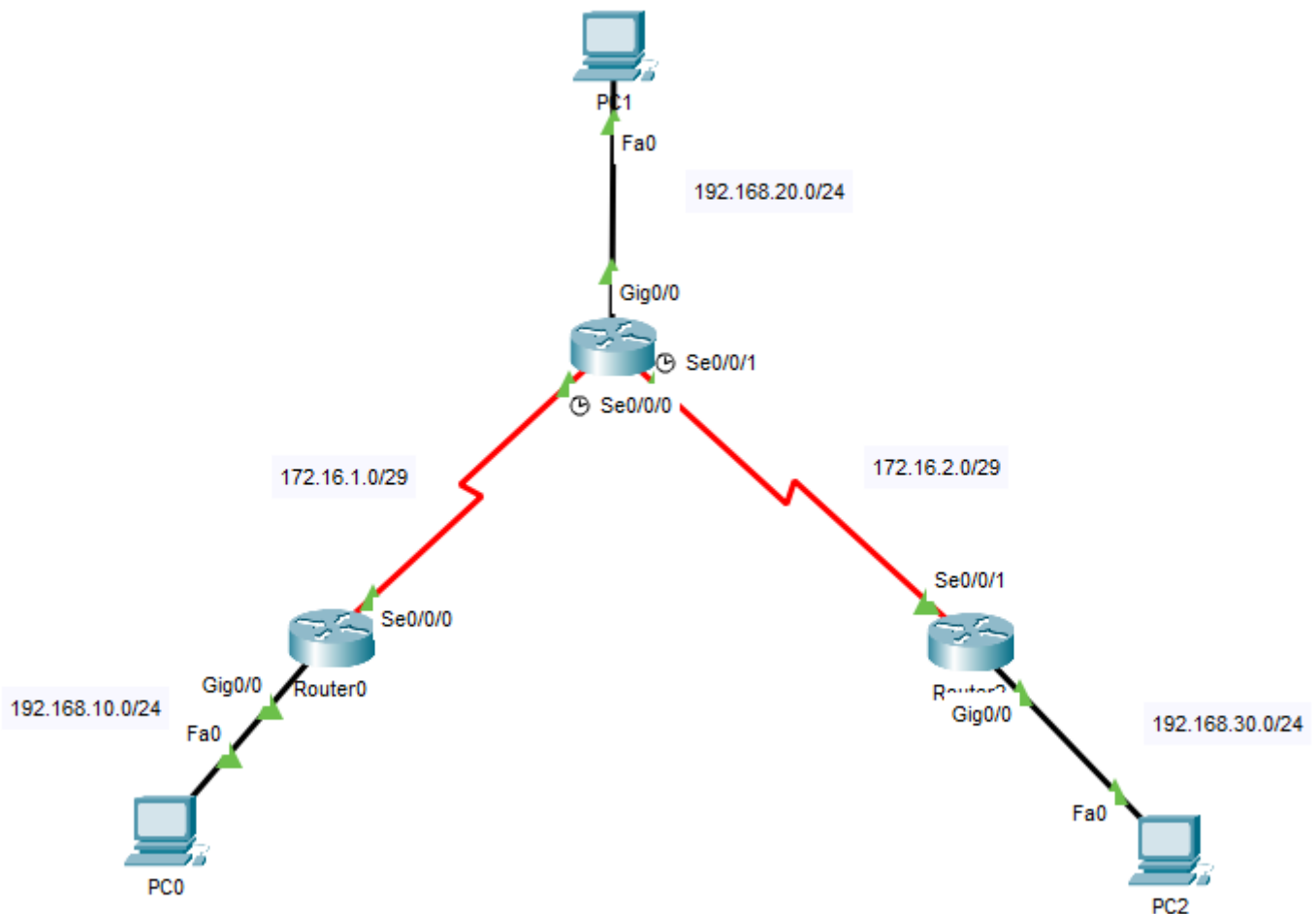


Cisco IOS OSPF Protocol

Network Topology



Router0 Configuration Commands

```
Router0>enable
Router0#configure terminal
Router0(config)#interface serial 0/0/0
Router0(config-if)#ip address 172.16.1.2 255.255.255.248
Router0(config-if)#no shutdown
Router0(config-if)#interface gigabitEthernet 0/0
Router0(config-if)#ip address 192.168.10.1 255.255.255.0
Router0(config-if)#no shutdown
Router0(config-if)#exit
Router0(config)#router ospf 1
```

```
Router0(config-router)#network 192.168.10.0 0.0.0.255 area 0
Router0(config-router)#network 172.16.1.0 0.0.0.7 area 0
Router0(config-router)#end
```

Router1 Configuration Commands

```
Router1>enable
Router1#configure terminal
Router1(config)#interface serial 0/0/0
Router1(config-if)#ip address 172.16.1.1 255.255.255.248
Router1(config-if)#no shutdown
Router1(config)#interface serial 0/0/1
Router1(config-if)#ip address 172.16.2.1 255.255.255.248
Router1(config-if)#no shutdown
Router1(config-if)#interface gigabitEthernet 0/0
Router1(config-if)#ip address 192.168.20.1 255.255.255.0
Router1(config-if)#no shutdown
Router1(config-if)#exit
Router1(config)#router ospf 1
Router1(config-router)#network 192.168.20.0 0.0.0.255 area 0
Router1(config-router)#network 172.16.1.0 0.0.0.7 area 0
Router1(config-router)#network 172.16.2.0 0.0.0.7 area 0
Router1(config-router)#end
```

Router2 Configuration Commands

```
Router2>enable
Router2#configure terminal
Router2(config)#interface serial 0/0/0
Router2(config-if)#ip address 172.16.2.2 255.255.255.248
Router2(config-if)#no shutdown
Router2(config-if)#interface gigabitEthernet 0/0
Router2(config-if)#ip address 192.168.30.1 255.255.255.0
Router2(config-if)#no shutdown
Router2(config-if)#exit
Router2(config)#router ospf 1
Router2(config-router)#network 192.168.30.0 0.0.0.255 area 0
Router2(config-router)#network 172.16.2.0 0.0.0.7 area 0
Router2(config-router)#end
```

PC Configurations

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0 ▾

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.10.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.10.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::2D0:FFFF:FEC1:9831

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5 ▾

Username

Password

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.20.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.20.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:C9FF:FEE0:6A96

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.30.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.30.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::2E0:F7FF:FE90:C3D5

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Verify OSPF Configuration

Router0#show ip route

Router0#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

```
172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
C    172.16.1.0/29 is directly connected, Serial0/0/0
L    172.16.1.2/32 is directly connected, Serial0/0/0
O    172.16.2.0/29 [110/128] via 172.16.1.1, 00:26:24, Serial0/0/0
    192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.10.0/24 is directly connected, GigabitEthernet0/0
L    192.168.10.1/32 is directly connected, GigabitEthernet0/0
O    192.168.20.0/24 [110/65] via 172.16.1.1, 00:26:44, Serial0/0/0
    192.168.30.0/29 is subnetted, 1 subnets
O    192.168.30.0/29 [110/129] via 172.16.1.1, 00:25:14, Serial0/0/0
```

Router1#show ip route

Router1#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

```
172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C    172.16.1.0/29 is directly connected, Serial0/0/0
L    172.16.1.1/32 is directly connected, Serial0/0/0
C    172.16.2.0/29 is directly connected, Serial0/0/1
L    172.16.2.1/32 is directly connected, Serial0/0/1
O    192.168.10.0/24 [110/65] via 172.16.1.2, 00:24:49, Serial0/0/0
    192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.20.0/24 is directly connected, GigabitEthernet0/0
L    192.168.20.1/32 is directly connected, GigabitEthernet0/0
    192.168.30.0/29 is subnetted, 1 subnets
O    192.168.30.0/29 [110/65] via 172.16.2.2, 00:23:29, Serial0/0/1
```

Router2#show ip route

```
Router2#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

```
172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
O    172.16.1.0/29 [110/128] via 172.16.2.1, 00:26:48, Serial0/0/1
C    172.16.2.0/29 is directly connected, Serial0/0/1
L    172.16.2.2/32 is directly connected, Serial0/0/1
O    192.168.10.0/24 [110/129] via 172.16.2.1, 00:26:48, Serial0/0/1
O    192.168.20.0/24 [110/65] via 172.16.2.1, 00:26:48, Serial0/0/1
192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.30.0/29 is directly connected, GigabitEthernet0/0
L    192.168.30.1/32 is directly connected, GigabitEthernet0/0
```

Router0# show ip ospf neighbor

```
Router0#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.20.1	0	FULL/ -	00:00:37	172.16.1.1	Serial0/0/0

Router1#show ospf neighbor

```
Router1#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.30.1	0	FULL/ -	00:00:34	172.16.2.2	Serial0/0/1
192.168.10.1	0	FULL/ -	00:00:35	172.16.1.2	Serial0/0/0

Router2#show ip ospf neighbor

```
Router2#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.20.1	0	FULL/ -	00:00:32	172.16.2.1	Serial0/0/1

Router0#show ip ospf

```
Router0#show ip ospf
Routing Process "ospf 1" with ID 192.168.10.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 2
    Area has no authentication
    SPF algorithm executed 7 times
    Area ranges are
    Number of LSA 3. Checksum Sum 0x01e255
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
```

Router1#show ip ospf

```
Router1#show ip ospf
Routing Process "ospf 1" with ID 192.168.20.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 3
    Area has no authentication
    SPF algorithm executed 6 times
    Area ranges are
    Number of LSA 3. Checksum Sum 0x01e255
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
```

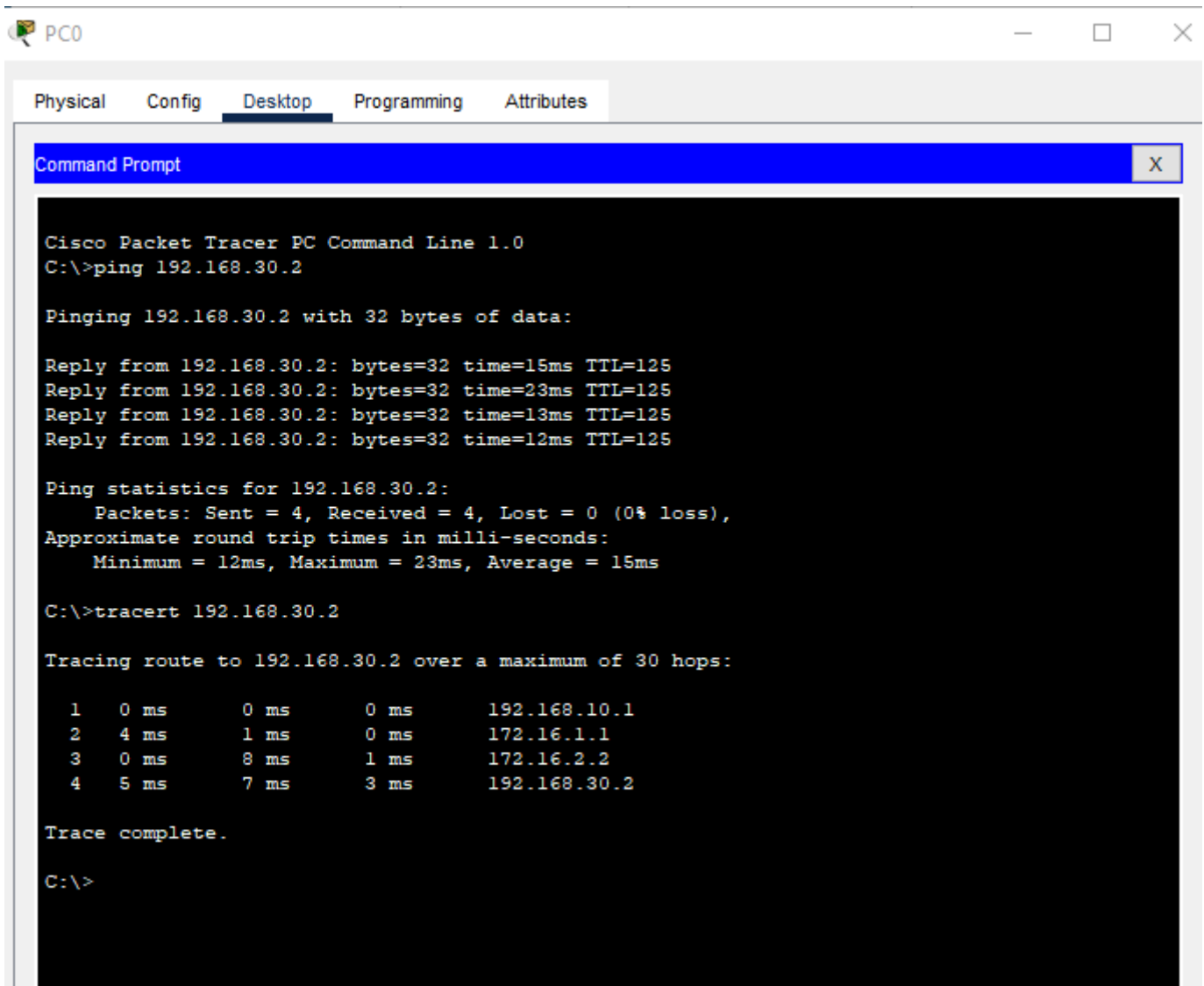
Router2#show ip ospf


```

Router2#show ip ospf
Routing Process "ospf 1" with ID 192.168.30.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 2
    Area has no authentication
    SPF algorithm executed 4 times
    Area ranges are
    Number of LSA 3. Checksum Sum 0x01e255
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0

```

Ping and Tracert Checks



The screenshot shows a PC0 window with a Command Prompt open. The window has tabs for Physical, Config, Desktop (selected), Programming, and Attributes. The Command Prompt title bar is blue with a close button (X). The text in the Command Prompt is as follows:

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time=15ms TTL=125
Reply from 192.168.30.2: bytes=32 time=23ms TTL=125
Reply from 192.168.30.2: bytes=32 time=13ms TTL=125
Reply from 192.168.30.2: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 12ms, Maximum = 23ms, Average = 15ms

C:\>tracert 192.168.30.2

Tracing route to 192.168.30.2 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    192.168.10.1
  1  4 ms    1 ms    0 ms    172.16.1.1
  2  0 ms    8 ms    1 ms    172.16.2.2
  3  5 ms    7 ms    3 ms    192.168.30.2

Trace complete.

C:\>

```

Cisco Packet Tracer File

[net15 ospf.pkt](#)

Revision #3

Created 8 January 2023 16:04:59 by Glen Taylor

Updated 24 January 2023 22:45:52 by Glen Taylor