What Does the show ip ospf interface Command Reveal?

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Introduction

This document explains the information contained in the **show ip ospf interface** command output.

Prerequisites

Requirements

Readers of this document should have basic knowledge of the Open Shortest Path First (OSPF) routing protocol.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

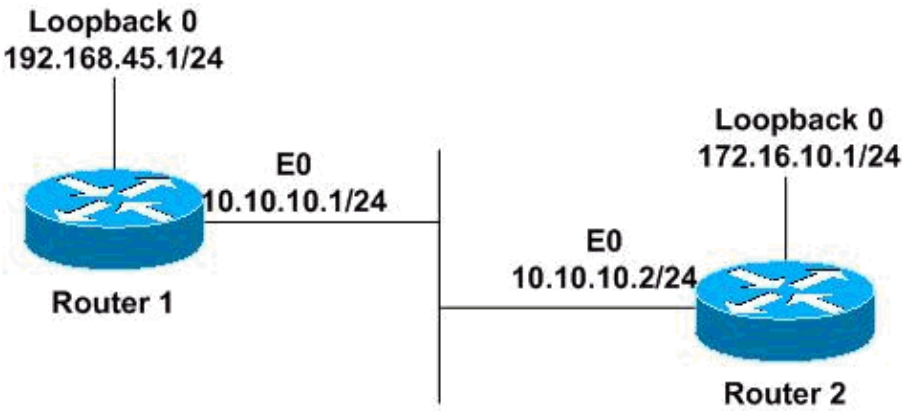
For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Example Interface Data Structure

This diagram with an Ethernet interface serves as an example.

Note: Depending on the type of interface, the contents of the data structure vary.

Click on this image to open it in a new window:




```
Router1# show ip ospf interface ethernet 0
Ethernet0 is up, line protocol is up
  Internet Address 10.10.10.1/24, Area 0
  Process ID 1, Router ID 192.168.45.1, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2
  Backup Designated router (ID) 192.168.45.1, Interface address 10.10.10.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:06
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 2
  Last flood scan time is 0 msec, maximum is 4 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 172.16.10.1  (Designated Router)
  Suppress hello for 0 neighbor(s)
```

Interface State

The first line of the output shows the Layer 1 and Layer 2 states of the interface. In this example, the interface Ethernet0 senses the carrier on line and shows Layer 1 as up. Line protocol on the Ethernet0 interface confirms that Layer 2 is up. For proper functioning, the interfaces should be in an up/up state.

IP Address and Area

The second line shows the IP address configured on this interface and the area in which this interface is placed. In the above example, the Ethernet0 has an IP address of 10.10.10.1/24 and is in OSPF area 0.

Process ID

The process ID is the ID of the OSPF process to which the interface belongs. The process ID is local to the router, and two OSPF neighboring routers can have different OSPF process IDs. (This is not true of Enhanced Interior Gateway Routing Protocol [EIGRP], in which the routers need to be in the same autonomous system). Cisco IOS® Software can run multiple OSPF processes on the same router, and the process ID merely distinguishes one process from the another. The process ID should be a positive integer. In this example, the process ID is 1.

Router ID

The OSPF router ID is a 32−bit IP address selected at the start of the OSPF process. The highest IP address configured on the router is the router ID. If a loopback address is configured, it is the router ID. In the case of multiple loopback addresses, the highest loopback address is the router ID. Once the router ID is elected, it does not change unless OSPF restarts or is manually changed with the **router−id** *32−bit−ip−address* command under **router ospf** *process−id* . In this example, 192.168.45.1 is the OSPF router ID.

Network Type

In the example, the OSPF network type is `BROADCAST`, which uses OSPF multicasting capabilities. Under this network type, a designated router (DR) and backup designated router (BDR) are elected. For routers on an interface to become neighbors, the network type for all should match.

The possible OSPF network types are:

- `POINT−TO−POINT` (for example, the interfaces of two routers connected through E1 or T1 links)
- `NON−BROADCAST` (such as X.25 and Frame Relay)
- `POINT−TO−MULTIPOINT` (such as Frame Relay)

To configure the OSPF network type to a type other than the default for a given medium, use the **ip ospf network {broadcast | non−broadcast | {point−to−multipoint [non−broadcast] | point−to−point}}** interface configuration command.

Cost

This is an OSPF metric. Cost is calculated with this formula:

- 10^8 / bandwidth (in bits per second [bps])

In the formula, bandwidth refers to the bandwidth of the interface in bps, and 10^8 is the reference bandwidth.

In the example, the bandwidth of Ethernet0 is 10 Mbps, which is equal to 10^7. The formula yields 10^8 / 10^7, equaling a cost of 10.

Use the **ip ospf cost** *interface cost* interface configuration command to explicitly specify the cost on an interface.

Transmit Delay

The transmit delay is the amount of time OSPF waits before flooding a link−state advertisement (LSA) over the link. Before transmitting an LSA, the link−state age is incremented by this number. In this example, the transmit delay is 1 second, which is the default value.

State

This field defines the state of the link and can be any of these:

- `DR` The router is the DR on the network to which this interface is connected, and it establishes OSPF adjacencies with all other routers on this broadcast network. In this example, this router is the BDR on the Ethernet segment to which the Ethernet0 interface is connected.
- `BDR` The router is the BDR on the network to which this interface is connected, and it establishes adjacencies with all other routers on the broadcast network.
- `DROTHER` The router is neither the DR nor the BDR on the network to which this interface is connected, and it establishes adjacencies only with the DR and the BDR.
- `Waiting` The interface is waiting to declare the state of the link as DR. The amount of time the interface waits is determined by the wait timer. This state is normal in a nonbroadcast multiaccess (NBMA) environment.
- `Point−to−Point` This interface is point−to−point for OSPF. In this state, the interface is fully functional and starts exchanging hello packets with all of its neighbors.
- `Point−to−Multipoint` This interface is point−to−multipoint for OSPF.

Priority

This is the OSPF priority that helps determine the DR and BDR on the network to which this interface is connected. Priority is an 8−bit field based on which DRs and BDRs are elected. The router with the highest priority becomes the DR. If the priorities are the same, the router with the highest router ID becomes the DR. By default, priorities are set to 1.

Use the **ip ospf priority** *number value* interface configuration command to set the OSPF router priority. A router with a priority of 0 never participates in the DR/BDR election process and does not become a DR/BDR.

Designated Router

This is the router ID of the DR for this broadcast network. In the example, it is 172.16.10.1.

Interface Address

This is the IP address of the DR interface on this broadcast network. In the example, the address is 10.10.10.2, which is Router 2.

Backup Designated Router

This is the router ID of the BDR for this broadcast network. In the example, it is 192.168.45.1.

Interface Address

This is the IP address of the BDR interface on this broadcast network. In the example, it is Router 1.

Timer Intervals

These are the values of the OSPF timers:

- `Hello` Interval time in seconds that a router sends an OSPF hello packet. On broadcast and point−to−point links, the default is 10 seconds. On NBMA, the default is 30 seconds.
- `Dead` Time in seconds to wait before declaring a neighbor dead. By default, the dead timer interval is four times the hello timer interval.
- `Wait` Timer interval that causes the interface to exit out of the wait period and select a DR on the network. This timer is always equal to the dead timer interval.
- `Retransmit` Time to wait before retransmitting a database description (DBD) packet when it has not been acknowledged.
- `Hello Due In` An OSPF hello packet is sent on this interface after this time. In this example, a hello is sent three seconds from the time the **show ip ospf interface** is issued.

Neighbor Count

This is the number of OSPF neighbors discovered on this interface. In this example, this router has one neighbor on its Ethernet0 interface.

Adjacent Neighbor Count

This is the number of routers running OSPF that are fully adjacent with this router. Adjacent means that their databases are fully synchronized. In this example, this router has formed an OSPF adjacency with one neighbor on its Ethernet0 interface.

Suppress Hello

When IP OSPF demand circuits are created over ISDN links, the OSPF hello packets are suppressed to keep the link from continually staying up. In the above example, the output is shown for an Ethernet interface; therefore, hello packets are not suppressed for any neighbors.

Index

This is the index of the interface flood lists (area/autonomous system) used. In the example, the value is 1/1.

Flood Queue Length

This is the number of LSAs waiting to be flooded over an interface. From the example, the number of LSAs waiting to be flooded over the Ethernet interface is 0.

Next

This is the pointer to the next LSAs (index) to flood. It refers to the flood lists.

Last Flood Scan Length/Maximum

This is the size of the last list of LSAs flooded and the maximum size of the list. When using pacing, one LSA is transmitted at a time.

Last Flood Scan Time/Maximum

This is the time spent in the last flooding and the maximum time spent flooding.

Related Information

- **OSPF Support Page**
- **Technical Support − Cisco Systems**

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