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 20.0.0.1
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.168.1.0 0.0.0.255 area 0
    192.168.3.0 0.0.0.255 area 1
    20.0.0.0 0.255.255.255 area 1
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.0.0.1             110      00:06:57
    20.0.0.1             110      00:23:08
    30.0.0.1             110      00:07:24
  Distance: (default is 110)
```

```
RouterB#sh ip protocols

Routing Protocol is "ospf 12"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 30.0.0.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.168.1.0 0.0.0.255 area 0
    192.168.2.0 0.0.0.255 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.0.0.1             110      00:03:19
    20.0.0.1             110      00:12:41
    30.0.0.1             110      00:03:46
  Distance: (default is 110)
```

```
RouterC#sh ip protocols

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 10.0.0.1
  Number of areas in this router is 3. 3 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.168.2.0 0.0.0.255 area 0
    192.168.4.0 0.0.0.255 area 2
    10.0.0.0 0.255.255.255 area 2
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.0.0.1             110      00:10:23
    20.0.0.1             110      00:20:58
    30.0.0.1             110      00:12:03
  Distance: (default is 110)
```

- Testing and ping Topology

Ping from PC1 to laptop 0

```
C:\>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

Reply from 192.168.4.2: bytes=32 time=16ms TTL=125
Reply from 192.168.4.2: bytes=32 time=15ms TTL=125
Reply from 192.168.4.2: bytes=32 time=2ms TTL=125
Reply from 192.168.4.2: bytes=32 time=20ms TTL=125

Ping statistics for 192.168.4.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 20ms, Average = 13ms
```

Ping from laptop 0 to PC1

```
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=22ms TTL=125
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125
Reply from 192.168.3.2: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 22ms, Average = 7ms
```

Remote access from PC0 to All Routers A ,B,C

```
C:\>telnet 192.168.3.1
Trying 192.168.3.1 ...Open


User Access Verification

Username: Ahmed
Password:
RouterA>en
Password:
RouterA#
```

```
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open


User Access Verification

Username: Ahmed
Password:
RouterB>en
Password:
RouterB#
```

```
C:\>telnet 192.168.4.1
Trying 192.168.4.1 ...Open


User Access Verification

Username: Ahmed
Password:
RouterC>en
Password:
RouterC#
```

Thank You

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