



BASIC OSPF - Enable OSPF

Open Shortest Path First (OSPF) is an IGP developed by the OSPF working group of the Internet Engineering Task Force (IETF). Designed expressly for IP networks, OSPF supports IP subnetting and tagging of externally derived routing information. OSPF also allows packet authentication and uses IP multicast when sending/receiving packets.

As with other routing protocols, enabling OSPF requires that you create an OSPF routing process, specify the range of IP addresses to be associated with the routing process, and assign area IDs to be associated with that range of IP addresses.

Configuration

With OSPF, every router has its own unique "picture" (topology map) of the network. Routers use "HELLO" packets to periodically check with routers to ensure they are still there. Every router in OSPF is identified with a "router ID". The router ID can be manually entered or OSPF will automatically choose the IP address with the highest number. It supports variable length subnet masks (VLSM), making it a classless routing protocols.

OSPF works well in point to point and point to multipoint, broadcast or non-broadcast configurations. OSPF also offers a number of OSPF-specific features such as stub areas, virtual links, and OSPF on demand circuits. In OSPF route redistribution is supported between different routing protocols.

An OSPF point-to-multipoint interface is defined as a numbered point-to-point interface having one or more neighbors. It creates multiple host routes. An OSPF point-to-multipoint network has the following benefits compared to nonbroadcast multiaccess and point-to-point networks.

OSPF On An IP Network

```
NetStepByStep-R2 (config-router) # network X.X.X.X Y.Y.Y.Y area Z
```

- Use to instruct the router to advertise the networks that are directly linked to it
- You should enter a network statement for every subnet that you want to peer OSPF across
- The X.X.X.X stands for the network id of a network that is linked directly to the router.

- The Y.Y.Y.Y stands for the wildcard mask for that network. The wildcard mask is the inverse mask of the subnet mask.
- The Z parameter stands for the area id number.
- Area id number can always be zero (0) for small networks, but for larger networks, the area IDs need to be properly planned as all routing updates must traverse area 0.

```
NetStepByStep-R2 (config-if) # ip ospf X area Z
```

- Use to enable OSPFv2 explicitly on an interface.
- It is an alternative to enabling OSPFv2 through the address of the interface that matches the address range specified by the network area command.
- It will supersede the effects of the network area command that is entered at the network level to affect the interfaces whose addresses fall within the address range specified for the network area command.
- The X stands for process-id.
- The Z stands for area-id

Verification

```
show ip ospf neighbor
```

- Use to display OSPF-related interface information.
- This command should be used in Executive and privileged mode.
- Use [brief] to displays brief overview information for OSPF interfaces, states, addresses and masks, and areas on the router.

```
NetStepByStep-R2# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
4.4.4.4	1	FULL/DR	00:00:37	24.24.24.4	Ethernet0/2
3.3.3.3	1	FULL/DR	00:00:39	23.23.23.3	Ethernet0/1
1.1.1.1	1	FULL/DROTHER	00:00:37	12.12.12.1	Ethernet0/3

Troubleshoot

```
Debug ip ospf adj
```

- Use to capture the authentication process.
- Use this command before the neighbor relationship is established.
- The output from debug privileged EXEC commands provides diagnostic information concerning a variety of internetworking events relating to protocol status and network activity in general.

- Enabling debugging can disrupt operation of the router when internetworks are experiencing high load conditions. Hence, if logging is enabled, the access server may intermittently freeze up as soon as the console port gets overloaded with log messages.
- Before you start a debug command, always consider the output that this command will generate and the amount of time this may take.

Video Cheat Sheet

R1

```
router ospf 1
 network 12.12.12.1 0.0.0.0 area 1
```

R2

```
router ospf 2
 network 12.12.12.0 0.0.0.255 area 1
```

R4

```
router ospf 4
 network 24.24.24.4 0.0.0.0 area 0
```

R2

```
interface ethernet 0/2
 ip ospf 2 area 0
```