# ip cef accounting

To enable Cisco Express Forwarding (CEF) network accounting, use the **ip cef accounting** command in global configuration mode or interface configuration mode. To disable network accounting of CEF, use the **no** form of this command.

**ip cef accounting** {[**non-recursive**] [**per-prefix**] [**prefix-length**]}

**no ip cef accounting** {[**non-recursive**] [**per-prefix**] [**prefix-length**]}

### Specific CEF Accounting Information Through Interface Configuration Mode

**ip cef accounting non-recursive** {**external | internal**}

**no ip cef accounting non-recursive** {**external | internal**}

## Syntax Description

| | |
|---|---|
| **non-recursive** | Enables accounting through nonrecursive prefixes.<br>This keyword is optional when used in global configuration mode. |
| **per-prefix** | (Optional) Enables the collection of the number of packets and bytes express forwarded to a destination (or prefix). |
| **prefix-length** | (Optional) Enables accounting through prefixlength. |
| **external** | Counts input traffic in the nonrecursive external bin. |
| **internal** | Counts input traffic in the nonrecursive internal bin. |

## Defaults

Accounting is disabled by default.

## Command Modes

Global configuration

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 GS | This command was introduced. |
| 11.1 CC | Multiple platform support was added. |
| 11.1 CC | The **prefix-length** keyword was added. |
| 12.2(2)T | The **ip cef accounting non-recursive** command in interface configuration mode was added. |

## Usage Guidelines

You might want to collect statistics to better understand CEF patterns in your network.

When you enable network accounting for CEF from global configuration mode, accounting information is collected at the Route Processor (RP) when CEF mode is enabled and at the line cards when distributed CEF (dCEF) mode is enabled. You can then display the collected accounting information using the **show ip cef** EXEC command.

For prefixes with directly connected next hops, the **non-recursive** keyword enables the collection of packets and bytes to be express forwarded through a prefix. This keyword is optional when this command is used in global configuration mode.

This command in interface configuration mode must be used in conjunction with the global configuration command. The interface configuration command allows a user to specify two different bins (internal or external) for the accumulation of statistics. The internal bin is used by default. The statistics are displayed through the **show ip cef detail** EXEC mode command.

## Examples

The following example enables the collection of CEF accounting information:

```
ip cef accounting
```

## Related Commands

| Command | Description |
|---|---|
| **show ip cef** | Displays entries or a summary of the FIB table. |

# ip cef linecard ipc memory

To configure the line card memory pool for the Cisco Express Forwarding (CEF) queuing messages, use the **ip cef linecard ipc memory** command. To return to the default ipc memory allocation, use the **no** form of this command.

**ip cef linecard ipc memory** *kbps*

**no ip cef linecard ipc memory** *kbps*

## Syntax Description

| | |
|---|---|
| *kbps* | Kilobytes of line card memory allocated. Range is 0 to 12800. |

## Defaults

Default ipc memory allocation is 25 messages. However, this value is dependant on switching platform.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(2)T | This command was introduced. |

## Usage Guidelines

This command is available only on distributed switching platforms.

If you are expecting large routing updates to the Route Processor (RP), use this command to allocate a larger memory pool on the line cards for queuing CEF routing update messages. The memory pool reduces the transient memory requirements on the RP.

To display and monitor the current size of the CEF message queues, use the **show cef linecard** command. Also, the peak size is recorded and displayed when you use the **detail** keyword.

## Examples

The following example configures the CEF line card memory queue to 128000 kilobytes:

```
Router(config)# ip cef linecard ipc memory 128000
```

## Related Commands

| Command | Description |
|---|---|
| **show cef linecard** | Displays detailed CEF information for the specified line card. |

# ip cef load-sharing algorithm

To select a Cisco Express Forwarding (CEF) load balancing algorithm, use the **ip cef load-sharing algorithm** command in global configuration mode. To return to the default universal load balancing algorithm, use the **no** form of this command.

**ip cef load-sharing algorithm** {**original** | **tunnel** [*id*] | **universal** [*id*]}

**no ip cef load-sharing algorithm** {**original** | **tunnel** [*id*] | **universal** [*id*]}

## Syntax Description

| | |
|---|---|
| **original** | Sets the load balancing algorithm to the original based on a source and destination hash. |
| **tunnel** | Sets the load balancing algorithm for use in tunnel environments or in environments where there are only a few IP source and destination address pairs. |
| **universal** | Sets the load balancing algorithm to the universal algorithm that uses a source and destination, and ID hash. |
| *id* | (Optional) Fixed identifier. |

## Defaults

Universal load sharing algorithm.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(12)S | This command was introduced. |
| 12.1(5)T | This command was integrated into Cisco IOS Release 12.1(5)T. |

## Usage Guidelines

The original CEF load sharing algorithm produced distortions in load sharing across multiple routers due to the use of the same algorithm on every router. When the load sharing algorithm is set to universal mode, each router on the network can make a different load sharing decision for each source-destination address pair which resolves load sharing distortions.

The tunnel algorithm is designed to more fairly share load when only a few source-destination pairs are involved.

## Examples

The following example enables the CEF load sharing algorithm for universal environments:

```
ip cef load-sharing algorithm universal 1
```

**Related Commands**

| Command | Description |
|---|---|
| **debug ip cef hash** | Records CEF load sharing hash algorithm events |
| **ip load-sharing** | Enables load balancing. |

# ip cef table adjacency-prefix

To modify how Cisco Express Forwarding (CEF) adjacency prefixes are managed, use the **ip cef table adjacency-prefix** command in global configuration mode. To disable CEF adjacency prefix management, use the **no** form of this command.

**ip cef table adjacency-prefix** [**override | validate**]

**no ip cef table adjacency-prefix** [**override | validate**]

## Syntax Description

| | |
|---|---|
| **override** | Enables Cisco Express Forwarding (CEF) adjacency prefixes to override static host glean routes. |
| validate | Enables the periodic validation of Cisco Express Forwarding (CEF) adjacency prefixes. |

## Defaults

All CEF adjacency prefix management is disabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(16)S | This command was introduced. |
| 12.2(2)T | This command was integrated into Cisco IOS Release 12.2(2)T. |
| 12.1(13)E07<br>12.1(19.02)E<br>12.3(04)XG<br>12.3(04)XK<br>12.3(06.01)PI03 | The validate keyword was added.<br>The default behavior for **ip cef table adjacency-prefix override** was changed to disabled |

## Usage Guidelines

When CEF is configured, the forwarding information base (FIB) table may conflict with static host routes that are specified in terms of an output interface or created by a Layer 2 address resolution protocols such as Address Resolution Protocol (ARP), map lists, and so on.

The Layer 2 address resolution protocol adds adjacencies to CEF, which in turn creates a corresponding host route entry in the FIB table. This entry is called an adjacency prefix.

### override

If the CEF adjacency prefix entries are also configured by a static host route, a conflict occurs.

This command ensures that adjacency prefixes can override static host glean routes, and correctly restore routes when the adjacency prefix is deleted.

**validate**

When you add a /31 netmask route, the new netmask does not overwrite an existing /32 CEF entry. This problem is resolved by configuring the **validate** keyword to periodically validate prefixes derived from adjacencies in the FIB against prefixes originating from the RIB.

## Examples

**override**

The following example shows how to enable CEF table adjacency prefix override:

```
Router(config)# ip cef table adjacency-prefix override
```

**validate**

The following example shows how to enable CEF table adjacency prefix validation:

```
Router(config)# ip cef table adjacency-prefix validate
```

# ip cef table adjacency-prefix override

The **override** keyword for the **ip cef table adjacency-prefix** command is no longer documented as a separate command.

The information for using the **override** keyword for the **ip cef table adjacency-prefix** command has been incorporated into the **ip cef table adjacency-prefix** command documentation. See the **ip cef table adjacency-prefix** command documentation for more information.

# IP cef table consistency-check

To enable Cisco Express Forwarding (CEF) table consistency checker types and parameters, use the **ip cef table consistency-check** command in global configuration mode. To disable consistency checkers, use the **no** form of this command.

**ip cef table consistency-check** [**type** {**lc-detect** | **scan-lc** | **scan-rib** | **scan-rp**}] [**count** *count_number*] [**period** *seconds*]

**no ip cef table consistency-check** [**type** {**lc-detect** | **scan-lc** | **scan-rib** | **scan-rp**}] [**count** *count_number*] [**period** *seconds*]

### Specific to Suppress Errors During Route Updates

**ip cef table consistency-check** [**settle-time** *seconds*]

**no ip cef table consistency-check** [**settle-time** *seconds*]

## Syntax Description

| | |
|---|---|
| **type** | (Optional) Type of consistency check to configure. |
| **lc-detect** | (Optional) Line card detects missing prefix. Confirmed by Route Processor (RP). |
| **scan-lc** | (Optional) Passive scan check of tables on line card. |
| **scan-rib** | (Optional) Passive scan check of tables on RP against Routing Information Base (RIB). |
| **scan-rp** | (Optional) Passive scan check of tables on RP. |
| **count** *count_number* | (Optional) Maximum number of prefixes to check per scan. Range is from 1 to 225. |
| **period** *seconds* | (Optional) Period between scans. Range is from 30 to 3600 seconds. |
| **settle-time** *seconds* | (Optional) Time elapsed during which updates for a candidate prefix are ignored as inconsistencies. Range is from 1 to 3600 seconds. |

## Defaults

All consistency checkers are disabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(15)S | This command was introduced. |
| 12.2(2)T | This command was integrated into Cisco IOS Release 12.2(2)T. |

## Usage Guidelines

This command configures CEF consistency checkers and parameters for the following detection mechanism types:

| Detection Mechanism | Operates On | Description |
|---|---|---|
| Lc-detect | Line Card | Operates on the line card by retrieving IP prefixes found missing from its forwarding information base (FIB) table. If IP prefixes are missing, the line card can not forward packets for these addresses. Lc-detect will then send IP prefixes to the RP for confirmation. If the RP detects that it has the relevant entry, an inconsistency is detected and an error message will be displayed. Also, the RP will send a signal back to the line card confirming that the IP prefix is an inconsistency. |
| Scan-lc | Line Card | Operates on the line card by looking through the FIB table for a configurable time period and sending the next *n* prefixes to the RP. The RP does an exact lookup. If it finds the prefix missing, the RP reports an inconsistency. Finally, the RP sends a signal back to the line card for confirmation. |
| Scan-rp | Route Processor | Operates on the RP (opposite of the scan-lc) by looking through the FIB table for a configurable time period and sending the next *n* prefixes to the line card. The line card does an exact lookup. If it finds the prefix missing, the line card reports an inconsistency and finally signals the RP for confirmation. |
| Scan-rib | Route Processor | Operates on all RPs (even nondistributed), and scans the RIBto ensure that prefix entries are present in the RP FIB table. |

## Examples

The following example enables the CEF consistency checkers:

```
ip cef table consistency-check
```

## Related Commands

| Command | Description |
|---|---|
| **clear ip cef inconsistency** | Clears CEF inconsistency statistics and records found by the CEF consistency checkers. |
| **debug ip cef** | Displays various CEF table query and check events. |
| **show ip cef inconsistency** | Displays CEF IP prefix inconsistencies. |

# ip cef table event-log

To control Cisco Express Forwarding (CEF) table event-log characteristics, use the **ip cef table event-log** command in global configuration mode.

**ip cef table event-log** [**size** *event-number*] [**match** *ip-prefix mask*]

**no ip cef table event-log** [**size** *event-number*] [**match** *ip-prefix mask*]

**Specific to Virtual Private Network (VPN) Event Log**

**ip cef table event-log** [**size** *event-number*] [**vrf** *vrf-name*] [**match** ***ip-prefix mask***]

**no ip cef table event-log** [**size** *event-number*] [**vrf** *vrf-name*] [**match** ***ip-prefix mask***]

## Syntax Description

| | |
|---|---|
| **size** *event-number* | (Optional) Number of event entries. The range is from 1 to 4294967295. |
| **match** | (Optional) Log events matching specified prefix and mask. |
| *ip-prefix* | (Optional) IP prefixes matched, in dotted decimal format (A.B.C.D). |
| *mask* | (Optional) Network mask written as A.B.C.D. |
| **vrf** *vrf-name* | (Optional) Virtual Routing and Forwarding (VRF) instance CEF table and VRF name. |

## Defaults

Default size for event log is 10000 entries.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(15)S | This command was introduced. |
| 12.2(2)T | This command was integrated into Cisco IOS Release 12.2(2)T. |

## Usage Guidelines

This command is used to troubleshoot inconsistencies that occur in the CEF event log between the routes in the Routing Information Base (RIB), Route Processor (RP) CEF tables and line card CEF tables.

The CEF event log collects CEF events as they occur without debugging enabled. This allows the tracing of an event immediately after it occurs. Cisco technical personnel may ask for information from this event log to aid in resolving problems with the CEF feature.

When the CEF table event log has reached its capacity, the oldest event is written over by the newest event until the event log size is reset using this command or cleared using the **clear ip cef event-log** command.

## Examples

The following example sets the CEF table event log size to 5000 entries:

```
ip cef table event-log size 5000
```

**Related Commands**

| Command | Description |
|---|---|
| **IP cef table consistency-check** | Enables CEF table consistency checker types and parameters. |
| **show ip cef events** | Displays all recorded CEF FIB and adjacency events. |
| **clear ip cef event-log** | Clears the CEF event-log buffer. |

# ip cef table resolution-timer

To change the Cisco Express Forwarding (CEF) background resolution timer, use the **ip cef table resolution-timer** command in global configuration mode.

**ip cef table resolution-timer** *seconds*

**no ip cef table resolution-timer** *seconds*

## Syntax Description

| | |
|---|---|
| *seconds* | Range is from 0 to 30 seconds; 0 is for the automatic exponential backoff scheme. |

## Defaults

The default configuration value is 0 seconds for automatic exponential backoff.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(2)T | This command was introduced. |

## Usage Guidelines

The CEF background resolution timer can use either a fixed time interval or an exponential backoff timer that reacts to the amount of resolution work required. The exponential backoff timer starts at 1 second, increasing to 16 seconds when a network flap is in progress. When the network recovers, the timer returns to 1 second.

The default is used for the exponential backoff timer. During normal operation, the default configuration value set to 0 results in re-resolution occurring much sooner than when the timer is set at a higher fixed interval.

## Examples

The following example sets the CEF background resolution timer to 3 seconds:

```
ip cef table resolution-timer 3
```

# ip cef traffic-statistics

To change the time intervals used to control the collection of Cisco Express Forwarding (CEF) traffic load statistics, use the **ip cef traffic-statistics** command in global configuration mode. To restore the default values, use the **no** form of this command.

**ip cef traffic-statistics** [**load-interval** *seconds*] [**update-rate** *seconds*]

**no ip cef traffic-statistics**

## Syntax Description

| | |
|---|---|
| **load-interval** *seconds* | (Optional) The interval time over which the CEF traffic load statistics are calculated. The **load-interval** range is from 30 to 300 seconds, in 30-second increments. The default value is 30 seconds. |
| **update-rate** *seconds* | (Optional) Frequency with which the port adapter sends the CEF traffic load statistics to the Router Processor (RP). The default value is 10 seconds. |

## Defaults

**load-interval**: 30 seconds

**update-rate**: 10 seconds

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0 | This command was introduced. |

## Usage Guidelines

This command configures the CEF traffic load statistics that are used to determine the behavior of the Next Hop Resolution Protocol (NHRP) — a protocol used by routers to dynamically discover the MAC address of other routers and hosts connected to a nonbroadcast multiaccess (NBMA) network.

The **ip nhrp trigger-svc** command sets the threshold by which NHRP sets up and tears down a connection. The threshold is the CEF traffic load statistics. To change the interval over which that threshold is determined, use the **load-interval** *seconds* keyword and argument of the **ip cef traffic-statistics** command.

## Examples

In the following example, the triggering and teardown thresholds are calculated based on an average over 120 seconds:

```
ip cef traffic-statistics load-interval 120
```

**Related Commands**

| Command | Description |
|---|---|
| **ip nhrp trigger-svc** | Configures when NHRP will set up and tear down an SVC based on aggregate traffic rates. |

# ip dhcp relay information option

To enable the system to insert the cable modem MAC address into a DHCP packet received from a cable modem or host and forward the packet to a DHCP server, use the **ip dhcp relay information option** in global configuration mode. To disable MAC address insertion, use the **no** form of this command.

**ip dhcp relay information option**

**no ip dhcp relay information option**

## Syntax Description

This command has no keywords or arguments.

## Defaults

MAC address insertion is disabled.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 11.3 NA | This command was introduced. |
| 12.0 | In previous releases, routers running Cisco IOS Release 11.3 NA used the **cable relay-agent option** command in the cable interface configuration mode. Cisco uBR7200 series routers running Cisco IOS Release 12.0 use the **ip dhcp relay information option** command in the global configuration mode. |
| 12.0 SC | This command was modified to configure the **cable relay-agent option** using **ip dhcp relay information option**. |

## Usage Guidelines

This functionality enables a DHCP server to identify the user (cable modem) sending the request and initiate appropriate action based on this information. To insert DHCP relay-agent option fields, use the **cable ip dhcp relay information option** command in global configuration mode.

In Cisco uBR7200 series routers running Cisco IOS Release 12.0, use the **ip dhcp relay information option** global configuration command to insert DHCP relay-agent option fields. Previously, routers running Cisco IOS Release 11.3 NA used the **cable relay-agent-option** command.

Cisco IOS Release 12.0 SC was built off Cisco IOS Release 11.3 NA with additional features such as interface bundling. If you use Cisco Release IOS Release 12.0(7) XR2 for concatenation, you should be able to configure the cable relay agent option using the **ip dhcp relay information option** command.

## Examples

The following example enables the insertion of DHCP relay agent information into DHCP packets:

```
interface cable 6/0
cable ip dhcp relay information option
```

# ip explicit-path

To enter the command mode for IP explicit paths and create or modify the specified path, use the **ip explicit-path** command in router configuration mode. An IP explicit path is a list of IP addresses, each representing a node or link in the explicit path.To disable this feature, use the **no** form of this command.

**ip explicit-path** {**name** *word* | **identifier** *number*} [{**enable** | **disable**}]

**no explicit-path** {**name** *word* | **identifier** *number*}

## Syntax Description

| | |
|---|---|
| **name** *word* | Name of the explicit path. |
| **identifier** *number* | Number of the explicit path. Valid values are from 1 to 65535. |
| **enable** | (Optional) Enables the path. |
| **disable** | (Optional) Prevents the path from being used for routing while it is being configured. |

## Command Modes

Router configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)S | This command was introduced. |

## Examples

In the following example, the explicit path command mode for IP explicit paths is entered and a path with the number 500 is created:

```
Router(config)# ip explicit-path identifier 500
Router(config-ip-expl-path)#
```

## Related Commands

| Command | Description |
|---|---|
| **append-after** | Inserts the new path entry after the specified index number. Commands might be renumbered as a result. |
| **index** | Inserts or modifies a path entry at a specific index. |
| **ip route vrf** | Displays all or part of the explicit paths. |
| **next-address** | Specifies the next IP address in the explicit path. |
| **show ip explicit-paths** | Displays the configured IP explicit paths. |

# ip flow-aggregation cache

To enable aggregation cache configuration mode, use the **ip flow-aggregation cache** global configuration command. To disable aggregation cache configuration mode, use the **no** form of this command.

**ip flow-aggregation cache** {**as** | **destination-prefix** | **prefix** | **protocol-port** | **source-prefix**}

**no ip flow-aggregation cache** {**as** | **destination-prefix** | **prefix** | **protocol-port** | **source-prefix**}

## Syntax Description

| | |
|---|---|
| **as** | Configures the autonomous system aggregation cache scheme. |
| **destination-prefix** | Configures the destination prefix aggregation cache scheme. |
| **prefix** | Configures the prefix aggregation cache scheme. |
| **protocol-port** | Configures the protocol port aggregation cache scheme. |
| **source-prefix** | Configures the source prefix aggregation cache scheme. |

## Defaults

This command is not enabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(3)T | This command was introduced. |

## Usage Guidelines

In source-prefix aggregation mode, only the source mask is configurable. In destination-prefix aggregation mode, only the destination mask is configurable.

## Examples

The following example shows how to enable an autonomous system aggregation scheme:

```
ip flow-aggregation cache as
enable
```

## Related Commands

| Command | Description |
|---|---|
| **mask destination** | Specifies the destination mask. |
| **mask source** | Specifies the source mask. |
| **show ip cache flow aggregation** | Displays the aggregation cache configuration. |

# ip flow-cache entries

To change the number of entries maintained in the NetFlow cache, use the **ip flow-cache entries** command in global configuration mode. To return to the default number of entries, use the **no** form of this command.

**ip flow-cache entries** *number*

**no ip flow-cache entries**

## Syntax Description

| | |
|---|---|
| *number* | Number of entries to maintain in the NetFlow cache. The valid range is from 1024 to 524288 entries. The default is 65536 (64K). |

## Defaults

65536 entries (64K)

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(3)T | This command was introduced. |

## Usage Guidelines

Normally the default size of the NetFlow cache will meet your needs. However, you can increase or decrease the number of entries maintained in the cache to meet the needs of your flow traffic rates. For environments with a high amount of flow traffic (such as an internet core router), a larger value such as 131072 (128K) is recommended. To obtain information on your flow traffic, use the **show ip cache flow** EXEC command.

The default is 64K flow cache entries. Each cache entry is approximately 64 bytes of storage. Assuming a cache with the default number of entries, approximately 4 MB of DRAM would be required. Each time a new flow is taken from the free flow queue, the number of free flows is checked. If only a few free flows remain, NetFlow attempts to age 30 flows using an accelerated timeout. If only one free flow remains, NetFlow automatically ages 30 flows regardless of their age. The intent is to ensure free flow entries are always available.

**Caution** We recommend that you do not change the NetFlow cache entries. Improper use of this command could cause network problems. To return to the default NetFlow cache entries, use the **no ip flow-cache entries** global configuration command.

## Examples

The following example increases the number of entries in the NetFlow cache to 131,072 (128K):

```
ip flow-cache entries 131072
```

**Related Commands**

| Command | Description |
|---|---|
| **show mpoa client** | Displays the routing table cache used to fast switch IP traffic. |

# ip flow-export

To enable the exporting of information in NetFlow cache entries, use the **ip flow-export** command in global configuration mode. To disable the exporting of information, use the **no** form of this command.

**ip flow-export** *ip-address udp-port* [**version 1** | **version 5** [**origin-as** | **peer-as**]]

**no ip flow-export**

## Syntax Description

| | |
|---|---|
| *ip-address* | IP address of the workstation to which you want to send the NetFlow information. |
| *udp-port* | UDP protocol-specific port number. |
| **version 1** | (Optional) Specifies that the export packet uses the version 1 format. This is the default. The version field occupies the first two bytes of the export record. The number of records stored in the datagram is a variable from 1 to 24 for version 1. |
| **version 5** | (Optional) Specifies that the export packet uses the version 5 format. The number of records stored in the datagram is a variable between 1 and 30 for version 5. |
| **origin-as** | (Optional) Specifies that export statistics include the origin autonomous system (AS) for the source and destination. |
| **peer-as** | (Optional) Specifies that export statistics include the peer AS for the source and destination. |

## Defaults

NetFlow cache entries export is disabled.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 11.1CA | This command was introduced. |

## Usage Guidelines

There is a lot of information in a NetFlow cache entry. When flow switching is enabled with the **ip route-cache flow** command, you can use the **ip flow-export** command to configure the router to export the flow cache entry to a workstation when a flow expires. This feature can be useful for purposes of statistics, billing, and security.

Version 5 format includes the source and destination AS addresses, source and destination prefix masks, and a sequence number. Because this change may appear on your router as a maintenance release, support for version 1 format is maintained with the **version 1** keyword.

**Caution** Entering the **ip flow-export** or **no ip flow-export** command on the Cisco 12000 series Internet routers, Cisco 6500 series routers and Cisco 7600 series routers and specifying a format other than version 1 (in other words, entering the **ip flow-export** or **no ip flow-export** command and specifying the **version 5**

keyword) causes packet forwarding to stop for a few seconds while NetFlow reloads the Route Processor and line card Cisco Express Fowarding tables. To avoid interruption of service to a live network, apply this command during a change window, or include it in the startup-config file to be executed during a router reboot.

For more information on version 1 and version 5 data formats, refer to the "NetFlow Data Format" section in the "Configuring NetFlow Switching" chapter of the *Cisco IOS Switching Services Configuration Guide*.

## Examples

The following example configures the router to export the NetFlow cache entry to UDP port 125 on the workstation at 134.22.23.7 when the flow expires using version 1 format:

```
ip flow-export 134.22.23.7 125
```

The following example configures the router to export the NetFlow cache entry to UDP port 2048 on the workstation at 134.22.23.7 when the flow expires using version 5 format and includes peer AS information:

```
ip flow-export 134.22.23.7 2048 version 5 peer-as
```

## Related Commands

| Command | Description |
|---|---|
| **ip route-cache flow** | Enables NetFlow switching for IP routing. |

# ip flow-export source

To specify the source interface IP address used in the NetFlow export datagram, use the **ip flow-export source** command in global configuration mode. To remove the source address, use the **no** form of this command.

**ip flow-export source** *interface*

**no ip flow-export source**

## Syntax Description

| | |
|---|---|
| *interface* | Interface from which the router gets the source IP address for the packet. |

## Defaults

No source interface is specified.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 11.1 CA | This command was introduced. |

## Usage Guidelines

After you configure NetFlow data export, you can also specify the source interface used in the UDP datagram containing the export data. The NetFlow Collector on the workstation uses the IP address of the source interface to determine which router sent the information. The NetFlow Collector also performs SNMP queries to the router using the IP address of the source interface. Because the IP address of the source interface can change (for example, the interface might flap so a different interface is used to send the data), we recommend you configure a loopback source interface. A loopback interface is always up and can respond to SNMP queries from the NetFlow Collector on the workstation.

## Examples

The following example shows the configuration for a loopback source interface. The loopback interface has the IP address 4.0.0.1 and is used by the serial interface in slot 5, port 0.

```
Router# configure terminal
Router(config)# interface loopback0
Router(config-if)# ip address 4.0.0.1 255.0.0.0
Router(config-if)# exit
Router(config)# interface serial 5/0:0
Router(config-if)# ip unnumbered loopback0
Router(config-if)# no ip mroute-cache
Router(config-if)# encapsulation ppp
Router(config-if)# ip route-cache flow
Router(config-if)# exit
Router(config)# ip flow-export source loopback0
Router(config)# exit
```

**Related Commands**

| Command | Description |
|---|---|
| **ip flow-cache** | Enables the exporting of information in NetFlow cache entries. |

# ip load-sharing

To enable load balancing for Cisco Express Forwarding (CEF), use the **ip load-sharing** command in interface configuration mode.

**ip load-sharing** [**per-packet**] [**per-destination**]

## Syntax Description

| | |
|---|---|
| **per-packet** | (Optional) Enables per-packet load balancing on the interface. |
| **per-destination** | (Optional) Enables per-destination load balancing on the interface. |

## Defaults

Per-destination load balancing is enabled by default when you enable CEF.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.2 GS | This command was introduced. |
| 11.1 CC | Multiple platform support was added. |

## Usage Guidelines

Per-packet load balancing allows the router to send data packets over successive equal-cost paths without regard to individual destination hosts or user sessions. Path utilization is good, but packets destined for a given destination host might take different paths and might arrive out of order.

**Note** Per-packet load balancing via CEF is not supported on Engine 2 Gigabit Switch Router (GSR) line cards (LCs).

Per-destination load balancing allows the router to use multiple, equal-cost paths to achieve load sharing. Packets for a given source-destination host pair are guaranteed to take the same path, even if multiple, equal-cost paths are available. Traffic for different source-destination host pairs tend to take different paths.

**Note** If you want to enable per-packet load sharing to a particular destination, then all interfaces that can forward traffic to the destination must be enabled for per-packet load sharing.

## Examples

The following example enables per-packet load balancing:

```
interface E0
 ip load-sharing per-packet
```

The following example enables per-destination load balancing:

```
interface E0
 ip load-sharing per-destination
```

**Related Commands**

| Command | Description |
|---|---|
| ip cef | Enables CEF on the RP card. |

# ip mroute-cache

To configure IP multicast fast switching or multicast distributed switching (MDS), use the **ip mroute-cache** command in interface configuration mode. To disable either of these features, use the **no** form of this command.

**ip mroute-cache** [**distributed**]

**no ip mroute-cache** [**distributed**]

## Syntax Description

| | |
|---|---|
| **distributed** | (Optional) Enables MDS on the interface. In the case of RSP, this keyword is optional; if it is omitted, fast switching occurs. On the GSR, this keyword is required because the GSR does only distributed switching. |

## Defaults

On the RSP, IP multicast fast switching is enabled; MDS is disabled.

On the GSR, MDS is disabled.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.2(11)GS | The **distributed** keyword was added. |

## Usage Guidelines

### On the RSP

If multicast fast switching is disabled on an incoming interface for a multicast routing table entry, the packet will be sent at process level for all interfaces in the outgoing interface list.

If multicast fast switching is disabled on an outgoing interface for a multicast routing table entry, the packet is process-level switched for that interface, but may be fast switched for other interfaces in the outgoing interface list.

When multicast fast switching is enabled (like unicast routing), debug messages are not logged. If you want to log debug messages, disable fast switching.

If MDS is not enabled on an incoming interface that is capable of MDS, incoming multicast packets will not be distributed switched; they will be fast switched at the Route Processor (RP) as before. Also, if the incoming interface is not capable of MDS, packets will get fast switched or process-switched at the RP as before.

If MDS is enabled on the incoming interface, but at least one of the outgoing interfaces cannot fast switch, packets will be process-switched. We recommend that you disable fast switching on any interface when MDS is enabled.

### On the GSR

On the GSR, all interfaces should be configured for MDS because that is the only switching mode.

## Examples

The following example enables IP multicast fast switching on the interface:

```
ip mroute-cache
```

The following example disables IP multicast fast switching on the interface:

```
no ip mroute-cache
```

The following example enables MDS on the interface:

```
ip mroute-cache distributed
```

The following example disables MDS and IP multicast fast switching on the interface:

```
no ip mroute-cache distributed
```

# ip multicast-routing

To enable IP multicast routing, use the **ip multicast-routing** command in global configuration mode. To disable IP multicast routing, use the **no** form of this command.

**ip multicast-routing** [**distributed**]

**no ip multicast-routing**

## Syntax Description

| | |
|---|---|
| **distributed** | (Optional) Enables MDS. |

## Defaults

Disabled

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.2(11)GS | The **distributed** keyword was introduced. |
| 12.0(5)T | The effect of this command was modified. If IP multicast Multilayer Switching (MLS) is enabled, using the **no** form of this command now disables IP multicast routing on the MMLS-RP and purges all multicast MLS cache entries on the MMLS-SE. |

## Usage Guidelines

When IP multicast routing is disabled, the Cisco IOS software does not forward any multicast packets.

## Examples

The following example enables IP multicast routing:

```
ip multicast-routing
```

## Related Commands

| Command | Description |
|---|---|
| **ip pim** | Enables PIM on an interface. |

# ip route-cache

To control the use of switching methods for forwarding IP packets use the **ip route-cache** command in interface configuration mode. To disable any of these switching methods, use the **no** form of this command.

**ip route-cache** [**same-interface | flow | distributed | cef | policy**]

**no ip route-cache** [**same-interface | flow | distributed | cef | policy**]

## Syntax Description

| | |
|---|---|
| **same-interface** | Enables fast-switching packets to forward IP packets back out through the interface on which they arrived. |
| **flow** | Enables NetFlow accounting for packets that are received by the interface. |
| **distributed** | Enables distributed switching on the interface. |
| **cef** | Enables Cisco Express Forwarding (CEF) operation on an interface. |
| **policy** | Enables fast-switching for packets that are forwarded using Policy Based Routing (PBR). |

## Defaults

### Fast Switching

The default behavior for Fast Switching varies by interface and media.

### Distributed Switching

Distributed switching is disabled.

### CEF and dCEF

When CEF or dCEF operation is enabled globally, all interfaces that support CEF or dCEF are enabled by default.

### NetFlow

NetFlow accounting is disabled

### Fast Switching for PBR (FSPBR)

FSPBR is disabled

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 10.0 | This command was introduced. |
| 11.1 | The **flow** keyword was added. |
| 11.2GS | The **cef** and **distributed** keywords were added. |
| 11.1CC | Support for multiple platforms was added for **cef** keyword. |
| 12.0 | The **policy** keyword was added. |

## Usage Guidelines



### ip route-cache

Using the route cache is often called *fast switching*. The route cache allows outgoing packets to be load-balanced on a *per-destination* basis rather than on a per-packet basis. The **ip route-cache** command with no additional keywords enables fast switching.

Entering the **ip route-cache** command has no effect on a subinterface. Subinterfaces accept the **no** form of the command; however, this disables CEF or dCEF on the physical interface as well as all subinterfaces associated with the physical interface

### ip route-cache same-interface

You can enable IP fast switching when the input and output interfaces are the same interface, using the **ip route-cache same-interface** command. This configuration normally is not recommended, although it is useful when you have partially meshed media, such as Frame Relay or you are running Web Cache Communication Protocol (WCCP) redirection. You could use this feature on other interfaces, although it is not recommended because it would interfere with redirection of packets to the optimal path.

### ip route-cache flow

Enables (ingress) NetFlow accounting for traffic arriving on an interface.

### ip route-cache distributed

The distributed option is supported on Cisco routers with line cards and Versatile Interface Processors (VIPs) that support both CEF and flow switching.

On Cisco routers with Route Switch Processor (RSP) and VIP controllers, the VIP hardware can be configured to switch packets received by the VIP with no per-packet intervention on the part of the RSP. When VIP distributed switching is enabled, the input VIP interface tries to switch IP packets instead of forwarding them to the RSP for switching. Distributed switching helps decrease the demand on the RSP

### ip route-cache cef

In some instances, you might want to disable CEF or dCEF on a particular interface because that interface is configured with a feature that CEF or dCEF does not support. Because all interfaces that support CEF or dCEF are enabled by default when you enable CEF operation globally, you must use the **no** form of the **ip route-cache cef** command in the interface configuration mode to turn CEF operation off a particular interface. To reenable CEF or dCEF operation, use the **ip route-cache cef** command.

Disabling CEF or dCEF on an interface disables CEF switching for packets forwarded to the interface, but has no effect on packets forwarded out of the interface.

Additionally when you disable CEF or dCEF, Cisco IOS software switches packets using the next-fastest switching path. In the case of dCEF, the next-fastest switching path is CEF on the RSP.

**Note** On the Cisco 12000 Series Internet Router, you must not disable dCEF on an interface

### ip route-cache policy

1. If Cisco Express Forwarding (CEF) is already enabled, this command is not needed because PBR packets are CEF switched by default.
2. Before you can enable fast-switched PBR, PBR itself must be configured.
3. FSPBR supports all of PBR's **match** commands and most of PBR's **set** commands, with the following restrictions:
   - The **set ip default next-hop** and **set default interface** commands are not supported.
   - The **set interface** command is supported only over point-to-point links, unless a route cache entry exists using the same interface specified in the **set interface** command in the route map. Also, at the process level, the routing table is consulted to determine if the interface is on a reasonable path to the destination. During fast switching, the software does not make this check. Instead, if the packet matches, the software blindly forwards the packet to the specified interface.

## Examples

- Configuring Fast Switching and Disabling CEF Switching
- Configuring Fast Switching for Traffic That is Received and Transmitted Over the Same Interface
- Enabling NetFlow Accounting
- Configuring Distributed Switching
- Configuring Fast Switching for PBR

### Configuring Fast Switching and Disabling CEF Switching

The following example shows how to enable fast switching and disable CEF switching:

```
Router(config)# interface ethernet 0/0/0
Router(config-if)# ip route-cache
```

The following example shows that fast switching is enabled:

```
Router# show ip interface fastEthernet 0/0/0
FastEthernet0/0/0 is up, line protocol is up
  Internet address is 10.1.1.254/24
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.10
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP Distributed switching is disabled
  IP Feature Fast switching turbo vector
  IP Null turbo vector
  IP multicast fast switching is enabled
```

The following example shows that CEF switching is disabled:

```
Router# show cef interface fastEthernet 0/0/0
FastEthernet0/0/0 is up (if_number 3)
  Corresponding hwidb fast_if_number 3
  Corresponding hwidb firstsw->if_number 3
  Internet address is 10.1.1.254/24
  ICMP redirects are always sent
  Per packet load-sharing is disabled
  IP unicast RPF check is disabled
  Inbound access list is not set
  Outbound access list is not set
  IP policy routing is disabled
  Hardware idb is FastEthernet0/0/0
  Fast switching type 1, interface type 18
  IP CEF switching disabled
  IP Feature Fast switching turbo vector
  IP Null turbo vector
  Input fast flags 0x0, Output fast flags 0x0
  ifindex 1(1)
  Slot 0 Slot unit 0 VC -1
  Transmit limit accumulator 0x48001A02 (0x48001A02)
  IP MTU 1500
```

The following example shows the configuration information for interface fastethernet 0/0/0

```
Router# show running-config
.
.
!
interface FastEthernet0/0/0
 ip address 10.1.1.254 255.255.255.0
 no ip route-cache cef
 no ip route-cache distributed
!
```

### Configuring Fast Switching for Traffic That is Received and Transmitted Over the Same Interface

The following example shows how to enable fast switching and disable CEF switching:

```
Router(config)# interface ethernet 0/0/0
Router(config-if)# ip route-cache same-interface
```

The following example shows that fast switching on the same interface is enabled for interface fastethernet 0/0/0:

```
Router# show ip interface fastEthernet 0/0/0
FastEthernet0/0/0 is up, line protocol is up
  Internet address is 10.1.1.254/24
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.10
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
```

```
  IP fast switching on the same interface is enabled
  IP Flow switching is disabled
  IP Distributed switching is disabled
  IP Feature Fast switching turbo vector
  IP Null turbo vector
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is disabled
  Network address translation is disabled
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
  BGP Policy Mapping is disabled
  IP multicast multilayer switching is disabled
```

The following example shows the configuration information for interface fastethernet 0/0/0

```
Router# show running-config
.
.
!
interface FastEthernet0/0/0
 ip address 10.1.1.254 255.255.255.0
 ip route-cache same-interface
 no ip route-cache cef
 no ip route-cache distributed
!
```

### Enabling NetFlow Accounting

The following example shows how to enable NetFlow switching:

```
Router(config)# interface ethernet 0/0/0
Router(config-if)# ip route-cache flow
```

The following example shows that NetFlow accounting is enabled for interface fastethernet 0/0/0:

```
Router# show ip interface fastEthernet 0/0/0
FastEthernet0/0/0 is up, line protocol is up
  Internet address is 10.1.1.254/24
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.10
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is enabled
```

```
  IP Distributed switching is disabled
  IP Flow switching turbo vector
  IP Null turbo vector
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast, Flow
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is disabled
  Network address translation is disabled
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
  BGP Policy Mapping is disabled
  IP multicast multilayer switching is disabled
```

### Configuring Distributed Switching

The following example shows how to enable distributed switching:

```
Router(config)# ip cef distributed
Router(config)# interface ethernet 0/0/0
Router(config-if)# ip route-cache distributed
```

The following example shows that distributed CEF switching is for interface fastethernet 0/0/0:

```
Router# show cef interface fastEthernet 0/0/0
FastEthernet0/0/0 is up (if_number 3)
  Corresponding hwidb fast_if_number 3
  Corresponding hwidb firstsw->if_number 3
  Internet address is 10.1.1.254/24
  ICMP redirects are always sent
  Per packet load-sharing is disabled
  IP unicast RPF check is disabled
  Inbound access list is not set
  Outbound access list is not set
  IP policy routing is disabled
  Hardware idb is FastEthernet0/0/0
  Fast switching type 1, interface type 18
  IP Distributed CEF switching enabled
  IP Feature Fast switching turbo vector
  IP Feature CEF switching turbo vector
  Input fast flags 0x0, Output fast flags 0x0
  ifindex 1(1)
  Slot 0 Slot unit 0 VC -1
  Transmit limit accumulator 0x48001A02 (0x48001A02)
  IP MTU 1500
```

### Configuring Fast Switching for PBR

The following example shows how to configure a simple policy based routing scheme and to enable FSPBR:

```
Router(config)# access-list 1 permit 10.1.1.0 0.0.0.255
Router(config)# route-map my_pbr_tag permit 10
Router(config-route-map)# match ip address 1
Router(config-route-map)# set ip next-hop 10.1.1.195
Router(config-route-map)# exit
Router(config)# interface fastethernet 0/0/0
```

```
Router(config-if)# ip route-cache policy
Router(config-if)# ip policy route-map my_pbr_tag
```

The following example shows that FSPBR is enabled for interface fastethernet 0/0/0:

```
Router# show ip interface fastEthernet 0/0/0
FastEthernet0/0/0 is up, line protocol is up
  Internet address is 10.1.1.254/24
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.10
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP CEF switching is enabled
  IP Distributed switching is enabled
  IP Feature Fast switching turbo vector
  IP Feature CEF switching turbo vector
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast, Distributed, Policy, CEF
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is enabled, using route map my_pbr_tag
  Network address translation is disabled
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
  BGP Policy Mapping is disabled
  IP multicast multilayer switching is disabled
```

## Related Commands

| Command | Description |
|---|---|
| **ip cef** | Enables CEF on the RP card. |
| **ip cef distributed** | Enables distributed CEF (dCEF) operation. |
| **show ip interface** | Displays the usability status of interfaces configured for IP. |
| **show cef interface** | Displays detailed Cisco Express Forwarding (CEF) information for interfaces. |

# ip route-cache policy

To enable fast-switch Policy Based Routing (PBR), use the **ip route-cache policy** command in interface configuration mode. To disable fast-switched PBR, use the **no** form of this command.

**[no] ip route-cache policy**

## Syntax Description

This command has no arguments or keywords.

## Defaults

Not enabled.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 12.0 | This command was introduced. |

## Usage Guidelines

1. If Cisco Express Forwarding (CEF) is already enabled, the present command isn't needed, because PBR packets are CEF switched by default.
2. Before you can enable fast-switch PBR, PBR itself must be configured.
3. FSPBR supports all of PBR's **match** commands and most of PBR's **set** commands, with the following restrictions:
   - The **set ip default next-hop** and **set default interface** commands are not supported.
   - The **set interface** command is supported only over point-to-point links, unless a route cache entry exists using the same interface specified in the **set interface** command in the route map. Also, at the process level, the routing table is consulted to determine if the interface is on a reasonable path to the destination. During fast switching, the software does not make this check. Instead, if the packet matches, the software blindly forwards the packet to the specified interface.

## Examples

The following example enables fast-switch Policy Based Routing on an Ethernet interface:

```
Router# config t
   Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# int e 1/3
Router(config-if)# ip route-cache policy
Router(config-if)# end
```

## Related Commands

| Command | Description |
|---|---|
| **show ip cache policy** | Displays cache entries in the policy route-cache. |

# ip route vrf

To establish static routes for a VPN routing and forwarding (VRF) instance, use the **ip route vrf** command in global configuration mode. To disable static routes, use the **no** form of this command.

**ip route vrf** *vrf-name prefix mask* [*next-hop-address*] [*interface* {*interface-number*}] [**global**] [*distance*] [**permanent**] [**tag** *tag*]

**no ip route vrf** *vrf-name prefix mask* [*next-hop-address*] [*interface* {*interface-number*}] [**global**] [*distance*] [**permanent**] [**tag** *tag*]

## Syntax Description

| | |
|---|---|
| *vrf-name* | Name of the VPN routing/forwarding instance (VRF) for the static route. |
| *prefix* | IP route prefix for the destination, in dotted-decimal format. |
| *mask* | Prefix mask for the destination, in dotted-decimal format. |
| *next-hop-address* | (Optional) IP address of the next hop (the forwarding router that can be used to reach that network). |
| *interface* | (Optional) Type of network interface to use: ATM, Ethernet, loopback, POS (packet over SONET), or null. |
| *interface-number* | (Optional) Number identifying the network interface to use. |
| **global** | (Optional) Specifies that the given next hop address is in the non-VRF routing table. |
| *distance* | (Optional) An administrative distance for this route. |
| **permanent** | (Optional) Specifies that this route will not be removed, even if the interface shuts down. |
| **tag** *tag* | (Optional) Label (tag) value that can be used for controlling redistribution of routes through route maps. |

## Defaults

No default behavior or values.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |

## Usage Guidelines

Use a static route when the Cisco IOS software cannot dynamically build a route to the destination.

If you specify an administrative distance when you set up a route, you are flagging a static route that can be overridden by dynamic information. For example, IGRP-derived routes have a default administrative distance of 100. To set a static route to be overridden by an IGRP dynamic route, specify an administrative distance greater than 100. Static routes each have a default administrative distance of 1.

Static routes that point to an interface are advertised through RIP, IGRP, and other dynamic routing protocols, regardless of whether the routes are redistributed into those routing protocols. That is, static routes configured by specifying an interface lose their static nature when installed into the routing table.

However, if you define a static route to an interface not defined in a network command, no dynamic routing protocols advertise the route unless a redistribute static command is specified for these protocols.

## Examples

The following command reroutes packets addressed to network 137.23.0.0 in VRF vpn3 to router 131.108.6.6:

```
ip route vrf vpn3 137.23.0.0 255.255.0.0 131.108.6.6
```

## Related Commands

| Command | Description |
|---|---|
| **show ip route vrf** | Displays the IP routing table associated with a VRF. |

# ip vrf forwarding

To associate a VPN routing and forwarding (VRF) instance with an interface or subinterface, use the **ip vrf forwarding** command in global configuration mode or interface configuration mode. To disassociate a VRF, use the **no** form of this command.

**ip vrf forwarding** *vrf-name*

**no ip vrf forwarding** *vrf-name*

## Syntax Description

| | |
|---|---|
| *vrf-name* | Name assigned to a VRF. |

## Defaults

The default for an interface is the global routing table.

## Command Modes

Global configuration

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |

## Usage Guidelines

Use this command to associate an interface with a VRF. Executing this command on an interface removes the IP address. The IP address should be reconfigured.

## Examples

The following example shows how to link a VRF to ATM interface 0/0:

```
interface atm0/0
ip vrf forwarding vpn1
```

## Related Commands

| Command | Description |
|---|---|
| **ip vrf** | Configures a VRF routing table. |
| **ip route vrf** | Establishes static routes for a VRF. |

# ip vrf

To configure a VPN routing and forwarding (VRF) routing table, use the **ip vrf** command in global configuration mode or router configuration mode. To remove a VRF routing table, use the **no** form of this command.

**ip vrf** *vrf-name*

**no ip vrf** *vrf-name*

## Syntax Description

| | |
|---|---|
| *vrf-name* | Name assigned to a VRF. |

## Defaults

No VRFs are defined. No import or export lists are associated with a VRF. No route maps are associated with a VRF.

## Command Modes

Global configuration

Router configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |

## Usage Guidelines

The **ip vrf** *vrf-name* command creates a VRF routing table and a Cisco Express Forwarding (CEF) table, both named *vrf-name*. Associated with these tables is the default route distinguisher value *route-distinguisher*.

## Examples

The following example imports a route map to a VRF:

```
ip vrf vpn1
rd 100:2
 route-target both 100:2
 route-target import 100:1
```

## Related Commands

| Command | Description |
|---|---|
| **ip vrf forwarding** | Associates a VRF with an interface or subinterface. |

# keepalive-lifetime

To specify the duration that a keepalive message from an MPS is considered valid by the MPC, use the **keepalive-lifetime** command in global configuration mode.

**keepalive-lifetime** *time*

## Syntax Description

| | |
|---|---|
| *time* | Time (in seconds) for the MPS-p2 variable of the MPS. The default value is 35 seconds. |

## Defaults

The default is 35 seconds.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(3)T | This command was introduced. |

## Usage Guidelines

The keepalive lifetime (MPS-p2) must be greater than or equal to three times the value of the keepalive time (MPS-p1). MPS-p1 specifies the frequency with which a keepalive message is sent from the MPS to the MPC.

## Examples

The following example specifies a keepalive lifetime of 60 seconds:

```
keepalive-lifetime 60
```

## Related Commands

| Command | Description |
|---|---|
| **keepalive-time** | Specifies the keepalive time value for the MPS-p1 variable of an MPS. |

# keepalive-time

To specify the keepalive time value for the MPS-p1variable of an MPS, use the **keepalive-time** command in MPS configuration mode. To revert to the default value, use the **no** form of this command.

**keepalive-time** *time*

**no keepalive-time** *time*

## Syntax Description

| | |
|---|---|
| *time* | Specifies the keepalive time value (in seconds). |

## Defaults

The default keepalive time is 10 seconds.

## Command Modes

MPS configuration

## Command History

| Release | Modification |
|---|---|
| 11.3(3a)WA4(5) | This command was introduced. |

## Examples

The following example sets the keepalive time to 25 seconds:

```
keepalive-time 25
```

# lane auto-config-atm-address

To specify that the configuration server ATM address is computed by the Cisco automatic method, use the **lane auto-config-atm-address** command in interface configuration mode. To remove the previously assigned ATM address, use the **no** form of this command.

**lane** [**config**] **auto-config-atm-address**

**no lane** [**config**] **auto-config-atm-address**

## Syntax Description

| | |
|---|---|
| **config** | (Optional) When the **config** keyword is used, this command applies only to the LAN Emulation Configuration Server (LECS). This keyword indicates that the LECS should use the auto computed LECS address. |

## Defaults

No specific ATM address is set.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

When the **config** keyword is not present, this command causes the LANE server and LANE client on the subinterface to use the automatically assigned ATM address for the configuration server.

When the **config** keyword is present, this command assigns the automatically generated ATM address to the configuration server (LECS) configured on the interface. Multiple commands that assign ATM addresses to the LANE configuration server can be issued on the same interface to assign different ATM addresses to the configuration server. Commands that assign ATM addresses to the LANE configuration server include **lane auto-config-atm-address**, **lane config-atm-address**, and **lane fixed-config-atm-address**.

For a discussion of Cisco's method of automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter in the *Cisco IOS Switching Services Configuration Guide.*

## Examples

The following example associates the LANE configuration server with the database named network1 and specifies that the configuration server's ATM address will be assigned by the Cisco automatic method:

```
lane database network1
 name eng server-atm-address 39.020304050607080910111213.0800.AA00.1001.02
 name mkt server-atm-address 39.020304050607080910111213.0800.AA00.4001.01
interface atm 1/0
 lane config database network1
 lane config auto-config-atm-address
```

The following example causes the LANE server and LANE client on the subinterface to use the automatically assigned ATM address to communicate with the configuration server:

```
interface atm 2/0.1
 ip address 172.16.0.4 255.255.255.0
 lane client ethernet
 lane server-bus ethernet eng
 lane auto-config-atm-address
```

## Related Commands

| Command | Description |
|---|---|
| **lane config-atm-address** | Specifies the ATM address of the configuration server explicitly. |
| **lane database** | Creates a named configuration database that can be associated with a configuration server. |
| **lane fixed-config-atm-address** | Specifies that the fixed configuration server ATM address assigned by the ATM Forum will be used. |

# lane bus-atm-address

To specify an ATM address—and thus override the automatic ATM address assignment—for the broadcast and unknown server on the specified subinterface, use the **lane bus-atm-address** command in interface configuration mode. To remove the ATM address previously specified for the broadcast and unknown server on the specified subinterface and thus revert to the automatic address assignment, use the **no** form of this command.

**lane bus-atm-address** *atm-address-template*

**no lane bus-atm-address** [*atm-address-template*]

## Syntax Description

| | |
|---|---|
| *atm-address-template* | ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, the end-system identifier (ESI) bytes, or the selector byte of the automatically assigned ATM address. |

## Defaults

For the broadcast and unknown server, the default is automatic ATM address assignment.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

When applied to a broadcast and unknown server, this command overrides automatic ATM address assignment for the broadcast and unknown server. When applied to a LANE client, this command gives the client the ATM address of the broadcast and unknown server. The client will use this address rather than sending LE ARP requests for the broadcast address.

When applied to a selected interface, but with a different ATM address from what was used previously, this command replaces the broadcast and unknown server's ATM address.

### ATM Addresses

A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address). It consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum:
  - AFI (Authority and Format Identifier) field (1 byte)
  - DCC (Data Country Code) or ICD (International Code Designator) field (2 bytes)
  - DFI field (Domain Specific Part Format Identifier) (1 byte)
  - Administrative Authority field (3 bytes)
  - Reserved field (2 bytes)

  - Routing Domain field (2 bytes)
  - Area field (2 bytes)
- A 6-byte ESI
- A 1-byte selector field

#### Address Templates

LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

The values of the digits that are replaced by wildcards come from the automatic ATM assignment method.

In LANE, a *prefix template* explicitly matches the prefix but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field but uses wildcards for the prefix and selector.

The Cisco implementation of LANE, the prefix corresponds to the switch, the ESI corresponds to the ATM interface, and the selector field corresponds to the specific subinterface of the interface.

## Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining values in the ATM address come from automatic assignment:

```
lane bus-atm-address ...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch; the remaining values in the ATM address come from automatic assignment:

```
lane bus-atm-address 45.000014155551212f.00.00...
```

## Related Commands

| Command | Description |
|---|---|
| **lane server-bus** | Enables a LANE server and a broadcast and unknown server on the specified subinterface with the ELAN ID. |

# lane client

To activate a LANE client on the specified subinterface, use the **lane client** command in interface configuration mode. To remove a previously activated LANE client on the subinterface, use the **no** form of this command.

**lane client** {**ethernet** | **tokenring**} [*elan-name*]

**no lane client** [{**ethernet** | **tokenring**} [*elan-name*]]

## Syntax Description

| | |
|---|---|
| **ethernet** | Identifies the emulated LAN (ELAN) attached to this subinterface as an Ethernet ELAN. |
| **tokenring** | Identifies the ELAN attached to this subinterface as a Token Ring ELAN. |
| *elan-name* | (Optional) Name of the ELAN. This argument is optional because the client obtains its ELAN name from the configuration server. The maximum length of the name is 32 characters. |

## Defaults

No LANE clients are enabled on the interface.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

If a **lane client** command has already been used on the subinterface for a different ELAN, then the client initiates termination procedures for that emulated LAN and joins the new ELAN.

If you do not provide an *elan-name* value, the client contacts the server to find which emulated LAN to join. If you do provide an ELAN name, the client consults the configuration server to ensure that no conflicting bindings exist.

## Examples

The following example enables a Token Ring LANE client on an interface:

```
lane client tokenring
```

## Related Commands

| Command | Description |
|---|---|
| **lane client-atm-address** | Specifies an ATM address—and thus overrides the automatic ATM address assignment—for the LANE client on the specified subinterface. |

# lane client-atm-address

To specify an ATM address—and thus override the automatic ATM address assignment—for the LANE client on the specified subinterface, use the **lane client-atm-address** command in interface configuration mode. To remove the ATM address previously specified for the LANE client on the specified subinterface and thus revert to the automatic address assignment, use the **no** form of this command.

**lane client-atm-address** *atm-address-template*

**no lane client-atm-address** [*atm-address-template*]

## Syntax Description

| | |
|---|---|
| *atm-address-template* | ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, the ESI bytes, or the selector byte of the automatically assigned ATM address. |

## Defaults

Automatic ATM address assignment

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

Use of this command on a selected subinterface, but with a different ATM address from what was used previously, replaces ATM address of the LANE client.

### ATM Addresses

A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address). It consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum:
  - AFI (Authority and Format Identifier) field (1 byte)
  - DCC (Data Country Code) or ICD (International Code Designator) field (2 bytes)
  - DFI field (Domain Specific Part Format Identifier) (1 byte)
  - Administrative Authority field (3 bytes)
  - Reserved field (2 bytes)
  - Routing Domain field (2 bytes)
  - Area field (2 bytes)
- A 6-byte ESI
- A 1-byte selector field

### Address Templates

LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the ATM address prefix but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field but uses wildcards for the prefix and selector.

The Cisco implementation of LANE, the prefix corresponds to the switch, the ESI corresponds to the ATM interface, and the selector field corresponds to the specific subinterface of the interface.

For a discussion of Cisco's method of automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter in the *Cisco IOS Switching Services Configuration Guide*.

## Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining parts of the ATM address come from automatic assignment:

```
lane client-atm-address...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch; the remaining parts of the ATM address come from automatic assignment:

```
lane client-atm-address 47.000014155551212f.00.00...
```

## Related Commands

| Command | Description |
|---|---|
| **lane client** | Activates a LANE client on the specified subinterface. |

# lane client flush

To enable the flush mechanism of a LAN Emulation Client (LEC), use the **lane client flush** global configuration command. To disable the flush mechanism of a LEC, use the **no** form of this command.

**lane client flush**

**no lane client flush**

## Syntax Description

This command contains no arguments or keywords.

## Defaults

All the LECs perform the LANE LE_FLUSH process by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(2)T | This command was introduced. |

## Usage Guidelines

In Cisco IOS Release 12.1(3)T and later releases, the **lane client flush** command will be hidden and will not be visible in the configuration.

Configuring the **no lane client flush** command on a Cisco networking device is recommended to prevent the initial packet drops during the establishment of LANE data direct virtual connection (VCC).

Use the **no lane client flush** command to keep LANE clients from sending LE_FLUSH messages to the remote LANE client. This will also allow the LANE clients to process the LE_FLUSH messages *from* the remote LANE clients.

**Note** Configuring the **no lane client flush** command on a Cisco networking device does not guarantee the orderly delivery of incoming packets. There is a chance of receiving out-of-order packets at the destination during the establishment of a LANE data direct VCC.

## Examples

The following example disables the flush mechanism of a LEC:

```
no lane client flush
```

## Related Commands

| Command | Description |
|---|---|
| **lane client** | Activates a LANE client on the specified subinterface. |
| **lane client-atm-address** | Specifies an ATM address—and thus overrides the automatic ATM address assignment—for the LANE client on the specified subinterface. |

# lane client mpoa client name

To bind a LEC to the named MPC, use the **lane client mpoa client name** command in interface configuration mode. To unbind the named MPC from a LEC, use the **no** form of this command.

**lane client mpoa client name** *mpc-name*

**no lane client mpoa client name** *mpc-name*

## Syntax Description

| | |
|---|---|
| *mpc-name* | Name of the specific MPC. |

## Defaults

No LEC is bound to a named MPC.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.3(3a)WA4(5) | This command was introduced. |

## Usage Guidelines

When you enter this command, the named MPC is bound to a LEC. The named MPC must exist before this command is accepted. If you enter this command before a LEC is configured (not necessarily running), a warning message is issued.

## Examples

The following example binds a LEC on a subinterface to the MPC:

```
lane client mpoa client name ip_mpc
```

# lane client mpoa server name

To bind a LEC with the named MPS, use the **lane client mpoa server name** command in interface configuration mode. To unbind the server, use the **no** form of this command.

**lane client mpoa server name** *mps-name*

**no lane client mpoa server name** *mps-name*

**Syntax Description**

| | |
|---|---|
| *mps-name* | Name of the specific MPOA server. |

**Defaults**

No LEC is bound to a named MPS.

**Command Modes**

Interface configuration

**Command History**

| Release | Modification |
|---|---|
| 11.3(3a)WA4(5) | This command was introduced. |

**Usage Guidelines**

This command binds a LEC to the named MPS. The specified MPS must exist before this command is accepted. If this command is entered when a LEC is not already configured (not necessarily running), a warning message will be issued.

**Examples**

The following example binds a LANE client with the MPS named MYMPS:

```
lane client mpoa server name MYMPS
```

# lane config-atm-address

To specify a configuration server's ATM address explicitly, use the **lane config-atm-address** command in interface configuration mode. To remove an assigned ATM address, use the **no** form of this command.

**lane** [**config**] **config-atm-address** *atm-address-template*

**no lane** [**config**] **config-atm-address** *atm-address-template*

## Syntax Description

| | |
|---|---|
| **config** | (Optional) When the **config** keyword is used, this command applies only to the LANE Configuration Server (LECS). This keyword indicates that the LECS should use the 20-byte address that you explicitly entered. |
| *atm-address-template* | ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, the ESI bytes, or the selector byte of the automatically assigned ATM address. |

## Defaults

No specific ATM address or method is set.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

If the **config** keyword is not present, this command causes the LANE server and LANE client on the subinterface to use the specified ATM address for the configuration server.

When the **config** keyword is present, this command adds an ATM address to the configuration server configured on the interface. A LECS can listen on multiple ATM addresses. Multiple commands that assign ATM addresses to the LECS can be issued on the same interface to assign different ATM addresses to the LECS.

### ATM Addresses

A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address). It consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum:
  - AFI (Authority and Format Identifier) field (1 byte)
  - DCC (Data Country Code) or ICD (International Code Designator) field (2 bytes)
  - DFI field (Domain Specific Part Format Identifier) (1 byte)
  - Administrative Authority field (3 bytes)
  - Reserved field (2 bytes)

  - Routing Domain field (2 bytes)
  - Area field (2 bytes)
- A 6-byte ESI
- A 1-byte selector field

#### Address Templates

LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the ATM address prefix but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field but uses wildcards for the prefix and selector.

In our implementation of LANE, the prefix corresponds to the switch prefix, the ESI corresponds to a function of the ATM interface's MAC address, and the selector field corresponds to the specific subinterface of the interface.

For a discussion of the Cisco method of automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter in the *Cisco IOS Switching Services Configuration Guide*.

## Examples

The following example associates the LANE configuration server with the database named network1 and explicitly specifies the configuration server's ATM address:

```
lane database network1
 name eng server-atm-address 39.020304050607080910111213.0800.AA00.1001.02
 name mkt server-atm-address 39.020304050607080910111213.0800.AA00.4001.01
interface atm 1/0
 lane config database network1
 lane config config-atm-address 39.020304050607080910111213.0800.AA00.3000.00
```

The following example causes the LANE server and LANE client on the subinterface to use the explicitly specified ATM address to communicate with the configuration server:

```
interface atm 2/0.1
 ip address 172.16.0.4 255.255.255.0
 lane client ethernet
 lane server-bus ethernet eng
 lane config-atm-address 39.020304050607080910111213.0800.AA00.3000.00
```

## Related Commands

| Command | Description |
|---|---|
| **lane auto-config-atm-address** | Specifies that the configuration server ATM address is computed by the Cisco automatic method. |
| **lane config database** | Associates a named configuration table (database) with the configuration server on the selected ATM interface. |
| **lane database** | Creates a named configuration database that can be associated with a configuration server. |
| **lane fixed-config-atm-address** | Specifies that the fixed configuration server ATM address assigned by the ATM Forum will be used. |

# lane config database

To associate a named configuration table (database) with the configuration server on the selected ATM interface, use the **lane config database** command in interface configuration mode. To remove the association between a named database and the configuration server on the specified interface, use the **no** form of this command.

**lane config database** *database-name*

**no lane config database**

## Syntax Description

| | |
|---|---|
| *database-name* | Name of the LANE database. |

## Defaults

No configuration server is defined, and no database name is provided.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

This command is valid only on a major interface, not a subinterface, because only one LANE Configuration Server (LECS) can exist per interface.

The named database must exist before the **lane config database** command is used. Refer to the **lane database** command for more information.

Multiple **lane config database** commands cannot be used multiple times on the same interface. You must delete an existing association by using the **no** form of this command before you can create a new association on the specified interface.

Activating a LANE configuration server requires the **lane config database** command and one of the following commands: **lane fixed-config-atm-address**, **lane auto-config-atm-address**, or **lane config-atm-address**.

## Examples

The following example associates the LECS with the database named network1 and specifies that the configuration server's ATM address will be assigned by the Cisco automatic method:

```
lane database network1
 name eng server-atm-address 39.020304050607080910111213.0800.AA00.1001.02
 name mkt server-atm-address 39.020304050607080910111213.0800.AA00.4001.01
interface atm 1/0
 lane config database network1
 lane config auto-config-atm-address
```

**Related Commands**

| Command | Description |
|---|---|
| **lane auto-config-atm-address** | Specifies that the configuration server ATM address is computed by the Cisco automatic method. |
| **lane config-atm-address** | Specifies the ATM address of the configuration server explicitly. |
| **lane database** | Creates a named configuration database that can be associated with a configuration server. |
| **lane fixed-config-atm-address** | Specifies that the fixed configuration server ATM address assigned by the ATM Forum will be used. |

# lane database

To create a named configuration database that can be associated with a configuration server, use the **lane database** command in global configuration mode. To delete the database, use the **no** form of this command.

**lane database** *database-name*

**no lane database** *database-name*

## Syntax Description

| | |
|---|---|
| *database-name* | Database name (32 characters maximum). |

## Defaults

No name is provided.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

Use of the **lane database** command places you in database configuration mode, in which you can use the **client-atm-address name, default name, mac-address name, name restricted, name unrestricted, name new-name,** and **name server-atm-address** commands to create entries in the specified database. When you are finished creating entries, type **^Z** or **exit** to return to global configuration mode.

## Examples

The following example creates the database named network1 and associates it with the configuration server on interface ATM 1/0:

```
lane database network1
 name eng server-atm-address 39.020304050607080910111213.0800.AA00.1001.02
 name mkt server-atm-address 39.020304050607080910111213.0800.AA00.4001.01
 default-name eng
interface atm 1/0
 lane config database network1
 lane config auto-config-atm-address
```

## Related Commands

| Command | Description |
|---|---|
| **client-atm-address name** | Adds a LANE client address entry to the configuration database of the configuration server. |
| **default-name** | Provides an ELAN name in the database of the configuration server for those client MAC addresses and client ATM addresses that do not have explicit ELAN name bindings. |

| Command | Description |
|---|---|
| **lane config database** | Associates a named configuration table (database) with the configuration server on the selected ATM interface. |
| **mac-address** | Sets the MAC-layer address of the Cisco Token Ring. |
| **name** | Assigns a name to the internal adapter. |
| **name server-atm-address** | Specifies or replaces the ATM address of the LANE server for the ELAN in the configuration database of the configuration server. |

# lane fixed-config-atm-address

To specify that the fixed configuration server ATM address assigned by the ATM Forum will be used, use the **lane fixed-config-atm-address** command in interface configuration mode. To specify that the fixed ATM address will not be used, use the **no** form of this command.

**lane** [**config**] **fixed-config-atm-address**

**no lane** [**config**] **fixed-config-atm-address**

## Syntax Description

| | |
|---|---|
| **config** | (Optional) When the **config** keyword is used, this command applies only to the LANE Configuration Server (LECS). This keyword indicates that LECS should use the well-known, ATM Forum LEC address. |

## Defaults

No specific ATM address or method is set.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 11.0 | This command was introduced. |

## Usage Guidelines

When the **config** keyword is not present, this command causes the LANE server and LANE client on the subinterface to use that ATM address, rather than the ATM address provided by the ILMI, to locate the configuration server.

When the **config** keyword is present, and the LECS is already up and running, be aware of the following scenarios:

- If you configure the LECS with only the well-known address, the LECS will not participate in the SSRP, will act as a standalone master, and will listen only on the well-known LECS address. This scenario is ideal if you want a standalone LECS that does not participate in SSRP, and you would like to listen to only the well-known address.
- If only the well-known address is already assigned, and you assign at least one other address to the LECS (additional addresses are assigned using the **lane auto-config-atm-address** command or the **lane config-atm-address** command), the LECS will participate in the SSRP and act as the master or slave based on the normal SSRP rules. This scenario is ideal if you would like the LECS to participate in SSRP, and you would like to make the master LECS listen on the well-known address.
- If the LECS is participating in SSRP, has more than one address (one of which is the well-known address), and all the addresses but the well-known address are removed, the LECS will declare itself the master and stop participating in SSRP completely.
- If the LECS is operating as an SSRP slave, and it has the well-known address configured, it will not listen on the well-known address unless it becomes the master.
- If you want the LECS to assume the well-known address only when it becomes the master, configure the LECS with the well-known address and at least one other address.

When you use this command with the **config** keyword, and the LECS is a master, the master will listen on the fixed address. If you use this command when an LECS is not a master, the LECS will listen on this address when it becomes a master. If you do not use this command, the LECS will not listen on the fixed address.

Multiple commands that assign ATM addresses to the LECS can be issued on the same interface in order to assign different ATM addresses to the LECS. Commands that assign ATM addresses to the LECS include **lane auto-config-atm-address, lane config-atm-address**, and **lane fixed-config-atm-address**. The **lane config database** command and at least one command that assigns an ATM address to the LECS are required to activate a LECS.

## Examples

The following example associates the LECS with the database named network1 and specifies that the configuration server's ATM address is the fixed address:

```
lane database network1
 name eng server-atm-address 39.020304050607080910111213.0800.AA00.1001.02
 name mkt server-atm-address 39.020304050607080910111213.0800.AA00.4001.01
interface atm 1/0
 lane config database network1
 lane config fixed-config-atm-address
```

The following example causes the LANE server and LANE client on the subinterface to use the fixed ATM address to communicate with the configuration server:

```
interface atm 2/0.1
 ip address 172.16.0.4 255.255.255.0
 lane client ethernet
 lane server-bus ethernet eng
 lane fixed-config-atm-address
```

## Related Commands

| Command | Description |
|---|---|
| **lane auto-config-atm-address** | Specifies that the configuration server ATM address is computed by the Cisco automatic method. |
| **lane config-atm-address** | Specifies the ATM address of the configuration server explicitly. |
| **lane config database** | Associates a named configuration table (database) with the configuration server on the selected ATM interface. |

# lane fssrp

To enable the special LANE features such that LANE components (such as the LANE Configuration Server, the LANE client, the LANE server, and the BUS) become aware of FSSRP, use the **lane fssrp** command in interface configuration mode. To disable the LANE FSSRP configuration, use the **no** form of this command.

**lane fssrp**

**no lane fssrp**

## Syntax Description

This command contains no keywords or arguments.

## Defaults

FSSRP is not enabled by default.

## Command Modes

Interface configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(4c)W5(10a) | This command was introduced. |

## Usage Guidelines

You must execute this command on all ATM interfaces to enable FSSRP capability for all LANE components on that interface and hence all its subinterfaces.

## Examples

The following example enables FSSRP on an ATM interface:

```
lane fssrp
```

## Related Commands

| Command | Description |
|---|---|
| **lane client** | Activates a LANE client on the specified subinterface. |
| **lane server** | Activates a LANE server on the specified subinterface. |
| **show lane client** | Generates additional FSSRP information about a LANE client. |
| **show lane config** | Displays global LANE information for the configuration server configured on an interface. |