



# OSPF Link-State Database Overload Protection

---

The OSPF Link-State Database Overload Protection feature allows you to limit the number of nonself-generated link-state advertisements (LSAs) for a given Open Shortest Path First (OSPF) process. Excessive LSAs generated by other routers in the OSPF domain can substantially drain the CPU and memory resources of the router.

## History for the OSPF Link-State Database Overload Protection Feature

Release	Modification
12.0(27)S	This feature was introduced.
12.3(7)T	This feature was integrated into Cisco IOS Release 12.3(7)T.
12.2(25)S	This feature was integrated into Cisco IOS Release 12.2(25)S.
12.2(18)SXE	This feature was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(27)SBC	This feature was integrated into Cisco IOS Release 12.2(27)SBC.

## Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

## Contents

- [Prerequisites for OSPF Link-State Database Overload Protection, page 2](#)
- [Information About OSPF Link-State Database Overload Protection, page 2](#)
- [How to Configure the OSPF Link-State Database Overload Protection Feature, page 2](#)
- [Configuration Examples for the OSPF Link-State Database Overload Protection Feature, page 5](#)
- [Additional References, page 7](#)
- [Command Reference, page 8](#)



---

**Americas Headquarters:**  
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

# Prerequisites for OSPF Link-State Database Overload Protection

It is presumed you have OSPF running on your network.

## Information About OSPF Link-State Database Overload Protection

Before you configure the OSPF Link-State Database Overload Protection feature, you should understand the concepts described in the following sections:

- [Benefits of Using OSPF Link-State Database Overload Protection, page 2](#)
- [How OSPF Link-State Database Overload Protection Works, page 2](#)

## Benefits of Using OSPF Link-State Database Overload Protection

The OSPF Link-State Database Overload Protection feature provides a mechanism at the OSPF level to limit the number of nonself-generated LSAs for a given OSPF process. When other routers in the network have been misconfigured, they may generate a high volume of LSAs, for instance, to redistribute large numbers of prefixes. This protection mechanism prevents routers from receiving a large number of LSAs and therefore experiencing CPU and memory shortages.

## How OSPF Link-State Database Overload Protection Works

When the OSPF Link-State Database Overload Protection feature is enabled, the router keeps a count of the number of received (nonself-generated) LSAs it has received. When the configured threshold number of LSAs is reached, an error message is logged. When the configured maximum number of LSAs is exceeded, the router will send a notification. If the count of received LSAs is still higher than the configured maximum after one minute, the OSPF process takes down all adjacencies and clears the OSPF database. In this ignore state, all OSPF packets received on any interface that belongs to this OSPF process are ignored and no OSPF packets are generated on any of these interfaces. The OSPF process remains in the ignore state for the time configured by the **ignore-time** keyword of the **max-lsa** command. Each time the OSPF process gets into an ignore state a counter is incremented. If this counter exceeds the number counts configured by the **ignore-count** keyword, the OSPF process stays permanently in the same ignore state and manual intervention is required to get the OSPF process out of the ignore state. The ignore state counter is reset to 0 when the OSPF process remains in the normal state of operation for the amount of time that was specified by the **reset-time** keyword.

If the **warning-only** keyword of the **max-lsa** command has been configured, the OSPF process will send only a warning that the LSA maximum has been exceeded.

## How to Configure the OSPF Link-State Database Overload Protection Feature

This section contains the following procedure:

- [Limiting the Number of Self-Generating LSAs for an OSPF Process, page 3](#) (required)

## Limiting the Number of Self-Generating LSAs for an OSPF Process

This task describes how to configure and verify a limit on the number of nonself-generating LSAs for an OSPF process.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id*
4. **router-id** *ip-address*
5. **log-adjacency-changes** [**detail**]
6. **max-lsa** *maximum-number* [*threshold-percentage*] [**warning-only**] [**ignore-time** *minutes*] [**ignore-count** *count-number*] [**reset-time** *minutes*]
7. **network** *ip-address wildcard-mask area* *area-id*

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>router ospf</b> <i>process-id</i>  <b>Example:</b> Router(config)# router ospf 1	Enables OSPF routing. <ul style="list-style-type: none"> <li>• The <i>process-id</i> argument identifies the OSPF process.</li> </ul>
Step 4	<b>router-id</b> <i>ip-address</i>  <b>Example:</b> Router(config-router)# router-id 10.0.0.1	Specifies a fixed router ID for an OSPF process.
Step 5	<b>log-adjacency-changes</b> [ <b>detail</b> ]  <b>Example:</b> Router(config-router)# log-adjacency-changes	Configures the router to send a syslog message when an OSPF neighbor goes up or down.

	Command or Action	Purpose
Step 6	<b>max-lsa</b> <i>maximum-number</i> [ <i>threshold-percentage</i> ] [ <b>warning-only</b> ] [ <b>ignore-time</b> <i>minutes</i> ] [ <b>ignore-count</b> <i>count-number</i> ] [ <b>reset-time</b> <i>minutes</i> ]  <b>Example:</b> Router(config-router)# max-lsa 12000	Limits the number of nonself-generated LSAs an OSPF routing process can keep in the OSPF link-state database (LSDB).
Step 7	<b>network</b> <i>ip-address wildcard-mask area</i> <i>area-id</i>  <b>Example:</b> Router(config-router)# network 209.165.201.1 255.255.255.255 area 0	Defines the interfaces on which OSPF runs and defines the area ID for those interfaces.

## Verifying the Number of Nonself-Generated LSAs on a Router

The **show ip ospf** command is entered with the **database-summary** keyword to verify the actual number of nonself-generated LSAs on a router. This command can be used at any given point in time to display lists of information related to the OSPF database for a specific router.

```
Router# show ip ospf 2000 database database-summary
```

```
OSPF Router with ID (192.168.1.3) (Process ID 2000)
```

```
Area 0 database summary
```

LSA Type	Count	Delete	Maxage
Router	5	0	0
Network	2	0	0
Summary Net	8	2	2
Summary ASBR	0	0	0
Type-7 Ext	0	0	0
Prefixes redistributed in Type-7	0		
Opaque Link	0	0	0
Opaque Area	0	0	0
Subtotal	15	2	2

```
Process 2000 database summary
```

LSA Type	Count	Delete	Maxage
Router	5	0	0
Network	2	0	0
Summary Net	8	2	2
Summary ASBR	0	0	0
Type-7 Ext	0	0	0
Opaque Link	0	0	0
Opaque Area	0	0	0
Type-5 Ext	4	0	0
Prefixes redistributed in Type-5	0		
Opaque AS	0	0	0
Non-self	16		
Total	19	2	2

# Configuration Examples for the OSPF Link-State Database Overload Protection Feature

This section contains the following example:

- [Setting a Limit for LSA Generation: Example, page 5](#)

## Setting a Limit for LSA Generation: Example

In the following example, the router is configured to not accept any more nonself-generated LSAs once a maximum of 14,000 has been exceeded:

```
Router(config)# router ospf 1
Router(config-router)# router-id 192.168.0.1
Router(config-router)# log-adjacency-changes
Router(config-router)# max-lsa 14000
Router(config-router)# area 33 nssa
Router(config-router)# network 192.168.0.1 0.0.0.0 area 1
Router(config-router)# network 192.168.5.1 0.0.0.0 area 1
Router(config-router)# network 192.168.2.1 0.0.0.0 area 0
```

In the following example, the **show ip ospf** command has been entered to confirm the configuration:

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 192.168.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
Maximum number of non self-generated LSA allowed 14000
  Threshold for warning message 75%
  Ignore-time 5 minutes, reset-time 10 minutes
  Ignore-count allowed 5, current ignore-count 0
It is an area border and autonomous system boundary router
```

In the following example, the following output appears when the **show ip ospf** command has been entered during the time when the router is in the ignore state:

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 192.168.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
Maximum number of non self-generated LSA allowed 14000
  Threshold for warning message 75%
  Ignore-time 5 minutes, reset-time 10 minutes
  Ignore-count allowed 5, current ignore-count 1
  Ignoring all neighbors due to max-lsa limit, time remaining: 00:04:52
It is an area border and autonomous system boundary router
```

The following output appears when the **show ip ospf** command has been entered after the router left the ignore state:

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 192.168.0.1
Supports only single TOS(TOS0) routes
```

```
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
Maximum number of non self-generated LSA allowed 14000
  Threshold for warning message 75%
  Ignore-time 5 minutes, reset-time 10 minutes
  Ignore-count allowed 5, current ignore-count 1 - time remaining: 00:09:51
It is an area border and autonomous system boundary router
```

The following output appears when the **show ip ospf** command has been entered for a router that is permanently in the ignore state:

```
Router# show ip ospf 1

Routing Process "ospf 1" with ID 192.168.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Link-local Signaling (LLS)
Supports area transit capability
Maximum number of non self-generated LSA allowed 14000
  Threshold for warning message 75%
  Ignore-time 5 minutes, reset-time 10 minutes
  Ignore-count allowed 5, current ignore-count 6
  Permanently ignoring all neighbors due to max-lsa limit
It is an area border and autonomous system boundary router
```

# Additional References

The following sections provide references related to the OSPF Link-State Database Overload Protection feature.

## Related Documents

Related Topic	Document Title
Configuring OSPF	<ul style="list-style-type: none"><li><a href="#">Cisco IOS IP Routing Protocols Configuration Guide</a></li></ul>

## Standards

Standards	Title
None	—

## MIBs

MIBs	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

## RFCs

RFCs	Title
None	—

## Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

# Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS IP Routing Protocols Command Reference* at [http://www.cisco.com/en/US/docs/ios/iproute/command/reference/irp\\_book.html](http://www.cisco.com/en/US/docs/ios/iproute/command/reference/irp_book.html). For information about all Cisco IOS commands, go to the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or to the *Cisco IOS Master Commands List*.

- **max-lsa**

# Glossary

**LSDB**—link-state database.

CCDE, CCENT, CCSI, Cisco Eos, Cisco HealthPresence, Cisco IronPort, the Cisco logo, Cisco Lumin, Cisco Nexus, Cisco Nurse Connect, Cisco StackPower, Cisco StadiumVision, Cisco TelePresence, Cisco Unified Computing System, Cisco WebEx, DCE, Flip Channels, Flip for Good, Flip Mino, Flip Video, Flip Video (Design), Flipshare (Design), Flip Ultra, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn, Cisco Store, and Flip Gift Card are service marks; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, CCVP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, MediaTone, MeetingPlace, MeetingPlace Chime Sound, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0907R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

© 2008 Cisco Systems, Inc. All rights reserved.