



OSPF Mechanism to Exclude Connected IP Prefixes from LSA Advertisements

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This document describes the Open Shortest Path First (OSPF) mechanism to exclude IP prefixes of connected networks from link-state advertisements (LSAs). When OSPF is deployed in large networks, limiting the number of IP prefixes that are carried in the OSPF LSAs can speed up OSPF convergence.

This feature can also be utilized to enhance the security of an OSPF network by allowing the network administrator to prevent IP routing toward internal nodes.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

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.

Prerequisites for Excluding Connected IP Prefixes from LSAs

Before you can use the mechanism to exclude IP prefixes from LSAs, the OSPF routing protocol must be configured.



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Information About Excluding Connected IP Prefixes from LSAs

One way to improve OSPF network convergence is to limit the number of IP prefixes carried in LSAs.

- [Previous Methods to Limit the Number of IP Prefixes Carried in LSAs, page 2](#)
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Previous Methods to Limit the Number of IP Prefixes Carried in LSAs

Configuring interfaces as unnumbered limits IP prefixes. However, for network management and the ease of identifying and troubleshooting numbered interfaces, you might want to have numbered interfaces and also want to limit the number of IP advertisements.

Feature Overview

The OSPF mechanism to exclude connected IP prefixes from LSAs allows network administrators to control what IP prefixes are installed into LSAs. This functionality is implemented for router and network LSAs in the following manner:

- For the router LSA, to exclude prefixes, the feature excludes link type 3 (stub link).
- For the network LSA, the OSPF Designated Router (DR) generates LSAs with a special /32 network mask (0xFFFFFFFF).

**Note**

Previous versions of Cisco IOS software that do not have this feature will install the /32 prefix into the routing table.

Globally Suppressing IP Prefix Advertisements per OSPF Process

You can reduce OSPF convergence time by configuring the OSPF process on a router to prevent the advertisement of all IP prefixes by using the **prefix-suppression** command in router configuration mode.

**Note**

Prefixes that are associated with loopbacks, secondary IP addresses, and passive interfaces are excluded because typical network designs require those to remain reachable.

Suppressing IP Prefix Advertisements on a Per-Interface Basis

You can explicitly configure an OSPF interface not to advertise its IP network to its neighbors by using the **ip ospf prefix-suppression** command in interface configuration mode.

**Note**

If you have globally suppressed IP prefixes from connected IP networks by configuring the **prefix-suppression** router configuration command, the interface configuration command takes precedence over the router configuration mode command.

How to Exclude Connected IP Prefixes from OSPF LSAs

This section describes how to configure two alternative methods to suppress IP prefix advertisements. You can suppress IP prefix advertisements per OSPF process or per interface. This section also explains how you can troubleshoot IP prefix suppression.

- [Excluding IP Prefixes per OSPF Process, page 3](#)
- [Excluding IP Prefixes on a Per-Interface Basis, page 5](#)
- [Troubleshooting IP Prefix Suppression, page 6](#)

Excluding IP Prefixes per OSPF Process

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf *process-id* [vrf *vpn-name*]**
4. **prefix-suppression**
5. **end**
6. **show ip ospf**

DETAILED STEPS

Command or Action	Purpose
Step 1 enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2 configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3 router ospf <i>process-id</i> [vrf <i>vpn-name</i>] Example: Router(config)# router ospf 23	Configures an OSPFv2 routing process and enters router configuration mode.

Command or Action	Purpose
Step 4 <code>prefix-suppression</code> Example: <pre>Router(config-router)# prefix-suppression</pre>	Prevents OSPF from advertising all IP prefixes except prefixes that are associated with loopbacks, secondary IP addresses, and passive interfaces.
Step 5 <code>end</code> Example: <pre>Router(config-router)# end</pre>	Returns to privileged EXEC mode.
Step 6 <code>show ip ospf</code> Example: <pre>Router# show ip ospf</pre>	Displays general information about OSPF routing processes. Note Use this command to verify that IP prefix suppression has been enabled.

Examples

In the following example, output from the **show ip ospf** command shows that IP prefix advertisement has been suppressed for OSPF process 1.

```
Router# show ip ospf

Routing Process "ospf 1" with ID 10.0.0.6
Start time: 00:00:04.912, Time elapsed: 00:02:35.184
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
It is an area border router
Router is not originating router-LSAs with maximum metric
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec
Incremental-SPF disabled
Minimum LSA interval 5 secs
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Number of external LSA 2. Checksum Sum 0x0132C8
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 3. 3 normal 0 stub 0 nssa
Number of areas transit capable is 1
External flood list length 0
IETF NSF helper support enabled
Cisco NSF helper support enabled
Prefix-suppression is enabled
.
.
```

Excluding IP Prefixes on a Per-Interface Basis

SUMMARY STEPS

1. enable
2. configure terminal
3. interface *type number*
4. ip ospf prefix-suppression [disable]
5. end
6. show ip ospf interface

DETAILED STEPS

Command or Action	Purpose
Step 1 enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2 configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3 interface <i>type number</i> Example: Router(config)# interface serial 0/0	Configures an interface type and enters interface configuration mode.
Step 4 ip ospf prefix-suppression [disable] Example: Router(config-if)# ip ospf prefix-suppression	Prevents OSPF from advertising IP prefixes that belong to a specific interface, except those that are associated with secondary IP addresses. Note When you enter the ip ospf prefix suppression command in interface configuration mode, it takes precedence over the prefix-suppression command that is entered in router configuration mode.
Step 5 end Example: Router(config-if)# end	Returns to privileged EXEC mode.

Command or Action	Purpose
<p>Step 6 <code>show ip ospf interface</code></p> <p>Example:</p> <pre>Router# show ip ospf interface</pre>	<p>Displays OSPF-related interface information.</p> <p>Note Use this command to verify that IP prefix suppression has been enabled for a specific interface.</p>

Examples

In the following example, the output from the **show ip ospf interface** command verifies that prefix suppression has been enabled for Ethernet interface 0/0.

```
Router# show ip ospf interface
Ethernet0/0 is up, line protocol is up
 Internet Address 192.168.130.2/24, Area 2
  Process ID 1, Router ID 10.0.0.6, Network Type BROADCAST, Cost: 10
  Prefix-suppression is enabled
.
.
```

Troubleshooting IP Prefix Suppression

SUMMARY STEPS

1. `enable`
2. `debug ip ospf lsa-generation`
3. `debug condition interface interface-type interface-number [dcli dcli] [vc {vci | vpi | vci}]`
4. `show debugging`
5. `show logging [slot slot-number | summary]`

DETAILED STEPS

Command or Action	Purpose
<p>Step 1 <code>enable</code></p> <p>Example:</p> <pre>Router> enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
<p>Step 2 <code>debug ip ospf lsa-generation</code></p> <p>Example:</p> <pre>Router# debug ip ospf lsa-generation</pre>	<p>Displays informations about each OSPF LSA generated.</p>

Command or Action	Purpose
<p>Step 3 <code>debug condition interface interface-type interface-number [dlci dlc] [vc {vci vpi vci}]</code></p> <p>Example:</p> <pre>Router# debug interface serial 0/0</pre>	<p>Limits output for some debug commands on the basis of the interface or virtual circuit.</p>
<p>Step 4 <code>show debugging</code></p> <p>Example:</p> <pre>Router# show debugging</pre>	<p>Displays information about the types of debugging that are enabled for your router.</p>
<p>Step 5 <code>show logging [slot slot-number summary]</code></p> <p>Example:</p> <pre>Router# show logging</pre>	<p>Displays the state of syslog and the contents of the standard system logging buffer.</p>

Examples

The following sample output from the `debug ip ospf lsa-generation` command verifies that for the Ethernet interface 0/0, IP prefixes from the connected network 192.168.131.0 are excluded.

```
Router# debug ip ospf lsa-generation

OSPF summary lsa generation debugging is on
Router# debug condition interface e0/0
Condition 1 set
Router# show debugging

IP routing:
  OSPF summary lsa generation debugging is on
  Condition 1: interface Et0/0 (1 flags triggered)
    Flags: Et0/0
Router# show logging
*Jun  5 21:54:47.295: OSPF: Suppressing 192.168.131.0/24 on Ethernet1/0 from router LSA
*Jun  5 21:54:52.355: OSPF: Suppressing 192.168.131.0/24 on Ethernet1/0 from router LSA
.
.
.
```

Configuration Examples for Excluding Connected IP Prefixes from LSAs

- [Excluding IP Prefixes from LSAs for an OSPF Process Example, page 8](#)
- [Excluding IP Prefixes from LSAs for a Specified Interface Example, page 8](#)

Excluding IP Prefixes from LSAs for an OSPF Process Example

The following example configures IP prefix suppression for OSPF routing process 23.

```
router ospf 23
 prefix-suppression
end
```

When the **show ip ospf** command is entered, the displayed output verifies that IP prefix suppression has been enabled for OSPF process 23.

```
Router# show ip ospf
outing Process "ospf 23" with ID 10.0.0.6
Start time: 00:00:04.912, Time elapsed: 00:02:35.184
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
It is an area border router
Router is not originating router-LSAs with maximum metric
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPFs 10000 msec
Maximum wait time between two consecutive SPFs 10000 msec
Incremental-SPF disabled
Minimum LSA interval 5 secs
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Number of external LSA 2. Checksum Sum 0x0132C8
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 3. 3 normal 0 stub 0 nssa
Number of areas transit capable is 1
External flood list length 0
IETF NSF helper support enabled
Cisco NSF helper support enabled
Prefix-suppression is enabled
.
.
.
```

Excluding IP Prefixes from LSAs for a Specified Interface Example

The following example configures the suppression of all IP prefixes that are associated with Ethernet interface 0/0:

```
interface Ethernet 0/0
 ip ospf prefix-suppression
end
```

When the **show ip ospf interface** command is entered, the displayed output verifies that IP prefix suppression is enabled for Ethernet interface 0/0.

```
Router# show ip ospf interface

Ethernet0/0 is up, line protocol is up
 Internet Address 192.168.130.2/24, Area 2
 Process ID 1, Router ID 10.0.0.6, Network Type BROADCAST, Cost: 10
 Prefix-suppression is enabled
.
.
.
```


Additional References

The following sections provide references related to the OSPF Mechanism to Exclude Connected IP Prefixes from LSA Advertisements feature.

Related Documents

Related Topic	Document Title
OSPF commands: complete command syntax, command mode, command history, command defaults, usage guidelines, and examples	<i>Cisco IOS IP Routing: OSPF Command Reference</i>

Standards

Standard	Title
None	--

MIBs

MIB	MIBs Link
There are no new MIBs that are associated with this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	--

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

Glossary

network LSA --The link-state advertisement created by the designated router (DR) or pseudonode that represents a group of routers on the same interface. The network LSA advertises summary information to represent the group of routers on the network.

router LSA --The link-state advertisement that is generated by a router. The router LSA advertises routing information (connected routes) for the router.

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