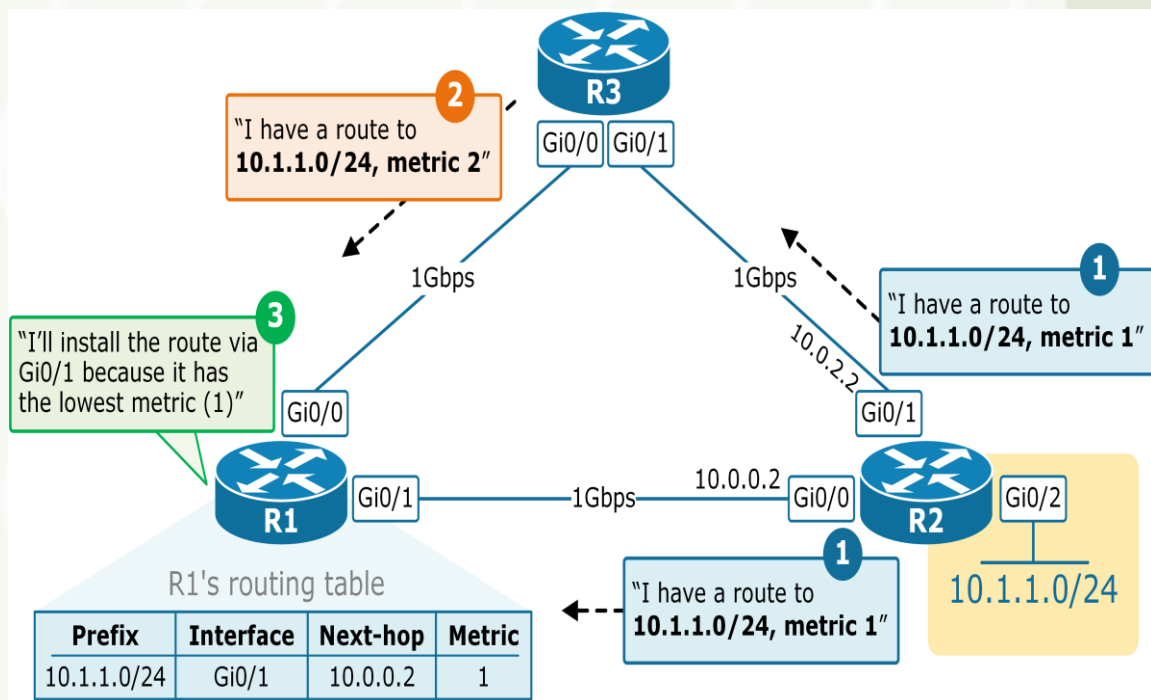


# OSPF

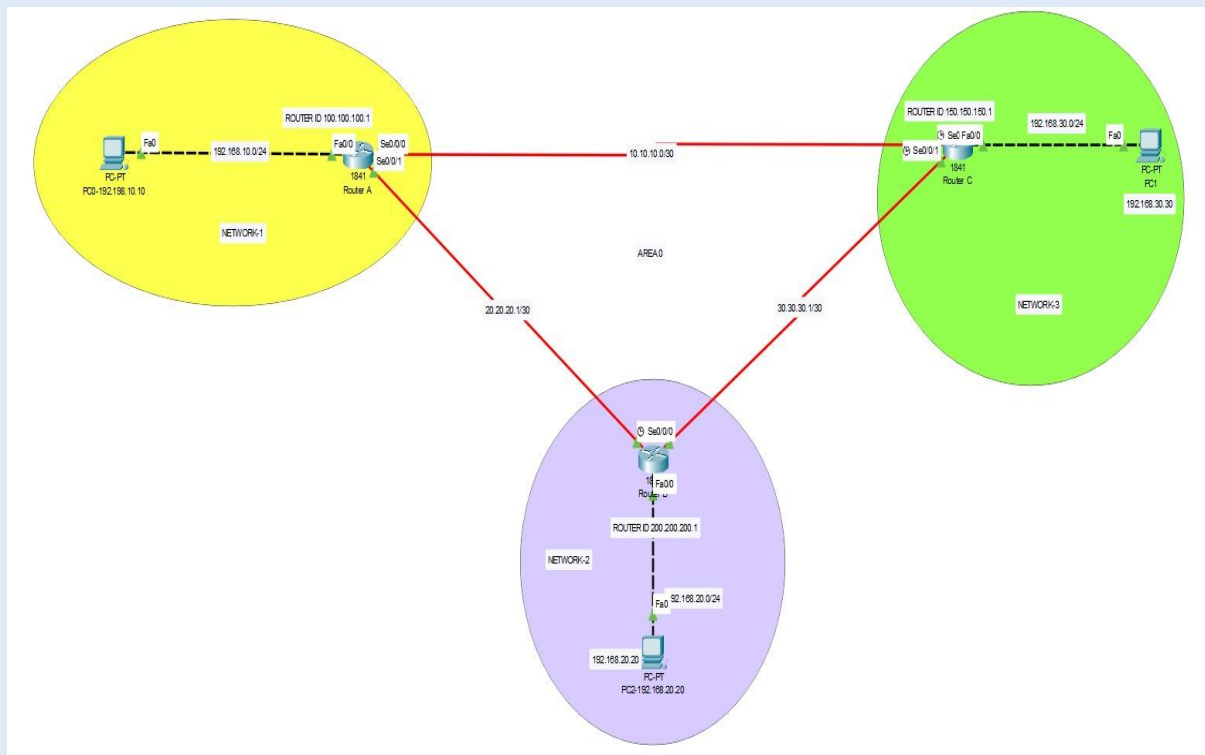
## Open Shortest Path First



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# Design & Implementation OSPF Network



## OSPF Network Topology

### Router-A Configuration

Router>en

Router#conf t

Router(config)#host network-1

network-1(config)#interface fastEthernet 0/0

network-1(config-if)#ip address 192.168.10.100 255.255.255.0

network-1(config-if)#no sh

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

network-1(config-if)# exit

network-1(config)#interface serial 0/0/0

network-1(config-if)#ip address 10.10.10.1 255.255.255.252

Config LAN interface  
Network

Config WAN interface  
Router A and Router C

```
network-1(config-if)#no sh
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial 0/0/0, changed state to up
network-1(config-if)#exit
```

```
network-1(config)#interface serial 0/0/1
network-1(config-if)#ip address 20.20.20.1 255.255.255.252
```

Config WAN interface  
Router A and Router B

```
network-1(config-if)#no sh
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial 0/0/0, changed state to up
network-1(config-if)#exit
```

```
network-1(config)#router ospf 1
network-1(config-router)#router-id 100.100.100.1
network-1(config-router)#network 192.168.10.0 0.0.0.255 area 0
network-1(config-router)#network 10.10.10.0 0.0.0.3 area 0
network-1(config-router)#network 20.20.20.0 0.0.0.3 area 0
network-1(config-router)#exit
```

OSPF  
Router ID  
WAN & LAN Network Routing  
with Area 0 in Router A

```
network-1(config)#end
%SYS-5-CONFIG_I: Configured from console by console
network-1#write
Building configuration...
[OK]
```

## Router-B Configuration

```
Router>en
Router#conf t
Router(config)#host Network-2
Network-2(config)#interface fastEthernet 0/0
Network-2(config-if)#ip address 192.168.20.100 255.255.255.0
Network-2(config-if)#no sh
```

Config LAN interface  
Network - 2

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

network-2(config)#interface serial 0/0/0

network-2(config-if)#ip address 20.20.20.2 255.255.255.252

network-2(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial 0/0/0, changed state to up

network-2(config-if)#exit

Config WAN interface  
Router B and Router A

network-2(config)#interface serial 0/0/1

network-2(config-if)#ip address 30.30.30.1 255.255.255.252

network-2(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial 0/0/1, changed state to up

network-2(config-if)#exit

network-2(config)#router ospf 2

network-2(config-router)#router-id 100.100.100.1

network-2(config-router)#network 192.168.20.0 0.0.0.255 area 0

network-2(config-router)#network 20.20.20.0 0.0.0.3 area 0

network-2(config-router)#network 30.30.30.0 0.0.0.3 area 0

network-2(config-router)#exit

network-2(config)#end

%SYS-5-CONFIG\_1: Configured from console by console

network-2#write

Building configuration...

[OK]

Config WAN interface  
Router B and Router C

OSPF  
Router ID  
WAN & LAN Network Routing  
with Area 0 in Router B

## Router-C Configuration

Router>en

Router#conf t

Router(config)#host Network-3

Network-3(config)#interface fastEthernet 0/0

Network-3(config-if)#ip address 192.168.30.100 255.255.255.0

Network-3(config-if)#no sh

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Network-3(config-if)#exit

Network-3(config)#interface serial 0/0/0

Network-3(config-if)#ip add 10.10.10.2 255.255.255.252

Network-3(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Network-3(config-if)#exit

Network-3(config)#interface serial 0/0/1

Network-3(config-if)#ip add 30.30.30.2 255.255.255.252

Network-3(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Network-3(config-if)#exit

Network-3(config)#router ospf 3

Network-3(config-router)#router-id 150.150.150.1

Network-3(config-router)#network 192.168.20.0 0.0.0.255 area 0

Network-3(config-router)#network 10.10.10.0 0.0.0.3 area 0

Network-3(config-router)#network 30.30.30.0 0.0.0.3 area 0

Config LAN interface  
Network - 3

Config WAN interface  
Router C and Router A

Config WAN interface  
Router C and Router B

OSPF  
Router ID  
WAN & LAN Network Routing  
with Area 0 in Router C

Network-3(config-router)#exit

Network-3(config)#exit

%SYS-5-CONFIG\_I: Configured from console by console

Network-3#write

Building configuration...

[OK]

## Router A

- **To Check Directly connected Routers**

network-1#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

200.200.200.1 0 FULL/ - 00:00:36 20.20.20.2 Serial0/0/1

150.150.150.1 0 FULL/ - 00:00:35 10.10.10.2 Serial0/0/0

- **Shows All Possible routes**

network-1#show ip ospf database

OSPF Router with ID (100.100.100.1) (Process ID 1)

Router Link States (Area 0)

Link ID ADV Router Age Seq# Checksum Link count

150.150.150.1 150.150.150.1 1008 0x80000014 0x004733 5

100.100.100.1 100.100.100.1 74 0x80000012 0x0095cf 5

200.200.200.1 200.200.200.1 74 0x80000012 0x0004b0 5

- **Show Routing Table and Best Path**

network-1#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

10.0.0.0/30 is subnetted, 1 subnets

C 10.10.10.0 is directly connected, Serial0/0/0

20.0.0.0/30 is subnetted, 1 subnets

C 20.20.20.0 is directly connected, Serial0/0/1

30.0.0.0/30 is subnetted, 1 subnets

O 30.30.30.0 [110/128] via 10.10.10.2, 00:02:16, Serial0/0/0

[110/128] via 20.20.20.2, 00:02:16, Serial0/0/1

C 192.168.10.0/24 is directly connected, FastEthernet0/0

O 192.168.20.0/24 [110/65] via 20.20.20.2, 00:02:16, Serial0/0/1

O 192.168.30.0/24 [110/65] via 10.10.10.2, 01:18:26, Serial0/0/0

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