IS-IS Limit on Number of Redistributed Routes

The IS-IS Limit on Number of Redistributed Routes feature provides for a user-defined maximum number of prefixes that are allowed to be redistributed into Intermediate System-to-Intermediate System (IS-IS) from other protocols or other IS-IS processes. Such a limit could help prevent the router from being flooded by too many redistributed routes.

History for the IS-IS Limit on Number of Redistributed Routes Feature

Release	Modification
12.0(25)S	This feature was introduced.
12.2(18)S	This feature was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This feature was integrated into Cisco IOS Release 12.3(4)T.
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

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

Prerequisites for IS-IS Limit on Number of Redistributed Routes

It is presumed that you have IS-IS configured in your network, along with another protocol or another IS-IS process you are redistributing.

Information About IS-IS Limit on Number of Redistributed Routes

Before you limit the number of IS-IS redistributed routes, you should understand the concepts described in this section:

Benefits of IS-IS Limit on Number of Redistributed Routes

If someone mistakenly injects a large number of IP routes into IS-IS, perhaps by redistributing Border Gateway Protocol (BGP) into IS-IS, the network can be severely flooded. Limiting the number of redistributed routes prevents this potential problem.

LSP Full State

In some cases when a limit is not placed on the number of redistributed routes, the LSP may become full and routes be dropped. A user can specify which routes should be suppressed in that event so that the consequence of an LSP full state is handled in a graceful and predictable manner.

Redistribution is usually the cause of the LSP full state. By default, external routes redistributed into IS-IS are suppressed if the LSP full state occurs. IS-IS can have 255 fragments for an LSP in a level. When there is no space left in any of the fragments, an LSPFULL error message is generated.

Once the problem that caused the LSP full state is resolved, a user can clear the LSPFULL state.

How to Limit the Number of IS-IS Redistributed Routes or Receive a Warning About the Number of IS-IS Redistributed Routes

This section contains the following procedures, which are mutually exclusive. That is, you cannot both limit redistributed prefixes and also choose to be warned.

Limiting the Number of IS-IS Redistributed Routes

This task describes how to limit the number of IS-IS redistributed routes. If the number of redistributed routes reaches the maximum value configured, no more routes will be redistributed.

The redistribution limit applies only to external IP prefixes. Default routes and summarized routes are not limited.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router isis**
4. **redistribute** *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** *metric-value*] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*]
5. **redistribute maximum-prefix** *maximum* [*threshold*] [**withdraw**]
6. **end**

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	**router isis** **Example:** `Router(config)# router isis`	Configures an IS-IS routing process.
Step 4	**redistribute** *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** *metric-value*] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] **Example:** `Router(config-router)# redistribute eigrp 10 level-1`	Redistributes routes from one routing domain into another routing domain.

	Command or Action	Purpose
Step 5	**redistribute maximum-prefix** *maximum* [*threshold*] [**withdraw**] **Example:** `Router(config-router)# redistribute maximum-prefix 1000 80`	Sets a maximum number of IP prefixes that are allowed to be redistributed into IS-IS. • There is no default value for the *maximum* argument. • The *threshold* value defaults to 75 percent. • If the **withdraw** keyword is specified and the maximum number of prefixes is exceeded, IS-IS rebuilds the link-state protocol data unit (PDU) fragments without the external IP prefixes. That is, the redistributed routes are removed from the PDUs. **Note** If the **warning-only** keyword had been configured in this command, no limit would be enforced; a warning message is simply logged.
Step 6	**end** **Example:** `Router(config-router)# end`	Exits router configuration mode.

Requesting a Warning About the Number of Prefixes Redistributed into IS-IS

This task describes how to cause the system to generate a warning message when the number of redistributed prefixes reaches a maximum value. However, additional redistribution is not prevented.

The redistribution count applies only to external IP prefixes. Default routes and summarized routes are not considered.

Because you are deciding not to impose a limit on the number of redistributed routes, the LSP may become full. You might want to configure which routes are dropped in that event, as shown in the optional step in this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router isis**
4. **redistribute** *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** *metric-value*] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*]
5. **redistribute maximum-prefix** *maximum* [*threshold*] **warning-only**
6. **lsp-full suppress** {[**external**] [**interlevel**] | **none**}
7. **end**

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	**router isis** **Example:** `Router(config)# router isis`	Configures an IS-IS routing process.
Step 4	**redistribute** *protocol* [*process-id*] {**level-1** | **level-1-2** | **level-2**} [*as-number*] [**metric** *metric-value*] [**metric-type** *type-value*] [**match** {**internal** | **external 1** | **external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] **Example:** `Router(config-router)# redistribute eigrp 10 level-1`	Redistributes routes from one routing domain into another routing domain.
Step 5	**redistribute maximum-prefix** *maximum* [*threshold*] **warning-only** **Example:** `Router(config-router)# redistribute maximum-prefix 1000 80 warning-only`	Causes a warning message to be logged when the maximum number of IP prefixes has been redistributed into IS-IS. • Because the **warning-only** keyword is included, no limit is imposed on the number of redistributed prefixes into IS-IS. • There is no default value for the *maximum* argument. • The *threshold* value defaults to 75 percent. • This example causes two warnings: one at 80 percent of 1000 (800 routes redistributed) and another at 1000 routes redistributed.

	Command or Action	Purpose
Step 6	**lsp-full suppress** {[**external**] [**interlevel**] | **none**} **Example:** `Router(config-router)# lsp-full suppress external interlevel`	(Optional) Controls which routes are suppressed when the link-state PDU becomes full. • The default is **external** (redistributed routes are suppressed). • The **interlevel** keyword causes routes from another level to be suppressed. • The **external** and **interval** keywords can be specified together or separately. • See the "LSP Full State" section.
Step 7	**end** **Example:** `Router(config-router)# end`	Exits router configuration mode.

Configuration Examples for IS-IS Limit on Number of Redistributed Routes

This section contains the following examples:

- IS-IS Limit on Number of Redistributed Routes: Example, page 6
- Requesting a Warning About the Number of Redistributed Routes: Example, page 6

IS-IS Limit on Number of Redistributed Routes: Example

This example sets a maximum of 1200 prefixes that can be redistributed into IS-IS. When the number of prefixes redistributed reaches 80 percent of 1200 (960 prefixes), a warning message is logged. When 1200 routes are redistributed, IS-IS rebuilds the LSP fragments without external prefixes and no redistribution occurs.

```
router isis 1
 redistribute maximum-prefix 1200 80 withdraw
```

Requesting a Warning About the Number of Redistributed Routes: Example

This example allows two warning messages to be logged, the first if the number of prefixes redistributed reaches 85 percent of 600 (510 prefixes), and the second if the number of redistributed routes reaches 600. However, the number of redistributed routes is not limited. If the LSPFULL state occurs, external prefixes will be suppressed.

```
router isis 1
 redistribute maximum-prefix 600 85 warning-only
 lsp-full suppress external
```

Additional References

The following sections provide references related to the IS-IS Limit on Number of Redistributed Routes Feature.

Related Documents

Related Topic	Document Title
Redistribution commands	"IP Routing Protocol-Independent Commands" chapter in the *Network Protocols Command Reference, Part 1,* Release 12.3T
Redistribution configuration tasks	"Configuring IP Routing Protocol-Independent Features" chapter in the *Network Protocols Configuration Guide, Part 1,* Release 12.3
IS-IS commands	"Integrated IS-IS Commands" chapter in the *Network Protocols Command Reference, Part 1,* Release 12.3T
IS-IS configuration tasks	"Configuring Integrated IS-IS" chapter in the *Network Protocols Configuration Guide, Part 1,* Release 12.3

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

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 http://www.cisco.com/go/mibs

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

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.	http://www.cisco.com/techsupport

Command Reference

This section documents new commands only.

- **clear isis lsp-full**
- **lsp-full suppress**
- **redistribute maximum-prefix**

clear isis lsp-full

To clear the LSPFULL state, use the **clear isis lsp-full** command in privileged EXEC mode.

clear isis lsp-full

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(25)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

If the link-state PDU (LSP) becomes full because too many routes are redistributed, use the **clear isis lsp-full** command to clear the state after the problem has been resolved.

Examples

This example clears the LSPFULL state:

```
Router# clear isis lsp-full
```

Related Commands

Command	Description
lsp-full suppress	Controls which routes are suppressed when the link-state PDU becomes full.

lsp-full suppress

To control which routes are suppressed when the link-state protocol data unit (PDU) becomes full, use the **lsp-full suppress** command in router configuration mode. To stop suppression of redistributed routes, specify **none** or use the **no** form of this command.

lsp-full suppress {[**external**] [**interlevel**] | [**none**]}

no lsp-full suppress

Syntax Description

external	(Optional) Suppresses any redistributed routes on this router.
interlevel	(Optional) Suppresses any routes coming from the other level. For example, if the Level-2 LSP becomes full, routes from Level 1 are suppressed.
none	(Optional) Suppresses no routes.

Defaults

If this command is not specified, or if this command is specified with no keyword, the default value used is **external**.

Command Modes

Router configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

In networks where there is no limit placed on the number of redistributed routes into IS-IS (that is, the **redistribute maximum-prefix** command was not configured), it is possible that the link-state PDU (LSP) could become full and routes will be dropped. Use the **lsp-full suppress** command to define in advance which routes are suppressed in the event that the LSP becomes full.

The **external** and **interlevel** keywords can be specified together or separately.

Use the **clear isis lsp-full** command to clear the LSPFULL state.

Examples

This example specifies that if the LSP becomes full, both redistributed routes and routes from another level will be suppressed from the LSP:

```
router isis
 lsp-full suppress external interlevel
```

Related Commands

Command	Description
clear isis lsp-full	Clears the LSPFULL state.
redistribute maximum-prefix	Limits the number of prefixes redistributed into IS-IS or generates a warning when the number of prefixes redistributed into IS-IS reaches a maximum.

redistribute maximum-prefix

To limit the number of prefixes redistributed into Open Shortest Path First (OSPF) or to generate a warning when the number of prefixes redistributed into OSPF reaches a maximum, use the **redistribute maximum-prefix** command in router configuration mode. To remove the values, use the **no** form of this command.

redistribute maximum-prefix *maximum* [*seconds*] [**warning-only** | **withdraw**]

no redistribute maximum-prefix

Syntax Description

maximum	The maximum number of IP prefixes that are allowed to be redistributed into OSPF, or sets a number of prefixes allowed to be redistributed into OSPF before the system logs a warning message, depending on whether the **warning-only** keyword is present. • There is no default value for the *maximum* argument. • If the **warning-only** keyword is also configured, this value does not limit redistribution; it is simply the number of redistributed prefixes that, when reached, causes a warning message to be logged.
seconds	(Optional) Percentage of the value set for *maximum* number of redistributed prefixes that, when reached, causes a warning message to be logged. • The *threshold* value defaults to 75 percent.
warning-only	(Optional) Causes a warning to be logged when the number of routes defined by the *maximum* argument have been redistributed. Additional redistribution is not prevented.
withdraw	(Optional) Prevents additional redistribution when the number of routes defined by the *maximum* argument have been redistributed. Also, IS-IS rebuilds link-state PDUs (LSPs) without the external (redistributed) IP prefixes.

Defaults

seconds: 75 percent

Command Modes

Router configuration

Command History

Release	Modification
12.0(25)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

If someone mistakenly injects a large number of IP routes into IS-IS, perhaps by redistributing Border Gateway Protocol (BGP) into IS-IS, the network can be severely flooded. Limiting the number of redistributed routes prevents this potential problem.

When the **redistributed maximum-prefix** command is configured, if the number of redistributed routes reaches the maximum value configured, no more routes will be redistributed (unless the **warning-only** keyword was configured).

The redistribution limit applies only to external IP prefixes. Default routes and summarized routes are not limited.

The limit is tracked separately for each not-so-stubby-area (NSSA) because redistribution to NSSAs is done independently for each NSSA and independently of all other regular areas.

Select a *maximum* value based on your knowledge of how many prefixes are redistributed on the router to the OSPF process.

Examples

Examples for IS-IS Protocol

This example sets a maximum of 600 prefixes that can be redistributed into IS-IS. If the number of prefixes redistributed reaches 75 percent of 600 (450 prefixes), a warning message is logged.

```
router isis
 redistribute maximum-prefix 600
```

This example sets a maximum of 1200 prefixes that can be redistributed into IS-IS. If the number of prefixes redistributed reaches 80 percent of 1200 (960 prefixes), a warning message is logged.

```
router isis
 redistribute maximum-prefix 1200 80
```

This example allows two warning messages to be logged, the first if the number of prefixes redistributed reaches 85 percent of 600 (510 prefixes), and the second if the number of redistributed routes reaches 600. However, the number of redistributed routes is not limited.

```
router isis
 redistribute maximum-prefix 600 85 warning-only
```

This example sets a maximum of 2000 prefixes that can be redistributed into OSPF process 1. If the number of prefixes redistributed reaches 75 percent of 2000 (1500 prefixes), a warning message is logged. Another warning is logged if the limit is reached, and no more routes are redistributed.

Examples for OSPF Routing Protocol

```
router ospf 1
 network 10.0.0.0 0.0.0.255 area 0
 redistribute eigrp 10 subnets
 redistribute maximum-prefix 2000
```

This example sets a maximum of 1200 prefixes that can be redistributed into OSPF process 1. If the number of prefixes redistributed reaches 80 percent of 1200 (960 prefixes), a warning message is logged. Another warning is logged if the limit is reached, and no more routes are redistributed.

```
router ospf 1
 network 10.0.0.0 0.0.0.255 area 0
 redistribute eigrp 10 subnets
 redistribute maximum-prefix 1200 80
```

This example allows two warning messages to be logged, the first if the number of prefixes redistributed reaches 85 percent of 600 (510 prefixes), and the second if the number of redistributed routes reaches 600. However, the number of redistributed routes is not limited.

```
router ospf 1
 network 10.0.0.0 0.0.0.255 area 0
 redistribute eigrp 10 subnets
 redistribute maximum-prefix 600 85 warning-only
```