

## OSPF Tables:

Each OSPF router stores routing and topology information in three tables: Neighbor table, Topology table and Routing Table.

|                             |  |
|-----------------------------|--|
| <b>OSPF Neighbor Table</b>  | Lists all directly connected neighbors<br>Next Hop Router<br>Interfaces                      |
| <b>OSPF Topology Table</b>  | List all learned Routes from all OSPF<br>Destination<br>Also called Link State Database LSDB |
| <b>Global Routing Table</b> | Best routes from EIGRP topology table will be copied to the routing table.                   |

## OSPF Routing Table:

OSPF stores single best route for each destination in this table. Router uses this table to forward the packet. There is a separate routing table for each routed protocol. OSPF Routing Table contains the best route for each known network. Contain the current working best paths that will be used to forward data traffic between neighbors.

```
R1#show ip route ospf
```

```
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  
i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP  
a - application route  
+ - replicated route, % - next hop override, p - overrides from PfR
```

```
Gateway of last resort is not set
```

```
10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks  
O 10.1.23.0/30 [110/2] via 10.1.13.2, 00:40:13, GigabitEthernet0/1  
[110/2] via 10.1.12.2, 00:40:13, GigabitEthernet0/0  
O IA 10.1.24.0/30 [110/2] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 10.1.35.0/30 [110/2] via 10.1.13.2, 00:40:13, GigabitEthernet0/1  
172.16.0.0/32 is subnetted, 9 subnets  
O IA 172.16.0.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.1.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.2.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.3.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.4.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.5.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.6.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.7.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
O IA 172.16.8.1 [110/3] via 10.1.12.2, 00:39:57, GigabitEthernet0/0  
172.30.0.0/32 is subnetted, 9 subnets
```

|                     |   |
|---------------------|---|
| <b>O</b>            | This route was learned through OSPF.                      |
| <b>O IA</b>         | This route was learned through OSPF.                      |
| <b>10.1.23.0/30</b> | Destination learn network and 30 is subnet mask.          |
| <b>110</b>          | 110, is the Administrative Distance of OSPF.              |
| <b>2</b>            | This is the metric, Total cost to get to the destination. |
| <b>10.1.13.2</b>    | Next Hop IP Address where to send the traffic.            |
| <b>00:40:13</b>     | Time since the route was learnt.                          |
| <b>GigabitE0/1</b>  | The outbound interface going towards the destination.     |

### OSPF Neighbor Table:

Contain information about the neighbors; Neighbor table includes all neighbors that is directly connected to router using OSPF. Contains all discovered OSPF neighbors with whom routing information will be interchanged. Each OSPF router will try to find and form a neighbor relationship with other OSPF routers. The information related to each Neighbor is stored in the OSPF Neighbor Table.

```
R1#show ip ospf neighbor
```

```
Neighbor ID    Pri   State           Dead Time   Address           Interface
3.3.3.3        1     FULL/DR         00:00:39   10.1.13.2        GigabitEthernet0/1
2.2.2.2        1     FULL/DR         00:00:31   10.1.12.2        GigabitEthernet0/0
R1#
```

|                    |  |
|--------------------|--|
| <b>Neighbor ID</b> | The Neighbor ID is the router ID of the neighbor router.   |
| <b>Pri</b>         | The Pri field indicates the priority of the neighbor router.   |
| <b>State</b>       | The State field indicates the functional state of the neighbor router.   |
| <b>Dead Time</b>   | The amount of time remaining that the router waits to receive an OSPF hello packet from the neighbor before declaring the neighbor down. |
| <b>Address</b>     | The IP address of the interface to which this neighbor is directly connected.  |
| <b>Interface</b>   | The interface on which the OSPF neighbor has formed adjacency.   |

## OSPF Topology Table:

Topology Table contains the entire road map of the network with all available OSPF routers and calculated best and alternative paths. The OSPF database contains all LSAs that describe the network topology. OSPF calls its topology table a Link State Database (LSDB). Each entry within the LSDB is called a Link State Advertisement (LSA).

```
R1#show ip ospf database
```

```
OSPF Router with ID (1.1.1.1) (Process ID 1)
```

```
Router Link States (Area 0)
```

| Link ID | ADV Router | Age | Seq#       | Checksum | Link count |
|---------|------------|-----|------------|----------|------------|
| 1.1.1.1 | 1.1.1.1    | 860 | 0x80000007 | 0x00525E | 2          |
| 2.2.2.2 | 2.2.2.2    | 808 | 0x80000006 | 0x000291 | 2          |
| 3.3.3.3 | 3.3.3.3    | 788 | 0x80000006 | 0x00F196 | 2          |

```
Net Link States (Area 0)
```

| Link ID   | ADV Router | Age | Seq#       | Checksum |
|-----------|------------|-----|------------|----------|
| 10.1.12.2 | 2.2.2.2    | 808 | 0x80000002 | 0x009E70 |
| 10.1.13.2 | 3.3.3.3    | 788 | 0x80000002 | 0x00976E |
| 10.1.23.2 | 3.3.3.3    | 788 | 0x80000002 | 0x005B9C |

```
Summary Net Link States (Area 0)
```

|                                      |   |
|--------------------------------------|---|
| <b>OSPF Router With ID (1.1.1.1)</b> | This router OSPF router ID that is 1.1.1.1 which is configured manually     |
| <b>Process ID 1</b>                  | Process ID of the OSPF configured by Network Administrator.                 |
| <b>Link ID</b>                       | The IDs of the routers in the area. There are three routers in Area 0.      |
| <b>ADV Router</b>                    | Router ID of the routers who is advertising the LSA.                        |
| <b>Age</b>                           | Maximum age counter in seconds. The maximum is 3600 seconds or 1 hour       |
| <b>Seq#</b>                          | It starts from 0x80000001 and will increase by 1 for each update.           |
| <b>Checksum</b>                      | This is check sum of each LSA.  |
| <b>Link</b>                          | Number of interfaces detected per router. Every router has 3 links in Area. |