

IOS Command Line Interface

```
Router>
Router>show ip route
Codes: C - connected, S - static, I - IGRP, 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

O IA 10.0.0.0/8 [110/129] via 30.0.0.1, 00:00:11, Serial2/0
O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:21:19, Serial2/0
    30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      30.0.0.0/8 is directly connected, Serial2/0
C      30.0.0.1/32 is directly connected, Serial2/0
C      40.0.0.0/8 is directly connected, FastEthernet0/0
C      172.16.0.0/16 is directly connected, Loopback0
Router>
00:51:41: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial2/0 from LOADING to FU
LL, Loading Done
```

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Router1

PhysicalConfigCLI

IOS Command Line Interface

```
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: C - connected, S - static, I - IGRP, 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

    20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial2/0
C       20.0.0.1/32 is directly connected, Serial2/0
    30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial3/0
C       30.0.0.2/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:02:33, Serial3/0
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface loopback 0

Router(config-if)#
```

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IOS Command Line Interface

```
Router>show ip route
```

```
Codes: C - connected, S - static, I - IGRP, 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
```

```
C    10.0.0.0/8 is directly connected, FastEthernet0/0
```

```
    20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
```

```
C      20.0.0.0/8 is directly connected, Serial2/0
```

```
C      20.0.0.2/32 is directly connected, Serial2/0
```

```
O    30.0.0.0/8 [110/128] via 20.0.0.2, 00:18:38, Serial2/0
```

```
O IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:18:13, Serial2/0
```

```
C    172.16.0.0/16 is directly connected, Loopback0
```

```
Router>
```

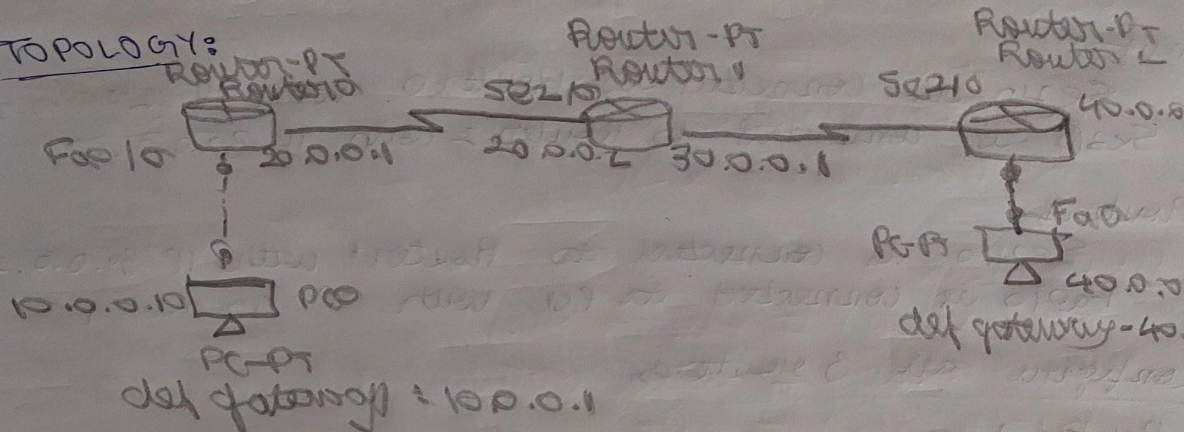
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EXPERIMENT-7

AIM: To configure OSPF routing protocol and connect across

TOPOLOGY:



Router 1 connected to Router 0 and Router 2 through interface S21/0 and S23/0

1) PC0 connected to Router 0 via copper cross cable through Fa0/0 interface with ip address 10.0.0.1

2) PC1 connected to Router 2 via cross cable through Fa0/0 interface, with ip address 40.0.0.10

PROCEDURE:

1) Open Cisco packet tracer and drag the following Router: Place three routers in the middle

PC0:

IP address: 10.0.0.10

Subnet mask: 255.0.0.0

Gateway: 10.0.0.1

PC1:

IP address: 40.0.0.10

Subnet mask: 255.0.0.0

Gateway: 40.0.0.1

Router 0

Se2/0 is connected to Router 1 with IP 20.0.0.1
Fa0/0 is connected to PC0 with IP 10.0.0.1

Router 1

Se2/0 is connected to Router 0 with IP 20.0.0.2
Se3/0 is connected to Router 2 with IP 30.0.0.1

Router 2

Se2/0 is connected to Router 1 with IP 30.0.0.2
Fa0/0 is connected to PC1 with IP 40.0.0.1

Configure all 3 routers

Router 1

Router > enable

Router # conf terminal

Router (config) > interface fastethernet 0/0

Router (config-if) > ip address 20.0.0.1 255.0.0.0
> encapsulation PPP
> clock rate 64000
> no shut

Router 0:

Router > enable

Router # conf terminal

Router (config) > interface fastethernet 0/0

Router (config-if)

→ Enable IP routing for configuring OSPF and Protocol in all routers

Router 0:

Router (config) # router ospf 1

Router (config) # router-id 1.1.1.1

Router (config) # network 10.0.0.0 0.255.255.255 area 0

Router (config) # network 20.0.0.0 0.255.255.255 area 0

Router (config)# exit

Router 1:

Router (config)# router ospf 1

Router (config)# router-id 2.2.2.2

Router (config)# network 10.0.0.0 0.255.255.255

Router (config)# network 20.0.0.0 0.255.255.255

Router (config)# exit

Router 2:

Router (config)# router ospf 1

Router (config)# router-id 3.3.3.3

Router (config)# network 30.0.0.0 0.255.255.255

Router (config)# network 40.0.0.0 0.255.255.255

Router (config)# exit

→ Configuration loopback address to routers :-

R0 (config)# interface loopback 0

R0 (config)# ip address 172.16.1.252 255.255.255

R0 (config)# no shut

R1 (config)# interface loopback 0

R1 (config)# ip address 172.16.1.253 255.255.255

R1 (config)# no shut

R2 (config)# interface loopback 0

R2 (config)# ip address 172.16.1.254 255.255.255

R2 (config)# no shut

Create virtual link between R0, R1

Router0

R0 (config) # router ospf 1

R0 (config) # area 0 virtual-link 2.2.2.2

R0 (config) # exit

Router 1

R1 (config) # router ospf 1

R1 (config) # area 0 virtual-link 1.1.1.1

R1 (config) # exit

Observation

The experiment demonstrates how OSPF dynamically learns and advertises routes, enabling efficient and scalable routing across multiple areas.

Routing tables on all routers must display networks from all areas with OIA indicating inter-area routes.

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