OSPF Per-Interface Link-Local Signaling

The OSPF Per-Interface Link-Local Signaling feature allows you to selectively enable or disable Link-Local Signaling (LLS) for a specific interface regardless of the global (router level) setting that you have previously configured.

Information About OSPF Per-Interface Link-Local Signaling

LLS allows for the extension of existing OSPF packets in order to provide additional bit space. The additional bit space enables greater information per packet exchange between OSPF neighbors. This functionality is used, for example, by the OSPF Nonstop Forwarding (NSF) Awareness feature that allows customer premises equipment (CPE) routers that are NSF-aware to help NSF-capable routers perform nonstop forwarding of packets.

When LLS is enabled at the router level, it is automatically enabled for all interfaces. The OSPF Per-Interface Link-Local Signaling feature allows you to selectively enable or disable LLS for a specific interface. You may want to disable LLS on a per-interface basis depending on your network design. For example, disabling LLS on an interface that is connected to a non-Cisco device that may be noncompliant with RFC 2328 can prevent problems with the forming of OSPF neighbors in the network.

How to Configure OSPF Per-Interface Link-Local Signaling

Turning Off LLS on a Per-Interface Basis

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot* /*port*

4. **ip address** *ip-address* *mask* [**secondary**]
5. **no ip directed-broadcast** [*access-list-number* | *extended access-list-number*]
6. **ip ospf message-digest-key** *key-id encryption-type* **md5** *key*
7. [**no** | **default**] **ip ospf lls** [**disable**]

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type* *slot*/*port* **Example:** `Router(config)# interface gigabitethernet 1/1/0`	Configures an interface type and enters interface configuration mode.

Step 4	**ip address** *ip-address* *mask* [**secondary**]
	
	Example:
	
	`Router(config-if)# ip address 10.2.145.20`
	`255.255.255.0`
		Sets a primary or secondary IP address for an interface.

Step 5	**no ip directed-broadcast** [*access-list-number*	*extended access-list-number*] **Example:** `Router(config-if)# no ip directed-broadcast`	Drops directed broadcasts destined for the subnet to which that interface is attached, rather than broadcasting them. • The forwarding of IP directed broadcasts on Ethernet interface 1/0 is disabled.

Step 6	**ip ospf message-digest-key** *key-id encryption-type* **md5** *key*
	
	Example:
	
	`Router(config-if)# ip ospf message-digest-key 100`
	` md5 testing`
		Enables OSPF Message Digest 5 (MD5) algorithm authentication.

Step 7	[**no**	**default**] **ip ospf lls** [**disable**] **Example:** `Router(config-if)# ip ospf lls disable`	Disables LLS on an interface, regardless of the global (router level) setting.

What to Do Next

To verify that LLS has been enabled or disabled for a specific interface, use the **show ip ospf interface** command. See the "Example: Configuring and Verifying the OSPF Per-Interface Link-Local Signaling Feature" section for an example of the information displayed.

Configuration Examples for OSPF Per-Interface Link-Local Signaling

Example Configuring and Verifying OSPF Per-Interface Link-Local Signaling

In the following example, LLS has been enabled on GigabitEthernet interface 1/1/0 and disabled on GigabitEthernet interface 2/1/0:

```
interface gigabitethernet1/1/0
 ip address 10.2.145.2 255.255.255.0
 no ip directed-broadcast
 ip ospf message-digest-key 1 md5 testing
 ip ospf lls
!
interface gigabitethernet2/1/0
 ip address 10.1.145.2 255.255.0.0
 no ip directed-broadcast
 ip ospf message-digest-key 1 md5 testing
!
 ip ospf lls disable
interface Ethernet3/0
 ip address 10.3.145.2 255.255.255.0
 no ip directed-broadcast
!
router ospf 1
 log-adjacency-changes detail
 area 0 authentication message-digest
 redistribute connected subnets
 network 10.0.0.0 0.255.255.255 area 1
 network 10.2.3.0 0.0.0.255 area 1
```

In the following example, the **show ip ospf interface** command has been entered to verify that LLS has been enabled for GigabitEthernet interface 1/1/0 and disabled for GigabitEthernet interface 2/1/0:

```
Router# show ip ospf interface
GigabitEthernet1/1/0 is up, line protocol is up
  Internet Address 10.2.145.2/24, Area 1
  Process ID 1, Router ID 10.22.222.2, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 10.2.2.3, Interface address 10.2.145.1
  Backup Designated router (ID) 10.22.222.2, Interface address 10.2.145.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:00
!   Supports Link-local Signaling (LLS)
Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 8
  Last flood scan time is 0 msec, maximum is 0 msec
```

```
    Neighbor Count is 1, Adjacent neighbor count is 1
      Adjacent with neighbor 10.2.2.3  (Designated Router)
    Suppress hello for 0 neighbor(s)
GigabitEthernet2/1/0 is up, line protocol is up
  Internet Address 10.1.145.2/16, Area 1
  Process ID 1, Router ID 10.22.222.2, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 10.2.2.3, Interface address 10.1.145.1
  Backup Designated router (ID) 10.22.222.2, Interface address 10.1.145.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:04
!   Does not support Link-local Signaling (LLS)
Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 11
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 45.2.2.3  (Designated Router)
    Suppress hello for 0 neighbor(s)
GigabitEthernet3/1/0 is up, line protocol is up
  Internet Address 10.3.145.2/24, Area 1
  Process ID 1, Router ID 10.22.222.2, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 10.2.2.3, Interface address 10.3.145.1
  Backup Designated router (ID) 10.22.222.2, Interface address 10.3.145.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:07
!   Supports Link-local Signaling (LLS)
Index 3/3, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 11
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 10.2.2.3  (Designated Router)
    Suppress hello for 0 neighbor(s)
```

Additional References

The following sections provide references related to the OSPF Per-Interface Link-Local Signaling feature.

Related Documents

Related Topic	Document Title
Configuring OSPF	"Configuring OSPF"
Configuring OSPF NSF Awareness	"Cisco Nonstop Forwarding"
OSPF commands	*Cisco IOS IP Routing: OSPF Command Reference*
Cisco IOS master command list, all releases	Cisco IOS Master Command List, All Releases

Standards

Standard	Title
None	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 2328	*OSPF Version 2*

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for OSPF Per-Interface Link-Local Signaling

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for OSPF Per-Interface Link-Local Signaling

Feature Name	Releases	Feature Information
OSPF Per-Interface Link-Local Signaling	Cisco IOS XE Release 2.1	The OSPF Per-Interface Link-Local Signaling feature allows you to selectively enable or disable Link-Local Signaling (LLS) for a specific interface regardless of the global (router level) setting that you have previously configured. The following commands are introduced or modified in the feature documented in this module: • **ip ospf lls**

Table 2: Feature Information for OSPF Per-Interface Link-Local Signaling

Feature Name	Releases	Feature Information
OSPF Per-Interface Link-Local Signaling	Cisco IOS XE Release 17.4	This feature was introduced.