

OSPF (Open Shortest Path First) protocol

Link-State IP Routing Protocol, a type of non-proprietary interior gateway protocol - supports VLSM

Variable Length S

Three Tables Routers Create

1. Neighbor Table - Exchanging HELLO packets with other OSPF routers. (Neighbor)
2. Topological / Link-State Database - Map of all links in the entire internetwork
3. Main Routing Table - using "shortest path algorithm" (SPF) tree calculation

OSPF V2 - (RFC2328)
administrative distance - 110

OSPF elects one router to be a **designated router (DR)**, and one router to be a **backup designated router (BDR)**, on each multi-access segment. If you don't want a router interface to participate in DR/BDR election, set the priority to 0. Cisco defaults to 1. **No DR on any point-to-point type.**

Interface Type	Hello Interval	Dead Interval
Broadcast	10	40
Point-to-Point	10	40
Non-broadcast	30	120
Point-to-Multipoint	30	120

Sub-protocol Hello interval in seconds

OSPF is sent using IP datagrams with IP protocol 89 x'59'.

Types

- 1 Hello (Keepalive's)
- 2 Database Description - DD
- 3 Link State Request - LSR (upload)
- 4 Link State Update - LSU (download)
- 5 Link State Acknowledgment - LSA
(Has a 20 Byte Header followed by type information)

LSA Type	Advertisement Name	Description
1	Router Links	Originated by all routers. The collected
2	Network Links	Originated for multi-access network
3,4	Summary Link	Originated by area border router (3 - Routes to the network, 4 - Routes to the network)
5	AS External Link	Originated by AS bound

(30-minute database synchron

Link State Advertisements - RFC 1247

Multicast addresses 224.0.0.5

A NEIGHBOR refers to adjacent interface and information is exchanged

OSPF uses This

OSPF 24 byte packet header

Version Number ("2") 1 Byte	Type ("1" hello) 1 Byte	Packet Length 2 Bytes
Router ID - IP Address of interface 4 Bytes Highest loopback interface address		
Area ID 4 Bytes		
Checksum (2 Bytes) Excluding the authentication field	Authentication 0=null, 1=SPF	
Authentication - Used by the authentication 8 Bytes		

Eight (8) states for OSPF neighbor relationships: Down, Init, 2Way, ExStart, Exchange, Loading, Full

Cisco commands:

```
>router ospf 100 (Process id)
Uniformity of Process ID's not required
> network 172.16.0.0 0.0.0.255
The mask contains wildcards
1 is a "do not care"
in the first two
>sh
```

```
>show ip ospf (number of times SPF algorithm has run)
```

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