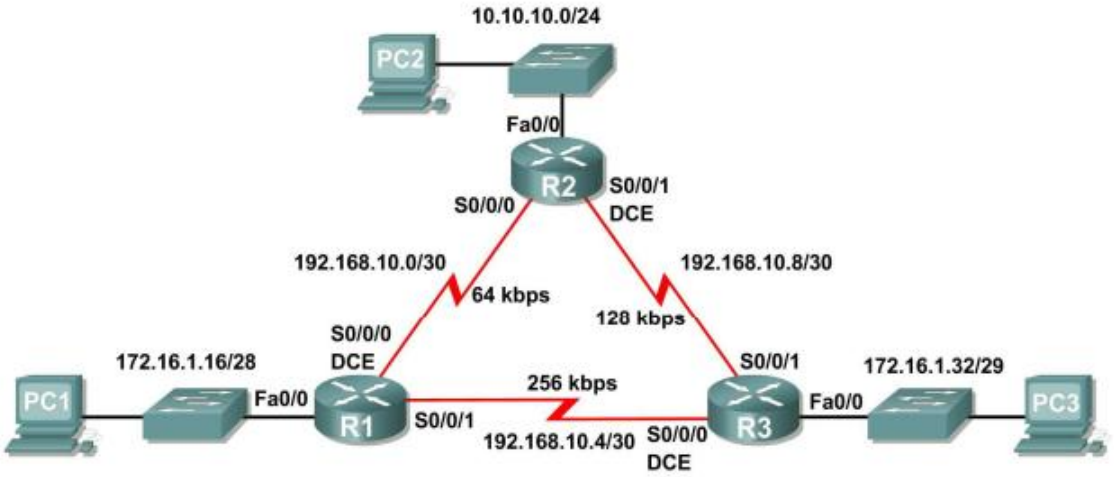
LAB#6: Basic OSPF Configuration Lab



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.16.1.17	255.255.255.240	N/A
	S0/0/0	192.168.10.1	255.255.255.252	N/A
	S0/0/1	192.168.10.5	255.255.255.252	N/A
R2	Fa0/0	10.10.10.1	255.255.255.0	N/A
	S0/0/0	192.168.10.2	255.255.255.252	N/A
	S0/0/1	192.168.10.9	255.255.255.252	N/A
R3	Fa0/0	172.16.1.33	255.255.255.248	N/A
	S0/0/0	192.168.10.6	255.255.255.252	N/A
	S0/0/1	192.168.10.10	255.255.255.252	N/A
PC1	NIC	172.16.1.20	255.255.255.240	172.16.1.17
PC2	NIC	10.10.10.10	255.255.255.0	10.10.10.1
PC3	NIC	172.16.1.35	255.255.255.248	172.16.1.33

Objectives:

- *Learn how OSPFv1 using metrics to select the best routing path.*
- *Configure the networks and troubleshoot the network.*

- *Analyze the routing table and check the metrics .*

Procedures :

Step 1*: Configure the routers On the routers, enter global configuration mode and configure the hostname as shown on the chart. Then configure the console, virtual terminal lines password (both "cisco") and privileged EXEC password ("class"):*

Step 2*: Disable DNS lookup:*
Router(config)#no ip domain-lookup

Step 3*: Configure the interfaces on R1, R2, and R3 Configure the interfaces on the R1, R2, and R3 routers with the IP addresses from the table under the Topology Diagram.*

Step 4: *Verify IP addressing and interfaces Use the* ***show ip interface brief*** *command to verify that the IP addressing is correct and that the interfaces are active.*

Step 5*: Configure Ethernet interfaces of PC1, PC2, and PC3 Configure the Ethernet interfaces of PC1, PC2, and PC3 with the IP addresses and default gateways from the table under the Topology Diagram.*

Task: Configure OSPF on the R1 Router

Step 1*: Use the router ospf command in global configuration mode to enable OSPF on the R1 router. Enter a process ID of 1 for the process-ID parameter.*

R1(config)#router ospf 1
R1(config-router)#

Step 2*: Configure the network statement for the LAN network.*

Once you are in the Router OSPF configuration sub-mode, configure the LAN network 172.16.1.16/28 to be included in the OSPF updates that are sent out of R1.

The OSPF network command uses a combination of network-address and wildcard-mask similar to that which can be used by EIGRP. Unlike EIGRP, the wildcard mask in OSPF is required.

Use an area ID of 0 for the OSPF area-id parameter. 0 will be used for the OSPF area ID in all of the network statements in this topology.

R1(config-router)# network 172.16.1.16 0.0.0.15 area 0
R1(config-router)#

Step 3*: Configure the router to advertise the 192.168.10.0/30 network attached to the Serial0/0/0 interface.*

R1(config-router)# network 192.168.10.0 0.0.0.3 area 0
R1(config-router)#

***Step 4**: Configure the router to advertise the 192.168.10.4/30 network attached to the Serial0/0/1 interface.*

R1(config-router)# network 192.168.10.4 0.0.0.3 area 0
R1(config-router)#

***Step 5**: When you are finished with the OSPF configuration for R1, return to privileged EXEC mode.*

R1(config-router)#end
R1#

Task: Configure OSPF on the R2 and R3 Routers

***Step 1**: Enable OSPF routing on the R2 router using the router ospf command. Use a process ID of 1.*

R2(config)#router ospf 1
R2(config-router)#

***Step 2**: Configure the router to advertise the LAN network 10.10.10.0/24 in the OSPF updates.*

R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#

***Step 3**: Configure the router to advertise the 192.168.10.0/30 network attached to the Serial0/0/0 interface.*

R2(config-router)#network 192.168.10.0 0.0.0.3 area 0
R2(config-router)#

Notice that when the network for the serial link from R1 to R2 is added to the OSPF configuration, the router sends a notification message to the console stating that a neighbor relationship with another OSPF router has been established.

***Step 4**: Configure the router to advertise the 192.168.10.8/30 network attached to the Serial0/0/1 interface. When you are finished, return to privileged EXEC mode.*

R2(config-router)#network 192.168.10.8 0.0.0.3 area 0
R2(config-router)#end
R2#

Step 5*: Configure OSPF on the R3 router using the router ospf and network commands. Use a process ID of 1. Configure the router to advertise the three directly connected networks. When you are finished, return to privileged EXEC mode.*

R3(config)#router ospf 1
R3(config-router)#network 172.16.1.32 0.0.0.7 area 0
R3(config-router)#network 192.168.10.4 0.0.0.3 area 0
R3(config-router)#
R3(config-router)#end
R3#

Notice that when the networks for the serial links from R3 to R1 and R3 to R2 are added to the OSPF configuration, the router sends a notification message to the console stating that a neighbor relationship with another OSPF router has been established.

Task: Configure OSPF Router IDs *:*

The OSPF router ID is used to uniquely identify the router in the OSPF routing domain. A router ID is an IP address. Cisco routers derive the Router ID in one of three ways and with the following precedence:
1. IP address configured with the OSPF router-id command.
2. Highest IP address of any of the router's loopback addresses.
3. Highest active IP address on any of the router's physical interfaces.

Step 1*: Examine the current router IDs in the topology. Since no router IDs or loopback interfaces have been configured on the three routers, the router ID for each router is determined by the highest IP address of any active interface.*

What is the router ID for R1? _____

What is the router ID for R2? _____

What is the router ID for R3? _____

The router ID can also be seen in the output of the show ip protocols, show ip ospf, and show ip ospf interfaces commands.

R3# show ip protocols

R3#show ip ospf
R3#show ip ospf
R1(config-router)#end
R1# clear ip ospf

R1#

Task: Verify OSPF Operation

Step 1*: On the R1 router, Use the show ip ospf neighbor command to view the information about the OSPF neighbor routers R2 and R3. You should be able to see the neighbor ID and IP address of each adjacent router, and the interface that R1 uses to reach that OSPF neighbor.*

R1#show ip ospf neighbor

R1#

Step 2*: On the R1 router, use the show ip protocols command to view information about the routing protocol operation.*

R1#show ip protocols

R1#

Notice that the output specifies the process ID used by OSPF. Remember, the process ID must be the same on all routers for OSPF to establish neighbor adjacencies and share routing information.

Task: Examine OSPF Routes in the Routing Tables*:*
View the routing table on the R1 router. OSPF routes are denoted in the routing table with an "O".

R1#show ip route