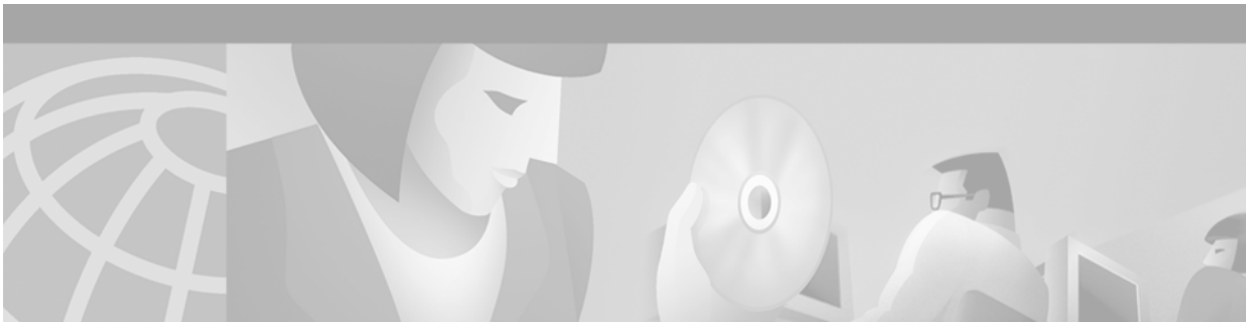

ABR Type 3 LSA Filtering

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

Feature Overview

The ABR Type 3 link-state advertisement (LSA) Filtering feature extends the capability of an ABR that is running the OSPF protocol to filter type 3 LSAs between different OSPF areas. This feature allows only specified prefixes to be sent from one area to another area and restricts all 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.

Benefits

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

Restrictions

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

Related Features and Technologies

The OSPF ABR Type 3 LSA Filtering 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 Cisco IOS Release 12.0 *Network Protocols Configuration Guide, Part 1* and Cisco IOS Release 12.0 *Network Protocols Command Reference, Part 1*.

Supported Platforms

The OSPF ABR Type 3 LSA Filtering feature is supported by the following platforms in Cisco IOS Release 12.0(15)S:

- Cisco 7200 series
- Cisco 7500 series
- Cisco 12000 series

Note Support for the Cisco 10000 and 10700 was added in Cisco IOS Release 12.0(17)ST.

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 MIBs supported by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at 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 optional or required:

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

Configuring 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 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 177.0.0.1
  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
            39.0.0.0/8 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 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 11.0.0.0 0.255.255.255 area 3
 network 20.1.1.0 0.0.0.255 area 0
 network 55.0.0.0 0.255.255.255 area 1
!
ip prefix-list AREA_1_OUT seq 10 permit 35.25.0.0/8 ge 16
ip prefix-list AREA_1_OUT seq 20 permit 192.20.20.0/24
!
ip prefix-list AREA_3_IN seq 10 permit 172.17.0.0/16
!
```

Command Reference

This section documents the **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 12.0 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. 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.

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 there is at least one prefix in the area range that 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-list AREA_1 in
```

The following example filters prefixes that are sent from area 2 to all other areas:

```
area 2 filter-list prefix-list AREA_2 out
```