

CN PROJECT

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Aim- OSPF configuration (single-area and multi-area) on CISCO packet tracer

Description

In an OSPF network, routers or systems within the same area maintain an identical link-state database that describes the topology of the area. Each router or system in the area generates its link-state database from the link-state advertisements (LSAs) that it receives from all the other routers or systems in the same area and the LSAs that itself generates. An LSA is a packet that contains information about neighbours and path costs. Based on the link-state database, each router or system calculates a shortest-path spanning tree, with itself as the root, using the SPF algorithm.

OSPF has the following key advantages:

- Compared with distance-vector routing protocols such as the Routing Information Protocol (RIP), OSPF is more suitable for serving large, heterogeneous internetworks. OSPF can recalculate the routes in a short amount of time when the network topology changes.
- With OSPF, you can divide an Autonomous System (AS) into areas and keep area topologies separate to decrease the OSPF routing traffic and the size of the link-state database of each area.
- OSPF provides equal-cost multipath routing. You can add duplicate routes to the TCP stack using different next hops.

Multi-area network

All areas must be connected to AREA 0 in the given configuration there are 3 AREAs AREA 0, AREA 1, AREA 2

First, we connect all the PCs to the switches and the switches to the routers Now assign IP addresses to the routers and the PCs

Now we will go to each individual router and go to their command-line interface and type the following commands in sequence

For R1

Enable to enter into Privileged EXEC mode

Config t to enter Global configuration

Router ospf 1

Here 1 is the process ID number we have selected 1 as the process ID for this configuration

Network 60.0.0.0 0.255.255.255 area 1

Network 30.0.0.0 0.255.255.255 area 1

Here 60.0.0.0 and 30.0.0.0 are the networks that are directly connected to the router

0.255.255.255 is the wildcard mask of the networks as they are both class A networks

We also specify the area of the network

Then enter exit

For R2

Enable to enter into Privileged EXEC mode

Config t to enter Global configuration

Router ospf 1

Network 50.0.0.0

0.255.255.255 area

0 Network 30.0.0.0

0.255.255.255 area

1 Exit

For R3

Enable to enter into
Privileged EXEC mode
Config t to enter Global
configuration Router
ospf 1
Network 50.0.0.0
0.255.255.255 area
0 Network 90.0.0.0
0.255.255.255 area
2 Exit

For R4
Enable to enter into
Privileged EXEC mode
Config t to enter Global
configuration Router
ospf 1
Network 80.0.0.0
0.255.255.255 area
2 Network 90.0.0.0
0.255.255.255 area
2 Exit

Single area network

We connect all the PCs,
switches, and routers For
Router 6
Enable to enter into
Privileged EXEC mode
Config t to enter Global
configuration Router
ospf 4
Network 100.0.0.0
0.255.255.255 area 0
Network 110.0.0.0

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0.255.255.255 area 0  
Exit
```

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For Router 7  
Enable to enter into  
Privileged EXEC mode  
Config t to enter Global  
configuration Router  
ospf 4  
Network 125.0.0.0 0.255.255.255 area 0  
Network 110.0.0.0 0.255.255.255 area 0  
Exit
```

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For Router 8  
Enable to enter into Privileged EXEC mode  
Config t to enter Global configuration  
Router ospf 4  
Network 125.0.0.0 0.255.255.255 area 0  
Network 120.0.0.0 0.255.255.255 area 0  
Exit  
Now ping from one PC to another if a reply is received  
then the connection is established.
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Output



