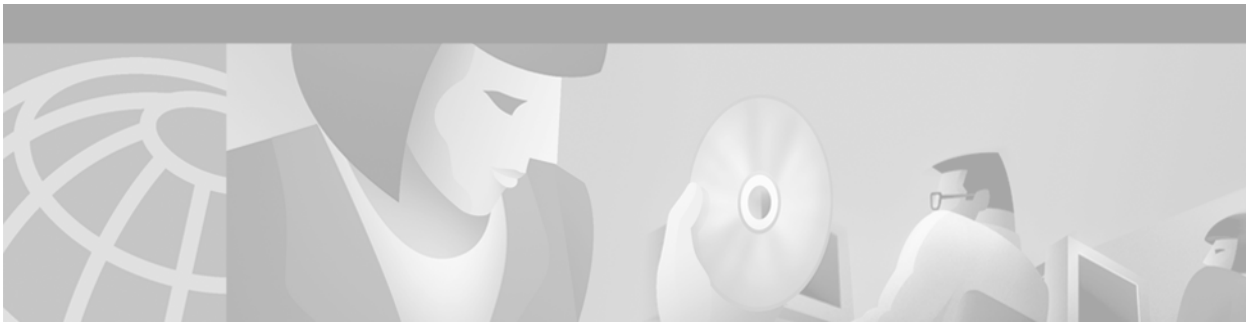

OSPF ABR Type 3 LSA Filtering

Feature History

Release	Modification
12.0(15)S	This feature was introduced.
12.2(4)T	This feature was integrated into Cisco IOS Release 12.2(4)T.
12.2(4)T3	Support for the Cisco 7500 series was added in Cisco IOS Release 12.2(4)T3.
12.2(8)T	Support for the Cisco 1710, 1721, 3631, 3725, 3745 and IGX 8400 series URM was added in Cisco IOS Release 12.2(8)T.
12.2(11)T	Support for the Cisco AS5300, AS5400, and AS5800 series was integrated into Cisco IOS Release 12.2(11)T.

This feature module describes filtering interarea routes on an Area Border Router (ABR) with the Open Shortest Path First (OSPF) protocol. It includes the following sections:

Feature Overview

The OSPF ABR Type 3 LSA Filtering feature extends the ability of an ABR that is running the OSPF protocol to filter type 3 link-state advertisements (LSAs) that are sent between different OSPF areas. This feature allows only packets with specified prefixes to be sent from one area to another area and restricts all packets with other prefixes. This type of area filtering can be applied out of a specific OSPF area, into a specific OSPF area, or into and out of the same OSPF areas at the same time. This feature is supported by the addition of the **area filter-list** command in router configuration mode.

Benefits

The OSPF ABR Type 3 LSA Filtering feature gives the administrator improved control of route distribution between OSPF areas.

Restrictions

Only type 3 LSAs that originate from an ABR are filtered.

Related Features and Technologies

This feature is an extension of the OSPF routing protocol. For more information about configuring OSPF and configuring route summarization and filtering, refer to the "OSPF" chapter of the Release 12.2 *Cisco IOS IP Configuration Guide* and the *Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols*.

Supported Platforms

The OSPF ABR Type 3 LSA Filtering feature is supported for the following platforms in Cisco IOS Release 12.2(11)T:

- Cisco AS5300 (Supported in Release 12.2(11)T and above.)
- Cisco AS5400 (Supported in Release 12.2(11)T and above.)
- Cisco AS5800 (Supported in Release 12.2(11)T and above.)
- Cisco 1400 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 1600 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 1600R series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 1710 (Supported in Cisco IOS Release 12.2(8)T and above.)
- Cisco 1720 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 1721 (Supported in Cisco IOS Release 12.2(8)T and above.)
- Cisco 1750 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 1751 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 2500 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 2600 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 3620 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 3631 (Supported in Cisco IOS Release 12.2(8)T and above.)
- Cisco 3640 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 3725 (Supported in Cisco IOS Release 12.2(8)T and above.)
- Cisco 3745 (Supported in Cisco IOS Release 12.2(8)T and above.)
- Cisco 3660 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco IGX 8400 Series URM (Supported in Release 12.2(8)T and above.)

- Cisco MC3810 (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 7100 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 7200 series (Supported in Cisco IOS Release 12.2(4)T and above.)
- Cisco 7500 series (Supported in Cisco IOS Release 12.2(4)T3 and above.)
- Cisco uBR7200 series (Supported in Cisco IOS Release 12.2(4)T and above.)

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that are supported by specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at http://www.cisco.com/register

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

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

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

No new or modified standards are supported by this feature.

Configuration Tasks

See the following sections for configuration tasks for the OSPF ABR Type 3 LSA Filtering feature. Each task in the list is identified as either required or optional:

- Configuring OSPF ABR Type 3 LSA Filtering (required)
- Verifying OSPF ABR Type 3 LSA Filtering (optional)

Configuring OSPF ABR Type 3 LSA Filtering

To filter interarea routes into a specified area, use the following commands beginning in router configuration mode:

	Command	Purpose
Step 1	`Router(config)# router ospf process-id`	Configures the router to run an OSPF process.
Step 2	`Router(config-router)# area area-id filter-list prefix prefix-list-name in`	Configures the router to filter interarea routes into the specified area.
Step 3	`Router(config-router)# ip prefix-list list-name [seq seq-value] deny | permit network/len [ge ge-value] [le le-value]`	Creates a prefix list with the name specified for the *list-name* argument.

To filter interarea routes out of a specified area, use the following commands beginning in router configuration mode:

	Command	Purpose
Step 1	`Router(config)# router ospf process-id`	Configures the router to run an OSPF process.
Step 2	`Router(config-router)# area area-id filter-list prefix prefix-list-name out`	Configures the router to filter interarea routes out of the specified area.
Step 3	`Router(config-router)# ip prefix-list list-name [seq seq-value] deny | permit network/len [ge ge-value] [le le-value]`	Creates a prefix list with the name specified for the *list-name* argument.

Verifying OSPF ABR Type 3 LSA Filtering

To verify that the OSPF ABR Type 3 LSA Filtering feature has been configured, use the **show ip ospf** EXEC command. The **show ip ospf** command will show that this feature has been enabled by listing the area filter as “in” or “out.” The following is sample output from the **show ip ospf** command:

```
router# show ip ospf 1
  Routing Process "ospf 1" with ID 172.16.0.1
  Supports only single TOS(TOS0) routes
  Supports opaque LSA
  It is an area border router
  SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
  Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
  Number of external LSA 0. Checksum Sum 0x0
  Number of opaque AS LSA 0. Checksum Sum 0x0
  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 2. 2 normal 0 stub 0 nssa
External flood list length 0
   Area BACKBONE(0)
       Number of interfaces in this area is 2
       Area has no authentication
       SPF algorithm executed 6 times
       Area ranges are
          10.0.0.0/8 Passive Advertise
       Area-filter AREA_0_IN in
       Area-filter AREA_0_OUT out
       Number of LSA 5. Checksum Sum 0x29450
       Number of opaque link LSA 0. Checksum Sum 0x0
       Number of DCbitless LSA 0
       Number of indication LSA 0
       Number of DoNotAge LSA 0
       Flood list length 0
   Area 1
       Number of interfaces in this area is 1
       Area has no authentication
       SPF algorithm executed 4 times
       Area ranges are
       Area-filter AREA_1_IN in
       Area-filter AREA_1_OUT out
       Number of LSA 6. Checksum Sum 0x30100
       Number of opaque link LSA 0. Checksum Sum 0x0
       Number of DCbitless LSA 0
       Number of indication LSA 0
       Number of DoNotAge LSA 0
       Flood list length 0
```

Monitoring and Maintaining OSPF ABR Type 3 LSA Filtering

Command	Purpose
`Router# **show ip prefix-list**`	Displays information about a prefix list or prefix list entries.

Configuration Examples

The following configuration example output shows interarea filtering that is applied to both incoming and outgoing routes:

```
Router(config)# router ospf 1
 log-adjacency-changes
 area 1 filter-list prefix AREA_1_OUT out
 area 3 filter-list prefix AREA_3_IN in
 network 10.0.0.0 0.255.255.255 area 3
 network 172.16.1.0 0.0.0.255 area 0
 network 192.168.0.0 0.255.255.255 area 1
!
ip prefix-list AREA_1_OUT seq 10 permit 10.25.0.0/8 ge 16
ip prefix-list AREA_1_OUT seq 20 permit 172.20.20.0/24
!
ip prefix-list AREA_3_IN seq 10 permit 172.31.0.0/16
!
```

Command Reference

This section documents the new **area filter-list** command that configures the OSPF ABR Type 3 LSA Filtering feature. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

area filter-list

To filter prefixes advertised in type 3 link-state advertisements (LSAs) between Open Shortest Path First (OSPF) areas of an Area Border Router (ABR), use the **area filter-list** command in router configuration mode. To change or cancel the filter, use the **no** form of this command.

area {*area-id*} **filter-list prefix** {*prefix-list-name* **in** | **out**}

no area {*area-id*} **filter-list prefix** {*prefix-list-name* **in** | **out**}

Syntax Description

area-id	Identifier of the area for which filtering is configured. The identifier can be specified as either a decimal value or an IP address.
prefix	Indicates that a prefix list is used.
prefix-list-name	Name of a prefix list.
in	Prefix list applied to prefixes advertised to the specified area from other areas
out	Prefix list applied to prefixes advertised out of the specified area to other areas

Defaults

This command has no default behavior.

Command Modes

Router configuration

Command History

Release	Modification
12.0(15)S	This command was introduced.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.

Usage Guidelines

With this feature enabled in the “in” direction, all type 3 LSAs originated by the ABR to this area, based on information from all other areas, are filtered by the prefix list. Type 3 LSAs that were originated as a result of the **area range** command in another area are treated like any other type 3 LSA that was originated individually. Any prefix that does not match an entry in the prefix list is implicitly denied.

With this feature enabled in the “out” direction, all type 3 LSAs advertised by the ABR, based on information from this area to all other areas, are filtered by the prefix list. If the **area range** command has been configured for this area, type 3 LSAs that correspond to the area range are sent to all other areas, only if at least one prefix in the area range matches an entry in the prefix list.

If all specific prefixes are denied by the prefix list, type 3 LSAs that correspond to the **area range** command will not be sent to any other area. Prefixes that are not permitted by the prefix list are implicitly denied.

Examples

The following example filters prefixes that are sent from all other areas to area 1:

```
area 1 filter-list prefix AREA_1 in
```

Related Commands

Command	Description
area range	Consolidates and summarizes routes at an area boundary.