



## **Cisco IOS IP Switching Command Reference**

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## cef table consistency-check through clear pxf

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## cef table consistency-check

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

**cef table consistency-check** {ipv4|ipv6} [type {lc-detect|scan-lc-rp|scan-rp-lc|scan-rib-ios|scan-ios-rib} [count *count-number* [period *seconds*]] period *seconds*] error-message|auto-repair [delay *seconds* [holddown *seconds*]] holddown *seconds*] data-checking]

**no cef table consistency-check** {ipv4|ipv6} [type {lc-detect|scan-lc-rp|scan-rp-lc|scan-rib-ios|scan-ios-rib} [count *count-number* [period *seconds*]] period *seconds*] error-message|auto-repair|data-checking]

### Syntax Description

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ipv4</b>      | Checks IPv4 addresses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>ipv6</b>      | Checks IPv6 addresses.<br><br><b>Note</b> On the Cisco 10000 series routers, IPv6 is supported on Cisco IOS Release 12.2(28)SB and later releases.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>type</b>      | (Optional) Specifies the type of consistency check to enable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>lc-detect</b> | (Optional) (Distributed platforms such as the Cisco 7500 series only) Detects missing prefixes on the line card. The information is confirmed by the Route Switch Processor (RSP).<br><br>This consistency checker operates on the line card by retrieving IP prefixes that are missing from its Forwarding Information Base (FIB) table. If IP prefixes are missing, the line card cannot forward packets for these addresses. This consistency checker then sends IP prefixes to the RSP for confirmation. If the RSP detects that it has the relevant entry, an inconsistency is detected, and an error message is displayed. Finally, the RSP sends a signal back to the line card confirming that the IP prefix is an inconsistency. |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>scan-lc-rp</b>                | <p>(Optional) (Distributed platforms only) Performs a passive scan check of tables on the line card.</p> <p>This consistency checker operates on the line card by examining the FIB table for a configurable time period and sending the next <i>x</i> prefixes to the RSP. The RSP does an exact lookup, and if it finds the prefix missing, it reports an inconsistency. Finally, the RSP sends a signal back to the line card for confirmation.</p> |
| <b>scan-rp-lc</b>                | <p>(Optional) Operates on the RSP (opposite of the <b>scan-lc-rp</b> consistency checker) by examining the FIB table for a configurable time period and sending the next <i>x</i> prefixes to the line card.</p> <p>The line card does an exact lookup. If it finds the prefix missing, the line card reports an inconsistency and signals the RSP for confirmation.</p>                                                                               |
| <b>scan-rib-ios</b>              | (Optional) Compares the Routing Information Base (RIB) to the FIB table and provides the number of entries missing from the FIB table.                                                                                                                                                                                                                                                                                                                 |
| <b>scan-ios-rib</b>              | (Optional) Compares the FIB table to the RIB and provides the number of entries missing from the RIB.                                                                                                                                                                                                                                                                                                                                                  |
| <b>count</b> <i>count-number</i> | (Optional) Specifies the maximum number of prefixes to check per scan. The range is from 2 to 10000. The default count number is 1000 prefixes per scan for the <b>scan-rib-ios</b> and <b>scan-ios-rib</b> keywords. The default count number is 0 for the <b>lc-detect</b> , <b>scan-lc-rp</b> , and <b>scan-rp-lc</b> keywords.                                                                                                                     |
| <b>period</b> <i>seconds</i>     | (Optional) Period between scans. Valid values are from 30 to 3600 seconds. The default is 60 seconds.                                                                                                                                                                                                                                                                                                                                                  |
| <b>error-message</b>             | (Optional) Enables the consistency checker to generate an error message when it detects an inconsistency. By default, this function is disabled.                                                                                                                                                                                                                                                                                                       |
| <b>auto-repair</b>               | (Optional) Enables the auto repair function. By default, this function is enabled. You can enter the <b>no</b> form of the command to disable auto repair or enter the default form of the command to return the auto repair settings to a 10-second delay and 300-second holddown.                                                                                                                                                                    |
| <b>delay</b> <i>seconds</i>      | (Optional) Specifies how long the consistency checker waits to fix an inconsistency. The range is 10 to 300 seconds. The default delay is 10 seconds.                                                                                                                                                                                                                                                                                                  |

|                                |                                                                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>holddown</b> <i>seconds</i> | (Optional) Specifies how long the consistency checker waits to reenable auto repair after auto repair runs. The range is from 300 to 3000 seconds. The default delay is 300 seconds. |
| <b>data-checking</b>           | (Optional) Enables the consistency checker data-checking utility. By default, this function is disabled.                                                                             |

**Command Default** All consistency checkers are disabled.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b>           | <b>Modification</b>                                                                                                                 |
|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(25)S                | This command was introduced. This command replaces the <b>ip cef table consistency-check</b> command.                               |
|                        | 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                      |
|                        | 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                     |
|                        | 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                     |
|                        | 12.4(20)T                | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                       |
|                        | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Router. |

**Examples** The following example enables the Cisco Express Forwarding consistency checker to check IPv4 addresses:

```
Router(config)# cef table consistency-check ipv4
```

The following example enables the Cisco Express Forwarding consistency checker to check IPv4 addresses and specifies the scan-rp-lc checker to run every 60 seconds for 5000 prefixes:

```
Router(config)# cef table consistency-check ipv4 type scan-rp-lc count 5000 period 60
```

The following example enables the Cisco Express Forwarding consistency checker to check IPv4 addresses and display an error message when it finds an inconsistency:

```
Router(config)# cef table consistency-check ipv4 error-message
```

**Related Commands**

| Command                                 | Description                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>clear cef table</b>                  | Clears the Cisco Express Forwarding tables.                                                                                      |
| <b>clear ip cef inconsistency</b>       | Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers. |
| <b>debug cef</b>                        | Enables the display of information about Cisco Express Forwarding events.                                                        |
| <b>debug ip cef table</b>               | Enables the collection of events that affect entries in the Cisco Express Forwarding tables.                                     |
| <b>show cef table consistency-check</b> | Displays Cisco Express Forwarding consistency checker table values.                                                              |
| <b>show ip cef inconsistency</b>        | Displays Cisco Express Forwarding IP prefix inconsistencies.                                                                     |

## cef table download

To set download characteristics for prefixes or routes in the Cisco Express Forwarding table, use the **cef table download** command in global configuration mode. To return to the default download characteristics, use the **no** form of this command.

**cef table download** {**catch-all**|**connected-route**|**default-route**|**receive-route**|**recursive-dependents**|**route-in-vrf**} **priority** *priority-number*

**no cef table download** {**catch-all**|**connected-route**|**default-route**|**receive-route**|**recursive-dependents**|**route-in-vrf**} **priority** *priority-number*

### Syntax Description

|                             |                                                                                                                                                                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>catch-all</b>            | Any route not matched, which include Internet routes. The default priority is 4.                                                                                                                                                         |
| <b>connected-route</b>      | Route directly connected to the router. The default priority is 2.                                                                                                                                                                       |
| <b>default-route</b>        | Default route, 0.0.0.0/0 or ::/0. The default priority is 1.                                                                                                                                                                             |
| <b>receive-route</b>        | Receive route, local address on router. The default priority is 2.                                                                                                                                                                       |
| <b>recursive-dependents</b> | Route with recursive dependents, matches next-hop of other recursive routes. The default priority is 1.                                                                                                                                  |
| <b>route-in-vrf</b>         | Route in a Virtual Private Network (VPN) routing and forwarding (VRF) table. The default priority is 3.                                                                                                                                  |
| <b>priority</b>             | Sets the table download priority.                                                                                                                                                                                                        |
| <i>priority-number</i>      | Select one of the following as the priority number: <ul style="list-style-type: none"> <li>• <b>1</b> --1st priority</li> <li>• <b>2</b> --2nd priority</li> <li>• <b>3</b> --3rd priority</li> <li>• <b>4</b> --4th priority</li> </ul> |

### Command Default

The default download characteristics apply to routes and prefixes downloaded from the Route Processor (RP) to the line cards.

**Command Modes**

Global configuration (config)

**Command History**

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)SRE | This command was introduced. |

**Usage Guidelines**

Use this command to change the priority of how prefixes and routes in the Cisco Express Forwarding table are downloaded from the RP to the line cards.

Default download priorities are set up to improve convergence when topology changes occur in networks of distributed platform, such as the Cisco 7600 series routers and the Cisco Catalyst 6000 series switches.

Prefixes and routes are categorized and downloaded at four different priorities. The table below lists the download priority and the associated prefix or route type.

**Table 1: Download Priorities and Associated Prefix or Route Category**

| Download Priority | Prefix or Route Type                                                                                                                                                                                                                               |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Priority 1 (P1)   | <ul style="list-style-type: none"> <li>• Default routes</li> <li>• Routes with recursive dependents, typically Interior Gateway Protocol (IGP) prefixes that are the next hop of internal Border Gateway Protocol (iBGP) learned routes</li> </ul> |
| Priority 2 (P2)   | <ul style="list-style-type: none"> <li>• Directly connected routes</li> <li>• Receive routes; that is, the host routes for the interface address of the router</li> </ul>                                                                          |
| Priority 3 (P3)   | <ul style="list-style-type: none"> <li>• Any route in a VRF table</li> </ul>                                                                                                                                                                       |
| Priority 4 (P4)   | <ul style="list-style-type: none"> <li>• Any other route</li> </ul>                                                                                                                                                                                |

In a typical network, a small number of IGP prefixes have many iBGP prefixes recursing through them. When an IGP topology change occurs, the key to updating the forwarding of the iBGP prefixes is to update the IGP prefix through which they recurse. If these prefixes with recursing dependents are downloaded before other prefixes, convergence will be faster. Therefore, the default priority for routes with recursive dependents is P1.

Prioritizing the download of directly connected prefixes and their associated local interface address allows for faster and more deterministic failure detection when an interface goes down. In addition, traffic is received

at the local interface addresses as soon as possible, which allows for faster Layer 3 protocol convergence. The default priority for directly connected and receive routes is set at P2.

VRF routes over global table routes or Internet routes have a default priority of P3, and all other routes are prioritized at P4.

The **cef table download** command allows you to override a default priority so you can customize prefix and route downloads from the RP to the line cards. To display the configured download priority, use the **show cef table download priority** command.

## Examples

The following example shows how to change the download priority of the default route from P1 to P2:

```
Router(config)# cef table download default-route priority 2
```

## Related Commands

| Command                                 | Description                                                                   |
|-----------------------------------------|-------------------------------------------------------------------------------|
| <b>show cef table download priority</b> | Displays the configured download priority of Cisco Express Forwarding routes. |



## cef table output-chain build

To configure characteristics for Cisco Express Forwarding table output chain building for the forwarding of packets through the network, use the **cef table output-chain build** command in global configuration mode. To disable Cisco Express Forwarding table output chain-building characteristics, use the **no** form of this command. To restore the general Cisco Express Forwarding table output chain-building characteristics to their default values, use either the **default** form of this command.

### General Characteristics

**cef table output-chain build favor** {convergence-speed| memory-utilization}

**no cef table output-chain build favor**

**default cef table output-chain build favor**

### Individual Overrides

**cef table output-chain build** {indirection [non-recursive-prefix] [recursive-prefix]| inplace-modify [load-sharing] [push-counter]}

**no cef table output-chain build** {indirection [non-recursive-prefix] [recursive-prefix]| inplace-modify [load-sharing] [push-counter]}

**default cef table output-chain build** {indirection [non-recursive-prefix] [recursive-prefix]| inplace-modify [load-sharing] [push-counter]}

### Syntax Description

|                             |                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------|
| <b>convergence-speed</b>    | Configures a faster convergence speed for table output chain building.                      |
| <b>memory-utilization</b>   | Configures less memory use for table output chain building.                                 |
| <b>default</b>              | Removes any table output chain building characteristic.                                     |
| <b>indirection</b>          | Enables insertion of indirection objects for table output chain building.                   |
| <b>non-recursive-prefix</b> | (Optional) Enables insertion of indirection objects for nonrecursive prefixes.              |
| <b>recursive-prefix</b>     | (Optional) Enables insertion of indirection objects for recursive prefixes.                 |
| <b>inplace-modify</b>       | Enables in-place modification of objects in the forwarding chain.                           |
| <b>load-sharing</b>         | (Optional) Enables in-place modification of load-balancing objects in the forwarding chain. |

|                     |                                                                                  |
|---------------------|----------------------------------------------------------------------------------|
| <b>push-counter</b> | (Optional) Enables in-place modification of packet counters in the output chain. |
|---------------------|----------------------------------------------------------------------------------|

**Command Default**

Convergence speed and indirection characteristics are enabled by default for the building of Cisco Express Forwarding table output chains.

**Command Modes**

Global configuration (config)

**Command History**

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SRA | This command was introduced.                                    |
| 12.2(33)SB  | This command was integrated into Cisco IOS Release 12.2(33)SB.  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

**Usage Guidelines****General Characteristics**

Use the **cef table output-chain build favor** command to override the Cisco Express Forwarding table default operational behavior used to build output chains for forwarding of network traffic.

The default behavior for output chain building favors convergence, if this behavior is permitted by the platform. (See your platform documentation for information on the convergence of recursive and nonrecursive prefixes.) Depending on your network requirements and resources, you might choose to do one of the following:

- Use the **convergence-speed** keyword to increase convergence speed, which requires additional system resources, especially additional memory.
- Use the **memory-utilization** keyword to decrease memory use, which decreases convergence speed and uses fewer system resources.

The default is platform-specific and usually sufficient. The default falls between the options provided for your use with this command.

For all **cef table output-chain build** commands, the state is enabled, disabled, or use the system defaults. To remove any configuration you must enter the **default** keyword with the command instead of the **no** keyword. To disable an output chain-building characteristic, enter the **no** keyword.

The output of the **show cef table** command displays the current configuration and operational state of the Cisco Express Forwarding table.

**Individual Overrides**

This command is used for troubleshooting purposes only.

**Note**

Use this command only on the advice of field personnel from Cisco.

The use of the **cef table output-chain build** command with either the **indirection** or **inplace-modify** keyword overrides specific Cisco Express Forwarding table output chain-building behavior. Indirection characteristics are installed by default if the platform supports or permits their use.

The **indirection** keyword enables or disables the insertion of indirection objects for recursive or nonrecursive prefixes or for both recursive and nonrecursive prefixes. Inserting an indirection object into the forwarding chain allows the handling of any aggregate event that affects multiple prefixes by the modification of the indirection object. For example, if a number of recursive prefixes all share the same recursive nexthop, and the route to the recursive nexthop changes, a single update to an indirection object can restore forwarding for those recursive prefixes.

If you configure the **cef table output-chain build indirection** command without a prefix type, recursive and nonrecursive prefixes are explicitly enabled. This command would override any preference configured with the existing **cef table output-chain build favor** command.

The **inplace-modify** keyword enables or disables the ability to modify certain objects in the forwarding chain by modifying the data that an object holds. The alternative is a complete replacement of the object and the relinking of all links to the object.

To return to system default settings for Cisco Express Forwarding table output chain building, use the **default** form of the command.

The output of the **show cef table** command displays the current configuration and operational state of the Cisco Express Forwarding table.

**Examples**

The following example shows how to configure the use of less memory for table output chain building:

```
Router(config)# cef table output-chain build favor memory
```

Use this command if your priority is to save memory and your network does not require a faster convergence speed for table output chain building for forwarding of network traffic.

**Related Commands**

| Command                                   | Description                                                  |
|-------------------------------------------|--------------------------------------------------------------|
| <b>show cef table</b>                     | Displays the configuration and operational state of the FIB. |
| <b>show ip cef switching statistics</b>   | Displays switching statistics in the FIB.                    |
| <b>show ipv6 cef switching statistics</b> | Displays switching statistics in the IPv6 FIB.               |

# cef table rate-monitor-period

To set a time period over which to calculate the rate of route updates from the Routing Information Base (RIB) to the Cisco Express Forwarding Forwarding Information Base (FIB) tables, use the **cef table rate-monitor-period** command in global configuration mode. To return to the default time period, use the **no** form of this command.

**cef table rate-monitor-period** *minutes*  
**no cef table rate-monitor-period** *minutes*

## Syntax Description

|                |                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>minutes</i> | The time period, in minutes, over which to calculate the rate of route updates to Cisco Express Forwarding tables. The range is from 1 to 60. The default is 5. |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

If the command is not configured, the sampling rate is every 5 minutes.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

Use this command to change the sampling rate period over which to monitor route updates from the RIB to the Cisco Express Forwarding IPv4 and IPv6 FIB tables. Changing the sampling period allows you to calculate the rate of route insertion into the FIB at any interval length from 1 minute to 60 minutes.

## Examples

The following example shows how to set the time period to 1 minute over which to calculate the rate of route updates from the RIB to the IPv4 FIB and IPv6 FIB:

```
Router(config)# cef table rate-monitor-period 1
```

**Related Commands**

| Command               | Description                                                                                 |
|-----------------------|---------------------------------------------------------------------------------------------|
| <b>show cef table</b> | Displays the configuration and operational state of the Cisco Express Forwarding FIB table. |

# clear adjacency

To clear the Cisco Express Forwarding adjacency table, use the **clear adjacency** command in privileged EXEC mode.

**clear adjacency**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                     |
|-----------------|-------------|------------------------------------------------------------------------------------------------------------------|
|                 | 11.2GS      | This command was introduced to support the Cisco 12012 Internet router.                                          |
|                 | 11.1CC      | Support was added for multiple platforms.                                                                        |
|                 | 12.2(25)S   | This command was integrated into Cisco IOS Release 12.2(25)S.                                                    |
|                 | 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
|                 | 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
|                 | 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines** Using the **clear adjacency** command repopulates adjacencies from sources. Any remaining stale adjacencies (meaning those that fail to repopulate on request) are then purged. Layer 2 next hop information is reevaluated. Clearing adjacencies cause the adjacency table to repopulate from the Layer 2 to Layer 3 mapping tables. To reevaluate the mappings, clear the source information by using a Cisco IOS command, such as the **clear arp-cache** command.

## For Cisco 7500 Routers

On a distributed system, the adjacency tables that reside on line cards are always synchronized to the adjacency table that resides on the Route/Switch Processor (RSP). Refreshing the adjacencies also refreshes adjacencies on line cards and purges stale entries. (Entering the **clear adjacency** command on a line card has no effect.)

**Examples** The following example clears the adjacency table:

```
Router# clear adjacency
```

**Related Commands**

| Command                       | Description                                                               |
|-------------------------------|---------------------------------------------------------------------------|
| <b>clear arp-cache</b>        | Deletes all dynamic entries from the ARP cache.                           |
| <b>debug adjacency</b>        | Enables the display of information about the adjacency database.          |
| <b>show adjacency</b>         | Displays Cisco Express Forwarding adjacency table information.            |
| <b>show mls cef adjacency</b> | Displays information about the hardware Layer 3 switching adjacency node. |

# clear adjacency epoch



**Note** The **clear adjacency epoch** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To begin a new epoch and increment the epoch number of the Cisco Express Forwarding adjacency table, use the **clear adjacency epoch** command in privileged EXEC mode.

**clear adjacency epoch**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                        |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(8)T    | This command was introduced.                                                                                        |
|                 | 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
|                 | 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.  |
|                 | 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
|                 | 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2S releases.  |
|                 | 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

**Usage Guidelines** The **clear adjacency epoch** command increments the epoch and flushes entries with the old epoch. This command clears inconsistencies.

Use the **clear adjacency epoch** command when you want to rebuild the adjacency table. A new adjacency table might be required because the user wants to remove inconsistencies from the table.



## Examples

The following example shows how to begin a new epoch and increments the epoch number of the adjacency table:

```
Router# clear adjacency epoch
```

# clear cef interface

To clear the Cisco Express Forwarding per-interface traffic policy statistics for an interface, use the **clear cef interface** command in privileged EXEC mode.

**clear cef interface** [*interface-type interface-number*] **policy-statistics**

## Syntax Description

|                          |                                                      |
|--------------------------|------------------------------------------------------|
| <i>interface-type</i>    | Type of interface to clear the policy statistics for |
| <i>interface-number</i>  | Port, connector, or interface card number            |
| <b>policy-statistics</b> | Policy statistics for the specified interface.       |

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                                    |
|------------|---------------------------------------------------------------------------------|
| 12.0(9)S   | This command was introduced to support the Cisco 12000 series Internet routers. |
| 12.0(17)ST | This command was introduced to support the Cisco 12000 series Internet routers. |
| 12.2(13)T  | This command was integrated into Cisco IOS Release 12.2(13)T.                   |
| 12.4(20)T  | This command was integrated into Cisco IOS Release 12.4(20)T.                   |

## Usage Guidelines

This command clears the Cisco Express Forwarding Border Gateway Protocol (BGP) traffic policy statistics counters for an interface.

If you do not specify an interface type and interface number the policy statistics for all interfaces are cleared.

## Examples

The following example clears the Cisco Express Forwarding BGP traffic policy statistics counters:

```
Router# clear cef interface ethernet 0/0 policy-statistics
Router#
```

## Related Commands

| Command           | Description                                                          |
|-------------------|----------------------------------------------------------------------|
| <b>bgp-policy</b> | Enables BGP policy accounting or policy propagation on an interface. |

| Command                                     | Description                                                                                   |
|---------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>show cef interface policy-statistics</b> | Displays detailed Cisco Express Forwarding policy statistical information for all interfaces. |

# clear cef linecard

To clear Cisco Express Forwarding information from line cards, use the **clear cef linecard** command in privileged EXEC mode.

**clear cef linecard** [ *slot-number* ] [ **adjacency** | **interface** | **prefix** ]

## Syntax Description

|                    |                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------|
| <i>slot-number</i> | (Optional) Line card slot number to clear. When you omit this argument, all line card slots are cleared.               |
| <b>adjacency</b>   | (Optional) Clears line card adjacency tables and rebuilds adjacency for the specified line card.                       |
| <b>interface</b>   | (Optional) Clears line card interface information and recreates the interface information for the specified line card. |
| <b>prefix</b>      | (Optional) Clears line card prefix tables and starts rebuilding the Forwarding Information Base (FIB) table.           |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS      | This command was introduced to support the Cisco 12012 Internet router.                                                                                                        |
| 11.1CC      | Support was added for multiple platforms.                                                                                                                                      |
| 12.2(25)S   | This command was integrated into Cisco IOS Release 12.2(25)S.                                                                                                                  |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 7000 series router. This command is not supported on the Cisco 10000 series router. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                |

## Usage Guidelines

This command is available only on distributed platforms (such as the Cisco 7500 series) running distributed Cisco Express Forwarding.

Cisco Express Forwarding information on the line cards is cleared; however, Cisco Express Forwarding information on the Route Processor (RP) is not affected.

After you clear Cisco Express Forwarding information from line cards, the corresponding information from the RSP is propagated to the line cards. Interprocess communications (IPC) ensures that Cisco Express Forwarding information on the Route Switch Processor (RSP) matches the Cisco Express Forwarding information on the line cards.

Because this command might require significant processing resources and can cause dropped traffic or system error messages about excessive CPU use, its use is recommended only as a last resort for debugging or mitigating serious problems.

**Note**

Cisco 10000 series routers do not support the **clear cef linecard** command.

**Examples**

The following example clears the Cisco Express Forwarding information from the line cards:

```
clear cef linecard
```

**Related Commands**

| Command                  | Description                                                                   |
|--------------------------|-------------------------------------------------------------------------------|
| <b>show cef linecard</b> | Displays Cisco Express Forwarding-related interface information by line card. |

# clear cef load-balance statistics

To clear Cisco Express Forwarding (CEF) load balancing information, use the **clear cef load-balance statistics** command in privileged EXEC mode.

**clear cef load-balance statistics**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Cisco Express Forwarding load balancing information is not cleared.

**Command Modes** Privileged EXEC (#)

| Command History | Release                  | Modification                                                                           |
|-----------------|--------------------------|----------------------------------------------------------------------------------------|
|                 | 15.0(1)M                 | This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.      |
|                 | 12.2(33)SRC              | This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SRC. |
|                 | 12.2(33)SXI              | This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SXI. |
|                 | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1.                             |

**Usage Guidelines** Cisco Express Forwarding load balancing is based on a combination of source and destination packet information; it allows you to optimize resources by distributing traffic over multiple paths for transferring data to a destination. You can use the **clear cef load-balance statistics** command to clear Cisco Express Forwarding load balancing information. To select and configure the load balancing algorithm and to record the statistics, use the **ip cef load-sharing algorithm** command.

**Examples** The following example shows how to clear CEF load balancing information:

```
Router# clear cef load-balance statistics
```

| Related Commands | Command                              | Description                                                  |
|------------------|--------------------------------------|--------------------------------------------------------------|
|                  | <b>ip cef load-sharing algorithm</b> | Selects a Cisco Express Forwarding load-balancing algorithm. |

| Command  | Description                                                               |
|----------|---------------------------------------------------------------------------|
| show cef | Displays information about packets forwarded by Cisco Express Forwarding. |

# clear cef table

To clear the Cisco Express Forwarding tables, use the **clear cef table** command in privileged EXEC mode.

**clear cef table** {**ipv4**|**ipv6**} [**vrf** {*vrf-name*|\*}]

## Syntax Description

|                 |                                                                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ipv4</b>     | Clears the Cisco Express Forwarding tables for IPv4 addresses.                                                                                                                            |
| <b>ipv6</b>     | Clears the Cisco Express Forwarding tables for IPv6 addresses.<br><br><b>Note</b> On the Cisco 10000 series routers IPv6 is supported on Cisco IOS Release 12.2(28)SB and later releases. |
| <b>vrf</b>      | (Optional) Specifies all VPN routing and forwarding (VRF) instance tables or a specific VRF table for an IPv4 or IPv6 address.                                                            |
| <i>vrf-name</i> | (Optional) Clears the specific VRF table for IPv4 or IPv6 addresses.                                                                                                                      |
| *               | (Optional) Clears all the VRF tables for IPv4 or IPv6 addresses.                                                                                                                          |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

The **clear cef table** command clears the selected table or address family of tables (for IPv4 or IPv6) and updates (refreshes) them throughout the router (including the Route Processor and line cards). The command increments the table epoch, updates the tables, distributes the updated information to the line cards, and



performs a distributed purge of any stale entries in the tables based on the noncurrent epoch number. This ensures that any inconsistencies that occurred over time are removed.

Because this command might require significant processing resources and can cause dropped traffic or system error messages about excessive CPU use, its use is recommended only as a last resort for debugging or mitigating serious problems.

Cisco Express Forwarding tables are also cleared automatically during bootup or online insertion and removal (OIR) of line cards.



#### Note

On the Cisco 10000 series routers, IPv6 is supported on Cisco IOS Release 12.2(28)SB or later releases.

## Examples

The following example clears the Cisco Express Forwarding tables for the IPv6 address family:

```
Router# clear cef table ipv6 vrf *
```

The following example clears the Cisco Express Forwarding tables for a VRF table named vrf1 in the IPv4 address family:

```
Router# clear cef table ipv4 vrf vrf1
```

The following example clears the Cisco Express Forwarding tables for all VRF tables in the IPv4 address family. This example shows output with Cisco Express Forwarding table debugging enabled:

```
Router# clear cef table ipv4 vrf *
06:56:01: FIBtable: Refreshing table IPv4:Default
06:56:01: FIBtable: Invalidated 224.0.0.0/4 in IPv4:Default
06:56:01: FIBtable: Deleted 224.0.0.0/4 from IPv4:Default
06:56:01: FIBtable: Validated 224.0.0.0/4 in IPv4:Default
06:56:01: FIBtable: IPv4: Event up, 10.1.41.0/24, vrf Default, 1 path, flags 0100
0220
06:56:01: FIBtable: IPv4: Adding route for 10.1.41.0/24 but route already exists.
Trying modify.
06:56:01: FIBtable: IPv4: Event up, 10.0.0.11/32, vrf Default, 1 path, flags 010
00000
06:56:01: FIBtable: IPv4: Adding route for 10.0.0.11/32 but route already exists
. Trying modify.
06:56:01: FIBtable: IPv4: Event up, 10.0.0.15/32, vrf Default, 1 path, flags 010
00000
06:56:01: FIBtable: IPv4: Adding route for 10.0.0.15/32 but route already exists
. Trying modify.
06:56:01: FIBtable: IPv4: Event up, 10.0.0.7/32, vrf Default, 1 path, flags 0100
0220
06:56:01: FIBtable: IPv4: Adding route for 10.0.0.7/32 but route already exists.
Trying modify.
06:56:01: FIBtable: IPv4: Event up, 10.0.0.0/8, vrf Default, 1 path, flags 00000
220
06:56:01: FIBtable: IPv4: Adding route for 10.0.0.0/8 but route already exists.
Trying modify.
06:56:01: FIBtable: IPv4: Event up, 0.0.0.0/0, vrf Default, 1 path, flags 004200
05
06:56:01: FIBtable: IPv4: Adding route for 0.0.0.0/0 but route already exists. T
rying modify.
06:56:01: FIBtable: Starting purge of table IPv4:Default to epoch 13
06:56:01: FIBtable: Invalidated 10.1.41.1/32 in IPv4:Default
06:56:01: FIBtable: Deleted 10.1.41.1/32 from IPv4:Default
06:56:01: FIBtable: Purged 1 prefix from table IPv4:Default
06:56:01: FIBtable: Validated 10.1.41.1/32 in IPv4:Default
06:56:06: FIBtable: IPv4: Event modified, 0.0.0.0/0, vrf Default, 1 path, flags
00420005
06:56:06: FIBtable: IPv4: Event up, default, 0.0.0.0/0, vrf Default, 1 path, fla
gs 00420005
```

```
06:56:06: FIBtable: IPv4: Adding route for 0.0.0.0/0 but route already exists. T
rying modify.
```

**Related Commands**

| Command                                 | Description                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>clear ip cef inconsistency</b>       | Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers. |
| <b>debug cef</b>                        | Enables the display of information about Cisco Express Forwarding events.                                                        |
| <b>debug ip cef table</b>               | Enables the collection of events that affect entries in the Cisco Express Forwarding tables.                                     |
| <b>show cef table consistency-check</b> | Displays Cisco Express Forwarding consistency checker table values.                                                              |
| <b>show ip cef inconsistency</b>        | Displays Cisco Express Forwarding IP prefix inconsistencies.                                                                     |

# clear ip cache

To delete entries in the routing table cache used to fast switch IP traffic, use the **clear ip cache** command in privileged EXEC mode.

**clear ip cache** [*prefix mask*]

## Syntax Description

|                    |                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------|
| <i>prefix mask</i> | (Optional) Deletes only the entries in the cache that match the prefix and mask combination. |
|--------------------|----------------------------------------------------------------------------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.0        | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                     |

## Usage Guidelines

Use this command to clear routes from the routing table cache. You can remove all entries in the routing cache or you can remove only those entries associated with a specified prefix and mask.



### Note

IPv4 fast switching is not supported in Cisco IOS 12.4(20)T and later releases.

## Examples

The following command shows how to delete the all of the entries in the routing table cache:

```
Router# clear ip cache
```

The following command show how to delete entries in the router table associated with the prefix and mask 192.168.32.0 255.255.255.0:

```
Router# clear ip cache 192.168.32.0 255.255.255.0
```

**Related Commands**

| Command               | Description                                                      |
|-----------------------|------------------------------------------------------------------|
| <b>ip route-cache</b> | Controls the use of high-speed switching caches for IP routing.  |
| <b>show ip cache</b>  | Displays the routing table cache used to fast switch IP traffic. |

# clear ip cef epoch



## Note

The **clear ip cef epoch** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T, and later releases.

To begin a new epoch and increment the epoch number for one or all Cisco Express Forwarding tables, use the **clear ip cef epoch** command in privileged EXEC mode.

**clear ip cef epoch** [**all-vrfs**|**full**|**vrf** [*table* ]]

## Syntax Description

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| <b>all-vrfs</b> | (Optional) Begins a new epoch for all Forwarding Information Base (FIB) tables.      |
| <b>full</b>     | (Optional) Begins a new epoch for all tables, including adjacency tables.            |
| <b>vrf</b>      | (Optional) Begins a new epoch for the specified FIB table.                           |
| <i>table</i>    | (Optional) Virtual Private Network (VPN) routing and forwarding (VRF) instance name. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release  | Modification                 |
|----------|------------------------------|
| 12.2(8)T | This command was introduced. |

## Command History

|             |                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                       |
| 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
| 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.  |
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |

|             |                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2SX releases. |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

### Usage Guidelines

Use the **clear ip cef epoch** command when you want to rebuild a table. This command increments the epoch number and flushes entries with the old epoch number. This command clears any inconsistencies that might exist, so if everything in the system is working correctly, this command does not affect the Cisco Express Forwarding forwarding tables other than changing the current epoch values.

### Examples

The following example shows the output before and after you clear the epoch table and increment the epoch number:

```
Router# show ip cef epoch
CEF epoch information:
Table: Default-table
  Table epoch: 2 (43 entries at this epoch)
Adjacency table
  Table epoch: 2 (5 entries at this epoch)
Router# clear ip cef epoch full
Router# show ip cef epoch
CEF epoch information:
Table: Default-table
  Table epoch: 3 (43 entries at this epoch)
Adjacency table
  Table epoch: 3 (5 entries at this epoch)
```

### Related Commands

| Command                  | Description                                                             |
|--------------------------|-------------------------------------------------------------------------|
| <b>show cef state</b>    | Displays the state of Cisco Express Forwarding.                         |
| <b>show ip cef epoch</b> | Displays the table epochs of the adjacency table and of all FIB tables. |

# clear ip cef epoch full

To begin a new epoch and increment the epoch number for all Cisco Express Forwarding tables (including the adjacency table), use the **clear ip cef epoch full** command in privileged EXEC mode.

**clear ip cef epoch full**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release      | Modification                                                                              |
|-----------------|--------------|-------------------------------------------------------------------------------------------|
|                 | 12.2(14)SX   | This command was introduced on the Supervisor Engine 720.                                 |
|                 | 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
|                 | 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |
|                 | 12.4(20)T    | This command was integrated into Cisco IOS Release 12.4(20)T.                             |

**Usage Guidelines** Use the **clear ip cef epoch full** command when you want to rebuild a table. This command allows old and new table entries to be distinguished within the same data structure and allows you to retain the old Cisco Express Forwarding database table while constructing the new table.

These **show** commands display epoch information:

- **show ip cef summary** --Displays the table epoch for a specific Forwarding Information Base (FIB) table.
- **show ip cef detail** --Displays the epoch value for each entry of a specific FIB table.
- **show adjacency summary** --Displays the adjacency table epoch.
- **show adjacency detail** --Displays the epoch value for each entry of the adjacency table.

**Examples** This example shows the output before and after you clear the epoch table and increment the epoch number:

```
Router# show ip cef epoch
CEF epoch information:
Table:Default-table
  Table epoch:2 (164 entries at this epoch)
Adjacency table
  Table epoch:1 (33 entries at this epoch)
Router# clear ip cef epoch full
Router# show ip cef epoch
CEF epoch information:
```

```
Table:Default-table
  Table epoch:3 (164 entries at this epoch)
Adjacency table
  Table epoch:2 (33 entries at this epoch)
```

**Related Commands**

| Command                       | Description                                                           |
|-------------------------------|-----------------------------------------------------------------------|
| show adjacency detail         | Displays the information about the protocol detail and timer.         |
| <b>show adjacency summary</b> | Displays a summary of Cisco Express Forwarding adjacency information. |
| <b>show ip cef detail</b>     | Displays detailed FIB entry information.                              |
| <b>show ip cef summary</b>    | Displays a summary of the FIB.                                        |



# clear ip cef event-log

**Note**

Effective with Cisco IOS 12.2(25)S, the **clear ip cef event-log** command is replaced by the **monitor event-trace cef ipv4 clear** command. See the **monitor event-trace** (EXEC) command for more information.

To clear the Cisco Express Forwarding event-log buffer, use the **clear ip cef event-log** command in privileged EXEC mode.

**clear ip cef event-log**

**Syntax Description**

This command has no arguments or keywords.

**Command Modes**

Privileged EXEC (#)

**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.                                                                                                                      |
| 12.2(25)S   | This command was replaced by the <b>monitor event-trace cef ipv4 clear</b> command.                                                                                               |
| 12.2(33)SRA | This command was replaced by the <b>monitor event-trace cef ipv4 clear</b> command.                                                                                               |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T   | This command was replaced by the <b>monitor event-trace cef ipv4 clear</b> command.                                                                                               |

**Usage Guidelines**

This command clears the entire Cisco Express Forwarding table event log that holds Forwarding Information Base (FIB) and adjacency events.

**Examples**

The following example shows how to clear the Cisco Express Forwarding event-log buffer:

```
Router# clear ip cef event-log
```

**Related Commands**

| Command                            | Description                                                                      |
|------------------------------------|----------------------------------------------------------------------------------|
| <b>cef table consistency-check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters. |
| <b>ip cef table event-log</b>      | Controls Cisco Express Forwarding table event-log characteristics.               |
| <b>show ip cef events</b>          | Displays all recorded Cisco Express Forwarding FIB and adjacency events.         |

# clear ip cef inconsistency

To clear the Cisco Express Forwarding inconsistency checker statistics and records found by the Cisco Express Forwarding consistency checkers, use the **clear ip cef inconsistency** command in privileged EXEC mode.

**clear ip cef inconsistency**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| 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.                                                     |
|                 | 12.2(25)S    | This command was integrated into Cisco IOS Release 12.2(25)S.                                                    |
|                 | 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                            |
|                 | 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to the 12.2(17d)SXB release.                    |
|                 | 12.2(28)SB   | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
|                 | 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SR.                                                   |
|                 | 12.2(33)SXH  | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
|                 | 12.4(20)T    | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines** This command clears the Cisco Express Forwarding inconsistency checker statistics and records that accumulate when the **cef table consistency-check** command is enabled.

**Examples** The following example shows how to clear all Cisco Express Forwarding inconsistency checker statistics and records:

```
Router# clear ip cef inconsistency
```

**Related Commands**

| Command                            | Description                                                                      |
|------------------------------------|----------------------------------------------------------------------------------|
| <b>cef table consistency-check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters. |
| <b>show ip cef inconsistency</b>   | Displays Cisco Express Forwarding IP prefix inconsistencies.                     |

# clear ip cef prefix-statistics

To clear Cisco Express Forwarding counters by resetting the packet and byte count to zero (0), use the **clear ip cef prefix-statistics** command in privileged EXEC mode.

**clear ip cef** *network* [ *mask* ] **prefix-statistics**

## Syntax Description

|                |                                                               |
|----------------|---------------------------------------------------------------|
| <i>network</i> | Forwarding Information Base (FIB) entry specified by network. |
| <i>mask</i>    | (Optional) FIB entry specified by network and mask.           |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS      | This command was introduced to support the Cisco 12012 Internet router.                                                                                                           |
| 11.1CC      | Support for multiple platform was added.                                                                                                                                          |
| 12.2(25)S   | The * (asterisk) keyword was removed.                                                                                                                                             |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                     |

## Usage Guidelines

When the clear statistics flag is set, statistics are cleared as the FIB table is scanned. The time period is up to 60 seconds for all statistics to clear. However, clearing a specific prefix is completed immediately.

## Examples

The following example shows how to reset the packet and byte counts to zero for Cisco Express Forwarding entries on the 172.17.10.10 network:

```
Router# clear ip cef 172.17.10.10 prefix-statistics
```

**Related Commands**

| Command                  | Description                                                    |
|--------------------------|----------------------------------------------------------------|
| <b>ip cef accounting</b> | Enables Cisco Express Forwarding network accounting.           |
| <b>show adjacency</b>    | Displays Cisco Express Forwarding adjacency table information. |
| <b>show ip cef</b>       | Displays entries or a summary of the FIB table.                |

# clear ip mds

To clear multicast distributed switching (MDS) information from the router, use the **clear ip mds** command in privileged EXEC mode.

**clear ip mds** {all| [*vrf vrf-name*] forwarding}

## Syntax Description

|                   |                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>        | Clear all IP MDS information.                                                                                                             |
| <b>vrf</b>        | (Optional) A Virtual Private Network (VPN) routing and forwarding (VRF) instance.                                                         |
| <i>vrf-name</i>   | (Optional) Name assigned to the VRF.                                                                                                      |
| <b>forwarding</b> | Clears all linecard routes from a Multicast Forwarding Information Base (MFIB) table and resynchronizes it with the Route Processor (RP). |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2(11)GS  | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

### Cisco 12000 Series Internet Router

On a Cisco 12000 series Internet router the **clear ip mds** command must be run in privileged EXEC mode on a linecard.

## Examples

The following example clears all line card routes in an MFIB table on a Cisco 12000 series Internet router:

```
Router# attach
1
LC-Slot1> enable
LC-Slot1# clear ip mds forwarding
The following example clears all line card routes in an MFIB table on a Cisco 7500 series
router:
Router# clear ip mds forwarding
```

**Related Commands**

| Command                       | Description                                                                |
|-------------------------------|----------------------------------------------------------------------------|
| <b>show ip mds interface</b>  | Displays the MFIB table and forwarding information for MDS on a line card. |
| <b>show ip mds stats</b>      | Display switching statistics or line card statistics for MDS.              |
| <b>show ip mds summary</b>    | Displays a summary of the MFIB table for MDS.                              |
| <b>show ip mds forwarding</b> | Displays MDS information for all the interfaces on the line card.          |



## clear ip mds forwarding

The **forwarding** keyword for the **clear ip mds** command is no longer documented as a separate command.

The information for using the **forwarding** keyword for the **clear ip mds** command has been incorporated into the **clear ip mds** command documentation. See the **clear ip mds** command documentation for more information.

# clear ip mds linecard

To reset multicast distributed switching (MDS) line card information on the router, use the **clear ip mds linecard** command in privileged EXEC mode.

**clear ip mds linecard** *{linecard-slot-number| \*}*

## Syntax Description

|                             |                                                                |
|-----------------------------|----------------------------------------------------------------|
| <i>linecard-slot-number</i> | Slot number containing the line card to be reset.              |
| *                           | Indicates that the reset should be executed on all line cards. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(19.3)S | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

When the \* keyword is specified instead of the *linecard-slot-number* argument, all MDS information on all line cards is cleared and reset.

## Examples

The following example clears and resets all MDS line card information on the router:

```
Router# clear ip mds linecard *
```

## Related Commands

| Command                      | Description                                                                |
|------------------------------|----------------------------------------------------------------------------|
| <b>show ip mds</b>           | Clears MDS information from the router.                                    |
| <b>show ip mds interface</b> | Displays the MFIB table and forwarding information for MDS on a line card. |
| <b>show ip mds stats</b>     | Display switching statistics or line card statistics for MDS.              |

| Command                       | Description                                                       |
|-------------------------------|-------------------------------------------------------------------|
| <b>show ip mds summary</b>    | Displays a summary of the MFIB table for MDS.                     |
| <b>show ip mds forwarding</b> | Displays MDS information for all the interfaces on the line card. |

# clear ip traffic

To clear the global or system-wide IP traffic statistics for one or more interfaces, use the **clear ip traffic** command in privileged EXEC mode.

**clear ip traffic** [**interface** *type number*]

## Syntax Description

|                                     |                                                                                                                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>interface</b> <i>type number</i> | (Optional) Clears the global or system-wide IP traffic statistics for a specific interface. If the <b>interface</b> keyword is used, the <i>type</i> and <i>number</i> arguments are required. |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

Using the **clear ip traffic** command with no keywords or arguments clears the global or system-wide IP traffic statistics for all interfaces.

## Command Modes

Privileged EXEC (#)

## Command History

| Release                   | Modification                                                                                                                                                                                                                                                                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.4(2)T                  | This command was introduced.                                                                                                                                                                                                                                                                         |
| 12.2(31)SB2               | This command was integrated into Cisco IOS Release 12.2(31)SB2.                                                                                                                                                                                                                                      |
| Cisco IOS XE Release 2.1  | This command was integrated into Cisco IOS XE Release 2.1.                                                                                                                                                                                                                                           |
| Cisco IOS XE Release 3.1S | This command was modified to include the optional <b>interface</b> keyword and associated <i>type</i> and <i>number</i> arguments. These modifications were made to provide support for the IPv4 MIBs as described in RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i> .  |
| 15.1(4)M                  | This command was modified. The optional <b>interface</b> keyword and associated <i>type</i> and <i>number</i> arguments were added. These modifications were made to provide support for the IPv4 MIBs as described in RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i> . |

## Usage Guidelines

Using the **clear ip traffic**command with the optional **interface** keyword clears the ipIfStatsTable counters displayed for the specified interface and also clears the counters displayed by the **show ip traffic interface** command.

## Examples

The following example shows how to clear the global or system-wide IP traffic statistics on all interfaces:

```
Router# clear ip traffic
```

The following example shows how to clear the IP traffic statistics on Ethernet interface 0/0:

```
Router# clear ip traffic interface ethernet 0/0
```

The following is sample output from the **show ip traffic** command for Ethernet interface 0/0 after clearing the traffic using the **clear ip traffic** command:

```
Router# show ip traffic
Ethernet0/0 IP-IF statistics :
  Rcvd:  0 total, 0 total_bytes
         0 format errors, 0 hop count exceeded
         0 bad header, 0 no route
         0 bad destination, 0 not a router
         0 no protocol, 0 truncated
         0 forwarded
         0 fragments, 0 total reassembled
         0 reassembly timeouts, 0 reassembly failures
         0 discards, 0 delivers
  Sent:  0 total, 0 total_bytes 0 discards
         0 generated, 0 forwarded
         0 fragmented into, 0 fragments, 0 failed
  Mcast: 0 received, 0 received bytes
         0 sent, 0 sent bytes
  Bcast: 0 received, 0 sent
```

## Related Commands

| Command                | Description                                                                          |
|------------------------|--------------------------------------------------------------------------------------|
| <b>show ip traffic</b> | Displays the global or system-wide IP traffic statistics for one or more interfaces. |

## clear mls cef ip accounting per-prefix

To clear information about the IP per-prefix accounting statistics, use the **clear mls cef ip accounting per-prefix** command in privileged EXEC mode.

**clear mls cef ip accounting per-prefix** {**all**| *prefix mask* [*instance* ]}

### Syntax Description

|                 |                                                          |
|-----------------|----------------------------------------------------------|
| <b>all</b>      | Clears all per-prefix accounting statistics information. |
| <i>prefix</i>   | Entry prefix in the format A.B.C.D.                      |
| <i>mask</i>     | Entry prefix mask.                                       |
| <i>instance</i> | (Optional) VPN routing and forwarding instance name.     |

### Command Modes

Privileged EXEC (#)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(17a)SX  | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Examples

This example shows how to clear all information about the per-prefix accounting statistics:

```
Router#
clear mls cef ip accounting per-prefix all
```

# clear pxf

To clear Parallel eXpress Forwarding (PXF) counters and statistics, use the **clear pxf** command in privileged EXEC mode.

**clear pxf** [**dma counters**| **interface** *interface*| **statistics** {**context**| **diversion**| **drop**| **ip**| **ipv6**}| **xcm counters**]

## Syntax Description

|                                   |                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dma counters</b>               | (Optional) Clears the direct memory access (DMA) PXF counters.                                                                                                                                                                                                                                                                                                                        |
| <b>interface</b> <i>interface</i> | (Optional) Clears the PXF counters on the specified interface.                                                                                                                                                                                                                                                                                                                        |
| <b>statistics</b>                 | (Optional) Type of PXF statistics to clear. The options are: <ul style="list-style-type: none"> <li>• <b>context</b> --Current and historical loads on the PXF.</li> <li>• <b>diversion</b> --Traffic diverted from the PXF.</li> <li>• <b>drop</b> --Dropped packets and bytes.</li> <li>• <b>ip</b> -- IP and ICMP statistics.</li> <li>• <b>ipv6</b> --IPv6 statistics.</li> </ul> |
| <b>xcm counters</b>               | Clears the PXF Error Code Correction (ECC) counters.                                                                                                                                                                                                                                                                                                                                  |

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                                                                                        |
|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(22)S  | This command was introduced on the Cisco 10000 series router.                                                                       |
| 12.2(1)XF1 | This command was introduced on the Cisco uBR10012 router.                                                                           |
| 12.2(4)XF1 | The <b>xcm counters</b> option was introduced to support the Performance Routing Engine (PRE1) module on the Cisco uBR10012 router. |
| 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                      |
| 12.3BC     | This command was integrated into Cisco IOS Release 12.3BC. The <b>context</b> and <b>ipv6</b> keyword options are not supported.    |

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(31)SB  | This command was integrated into Cisco IOS Release 12.2(31)SB.                                                   |
| 12.2(33)SCA | This command was integrated into Cisco IOS Release 12.2(33)SCA. The <b>ipv6</b> keyword option is not supported. |

### Usage Guidelines

If no interface is specified, the command clears PXF counters on all interfaces. The **clear pxf** command clears counters associated with the **show pxf dma**, **show pxf interface**, **show pxf statistics**, and **show pxf xcm** commands.

#### Cisco uBR10012 Universal Broadband Router

Not all keyword options are supported in the Cisco IOS software for the Cisco uBR10012 universal broadband router. See the command history table for the unsupported keyword options by release.

The **clear pxf xcm counters** command is supported only on the PRE1 and later processors for the Cisco uBR10012 router. This command is not supported on the PRE processor.

### Examples

The following example clears PXF statistics for serial interface 1/0/0:

```
Router# clear pxf interface serial 1/0/0
```

The following example clears PXF statistics on all interfaces:

```
Router# clear pxf interface
```

### Related Commands

| Command                        | Description                                                                                 |
|--------------------------------|---------------------------------------------------------------------------------------------|
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.                                                                |
| <b>show pxf dma</b>            | Displays the current state of DMA buffers, error counters, and registers on the PXF engine. |
| <b>show pxf interface</b>      | Displays a summary of the statistics accumulated by column 0 of the PXF for an interface.   |
| <b>show pxf statistics</b>     | Displays chassis-wide, summary PXF statistics.                                              |
| <b>show pxf xcm</b>            | Displays PXF XCM information.                                                               |





## ip cache-invalidate-delay through monitor event-trace cef ipv6 global

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## ip cache-invalidate-delay

To control the invalidation rate of the IP route cache, use the **ip cache-invalidate-delay** command in global configuration mode. To allow the IP route cache to be immediately invalidated, use the **no** form of this command.

**ip cache-invalidate-delay** [*minimum maximum quiet threshold*]

**no ip cache-invalidate-delay**

### Syntax Description

|                  |                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <i>minimum</i>   | (Optional) Minimum time (in seconds) between invalidation request and actual invalidation. The default is 2 seconds.                       |
| <i>maximum</i>   | (Optional) Maximum time (in seconds) between invalidation request and actual invalidation. The default is 5 seconds.                       |
| <i>quiet</i>     | (Optional) Length of quiet period (in seconds) before invalidation. The default is 3 seconds with no more than zero invalidation requests. |
| <i>threshold</i> | (Optional) Maximum number of invalidation requests considered to be quiet.                                                                 |

### Command Default

The invalidation rate of the IP route cache is not controlled.

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.0        | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

### Usage Guidelines

After you enter the **ip cache-invalidate-delay** command all cache invalidation requests are honored immediately.

**Caution**

This command should only be used under the guidance of technical support personnel. Incorrect settings can seriously degrade network performance. The command-line-interface (CLI) will not allow you to enter the **ip cache-invalidate-delay** command until you configure the **service internal** command in global configuration mode.

The IP fast-switching and autonomous-switching features maintain a cache of IP routes for rapid access. When a packet is to be forwarded and the corresponding route is not present in the cache, the packet is process switched and a new cache entry is built. However, when routing table changes occur (such as when a link or an interface goes down), the route cache must be flushed so that it can be rebuilt with up-to-date routing information.

This command controls how the route cache is flushed. The intent is to delay invalidation of the cache until after routing has settled down. Because route table changes tend to be clustered in a short period of time, and the cache may be flushed repeatedly, a high CPU load might be placed on the router.

When this feature is enabled, and the system requests that the route cache be flushed, the request is held for at least *minimum* seconds. Then the system determines whether the cache has been "quiet" (that is, less than *threshold* invalidation requests in the last *quiet* seconds). If the cache has been quiet, the cache is then flushed. If the cache does not become quiet within *maximum* seconds after the first request, it is flushed unconditionally.

Manipulation of these parameters trades off CPU utilization versus route convergence time. Timing of the routing protocols is not affected, but removal of stale cache entries is affected.

**Examples**

The following example shows how to set a minimum delay of 5 seconds, a maximum delay of 30 seconds, and a quiet threshold of no more than 5 invalidation requests in the previous 10 seconds:

```
Router(config)# service internal
Router(config)# ip cache-invalidate-delay 5 30 10 5
```

**Related Commands**

| Command               | Description                                                |
|-----------------------|------------------------------------------------------------|
| <b>ip route-cache</b> | Configures the high-speed switching caches for IP routing. |

# ip cef

To enable Cisco Express Forwarding on the route processor card, use the **ip cef** command in global configuration mode. To disable Cisco Express Forwarding, use the **no** form of this command.

**Cisco IAD2420 Series Routers, Cisco 2600 Series Routers, Cisco 3600 Series Routers, Cisco 3700 Series Routers, Cisco 7200 Series Routers**

**ip cef [distributed]**

**no ip cef [distributed]**

**Cisco ASR 1000 Series Aggregation Services Routers**

**ip cef distributed**

**no ip cef distributed**

## Syntax Description

|                    |                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>distributed</b> | (Optional) Enables distributed Cisco Express Forwarding operation. Distributes Cisco Express Forwarding information to line cards. Line cards perform express forwarding. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

Cisco Express Forwarding is enabled by default on most platforms. To find out if Cisco Express Forwarding is enabled by default on your platform, enter the **show ip cef** command.

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                                                                                                                                                                                                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1CC      | This command was introduced.                                                                                                                                                                                                                                                                 |
| 12.2        | The default for Cisco 7200 series routers was changed from disabled to enabled.                                                                                                                                                                                                              |
| 12.2(11)T   | This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the following platforms: Cisco IAD2420 series, Cisco 2600 series, Cisco 3620 routers, Cisco 3640 routers, Cisco 3660 routers, Cisco 3700 series routers, and Cisco MC3810 multiservice access concentrators. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                                                                               |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                              |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.                                                                                                            |

| Release    | Modification                                                                           |
|------------|----------------------------------------------------------------------------------------|
| 12.4(20T)  | This command was integrated into Cisco IOS Release 12.4(20)T.                          |
| 15.2(2)SNI | This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers. |

### Usage Guidelines

The **ip cef** command is not available on the Cisco 12000 series because that router series operates only in distributed Cisco Express Forwarding mode. Distributed Cisco Express Forwarding is enabled also on the Cisco 6500 series router.

Cisco Express Forwarding is advanced Layer 3 IP switching technology. Cisco Express Forwarding optimizes network performance and scalability for networks with dynamic, topologically dispersed traffic patterns, such as those associated with web-based applications and interactive sessions.

If you enable Cisco Express Forwarding and then create an access list that uses the **log** keyword, the packets that match the access list are not Cisco Express Forwarding switched. They are fast switched. Logging disables Cisco Express Forwarding.

The following example shows how to enable standard Cisco Express Forwarding operation:

```
Router(config)# ip cef
```

The following example shows how to enable distributed Cisco Express Forwarding operation:

```
Router(config)# ip cef
distributed
```

### Related Commands

| Command                                       | Description                                                                               |
|-----------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>ip route-cache</b>                         | Controls the use of high-speed switching caches for IP routing.                           |
| <b>ip cef accounting</b>                      | Enables Cisco Express Forwarding network accounting.                                      |
| <b>ip cef load-sharing algorithm</b>          | Selects a Cisco Express Forwarding load balancing algorithm.                              |
| <b>ip cef table adjacency-prefix override</b> | Enables Cisco Express Forwarding adjacency prefixes to override static host glean routes. |
| <b>cef table consistency-check</b>            | Enables Cisco Express Forwarding table consistency checker types and parameters.          |
| <b>show ip cef</b>                            | Displays entries or a summary of the FIB table.                                           |

## ip cef accounting

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

**ip cef accounting** *accounting-types*

**no ip cef accounting** *accounting-types*

### Specific Cisco Express Forwarding Accounting Information Through Interface Configuration Mode

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

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

#### Syntax Description

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>accounting-types</i> | <p>The <i>accounting-types</i> argument must be replaced with at least one of the following keywords. Optionally, you can follow this keyword by any or all of the other keywords, but you can use each keyword only once.</p> <ul style="list-style-type: none"> <li>• <b>load-balance-hash</b> --Enables load balancing hash bucket counters.</li> <li>• <b>non-recursive</b> --Enables accounting through nonrecursive prefixes.</li> <li>• <b>per-prefix</b> --Enables express forwarding of the collection of the number of packets and bytes to a destination (or prefix).</li> <li>• <b>prefix-length</b> --Enables accounting through prefix length.</li> </ul> |
| <b>non-recursive</b>    | <p>Enables accounting through nonrecursive prefixes. This keyword is optional when used in global configuration mode after another keyword is entered. See the <i>accounting-types</i> argument.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>external</b>         | <p>Counts input traffic in the nonrecursive external bin.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>internal</b>         | <p>Counts input traffic in the nonrecursive internal bin.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

#### Command Default

Accounting is disabled by default.

#### Command Modes

Global configuration (config) Interface configuration (config-if)

**Command History**

| Release     | Modification                                                                                  |
|-------------|-----------------------------------------------------------------------------------------------|
| 11.2GS      | This command was introduced.                                                                  |
| 11.1CC      | Multiple platform support was added and the <b>prefix-length</b> keyword was added.           |
| 12.2(2)T    | The <b>ip cef accounting non-recursive</b> command in interface configuration mode was added. |
| 12.2(25)S   | The <b>load-balance-hash</b> keyword was added.                                               |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                |
| 12.2(25)SG  | This command was integrated into Cisco IOS Release 12.2(25)SG.                                |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                               |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                               |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                 |

**Usage Guidelines**

Collecting statistics can help you better understand Cisco Express Forwarding patterns in your network.

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

For prefixes with directly connected next hops, the **non-recursive** keyword enables express forwarding of the collection of packets and bytes 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** command.

Per-destination load balancing uses a series of 16 hash buckets into which the set of available paths are distributed. A hash function operating on certain properties of the packet is applied to select a bucket that contains a path to use. The source and destination IP addresses are the properties used to select the bucket for per-destination load balancing. Use the **load-balance-hash** keyword with the **ip cef accounting** command to enable per-hash-bucket counters. Enter the **show ip cef prefix internal** command to display the per-hash-bucket counters.

**Examples**

The following example shows how to enable the collection of Cisco Express Forwarding accounting information for prefixes directly connected to the next hops:

```
Router(config)# ip cef accounting non-recursive
```



**Related Commands**

| Command                    | Description                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------|
| <b>ipv6 cef accounting</b> | Enables Cisco Express Forwarding for IPv6 (CEFv6) and distributed CEFv6 (dCEFv6) network accounting. |
| <b>show cef</b>            | Displays information about packets <b>forwarded by Cisco Express Forwarding</b> .                    |
| <b>show ip cef</b>         | 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 queuing messages, use the **ip cef linecard ipc memory** command in global configuration mode. To return to the default Inter-process Communications (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

|             |                                                                                                                                                                        |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>kbps</i> | Kilobytes of line card memory allocated. Range is 0 to 12800. The default IPC memory allocation is 25 messages. However, this value depends on the switching platform. |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Command Default

If you do not configure a line card memory pool for the Cisco Express Forwarding queuing messages, the default is the IPC memory allocation for the switching platform.

### Command Modes

Global configuration (config)

### 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 Cisco Express Forwarding routing update messages. The memory pool reduces the transient memory requirements on the RP.

To display and monitor the current size of the Cisco Express Forwarding 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 shows how to configure the Cisco Express Forwarding line card memory queue to 128000 kilobytes per second:

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

**Related Commands**

| Command                  | Description                                                                         |
|--------------------------|-------------------------------------------------------------------------------------|
| <b>show cef linecard</b> | Displays detailed Cisco Express Forwarding information for the specified line card. |

## ip cef load-sharing algorithm

To select a Cisco Express Forwarding 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*] | **include-ports** {**source** [*id*] | [*destination*] [*id*] | **source** [*id*] **destination** [*id*] **gtp**}}

**no ip cef load-sharing algorithm**

### Syntax Description

|                                             |                                                                                                                                                                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>original</b>                             | Sets the load-balancing algorithm to the original algorithm based on a source and destination hash.                                                                                                                                                              |
| <b>tunnel</b>                               | 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.                                                                                                          |
| <i>id</i>                                   | (Optional) Fixed identifier.                                                                                                                                                                                                                                     |
| <b>universal</b>                            | Sets the load-balancing algorithm to the universal algorithm that uses a source and destination and an ID hash.                                                                                                                                                  |
| <b>include-ports source</b>                 | Sets the load-balancing algorithm to the include-ports algorithm that uses a Layer 4 source port.                                                                                                                                                                |
| <b>include-ports destination</b>            | Sets the load-balancing algorithm to the include-ports algorithm that uses a Layer 4 destination port.                                                                                                                                                           |
| <b>include-ports source destination</b>     | Sets the load-balancing algorithm to the include-ports algorithm that uses Layer 4 source and destination ports.                                                                                                                                                 |
| <b>include-ports source destination gtp</b> | <p>Sets the load-balancing algorithm based on the GPRS Tunneling Protocol Tunnel Endpoint Identifier (GTP TEID) for the GTP-U packets.</p> <p>Sets the load-balancing algorithm based on the Layer 4 source and destination ports for the non-GTP-U packets.</p> |

### Command Default

The universal load-balancing algorithm is selected. If you do not configure the fixed identifier for a load-balancing algorithm, the router automatically generates a unique ID.

**Command Modes**

Global configuration (config)

**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.                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.4(11)T   | This command was modified. The <b>include-ports source</b> , <b>include-ports destination</b> , and the <b>include-ports source destination</b> keywords were added.              |
| 12.2SX      | This command was integrated into Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 3.10S       | This command is supported in Cisco IOS XE Release 3.10S. The <b>gtp</b> keyword was added to the command.                                                                         |

**Usage Guidelines**

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

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

The include-ports algorithm allows you to use the Layer 4 source and destination ports as part of the load-balancing decision. This method benefits traffic streams running over equal-cost paths that are not loadshared because the majority of the traffic is between peer addresses that use different port numbers, such as Real-Time Protocol (RTP) streams. The include-ports algorithm is available in Cisco IOS Release 12.4(11)T and later releases.

**Examples**

The following example shows how to enable the Cisco Express Forwarding load-balancing algorithm for tunnel environments:

```
configure terminal
!
ip cef load-sharing algorithm tunnel
exit
```

**Examples**

The following example shows how to enable the IP CEF load-sharing algorithm based on GTP TEID:

```
configure terminal
!
ip cef load-sharing algorithm include-ports source destination gtp
exit
```

**Related Commands**

| Command                  | Description                                                           |
|--------------------------|-----------------------------------------------------------------------|
| <b>debug ip cef hash</b> | Records Cisco Express Forwarding load-balancing hash algorithm events |
| <b>ip load-sharing</b>   | Enables load balancing for Cisco Express Forwarding.                  |

## ip cef optimize neighbor resolution

To configure address resolution optimization from Cisco Express Forwarding for IPv4 for directly connected neighbors, use the **ip cef optimize neighbor resolution** command in global configuration mode. To disable address resolution optimization from Cisco Express Forwarding for directly connected neighbors, use the **no** form of this command.

**ip cef optimize neighbor resolution**

**no ip cef optimize neighbor resolution**

**Syntax Description** This command has no arguments or keywords.

**Command Default** If this command is not configured, Cisco Express Forwarding does not optimize the address resolution of directly connected neighbors for IPv4.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(25)S   | This command was introduced.                                    |
|                 | 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
|                 | 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
|                 | 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

**Usage Guidelines** The **ip cef optimize neighbor resolution** command is very similar to the **ipv6 cef optimize neighbor resolution** command, except that it is IPv4-specific.

Use this command to trigger Layer 2 address resolution of neighbors directly from Cisco Express Forwarding for IPv4.

**Examples** The following example shows how to optimize address resolution from Cisco Express Forwarding for directly connected neighbors:

```
Router(config)# ip cef optimize neighbor resolution
```

**Related Commands**

| Command                                      | Description                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>ipv6 cef optimize neighbor resolution</b> | Configures address resolution optimization from Cisco Express Forwarding for IPv6 for directly connected neighbors. |



## ip cef table adjacency-prefix

To modify how Cisco Express Forwarding adjacency prefixes are managed, use the **ip cef table adjacency-prefix** command in global configuration mode. To disable Cisco Express Forwarding 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 | (Optional) Enables Cisco Express Forwarding adjacency prefixes to override static host glean routes. |
| validate | (Optional) Enables the periodic validation of Cisco Express Forwarding adjacency prefixes.           |

### Command Default

All Cisco Express Forwarding adjacency prefix management is disabled by default.

### Command Modes

Global configuration (config)

### 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     | The <b>validate</b> keyword was added.                                                                                                                                            |
| 12.1(19.02)E    | The default behavior for <b>ip cef table adjacency-prefix override</b> was changed to disabled.                                                                                   |
| 12.3(04)XG      |                                                                                                                                                                                   |
| 12.3(04)XK      |                                                                                                                                                                                   |
| 12.3(06.01)PI03 |                                                                                                                                                                                   |
| 12.2(33)SRA     | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX          | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

### Usage Guidelines

When Cisco Express Forwarding 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 Cisco Express Forwarding, which in turn creates a corresponding host route entry in the FIB table. This entry is called an adjacency prefix.

#### override

If the Cisco Express Forwarding 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 Cisco Express Forwarding 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

#### Examples

The following example shows how to enable Cisco Express Forwarding table adjacency prefix override:

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

#### Examples

The following example shows how to enable Cisco Express Forwarding table adjacency prefix validation:

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

# ip cef table consistency-check



## Note

Effective with Cisco IOS Release 12.4(20)T, the **ip cef table consistency-check** command is not available in Cisco IOS software.

To enable consistency checker types and parameters for Cisco Express Forwarding tables, 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*]

## Suppressing Errors During Route Updates

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

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

## Syntax Description

|                                  |                                                                                                                                                                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>type</b>                      | (Optional) Specifies the type of consistency check to configure.                                                                                                                                                                                          |
| <b>lc-detect</b>                 | (Optional) Specifies that the line card or the module detects a missing prefix. On the line card, a missing prefix is confirmed by Route Processor (RP).                                                                                                  |
| <b>scan-lc</b>                   | (Optional) Specifies a passive scan check of tables on the line card or module.                                                                                                                                                                           |
| <b>scan-rib</b>                  | (Optional) Specifies a passive scan check of tables on the RP against the Routing Information Base (RIB). For the Cisco 7600 series router, the <b>scan-rib</b> keyword specifies a passive scan check of tables on the rendezvous point against the RIB. |
| <b>scan-rp</b>                   | (Optional) Specifies a passive scan check of tables on the RP or on the rendezvous point for the Cisco 7600 series router.                                                                                                                                |
| <b>count</b> <i>count-number</i> | (Optional) Specifies the maximum number of prefixes to check per scan. Valid values are from 1 to 225.                                                                                                                                                    |
| <b>period</b> <i>seconds</i>     | (Optional) Specifies the period of time between scans. Valid values are from 30 to 3600 seconds.                                                                                                                                                          |

|                                   |                                                                                                                                                                                                                      |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>settle-time</b> <i>seconds</i> | (Optional) Specifies the amount of time that elapsed during which updates for a candidate prefix are ignored as inconsistencies. Valid values are from 1 to 3600 seconds. This keyword is used during route updates. |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Command Default** All consistency checkers are disabled by default.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                           |
|------------------------|----------------|-----------------------------------------------------------------------------------------------|
|                        | 12.0(15)S      | This command was introduced.                                                                  |
|                        | 12.2(2)T       | This command was integrated into Cisco IOS Release 12.2(2)T.                                  |
|                        | 12.2(14)SX     | Support for this command was implemented on the Supervisor Engine 720.                        |
|                        | 12.2(17d)SXB   | Support for this command on the Supervisor Engine 2 was integrated into Release 12.2(17d)SXB. |
|                        | 12.2(25)S      | This command was replaced by the <b>cef table consistency-check</b> command.                  |
|                        | 12.2(28)SB     | This command was replaced by the <b>cef table consistency-check</b> command.                  |
|                        | 12.2(33)SRA    | This command was replaced by the <b>cef table consistency-check</b> command.                  |
|                        | 12.2(33)SXH    | This command was replaced by the <b>cef table consistency-check</b> command.                  |
|                        | 12.4(20)T      | This command was removed.                                                                     |

**Usage Guidelines** This command configures Cisco Express Forwarding table consistency checkers and parameters for the detection mechanism types that are listed in the table below.

**Table 2: CEF Detection Mechanism Types**

| Detection Mechanism | Where Operates      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lc-detect           | Line Card or Module | Operates on the line card or module detecting and retrieving IP prefixes that are missing from its FIB table. If IP prefixes are missing, the line card or module cannot forward packets for these addresses. The lc-detect mechanism sends IP prefixes to the RP or rendezvous point for confirmation. If the RP or rendezvous point detects that it has the relevant entry, an inconsistency is identified and an error message is displayed. Also, the RP or rendezvous point sends a signal back to the line card or module confirming that the IP prefix is an inconsistency. |
| scan-lc             | Line Card or Module | Operates on the line card or module by looking through the FIB table for a configurable time period and sending the next <i>n</i> prefixes to the RP or rendezvous point. The RP or rendezvous point performs an exact lookup. If it finds the prefix missing, the RP or rendezvous point reports an inconsistency. Finally, the RP or rendezvous point sends a signal back to the line card or module for confirmation.                                                                                                                                                           |
| scan-rp             | Route Processor     | Operates on the RP or rendezvous point (opposite of the scan-lc) by looking through the FIB table for a configurable time period and sending the next <i>n</i> prefixes to the line card or module. The line card or module performs an exact lookup. If it finds the prefix missing, the line card or module reports an inconsistency and finally signals the RP or rendezvous point for confirmation.                                                                                                                                                                            |

| Detection Mechanism | Where Operates  | Description                                                                                                                                                         |
|---------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| scan-rib            | Route Processor | Operates on all RPs or rendezvous points (even nondistributed) and scans the RIB to ensure that prefix entries are present in the RP or rendezvous point FIB table. |

### Examples

The following example shows how to enable the Cisco Express Forwarding consistency checkers:

```
Router(config)# ip cef table consistency-check
```

### Related Commands

| Command                           | Description                                                                                                                      |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>clear ip cef inconsistency</b> | Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers. |
| <b>debug ip cef</b>               | Displays various Cisco Express Forwarding table query and check events.                                                          |
| <b>show ip cef inconsistency</b>  | Displays Cisco Express Forwarding IP prefix inconsistencies.                                                                     |

# ip cef table event-log



## Note

The **ip cef table event-log** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T, and later releases.

To control Cisco Express Forwarding 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

|                                 |                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>size</b> <i>event-number</i> | (Optional) Number of event entries. The range is from 1 to 4294967295. The default is 10000.                                |
| <b>match</b>                    | (Optional) Log events matching specified prefix and mask.                                                                   |
| <i>ip-prefix</i>                | (Optional) IP prefixes matched, in dotted decimal format (A.B.C.D).                                                         |
| <i>mask</i>                     | (Optional) Network mask written as A.B.C.D.                                                                                 |
| <b>vrf</b> <i>vrf-name</i>      | (Optional) Virtual Private Network (VPN) routing and forwarding instance (VRF) Cisco Express Forwarding table and VRF name. |

## Command Default

Default size for event log is 10000 entries.

## Command Modes

Global configuration (config)

## 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. |

| Release     | Modification                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
| 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.  |
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2SX releases. |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

### Usage Guidelines

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

The Cisco Express Forwarding event log collects Cisco Express Forwarding events as they occur without debugging enabled. This process 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 Cisco Express Forwarding feature.

When the Cisco Express Forwarding 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 shows how to set the Cisco Express Forwarding table event log size to 5000 entries:

```
Router(config)# ip cef table event-log size 5000
```

### Related Commands

| Command                            | Description                                                                      |
|------------------------------------|----------------------------------------------------------------------------------|
| <b>cef table consistency-check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters. |



# ip cef table resolution-timer



## Note

The **ip cef table resolution-timer** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To change the Cisco Express Forwarding 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

|                |                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------|
| <i>seconds</i> | Timer value in seconds. Range is from 0 to 30 seconds; 0 is for the automatic exponential backoff scheme. |
|----------------|-----------------------------------------------------------------------------------------------------------|

## Command Default

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

## Command Modes

Global configuration (config)

## Command History

| Release     | Modification                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(2)T    | This command was introduced.                                                                                        |
| 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
| 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.  |
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2SX releases. |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

### Usage Guidelines

The Cisco Express Forwarding 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 show how to set the Cisco Express Forwarding background resolution timer to 3 seconds:

```
Router(config)# ip cef table resolution-timer 3
```

## ip cef traffic-statistics

To change the time interval that controls when Next Hop Resolution Protocol (NHRP) sets up or tears down a switched virtual circuit (SVC), 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

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>load-interval</b> <i>seconds</i> | (Optional) Length of time (in 30-second increments) during which the average <i>trigger-threshold</i> and <i>teardown-threshold</i> intervals are calculated before an SVC setup or teardown action is taken. (These thresholds are configured in the <b>ip nhrp trigger-svc</b> command.) The <b>load-interval</b> range is from 30 seconds to 300 seconds, in 30-second increments. The default value is 30 seconds. |
| <b>update-rate</b> <i>seconds</i>   | (Optional) Frequency that the port adapter sends the accounting statistics to the Route Processor (RP). When the route processor is using NHRP in distributed Cisco Express Forwarding switching mode, this value must be set to 5 seconds. The default value is 10 seconds.                                                                                                                                           |

### Command Default

Load interval: 30 seconds Update rate: 10 seconds

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0        | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

### Usage Guidelines

The **ip nhrp trigger-svc** command sets the threshold by which NHRP sets up and tears down a connection. The threshold is the Cisco Express Forwarding traffic load statistics. The thresholds in the **ip nhrp trigger-svc**

command are measured during a sampling interval of 30 seconds, by default. To change that interval over which that threshold is determined, use the **load-interval** *seconds* option of the **ip cef traffic-statistics** command.

When NHRP is configured on a Cisco Express Forwarding switching node with a Versatile Interface Processor (VIP2) adapter, you must make sure the **update-rate** keyword is set to 5 seconds.

Other Cisco IOS features could also use the **ip cef traffic-statistics** command; this NHRP feature relies on it.

## Examples

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

```
Router(config)# ip cef traffic-statistics load-interval 120
```

## Related Commands

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

## ip load-sharing

To enable load balancing for Cisco Express Forwarding on an interface, use the **ip load-sharing** command in interface configuration mode. To disable load balancing for Cisco Express Forwarding on the interface, use the **no** form of this command.

**ip load-sharing {per-packet| per-destination}**

**no ip load-sharing per-packet**

### Syntax Description

|                        |                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>per-packet</b>      | Enables per-packet load balancing for Cisco Express Forwarding on the interface. This functionality and keyword are not supported on all platforms. See "Usage Guidelines" for more information. |
| <b>per-destination</b> | Enables per-destination load balancing for Cisco Express Forwarding on the interface.                                                                                                            |

### Command Default

Per-destination load balancing is enabled by default when you enable Cisco Express Forwarding.

### Command Modes

Interface configuration (config-if)

### Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS      | This command was introduced.                                                                                                                                                      |
| 11.1CC      | This command was modified. Multiple platform support was added.                                                                                                                   |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

### 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 Cisco Express Forwarding is not supported on Engine 2 Cisco 12000 series Internet router 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 tends 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.

**Note**

Per-packet load balancing can result in out-of-sequence (OOS) packet delivery errors on some routers, which can cause applications such as VoIP to malfunction. Therefore, per-packet load balancing is not recommended. For more information, see the release notes and caveats for your platform and software release.

### Cisco ASR 1000 Series Aggregation Services Routers

The **ip load-sharing** command is not supported on the Cisco ASR 1000 Series Aggregation Services Router. Per-packet load balancing is not supported. On the Cisco ASR 1000 Series Aggregation Services Router, per-destination load balancing is enabled by default and cannot be disabled.

## Examples

The following example shows how to enable per-packet load balancing:

```
Router(config)# interface E0
Router(config-if)# ip load-sharing per-packet
```

The following example shows how to enable per-destination load balancing:

```
Router(config)# interface E0
Router(config-if)# ip load-sharing per-destination
```

## Related Commands

| Command       | Description                 |
|---------------|-----------------------------|
| <b>ip cef</b> | Enables CEF on the RP card. |

## 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** [cef] distributed| flow| policy| same-interface]

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

### Syntax Description

|                |                                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cef            | (Optional) Enables Cisco Express Forwarding operation on an interface.                                                                                              |
| distributed    | (Optional) Enables distributed switching on the interface. (This keyword is not supported on the Cisco 7600 routers.) Distributed switching is disabled by default. |
| flow           | (Optional) Enables NetFlow accounting for packets that are received by the interface. The default is disabled.                                                      |
| policy         | (Optional) Enables fast-switching for packets that are forwarded using policy-based routing (PBR). Fast Switching for PBR (FSPBR) is disabled by default.           |
| same-interface | (Optional) Enables fast-switching of packets onto the same interface on which they arrived.                                                                         |

### Command Default

The switching method is not controlled.

### Command Modes

Interface configuration (config-if)

### Command History

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

| Release     | Modification                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was integrated into Cisco IOS Release 12.2(25)S. The ip route-cache flow command is automatically remapped to the ip flow ingress command. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB. This command is not supported on the Cisco 10000 series router.                          |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                         |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                           |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI.                                                                                         |

## Usage Guidelines

### IP Route Cache



#### Note

The Cisco 10000 series routers do not support the **ip route-cache** command.

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 Cisco Express Forwarding or distributed Cisco Express Forwarding on the physical interface and all subinterfaces associated with the physical interface.

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



#### Note

IPv4 fast switching is removed with the implementation of the Cisco Express Forwarding infrastructure enhancements for Cisco IOS 12.2(25)S-based releases and Cisco IOS Release 12.4(20)T. For these and later Cisco IOS releases, switching path are Cisco Express Forwarding switched or process switched.

### 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

The flow caching option can be used in conjunction with Cisco Express Forwarding switching to enable NetFlow, which allows statistics to be gathered with a finer granularity. The statistics include IP subprotocols, well-known ports, total flows, average number of packets per flow, and average flow lifetime.



**Note**

The **ip route-cache flow** command has the same functionality as the **ip flow ingress** command, which is the preferred command for enabling NetFlow. If either the **ip route-cache flow** command or the **ip flow ingress** command is configured, both commands will appear in the output of the **show running-config** command.

---

**IP Route Cache Distributed**

The distributed option is supported on Cisco routers with line cards and Versatile Interface Processors (VIPs) that support Cisco Express Forwarding 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.

If the **ip route-cache distributed**, **ip cef distributed**, and **ip route-cache flow** commands are configured, the VIP performs distributed Cisco Express Forwarding switching and collects a finer granularity of flow statistics.

**IP Route-Cache Cisco Express Forwarding**

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

Disabling Cisco Express Forwarding or distributed Cisco Express Forwarding on an interface disables Cisco Express Forwarding or distributed Cisco Express Forwarding switching for packets forwarded to the interface, but does not affect packets forwarded out of the interface.

Additionally, when you disable distributed Cisco Express Forwarding on the RSP, Cisco IOS software switches packets using the next-fastest switch path (Cisco Express Forwarding).

Enabling Cisco Express Forwarding globally disables distributed Cisco Express Forwarding on all interfaces. Disabling Cisco Express Forwarding or distributed Cisco Express Forwarding globally enables process switching on all interfaces.

**Note**

On the Cisco 12000 series Internet router, you must not disable distributed Cisco Express Forwarding on an interface.

---

**IP Route Cache Policy**

If Cisco Express Forwarding is already enabled, the **ip route-cache route** command is not required because PBR packets are Cisco Express Forwarding-switched by default.

Before you can enable fast-switched PBR, you must first configure PBR.

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.

**Note**

Not all switching methods are available on all platforms. Refer to the *Cisco Product Catalog* for information about features available on the platform you are using.

**Examples****Examples**

The following example shows how to enable fast switching and disable Cisco Express Forwarding 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 255.255.255.224
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 unreachable 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 Cisco Express Forwarding 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 FastEthernet interface 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
!

```

The following example shows how to enable Cisco Express Forwarding (and to disable distributed Cisco Express Forwarding if it is enabled):

```
Router(config-if)# ip route-cache cef
```

The following example shows how to enable VIP distributed Cisco Express Forwarding and per-flow accounting on an interface (regardless of the previous switching type enabled on the interface):

```

Router(config)# interface e0
Router(config-if)# ip address 10.252.245.2 255.255.255.0
Router(config-if)# ip route-cache distributed
Router(config-if)# ip route-cache flow

```

The following example shows how to enable Cisco Express Forwarding on the router globally (which also disables distributed Cisco Express Forwarding on any interfaces that are running distributed Cisco Express Forwarding), and disable Cisco Express Forwarding (which enables process switching) on Ethernet interface 0:

```

Router(config)# ip cef
Router(config)# interface e0
Router(config-if)# no ip route-cache cef

```

The following example shows how to enable distributed Cisco Express Forwarding operation on the router (globally), and disable Cisco Express Forwarding operation on Ethernet interface 0:

```

Router(config)# ip cef distributed
Router(config)# interface e0
Router(config-if)# no ip route-cache cef

```

The following example shows how to reenabling distributed Cisco Express Forwarding operation on Ethernet interface 0:

```

Router(config)# ip cef distributed
Router(config)# interface e0
Router(config-if)# ip route-cache distributed

```

## Examples

The following example shows how to enable fast switching and disable Cisco Express Forwarding 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 255.255.255.224
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 unreachable 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 FastEthernet interface 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
!

```

## Examples

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 FastEthernet interface 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 255.255.255.224
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 unreachable 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

```

## Examples

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 Cisco Express Forwarding switching is for FastEthernet interface 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

```

## Examples

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 mypbtag 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 mypbrtag
```

The following example shows that FSPBR is enabled for FastEthernet interface 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 unreachable 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                                             |
|--------------------------------|---------------------------------------------------------|
| <b>exit</b>                    | Leaves aggregation cache mode.                          |
| <b>ip cef</b>                  | Enables Cisco Express Forwarding on the RP card.        |
| <b>ip cef distributed</b>      | Enables distributed Cisco Express Forwarding operation. |
| <b>ip flow ingress</b>         | Configures NetFlow on a subinterface.                   |
| <b>set default interface</b>   | Configures a default interface for PBR.                 |
| <b>set interface</b>           | Configures a specified interface for PBR.               |
| <b>set ip default next-hop</b> | Configures a default IP next hop for PBR.               |

| Command                   | Description                                                            |
|---------------------------|------------------------------------------------------------------------|
| <b>show cef interface</b> | Displays detailed Cisco Express Forwarding information for interfaces. |
| <b>show ip interface</b>  | Displays the usability status of interfaces configured for IP.         |
| <b>show mpoa client</b>   | Displays the routing table cache used to fast switch IP traffic.       |

## ip route-cache policy

The **policy** keyword for the **ip route-cache** command is no longer documented as a separate command.

The information for using the **policy** keyword for the **ip route-cache** command has been incorporated into the **ip route-cache** command documentation. See the **ip route-cache** command documentation for more information.



## ip verify unicast notification threshold

To configure the threshold value used to determine whether to send a Unicast Reverse Path Forwarding (RPF) drop rate notification, use the **ip verify unicast notification threshold** command in interface configuration mode. To set the notification threshold back to the default value, use the **no** form of this command.

**ip verify unicast notification threshold** *packets-per-second*

**no ip verify unicast notification threshold**

### Syntax Description

|                           |                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>packets-per-second</i> | Threshold value, in packets per second, used to determine whether to send a Unicast RPF drop rate notification. The range is from 0 to 4294967295. The default is 1000. |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Command Default

No notifications are sent.

### Command Modes

Interface configuration (config-if)

### Command History

| Release      | Modification                                                     |
|--------------|------------------------------------------------------------------|
| 12.2(31)SB2  | This command was introduced.                                     |
| 12.2(33)SRC  | This command was integrated into Cisco IOS Release 12.2(33)SRC.  |
| 12.4(20)T    | This command was integrated into Cisco IOS Release 12.4(20)T.    |
| 12.2(33)SX12 | This command was integrated into Cisco IOS Release 12.2(33)SX12. |

### Usage Guidelines

This command configures the threshold Unicast RPF drop rate which, when exceeded, triggers a notification. Configuring a value of 0 means that any Unicast RPF packet drop triggers a notification.

### Examples

The following example shows how to configure a notification threshold value of 900 on Ethernet interface 3/0:

```
Router> enable
Router# configure terminal
Router(config)# interface ethernet 3/0
Router(config-if)# ip verify unicast notification threshold 900
```

**Related Commands**

| Command                                     | Description                                                                                                         |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>ip verify drop-rate compute interval</b> | Configures the interval of time between Unicast RPF drop rate computations.                                         |
| <b>ip verify drop-rate compute window</b>   | Configures the interval of time during which the Unicast RPF drop count is collected for the drop rate computation. |
| <b>ip verify drop-rate notify hold-down</b> | Configures the minimum time between Unicast RPF drop rate notifications.                                            |

# ip verify unicast reverse-path



## Note

This command was replaced by the **ip verify unicast source reachable-via** command effective with Cisco IOS Release 12.0(15)S. The **ip verify unicast source reachable-via** command allows for more flexibility and functionality, such as supporting asymmetric routing, and should be used for any Reverse Path Forward implementation. The **ip verify unicast reverse-path** command is still supported.

To enable Unicast Reverse Path Forwarding (Unicast RPF), use the **ip verify unicast reverse-path** command in interface configuration mode. To disable Unicast RPF, use the **no** form of this command.

**ip verify unicast reverse-path** [ *list* ]

**no ip verify unicast reverse-path** [ *list* ]

## Syntax Description

|             |                                                                                                                                                                                                                                                                                                                                                              |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>list</i> | (Optional) Specifies a numbered access control list (ACL) in the following ranges: <ul style="list-style-type: none"> <li>• 1 to 99 (IP standard access list)</li> <li>• 100 to 199 (IP extended access list)</li> <li>• 1300 to 1999 (IP standard access list, expanded range)</li> <li>• 2000 to 2699 (IP extended access list, expanded range)</li> </ul> |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

Unicast RPF is disabled.

## Command Modes

Interface configuration (config-if)

## Command History

| Release          | Modification                                                                                                                                                                                                                                                      |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1(CC)<br>12.0 | This command was introduced. This command was not included in Cisco IOS Release 11.2 or 11.3                                                                                                                                                                      |
| 12.1(2)T         | Added ACL support using the list argument. Added per-interface statistics on dropped or suppressed packets.                                                                                                                                                       |
| 12.0(15)S        | The <b>ip verify unicast source reachable-via</b> command replaced this command, and the following keywords were added to the <b>ip verify unicast source reachable-via</b> command: <b>allow-default</b> , <b>allow-self-ping</b> , <b>rx</b> , and <b>any</b> . |

| Release     | Modification                                                                                         |
|-------------|------------------------------------------------------------------------------------------------------|
| 12.1(8a)E   | The <b>ip verify unicast reverse-path</b> command was integrated into Cisco IOS Release 12.1(8a)E.   |
| 12.2(14)S   | The <b>ip verify unicast reverse-path</b> command was integrated into Cisco IOS Release 12.2(14)S.   |
| 12.2(14)SX  | The <b>ip verify unicast reverse-path</b> command was integrated into Cisco IOS Release 12.2(14)SX.  |
| 12.2(33)SRA | The <b>ip verify unicast reverse-path</b> command was integrated into Cisco IOS Release 12.2(33)SRA. |

### Usage Guidelines

Use the **ip verify unicast reverse-path interface** command to mitigate problems caused by malformed or forged (spoofed) IP source addresses that are received by a router. Malformed or forged source addresses can indicate denial of service (DoS) attacks on the basis of source IP address spoofing.

When Unicast RPF is enabled on an interface, the router examines all packets that are received on that interface. The router checks to ensure that the source address appears in the Forwarding Information Base (FIB) and that it matches the interface on which the packet was received. This "look backwards" ability is available only when Cisco Express Forwarding is enabled on the router because the lookup relies on the presence of the FIB. Cisco Express Forwarding generates the FIB as part of its operation.

To use Unicast RPF, enable Cisco Express Forwarding switching or distributed Cisco Express Forwarding switching in the router. There is no need to configure the input interface for Cisco Express Forwarding switching. As long as Cisco Express Forwarding is running on the router, individual interfaces can be configured with other switching modes.



#### Note

It is very important for Cisco Express Forwarding to be configured globally in the router. Unicast RPF will not work without Cisco Express Forwarding.



#### Note

Unicast RPF is an input function and is applied on the interface of a router only in the ingress direction.

The Unicast Reverse Path Forwarding feature checks to determine whether any packet that is received at a router interface arrives on one of the best return paths to the source of the packet. The feature does this by doing a reverse lookup in the Cisco Express Forwarding table. If Unicast RPF does not find a reverse path for the packet, Unicast RPF can drop or forward the packet, depending on whether an ACL is specified in the Unicast Reverse Path Forwarding command. If an ACL is specified in the command, then when (and only when) a packet fails the Unicast RPF check, the ACL is checked to determine whether the packet should be dropped (using a deny statement in the ACL) or forwarded (using a permit statement in the ACL). Whether a packet is dropped or forwarded, the packet is counted in the global IP traffic statistics for Unicast RPF drops and in the interface statistics for Unicast RPF.

If no ACL is specified in the Unicast Reverse Path Forwarding command, the router drops the forged or malformed packet immediately and no ACL logging occurs. The router and interface Unicast RPF counters are updated.

Unicast RPF events can be logged by specifying the logging option for the ACL entries used by the Unicast Reverse Path Forwarding command. Log information can be used to gather information about the attack, such as source address, time, and so on.

### Where to Use RPF in Your Network

Unicast RPF may be used on interfaces in which only one path allows packets from valid source networks (networks contained in the FIB). Unicast RPF may also be used in cases for which a router has multiple paths to a given network, as long as the valid networks are switched via the incoming interfaces. Packets for invalid networks will be dropped. For example, routers at the edge of the network of an Internet service provider (ISP) are likely to have symmetrical reverse paths. Unicast RPF may still be applicable in certain multi-homed situations, provided that optional Border Gateway Protocol (BGP) attributes such as weight and local preference are used to achieve symmetric routing.

With Unicast RPF, all equal-cost "best" return paths are considered valid. This means that Unicast RPF works in cases where multiple return paths exist, provided that each path is equal to the others in terms of the routing cost (number of hops, weights, and so on) and as long as the route is in the FIB. Unicast RPF also functions where Enhanced Internet Gateway Routing Protocol (EIGRP) variants are being used and unequal candidate paths back to the source IP address exist.

For example, routers at the edge of the network of an ISP are more likely to have symmetrical reverse paths than routers that are in the core of the ISP network. Routers that are in the core of the ISP network have no guarantee that the best forwarding path out of the router will be the path selected for packets returning to the router. In this scenario, you should use the new form of the command, **ip verify unicast source reachable-via**, if there is a chance of asymmetrical routing.

### Examples

The following example shows that the Unicast Reverse Path Forwarding feature has been enabled on a serial interface:

```
ip cef
! or "ip cef distributed" for RSP+VIP based routers
!
interface serial 5/0/0
 ip verify unicast reverse-path
```

The following example uses a very simple single-homed ISP to demonstrate the concepts of ingress and egress filters used in conjunction with Unicast RPF. The example illustrates an ISP-allocated classless interdomain routing (CIDR) block 192.168.202.128/28 that has both inbound and outbound filters on the upstream interface. Be aware that ISPs are usually not single-homed. Hence, provisions for asymmetrical flows (when outbound traffic goes out one link and returns via a different link) need to be designed into the filters on the border routers of the ISP.

```
ip cef distributed
!
interface Serial 5/0/0
 description Connection to Upstream ISP
 ip address 192.168.200.225 255.255.255.255
 no ip redirects
 no ip directed-broadcast
 no ip proxy-arp
 ip verify unicast reverse-path
 ip access-group 111 in
 ip access-group 110 out
!
access-list 110 permit ip 192.168.202.128 10.0.0.31 any
access-list 110 deny ip any any log
access-list 111 deny ip host 10.0.0.0 any log
access-list 111 deny ip 172.16.0.0 255.255.255.255 any log
access-list 111 deny ip 10.0.0.0 255.255.255.255 any log
access-list 111 deny ip 172.16.0.0 255.255.255.255 any log
access-list 111 deny ip 192.168.0.0 255.255.255.255 any log
```

```
access-list 111 deny ip 209.165.202.129 10.0.0.31 any log
access-list 111 permit ip any any
```

The following example demonstrates the use of ACLs and logging with Unicast RPF. In this example, extended ACL 197 provides entries that deny or permit network traffic for specific address ranges. Unicast RPF is configured on Ethernet interface 0 to check packets arriving at that interface.

For example, packets with a source address of 192.168.201.10 arriving at Ethernet interface 0 are dropped because of the deny statement in ACL 197. In this case, the ACL information is logged (the logging option is turned on for the ACL entry) and dropped packets are counted per-interface and globally. Packets with a source address of 192.168.201.100 arriving at Ethernet interface 0 are forwarded because of the permit statement in ACL 197. ACL information about dropped or suppressed packets is logged (the logging option is turned on for the ACL entry) to the log server.

```
ip cef distributed
!
int eth0/1/1
 ip address 192.168.200.1 255.255.255.255
 ip verify unicast reverse-path 197
!
int eth0/1/2
 ip address 192.168.201.1 255.255.255.255
!
access-list 197 deny ip 192.168.201.0 10.0.0.63 any log-input
access-list 197 permit ip 192.168.201.64 10.0.0.63 any log-input
access-list 197 deny ip 192.168.201.128 10.0.0.63 any log-input
access-list 197 permit ip 192.168.201.192 10.0.0.63 any log-input
access-list 197 deny ip host 10.0.0.0 any log-input
access-list 197 deny ip 172.16.0.0 255.255.255.255 any log-input
access-list 197 deny ip 10.0.0.0 255.255.255.255 any log-input
access-list 197 deny ip 172.16.0.0 255.255.255.255 any log-input
access-list 197 deny ip 192.168.0.0 255.255.255.255 any log-input
```

## Related Commands

| Command       | Description                                                   |
|---------------|---------------------------------------------------------------|
| <b>ip cef</b> | Enables Cisco Express Forwarding on the route processor card. |

## ip verify unicast source reachable-via

To enable Unicast Reverse Path Forwarding (Unicast RPF), use the **ip verify unicast source reachable-via** command in interface configuration mode. To disable Unicast RPF, use the **no** form of this command.

**ip verify unicast source reachable-via** {any| rx [l2-src]} [allow-default] [allow-self-ping] [ *access-list* ]  
**no ip verify unicast source reachable-via**

### Syntax Description

|                        |                                                                                                                                                                                                                                                                                                                                                              |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>any</b>             | Examines incoming packets to determine whether the source address is in the Forwarding Information Base (FIB) and permits the packet if the source is reachable through any interface (sometimes referred to as loose mode).                                                                                                                                 |
| <b>rx</b>              | Examines incoming packets to determine whether the source address is in the FIB and permits the packet only if the source is reachable through the interface on which the packet was received (sometimes referred to as strict mode).                                                                                                                        |
| <b>l2-src</b>          | (Optional) Enables source IPv4 and source MAC address binding.                                                                                                                                                                                                                                                                                               |
| <b>allow-default</b>   | (Optional) Allows the use of the default route for RPF verification.                                                                                                                                                                                                                                                                                         |
| <b>allow-self-ping</b> | (Optional) Allows a router to ping its own interface or interfaces.<br><br><b>Caution</b> Use caution when enabling the <b>allow-self-ping</b> keyword. This keyword opens a denial-of-service (DoS) hole.                                                                                                                                                   |
| <i>access-list</i>     | (Optional) Specifies a numbered access control list (ACL) in the following ranges: <ul style="list-style-type: none"> <li>• 1 to 99 (IP standard access list)</li> <li>• 100 to 199 (IP extended access list)</li> <li>• 1300 to 1999 (IP standard access list, expanded range)</li> <li>• 2000 to 2699 (IP extended access list, expanded range)</li> </ul> |

### Command Default

Unicast RPF is disabled.

Source IPv4 and source MAC address binding is disabled.

### Command Modes

Interface configuration (config-if)

### Command History

| Release        | Modification                                                                                                                                                                                                     |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1(CC), 12.0 | This command was introduced. This command was not included in Cisco IOS Release 11.2 or 11.3.                                                                                                                    |
| 12.1(2)T       | Added access control list (ACL) support using the <i>access-list</i> argument. Added per-interface statistics on dropped or suppressed packets.                                                                  |
| 12.0(15)S      | This command replaced the <b>ip verify unicast reverse-path</b> command, and the following keywords were added: <b>allow-default</b> , <b>allow-self-ping</b> , <b>rx</b> , and <b>any</b> .                     |
| 12.1(8a)E      | This command was integrated into Cisco IOS Release 12.1(8a)E.                                                                                                                                                    |
| 12.2(14)S      | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                                                    |
| 12.2(14)SX     | Support for this command was introduced on the Supervisor Engine 720.                                                                                                                                            |
| 12.2(17d)SXB   | Support for this command was introduced on the Supervisor Engine 2.                                                                                                                                              |
| 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                  |
| 12.2(33)SRC    | This command was modified. The <b>l2-src</b> keyword was added to support the source IPv4 and source MAC address binding feature on platforms that support the Cisco Express Forwarding software switching path. |
| 15.0(1)M       | This command was integrated into Cisco IOS Release 15.0(1)M.                                                                                                                                                     |

### Usage Guidelines

Use the **ip verify unicast source reachable-via** interface command to mitigate problems caused by malformed or forged (spoofed) IP source addresses that pass through a router. Malformed or forged source addresses can indicate DoS attacks based on source IP address spoofing.

To use Unicast RPF, enable Cisco Express Forwarding or distributed Cisco Express Forwarding in the router. There is no need to configure the input interface for Cisco Express Forwarding. As long as Cisco Express Forwarding is running on the router, individual interfaces can be configured with other switching modes.



#### Note

It is important for Cisco Express Forwarding to be configured globally on the router. Unicast RPF does not work without Cisco Express Forwarding.



#### Note

Unicast RPF is an input function and is applied on the interface of a router only in the ingress direction.



When Unicast RPF is enabled on an interface, the router examines all packets that are received on that interface. The router checks to make sure that the source address appears in the FIB. If the **rx** keyword is selected, the source address must match the interface on which the packet was received. If the **any** keyword is selected, the source address must be present only in the FIB. This ability to "look backwards" is available only when Cisco Express Forwarding is enabled on the router because the lookup relies on the presence of the FIB. Cisco Express Forwarding generates the FIB as part of its operation.

**Note**

If the source address of an incoming packet is resolved to a null adjacency, the packet will be dropped. The null interface is treated as an invalid interface by the new form of the Unicast RPF command. The older form of the command syntax did not exhibit this behavior.

Unicast RPF checks to determine whether any packet that is received at a router interface arrives on one of the best return paths to the source of the packet. If a reverse path for the packet is not found, Unicast RPF can drop or forward the packet, depending on whether an ACL is specified in the Unicast RPF command. If an ACL is specified in the command, when (and only when) a packet fails the Unicast RPF check, the ACL is checked to determine whether the packet should be dropped (using a deny statement in the ACL) or forwarded (using a permit statement in the ACL). Whether a packet is dropped or forwarded, the packet is counted in the global IP traffic statistics for Unicast RPF drops and in the interface statistics for Unicast RPF.

If no ACL is specified in the **ip verify unicast source reachable-via** command, the router drops the forged or malformed packet immediately, and no ACL logging occurs. The router and interface Unicast RPF counters are updated.

Unicast RPF events can be logged by specifying the logging option for the ACL entries that are used by the **ip verify unicast source reachable-via** command. Log information can be used to gather information about the attack, such as source address, time, and so on.

**Strict Mode RPF**

If the source address is in the FIB and reachable only through the interface on which the packet was received, the packet is passed. The syntax for this method is **ip verify unicast source reachable-via rx**.

**Exists-Only (or Loose Mode) RPF**

If the source address is in the FIB and reachable through any interface on the router, the packet is passed. The syntax for this method is **ip verify unicast source reachable-via any**.

Because this Unicast RPF option passes packets regardless of which interface the packet enters, it is often used on Internet service provider (ISP) routers that are "peered" with other ISP routers (where asymmetrical routing typically occurs). Packets using source addresses that have not been allocated on the Internet, which are often used for spoofed source addresses, are dropped by this Unicast RPF option. All other packets that have an entry in the FIB are passed.

**allow-default**

Normally, sources found in the FIB but only by way of the default route will be dropped. Specifying the **allow-default** keyword option will override this behavior. You must specify the **allow-default** keyword in the command to permit Unicast RPF to successfully match on prefixes that are known through the default route to pass these packets.

**allow-self-ping**

This keyword allows the router to ping its own interface or interfaces. By default, when Unicast RPF is enabled, packets that are generated by the router and destined to the router are dropped, thereby, making certain troubleshooting and management tasks difficult to accomplish. Issue the **allow-self-ping** keyword to enable self-pinging.

**Caution**

Caution should be used when enabling the **allow-self-ping** keyword because this option opens a potential DoS hole.

### Using RPF in Your Network

Use Unicast RPF strict mode on interfaces where only one path allows packets from valid source networks (networks contained in the FIB). Also, use Unicast RPF strict mode when a router has multiple paths to a given network, as long as the valid networks are switched through the incoming interfaces. Packets for invalid networks will be dropped. For example, routers at the edge of the network of an ISP are likely to have symmetrical reverse paths. Unicast RPF strict mode is applicable in certain multihomed situations, provided that optional Border Gateway Protocol (BGP) attributes, such as weight and local preference, are used to achieve symmetric routing.

**Note**

With Unicast RPF, all equal-cost "best" return paths are considered valid. This means that Unicast RPF works in cases where multiple return paths exist, provided that each path is equal to the others in terms of the routing cost (number of hops, weights, and so on) and as long as the route is in the FIB. Unicast RPF also functions where Enhanced Internet Gateway Routing Protocol (EIGRP) variants are being used and unequal candidate paths back to the source IP address exist.

Use Unicast RPF loose mode on interfaces where asymmetric paths allow packets from valid source networks (networks contained in the FIB). Routers that are in the core of the ISP network have no guarantee that the best forwarding path out of the router will be the path selected for packets returning to the router.

### IP and MAC Address Spoof Prevention

In Release 15.0(1)M and later, you can use the **l2-src** keyword to enable source IPv4 and source MAC address binding. To disable source IPv4 and source MAC address binding, use the **no** form of the **ip verify unicast source reachable-via** command.

If an inbound packet fails this security check, it will be dropped and the Unicast RPF dropped-packet counter will be incremented. The only exception occurs if a numbered access control list has been specified as part of the Unicast RPF command in strict mode, and the ACL permits the packet. In this case the packet will be forwarded and the Unicast RPF suppressed-drops counter will be incremented.

**Note**

The **l2-src** keyword cannot be used with the loose uRPF command, **ip verify unicast source reachable-via any** command.

Not all platforms support the **l2-src** keyword. Therefore, not all the possible keyword combinations for strict Unicast RPF in the following list will apply to your platform:

Possible keyword combinations for strict Unicast RPF include the following:

```
allow-default
allow-self-ping
l2-src
<ACL-number>
allow-default allow-self-ping
allow-default l2-src
allow-default <ACL-number>
allow-self-ping l2-src
allow-self-ping <ACL-number>
l2-src <ACL-number>
```

```

allow-default allow-self-ping l2-src
allow-default allow-self-ping <ACL-number>
allow-default l2-src <ACL-number>
allow-self-ping l2-src <ACL-number>
allow-default allow-self-ping l2-src <ACL-number>

```

## Examples

### Examples

The following example uses a very simple single-homed ISP connection to demonstrate the concept of Unicast RPF. In this example, an ISP peering router is connected through a single serial interface to one upstream ISP. Hence, traffic flows into and out of the ISP will be symmetric. Because traffic flows will be symmetric, a Unicast RPF strict-mode deployment can be configured.

```

ip cef
! or "ip cef distributed" for Route Switch Processor+Versatile Interface Processor-
(RSP+VIP-) based routers.
!
interface Serial5/0/0
description - link to upstream ISP (single-homed)
ip address 192.168.200.225 255.255.255.252
no ip redirects
no ip directed-broadcasts
no ip proxy-arp
ip verify unicast source reachable-via

```

### Examples

The following example demonstrates the use of ACLs and logging with Unicast RPF. In this example, extended ACL 197 provides entries that deny or permit network traffic for specific address ranges. Unicast RPF is configured on interface Ethernet 0/1/1 to check packets arriving at that interface.

For example, packets with a source address of 192.168.201.10 arriving at interface Ethernet 0/1/1 are dropped because of the deny statement in ACL 197. In this case, the ACL information is logged (the logging option is turned on for the ACL entry) and dropped packets are counted per-interface and globally. Packets with a source address of 192.168.201.100 arriving at interface Ethernet 0/1/2 are forwarded because of the permit statement in ACL 197. ACL information about dropped or suppressed packets is logged (the logging option is turned on for the ACL entry) to the log server.

```

ip cef distributed
!
int eth0/1/1
ip address 192.168.200.1 255.255.255.0
ip verify unicast source reachable-via rx 197
!
int eth0/1/2
ip address 192.168.201.1 255.255.255.0
!
access-list 197 deny ip 192.168.201.0 0.0.0.63 any log-input
access-list 197 permit ip 192.168.201.64 0.0.0.63 any log-input
access-list 197 deny ip 192.168.201.128 0.0.0.63 any log-input
access-list 197 permit ip 192.168.201.192 0.0.0.63 any log-input
access-list 197 deny ip host 0.0.0.0 any log-input
access-list 197 deny ip 172.16.0.0 0.255.255.255 any log-input
access-list 197 deny ip 10.0.0.0 0.255.255.255 any log-input
access-list 197 deny ip 172.16.0.0 0.15.255.255 any log-input
access-list 197 deny ip 192.168.0.0 0.0.255.255 any log-input

```

### Examples

The following example shows how to enable source IPv4 and source MAC address binding on Ethernet 0/0:

```
Router# configure terminal
```

```
Router(config)# interface Ethernet0/0
Router(config-if)# ip address 10.0.0.1 255.255.255.0
Router(config-if)# ip verify unicast source reachable-via rx 12-src
```

**Related Commands**

| Command                   | Description                                                   |
|---------------------------|---------------------------------------------------------------|
| <b>ip cef</b>             | Enables Cisco Express Forwarding on the route processor card. |
| <b>ip cef distributed</b> | Enables Cisco Express Forwarding on the line card.            |

## ip verify unicast vrf

To enable Unicast Reverse Path Forwarding (Unicast RPF) verification for a specified VRF, use the **ip verify unicast vrf** command in interface configuration mode. To disable the Unicast RPF check for a VRF, use the **no** form of this command.

**ip verify unicast vrf** *vrf-name* {**deny**|**permit**}

**no ip verify unicast vrf** *vrf-name* {**deny**|**permit**}

### Syntax Description

|                 |                                                                                                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------|
| <i>vrf-name</i> | Virtual Private Network (VPN) routing and forwarding (VRF) instance name.                                           |
| <b>deny</b>     | Specifies that traffic associated with the specified VRF is dropped after it passes the Unicast RPF verification.   |
| <b>permit</b>   | Specifies that traffic associated with the specified VRF is forwarded after it passes the Unicast RPF verification. |

### Command Default

Unicast RPF verification is disabled.

### Command Modes

Interface configuration (config-if)

### Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.0(29)S   | This command was introduced.                                    |
| 12.2(25)S   | This command was integrated into Cisco IOS Release 12.2(25)S.   |
| 12.3(14)T   | This command was integrated into Cisco IOS Release 12.3(14)T.   |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(27)SBC. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |

### Usage Guidelines

Unicast RPF is configured to verify that the source address is in the Forwarding Information Base (FIB). The **ip verify unicast vrf** command is configured in interface configuration mode and is enabled for each VRF.

This command has **permit** and **deny** keywords that are used to determine if traffic is forwarded or dropped after Unicast RPF verification.

### Examples

The following example configures Unicast RPF verification for VRF1 and VRF2. VRF1 traffic is forwarded. VRF2 traffic is dropped.

```
Router(config)# interface Ethernet 0
Router(config-if)# ip verify unicast vrf vrf1 permit
Router(config-if)# ip verify unicast vrf vrf2 deny
Router(config-if)# end
```

### Related Commands

| Command                  | Description                                                                                    |
|--------------------------|------------------------------------------------------------------------------------------------|
| <b>import ipv4</b>       | Configures an import map to import IPv4 prefixes from the global routing table to a VRF table. |
| <b>ip vrf</b>            | Configures a VRF routing table.                                                                |
| <b>rd</b>                | Creates routing and forwarding tables for a VRF.                                               |
| <b>show ip bgp</b>       | Displays entries in the BGP routing table.                                                     |
| <b>show ip bgp vpnv4</b> | Displays VPN address information from the BGP table.                                           |
| <b>show ip vrf</b>       | Displays the set of defined VRFs and associated interfaces.                                    |

# ipv6 cef

To enable Cisco Express Forwarding for IPv6, use the **ipv6 cef** command in global configuration mode. To disable Cisco Express Forwarding for IPv6, use the **no** form of this command.

**ipv6 cef**

**no ipv6 cef**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Cisco Express Forwarding for IPv6 is disabled by default.

## Command Modes

Global configuration (config)

## Command History

| Release                    | Modification                                                                        |
|----------------------------|-------------------------------------------------------------------------------------|
| 12.0(22)S                  | This command was introduced.                                                        |
| 12.2(13)T                  | This command was integrated into Cisco IOS Release 12.2(13)T.                       |
| 12.2(14)S                  | This command was integrated into Cisco IOS Release 12.2(14)S.                       |
| 12.2(28)SB                 | This command was integrated into Cisco IOS Release 12.2(28)SB.                      |
| 12.2(25)SG                 | This command was integrated into Cisco IOS Release 12.2(25)SG.                      |
| 12.2(33)SRA                | This command was integrated into Cisco IOS Release 12.2(33)SRA.                     |
| 12.2(33)SXH                | This command was integrated into Cisco IOS Release 12.2(33)SXH.                     |
| Cisco IOS XE Release 2.1   | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |
| Cisco IOS XE Release 3.2SE | This command was integrated into Cisco IOS XE Release 3.2SE.                        |

## Usage Guidelines

The **ipv6 cef** command is similar to the **ip cef** command, except that it is IPv6-specific.

The **ipv6 cef** command is not available on the Cisco 12000 series Internet routers because this distributed platform operates only in distributed Cisco Express Forwarding for IPv6 mode.



### Note

The **ipv6 cef** command is not supported in interface configuration mode.



**Note**

Some distributed architecture platforms, such as the Cisco 7500 series routers, support both Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6. When Cisco Express Forwarding for IPv6 is configured on distributed platforms, Cisco Express Forwarding switching is performed by the Route Processor (RP).



**Note**

You must enable Cisco Express Forwarding for IPv4 by using the **ip cef** global configuration command before enabling Cisco Express Forwarding for IPv6 by using the **ipv6 cef** global configuration command.

Cisco Express Forwarding for IPv6 is advanced Layer 3 IP switching technology that functions the same and offer the same benefits as Cisco Express Forwarding for IPv4. Cisco Express Forwarding for IPv6 optimizes network performance and scalability for networks with dynamic, topologically dispersed traffic patterns, such as those associated with web-based applications and interactive sessions.

## Examples

The following example enables standard Cisco Express Forwarding for IPv4 operation and then standard Cisco Express Forwarding for IPv6 operation globally on the router.

```
ip cef
ipv6 cef
```

## Related Commands

| Command                     | Description                                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>ip route-cache</b>       | Controls the use of high-speed switching caches for IP routing.                                                 |
| <b>ipv6 cef accounting</b>  | Enables Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 network accounting. |
| <b>ipv6 cef distributed</b> | Enables distributed Cisco Express Forwarding for IPv6.                                                          |
| <b>show cef</b>             | Displays which packets the line cards dropped or displays which packets were not express-forwarded.             |
| <b>show ipv6 cef</b>        | Displays entries in the IPv6 FIB.                                                                               |



## ipv6 cef accounting

To enable Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 network accounting, use the **ipv6 cef accounting** command in global configuration mode or interface configuration mode. To disable Cisco Express Forwarding for IPv6 network accounting, use the **no** form of this command.

**ipv6 cef accounting** *accounting-types*

**no ipv6 cef accounting** *accounting-types*

### Specific Cisco Express Forwarding Accounting Information Through Interface Configuration Mode

**ipv6 cef accounting non-recursive** {external| internal}

**no ipv6 cef accounting non-recursive** {external| internal}

#### Syntax Description

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>accounting-types</i> | <p>The <i>accounting-types</i> argument must be replaced with at least one of the following keywords. Optionally, you can follow this keyword by any or all of the other keywords, but you can use each keyword only once.</p> <ul style="list-style-type: none"> <li>• <b>load-balance-hash</b> --Enables load balancing hash bucket counters.</li> <li>• <b>non-recursive</b> --Enables accounting through nonrecursive prefixes.</li> <li>• <b>per-prefix</b> --Enables express forwarding of the collection of the number of packets and bytes to a destination (or prefix).</li> <li>• <b>prefix-length</b> --Enables accounting through prefix length.</li> </ul> |
| <b>non-recursive</b>    | <p>Enables accounting through nonrecursive prefixes. This keyword is optional when used in global configuration mode after another keyword is entered. See the <i>accounting-types</i> argument.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>external</b>         | <p>Counts input traffic in the nonrecursive external bin.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>internal</b>         | <p>Counts input traffic in the nonrecursive internal bin.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

#### Command Default

Cisco Express Forwarding for IPv6 network accounting is disabled by default.

#### Command Modes

Global configuration (config) Interface configuration (config-if)

**Command History**

| Release                    | Modification                                                               |
|----------------------------|----------------------------------------------------------------------------|
| 12.0(22)S                  | This command was introduced.                                               |
| 12.2(13)T                  | This command was integrated into Cisco IOS Release 12.2(13)T.              |
| 12.2(14)S                  | This command was integrated into Cisco IOS Release 12.2(14)S.              |
| 12.2(25)S                  | The <b>non-recursive</b> and <b>load-balance-hash</b> keywords were added. |
| 12.2(28)SB                 | This command was integrated into Cisco IOS Release 12.2(28)SB.             |
| 12.2(25)SG                 | This command was integrated into Cisco IOS Release 12.2(25)SG.             |
| 12.2(33)SRA                | This command was integrated into Cisco IOS Release 12.2(33)SRA.            |
| 12.2(33)SXH                | This command was integrated into Cisco IOS Release 12.2(33)SXH.            |
| Cisco IOS XE Release 2.1   | This command was introduced on Cisco ASR 1000 Series Routers.              |
| 12.4(20)T                  | This command was integrated into Cisco IOS Release 12.4(20)T.              |
| Cisco IOS XE Release 3.2SE | This command was integrated into Cisco IOS XE Release 3.2SE.               |

**Usage Guidelines**

The **ipv6 cef accounting** command is similar to the **ip cef accounting** command, except that it is IPv6-specific. Configuring Cisco Express Forwarding for IPv6 network accounting enables you to collect statistics on Cisco Express Forwarding for IPv6 traffic patterns in your network.

When you enable network accounting for Cisco Express Forwarding for IPv6 by using the **ipv6 cef accounting** command in global configuration mode, accounting information is collected at the Route Processor (RP) when Cisco Express Forwarding for IPv6 mode is enabled and at the line cards when distributed Cisco Express Forwarding for IPv6 mode is enabled. You can then display the collected accounting information using the **show ipv6 cef EXEC** command.

For prefixes with directly connected next hops, the **non-recursive** keyword enables express forwarding of the collection of packets and bytes through a prefix. This keyword is optional when this command is used in global configuration mode after you enter another keyword on the **ipv6 cef accounting** command.

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 ipv6 cef detail** command.

Per-destination load balancing uses a series of 16 hash buckets into which the set of available paths are distributed. A hash function operating on certain properties of the packet is applied to select a bucket that contains a path to use. The source and destination IP addresses are the properties used to select the bucket for per-destination load balancing. Use the **load-balance-hash** keyword with the **ipv6 cef accounting** command to enable per-hash-bucket counters. Enter the **show ipv6 cef prefix internal** command to display the per-hash-bucket counters.

### Examples

The following example enables the collection of Cisco Express Forwarding for IPv6 accounting information for prefixes with directly connected next hops:

```
Router(config)# ipv6 cef accounting non-recursive
```

### Related Commands

| Command                  | Description                                                                       |
|--------------------------|-----------------------------------------------------------------------------------|
| <b>ip cef accounting</b> | Enable Cisco Express Forwarding network accounting (for IPv4).                    |
| <b>show cef</b>          | Displays information about packets <b>forwarded by Cisco Express Forwarding</b> . |
| <b>show ipv6 cef</b>     | Displays entries in the IPv6 FIB.                                                 |

# ipv6 cef distributed

To enable distributed Cisco Express Forwarding for IPv6, use the **ipv6 cef distributed** command in global configuration mode. To disable Cisco Express Forwarding for IPv6, use the **no** form of this command.

**ipv6 cef distributed**

**no ipv6 cef distributed**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Distributed Cisco Express Forwarding for IPv6 is disabled on the Cisco 7500 series routers and enabled on the Cisco 12000 series Internet routers.

## Command Modes

Global configuration (config)

## Command History

| Release                    | Modification                                                                        |
|----------------------------|-------------------------------------------------------------------------------------|
| 12.0(22)S                  | This command was introduced.                                                        |
| 12.2(13)T                  | This command was integrated into Cisco IOS Release 12.2(13)T.                       |
| 12.2(14)S                  | This command was integrated into Cisco IOS Release 12.2(14)S.                       |
| 12.2(28)SB                 | This command was integrated into Cisco IOS Release 12.2(28)SB.                      |
| 12.2(25)SG                 | This command was integrated into Cisco IOS Release 12.2(25)SG.                      |
| 12.2(33)SRA                | This command was integrated into Cisco IOS Release 12.2(33)SRA.                     |
| 12.2(33)SXH                | This command was integrated into Cisco IOS Release 12.2(33)SXH.                     |
| Cisco IOS XE Release 2.1   | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |
| Cisco IOS XE Release 3.2SE | This command was integrated into Cisco IOS XE Release 3.2SE.                        |

## Usage Guidelines

The **ipv6 cef distributed** command is similar to the **ip cef distributed** command, except that it is IPv6-specific. Enabling distributed Cisco Express Forwarding for IPv6 globally on the router by using the **ipv6 cef distributed** in global configuration mode distributes the Cisco Express Forwarding processing of IPv6 packets from the Route Processor (RP) to the line cards of distributed architecture platforms.

**Note**

The **ipv6 cef distributed** command is not supported on the Cisco 12000 series Internet routers because distributed Cisco Express Forwarding for IPv6 is enabled by default on this platform.

**Note**

To forward distributed Cisco Express Forwarding for IPv6 traffic on the router, configure the forwarding of IPv6 unicast datagrams globally on your router by using the **ipv6 unicast-routing** global configuration command, and configure an IPv6 address and IPv6 processing on an interface by using the **ipv6 address** interface configuration command.

**Note**

You must enable distributed Cisco Express Forwarding for IPv4 by using the **ip cef distributed** global configuration command before enabling distributed Cisco Express Forwarding for IPv6 by using the **ipv6 cef distributed** global configuration command.

Cisco Express Forwarding is advanced Layer 3 IP switching technology. Cisco Express Forwarding optimizes network performance and scalability for networks with dynamic, topologically dispersed traffic patterns, such as those associated with web-based applications and interactive sessions.

**Examples**

The following example enables distributed Cisco Express Forwarding for IPv6 operation:

```
ipv6 cef distributed
```

**Related Commands**

| Command               | Description                                                     |
|-----------------------|-----------------------------------------------------------------|
| <b>ip route-cache</b> | Controls the use of high-speed switching caches for IP routing. |
| <b>show ipv6 cef</b>  | Displays entries in the IPv6 FIB.                               |

## ipv6 cef load-sharing algorithm

To select a Cisco Express Forwarding load-balancing algorithm for IPv6, use the **ipv6 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.

**ipv6 cef load-sharing algorithm** {**original**|**universal** [*id*]} [**include-ports** {**source** [*id*]|**destination** [*id*]|**source** [*id*]**destination** [*id*]**gtp**}}

**no ipv6 cef load-sharing algorithm**

### Syntax Description

|                                             |                                                                                                                                                                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>original</b>                             | Sets the load-balancing algorithm to the original algorithm based on a source and destination hash.                                                                                                                                                              |
| <b>universal</b>                            | Sets the load-balancing algorithm to the universal algorithm that uses a source and destination and an ID hash.                                                                                                                                                  |
| <i>id</i>                                   | (Optional) Fixed identifier in hexadecimal format.                                                                                                                                                                                                               |
| <b>include-ports source</b>                 | Sets the load-balancing algorithm to the include-ports algorithm that uses a Layer 4 source port.                                                                                                                                                                |
| <b>include-ports destination</b>            | Sets the load-balancing algorithm to the include-ports algorithm that uses a Layer 4 destination port.                                                                                                                                                           |
| <b>include-ports source destination</b>     | Sets the load balancing algorithm to the include-ports algorithm that uses Layer 4 source and destination ports.                                                                                                                                                 |
| <b>include-ports source destination gtp</b> | <p>Sets the load-balancing algorithm based on the GPRS Tunneling Protocol Tunnel Endpoint Identifier (GTP TEID) for the GTP-U packets.</p> <p>Sets the load-balancing algorithm based on the Layer 4 source and destination ports for the non-GTP-U packets.</p> |

### Command Default

The universal load-balancing algorithm is selected. If you do not configure the fixed identifier for a load-balancing algorithm, the router automatically generates a unique ID.

### Command Modes

Global configuration (config)

**Command History**

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                                                                                      |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                    |
| 12.2(25)SG  | This command was integrated into Cisco IOS Release 12.2(25)SG.                                                                                                                    |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                     |
| 3.10S       | This command is supported in Cisco IOS XE Release 3.10S. The <b>gtp</b> keyword was added to the command.                                                                         |

**Usage Guidelines**

The **ipv6 cef load-sharing algorithm** command is similar to the **ip cef load-sharing algorithm** command, except that it is IPv6-specific.

When the Cisco Express Forwarding for IPv6 load-balancing algorithm is set to universal mode, each router on the network can make a different load-sharing decision for each source-destination address pair.

The include-ports algorithm allows you to use the Layer 4 source and destination ports as part of the load-balancing decision. This method benefits traffic streams running over equal-cost paths that are not load-shared because the majority of the traffic is between peer addresses that use different port numbers, such as Real-Time Protocol (RTP) streams.

**Examples**

The following example shows how to enable the Cisco Express Forwarding load-balancing algorithm for IPv6 for Layer-4 source and destination ports:

```
Router(config)# ipv6 cef load-sharing algorithm include-ports source destination
```

The router automatically generates fixed IDs for the algorithm.

**Examples**

The following example shows how to enable the IPv6 CEF load-sharing algorithm based on GTP TEID:

```
configure terminal
!
ipv6 cef load-sharing algorithm include-ports source destination gtp
exit
```

**Related Commands**

| Command                              | Description                                                                                                                                         |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>debug ipv6 cef hash</b>           | Displays debug messages for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 load-sharing hash algorithm events. |
| <b>ip cef load-sharing algorithm</b> | Selects a Cisco Express Forwarding load-balancing algorithm (for IPv4).                                                                             |



## ipv6 cef optimize neighbor resolution

To configure address resolution optimization from Cisco Express Forwarding for IPv6 for directly connected neighbors, use the **ipv6 cef optimize neighbor resolution** command in global configuration mode. To disable address resolution optimization from Cisco Express Forwarding for IPv6 for directly connected neighbors, use the **no** form of this command.

**ipv6 cef optimize neighbor resolution**

**no ipv6 cef optimize neighbor resolution**

**Syntax Description** This command has no arguments or keywords.

**Command Default** If this command is not configured, Cisco Express Forwarding for IPv6 does not optimize the address resolution of directly connected neighbors.

**Command Modes** Global configuration (config)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(25)S   | This command was introduced.                                    |
|                 | 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
|                 | 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
|                 | 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

**Usage Guidelines** The **ipv6 cef optimize neighbor resolution** command is very similar to the **ip cef optimize neighbor resolution** command, except that it is IPv6-specific.

Use this command to trigger Layer 2 address resolution of neighbors directly from Cisco Express Forwarding for IPv6.

**Examples** The following example shows how to optimize address resolution from Cisco Express Forwarding for IPv6 for directly connected neighbors:

```
Router(config)# ipv6 cef optimize neighbor resolution
```

**Related Commands**

| Command                                    | Description                                                                                                         |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>ip cef optimize neighbor resolution</b> | Configures address resolution optimization from Cisco Express Forwarding for IPv4 for directly connected neighbors. |

## ipv6 verify unicast reverse-path

To enable Unicast Reverse Path Forwarding (Unicast RPF) for IPv6, use the **ipv6 verify unicast reverse-path** command in interface configuration mode. To disable Unicast RPF, use the **no** form of this command.

**ipv6 verify unicast reverse-path** [*access-list name*]

**no ipv6 verify unicast reverse-path** [*access-list name*]

### Syntax Description

|                                |                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------|
| <b>access-list</b> <i>name</i> | (Optional) Specifies the name of the access list.                                                  |
|                                | <b>Note</b> This keyword and argument are not supported on the Cisco 12000 series Internet router. |

### Command Default

Unicast RPF is disabled.

### Command Modes

Interface configuration (config-if)

### Command History

| Release    | Modification                                                                                                                                                       |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(13)T  | This command was introduced.                                                                                                                                       |
| 12.2(14)S  | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                      |
| 12.0(31)S  | This command was integrated into Cisco IOS Release 12.0(31)S and introduced on the 10G Engine 5 SPA Interface Processor in the Cisco 12000 series Internet router. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                     |

### Usage Guidelines

The **ipv6 verify unicast reverse-path** command is used to enable Unicast RPF for IPv6 in strict checking mode. The Unicast RPF for IPv6 feature requires that Cisco Express Forwarding for IPv6 is enabled on the router.



#### Note

Beginning in Cisco IOS Release 12.0(31)S, the Cisco 12000 series Internet router supports both the **ipv6 verify unicast reverse-path** and **ipv6 verify unicast source reachable-via rx** commands to enable Unicast RPF to be compatible with the Cisco IOS Release 12.3T and 12.2S software trains.

Use the **ipv6 verify unicast reverse-path** command to mitigate problems caused by malformed or forged (spoofed) IP source addresses that pass through a router. Malformed or forged source addresses can indicate denial-of-service (DoS) attacks based on source IP address spoofing.

When Unicast RPF is enabled on an interface, the router examines all packets received on that interface. The router checks to make sure that the source IPv6 address appears in the routing table and that it is reachable by a path through the interface on which the packet was received. Unicast RPF is an input feature and is applied only on the input interface of a router at the upstream end of a connection.

The Unicast RPF feature performs a reverse lookup in the CEF table to check if any packet received at a router interface has arrived on a path identified as a best return path to the source of the packet. If a reverse path for the packet is not found, Unicast RPF can drop or forward the packet, depending on whether an ACL is specified in the Unicast RPF command. If an ACL is specified in the command, then when (and only when) a packet fails the Unicast RPF check, the ACL is checked to determine whether the packet should be dropped (using a deny statement in the ACL) or forwarded (using a permit statement in the ACL). Whether a packet is dropped or forwarded, the packet is counted in the global IP traffic statistics for Unicast RPF drops and in the interface statistics for Unicast RPF.

If no ACL is specified in the Unicast RPF command, the router drops the forged or malformed packet immediately and no ACL logging occurs. The router and interface Unicast RPF counters are updated.

Unicast RPF events can be logged by specifying the logging option for the ACL entries used by the Unicast RPF command. Log information can be used to gather information about the attack, such as source address, time, and so on.



#### Note

When you configure Unicast RPF for IPv6 on the Cisco 12000 series Internet router, the most recently configured checking mode is not automatically applied to all interfaces as on other platforms. You must enable Unicast RPF for IPv6 separately on each interface. When you configure a SPA on the Cisco 12000 series Internet router, the interface address is in the format *slot/subslot/port*. The optional **access-list** keyword for the **ipv6 verify unicast reverse-path** command is not supported on the Cisco 12000 series Internet router. For information about how Unicast RPF can be used with ACLs on other platforms to mitigate the transmission of invalid IPv4 addresses (perform egress filtering) and to prevent (deny) the reception of invalid IPv4 addresses (perform ingress filtering), refer to the "Configuring Unicast Reverse Path Forwarding" chapter in the "Other Security Features" section of the *Cisco IOS Security Configuration Guide*.



#### Note

When using Unicast RPF, all equal-cost "best" return paths are considered valid. This means that Unicast RPF works in cases where multiple return paths exist, provided that each path is equal to the others in terms of the routing cost (number of hops, weights, and so on).

Do not use Unicast RPF on core-facing interfaces that are internal to the network. Internal interfaces are likely to have routing asymmetry, meaning that there are multiple routes to the source of a packet. Apply Unicast RPF only where there is natural or configured symmetry.

For example, routers at the edge of the network of an Internet service provider (ISP) are more likely to have symmetrical reverse paths than routers that are in the core of the ISP network. Routers that are in the core of the ISP network have no guarantee that the best forwarding path out of the router will be the path selected for packets returning to the router. Hence, it is not recommended that you apply Unicast RPF where there is a chance of asymmetric routing. It is simplest to place Unicast RPF only at the edge of a network or, for an ISP, at the customer edge of the network.

## Examples

### Examples

The following example shows how to enable the Unicast RPF feature on a serial interface:

```
interface serial 5/0/0
  ipv6 verify unicast reverse-path
```

### Examples

The following example shows how to enable Unicast RPF for IPv6 with strict checking on a 10G SIP Gigabit Ethernet interface 2/1/2:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface gigabitEthernet 2/1/2
Router(config-if)# ipv6 verify unicast reverse-path
Router(config-if)# exit
```

### Examples

The following example uses a very simple single-homed ISP to demonstrate the concepts of ingress and egress filters used in conjunction with Unicast RPF. The example illustrates an ISP-allocated classless interdomain routing (CIDR) block 209.165.202.128/28 that has both inbound and outbound filters on the upstream interface. Be aware that ISPs are usually not single-homed. Hence, provisions for asymmetrical flows (when outbound traffic goes out one link and returns via a different link) need to be designed into the filters on the border routers of the ISP.

```
interface Serial 5/0/0
description Connection to Upstream ISP
ipv6 address FE80::260:3EFF:FE11:6770/64
no ipv6 redirects
ipv6 verify unicast reverse-path abc
!
ipv6 access-list abc
permit ipv6 host 2::1 any
deny ipv6 FEC0::/10 any
  ipv6 access-group abc in
  ipv6 access-group jkl out
!
access-list abc permit ip FE80::260:3EFF:FE11:6770/64 2001:0DB8:0000:0001::0001 any
access-list abc deny ipv6 any any log
access-list jkl deny ipv6 host 2001:0DB8:0000:0001::0001 any log
access-list jkl deny ipv6 2001:0DB8:0000:0001:FFFF:1234::5 0.0.255.255 any log
access-list jkl deny ipv6 2002:0EF8:002001:0DB8:0000:0001:FFFF:1234::5 172.16.0.0
0.15.255.255 any log
access-list jkl deny ipv6 2001:0CB8:0000:0001:FFFF:1234::5 0.0.255.255 any log
access-list jkl deny ipv6 2003:0DB8:0000:0001:FFFF:1234::5 0.0.0.31 any log
access-list jkl permit ipv6
```

### Examples

The following example demonstrates the use of ACLs and logging with Unicast RPF. In this example, extended ACL abc provides entries that deny or permit network traffic for specific address ranges. Unicast RPF is configured on interface Ethernet 0/0 to check packets arriving at that interface.

For example, packets with a source address of 8765:4321::1 arriving at Ethernet interface 0 are dropped because of the deny statement in ACL "abc." In this case, the ACL information is logged (the logging option is turned on for the ACL entry) and dropped packets are counted per-interface and globally. Packets with a source address of 1234:5678::1 arriving at Ethernet interface 0/0 are forwarded because of the permit statement

in ACL abc. ACL information about dropped or suppressed packets is logged (the logging option is turned on for the ACL entry) to the log server.

```
interface ethernet 0/0
ipv6 address FE80::260:3EFF:FE11:6770/64 link-local
ipv6 verify unicast reverse-path abc
!
ipv6 access-list abc
permit ipv6 1234:5678::/64 any log-input
deny ipv6 8765:4321::/64 any log-input
```

#### Related Commands

| Command                               | Description                                                   |
|---------------------------------------|---------------------------------------------------------------|
| <b>ip cef</b>                         | Enables Cisco Express Forwarding on the route processor card. |
| <b>ip verify unicast reverse-path</b> | Enables Unicast RPF for IPv4 traffic.                         |
| <b>ipv6 cef</b>                       | Enables Cisco Express Forwarding for IPv6 interfaces.         |

## ipv6 verify unicast source reachable-via

To verify that a source address exists in the FIB table and enable Unicast Reverse Path Forwarding (Unicast RPF), use the **ipv6 verify unicast source reachable-via** command in interface configuration mode. To disable URPF, use the **no** form of this command.

```
ipv6 verify unicast source reachable-via {rx|any} [allow-default] [allow-self-ping] [ access-list-name ]
no ipv6 verify unicast
```

### Syntax Description

|                         |                                                                                                                   |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>rx</b>               | Source is reachable through the interface on which the packet was received.                                       |
| <b>any</b>              | Source is reachable through any interface.                                                                        |
| <b>allow-default</b>    | (Optional) Allows the lookup table to match the default route and use the route for verification.                 |
| <b>allow-self-ping</b>  | (Optional) Allows the router to ping a secondary address.                                                         |
| <i>access-list-name</i> | (Optional) Name of the IPv6 access list. Names cannot contain a space or quotation mark, or begin with a numeral. |

### Command Default

Unicast RPF is disabled.

### Command Modes

Interface configuration (config-if)

### Command History

| Release                  | Modification                                                                       |
|--------------------------|------------------------------------------------------------------------------------|
| 12.2(25)S                | This command was introduced.                                                       |
| 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB.                     |
| Cisco IOS XE Release 2.1 | This command was introduced on Cisco ASR 1000 Series Aggregation Services Routers. |

### Usage Guidelines

The **ipv6 verify unicast reverse-path** command is used to enable Unicast RPF for IPv6 in loose checking mode.

Use the **ipv6 verify unicast source reachable-via** command to mitigate problems caused by malformed or forged (spoofed) IP source addresses that pass through an IPv6 router. Malformed or forged source addresses can indicate denial-of-service (DoS) attacks based on source IPv6 address spoofing.

The URPF feature checks to see if any packet received at a router interface arrives on one of the best return paths to the source of the packet. The feature does this by doing a reverse lookup in the CEF table. If URPF does not find a reverse path for the packet, U RPF can drop or forward the packet, depending on whether an access control list (ACL) is specified in the **ipv6 verify unicast source reachable-via** command. If an ACL is specified in the command, then when (and only when) a packet fails the URPF check, the ACL is checked to see if the packet should be dropped (using a deny statement in the ACL) or forwarded (using a permit statement in the ACL). Whether a packet is dropped or forwarded, the packet is counted in the global IP traffic statistics for U RPF drops and in the interface statistics for Unicast RPF.

If no ACL is specified in the **ipv6 verify unicast source reachable-via** command, the router drops the forged or malformed packet immediately and no ACL logging occurs. The router and interface Unicast RPF counters are updated.

U RPF events can be logged by specifying the logging option for the ACL entries used by the **ipv6 verify unicast source reachable-via** command. Log information can be used to gather information about the attack, such as source address, time, and so on.

## Examples

The following example enables Unicast RPF on any interface:

```
ipv6 verify unicast source reachable-via any
```

## Related Commands

| Command                    | Description                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------|
| <b>ipv6 access-list</b>    | Defines an IPv6 access list and places the router in IPv6 access list configuration mode. |
| <b>show ipv6 interface</b> | Displays the usability status of interfaces configured for IPv6.                          |



## mls cef maximum-routes

To limit the maximum number of the routes that can be programmed in the hardware allowed per protocol, use the **mls cef maximum-routes** command in global configuration mode. To return to the default settings, use the **no** form of this command.

**mls cef maximum-routes** {ip| ip-multicast| ipv6| mpls} *maximum-routes*

**no mls cef maximum-routes** {ip| ip-multicast| ipv6| mpls}

### Syntax Description

|                       |                                                                                           |
|-----------------------|-------------------------------------------------------------------------------------------|
| <b>ip</b>             | Specifies the maximum number of IP routes.                                                |
| <i>maximum-routes</i> | Maximum number of the routes that can be programmed in the hardware allowed per protocol. |
| <b>ip-multicast</b>   | Specifies the maximum number of multicast routes.                                         |
| <b>ipv6</b>           | Specifies the maximum number of IPv6 routes.                                              |
| <b>mpls</b>           | Specifies the maximum number of Multiprotocol Label Switching (MPLS) labels.              |

### Command Default

The defaults are as follows:

- For XL-mode systems:
  - IPv4 unicast and MPLS--512,000 routes
  - IPv6 unicast and IPv4 multicast--256,000 routes
- For non-XL mode systems:
  - IPv4 unicast and MPLS--192,000 routes
  - IPv6 unicast and IPv4 multicast--32,000 routes



#### Note

See the "Usage Guidelines" section for information on XL and non-XL mode systems.

### Command Modes

Global configuration (config)

**Command History**

| Release      | Modification                                                    |
|--------------|-----------------------------------------------------------------|
| 12.2(17b)SXA | This command was introduced on the Supervisor Engine 720.       |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH  | This command was integrated into Cisco IOS Release 12.2(33)SXH. |

**Usage Guidelines** **Note**

If you copy a configuration file that contains the multilayer switching (MLS) Cisco Express Forwarding maximum routes into the startup-config file and reload the Cisco 7600 series router, the Cisco 7600 series router reloads after it reboots.

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. The **mls cef maximum-routes** command limits the maximum number of the routes that can be programmed in the hardware. If routes are detected that exceed the limit for that protocol, an exception condition is generated. The determination of XL and non-XL mode is based on the type of Policy Feature Card (PFC) or Distributed Forwarding Card (DFC) modules that are installed in your system. For additional information on systems running Cisco IOS software release 12.2SXF and earlier releases see:

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SXF/native/release/notes/OL\\_4164.html#Policy\\_Feature\\_Card\\_Guidelines\\_and\\_Restrictions](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SXF/native/release/notes/OL_4164.html#Policy_Feature_Card_Guidelines_and_Restrictions)

For additional information on systems running Cisco IOS software release 12.2SXH and later releases see:

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol\\_14271.html#Policy\\_Feature\\_Card\\_Guidelines\\_and\\_Restrictions](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.html#Policy_Feature_Card_Guidelines_and_Restrictions)

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol\\_14271.html#Policy\\_Feature\\_Card\\_Guidelines\\_and\\_Restrictions](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.html#Policy_Feature_Card_Guidelines_and_Restrictions)

The valid values for the *maximum-routes* argument depend on the system mode--XL mode or non-XL mode. The valid values are as follows:

- XL mode
  - IP and MPLS--Up to 1,007,000 routes
  - IP multicast and IPv6--Up to 503,000 routes
- Non-XL mode
  - IP and MPLS--Up to 239,000 routes
  - IP multicast and IPv6--Up to 119,000 routes

**Note**

The maximum values that you are permitted to configure is not fixed but varies depending on the values that are allocated for other protocols.

An example of how to enter the maximum routes argument is as follows:

```
mls cef maximum-routes ip 4
```

where 4 is 4096 IP routes (1024 x4 = 4096).

The new configurations are applied after a system reload only and do not take effect if a switchover occurs.

In RPR mode, if you change and save the maximum-routes configuration, the redundant supervisor engine reloads when it becomes active from either a switchover or a system reload. The reload occurs 5 minutes after the supervisor engine becomes active.

Use the **show mls cef maximum-routes** command to display the current maximum routes system configuration.

## Examples

This example shows how to set the maximum number of routes that are allowed per protocol:

```
Router(config)#  
mls cef maximum-routes ip 100
```

This example shows how to return to the default setting for a specific protocol:

```
Router(config)#  
no mls cef maximum-routes ip
```

## Related Commands

| Command                            | Description                                              |
|------------------------------------|----------------------------------------------------------|
| <b>show mls cef maximum-routes</b> | Displays the current maximum-route system configuration. |

# mls cef tunnel fragment

To allow tunnel fragmentation, use the **mls cef tunnel fragment** command. To return to the default settings, use the **no** form of this command.

**mls cef tunnel fragment**

**no mls cef tunnel fragment**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Tunnel fragmentation is not enabled.

**Command Modes** Global configuration (config)

| Command History | Release      | Modification                                                                             |
|-----------------|--------------|------------------------------------------------------------------------------------------|
|                 | 12.2(18)SXF  | This command was introduced.                                                             |
|                 | 12.2(33)SXH  | This command was modified. Support was added for PCF3BXL, PFC3C, and PFC3CXL modes only. |
|                 | 12.2(33)SXI  | This command was modified. Support was added for PCF3BXL, PFC3C, and PFC3CXL modes only. |
|                 | 12.2(33)SXI2 | This command was modified. Support was added for all PFC3 modes.                         |

**Usage Guidelines** When you enable tunnel fragmentation, if the size of the packets that are going into a tunnel interface exceed the MTU, the packet is fragmented. The packets that are fragmented are reassembled at the destination point.

**Examples** This example shows how to allow tunnel fragmentation:

```
Router(config)#
mls cef tunnel fragment
```

This example shows how to return to the default setting:

```
Router(config)#
no mls cef tunnel fragment
```

## Related Commands

| Command                             | Description                                              |
|-------------------------------------|----------------------------------------------------------|
| <b>show mls cef tunnel fragment</b> | Displays the operational status of tunnel fragmentation. |



## mls erm priority

To assign the priorities to define an order in which protocols attempt to recover from the exception status, use the **mls erm priority** command in global configuration mode. To return to the default settings, use the **no** form of this command.



### Note

The **mls erm priority** command is not available in Cisco IOS Release 12.2(33)SXJ and later Cisco IOS 12.2SX releases.

**mls erm priority** **ipv4** *value* **ipv6** *value* **mpls** *value*

**no mls erm priority** **ipv4** *value* **ipv6** *value* **mpls** *value*

### Syntax Description

|              |                                                                                           |
|--------------|-------------------------------------------------------------------------------------------|
| <b>ipv4</b>  | Prioritizes the IPv4 protocol. The default priority is 1.                                 |
| <i>value</i> | Priority value; valid values are from 1 to 3.                                             |
| <b>ipv6</b>  | Prioritizes the IPv6 protocol. The default priority is 2.                                 |
| <b>mpls</b>  | Prioritizes the Multiprotocol Label Switching (MPLS) protocol. The default priority is 3. |

### Command Default

The default priority settings are used.

### Command Modes

Global configuration (config)

### Command History

| Release      | Modification                                                                                                        |
|--------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | This command was introduced on the Supervisor Engine 720.                                                           |
| 12.2(17a)SX  | This command was changed to support the <b>ipv6</b> keyword.                                                        |
| 12.2(17b)SXA | This command was changed to support the <b>mpls</b> keyword.                                                        |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                     |
| 12.2(33)SXJ  | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXJ and later Cisco IOS 12.2SX releases. |

### Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. A lower *value* indicates a higher priority.

When a protocol sees a Forwarding Information Base (FIB) table exception, the protocol notifies the FIB Embedded Resource Manager (ERM). The FIB ERM periodically polls the FIB table exception status and decides which protocol gets priority over another protocol when multiple protocols are running under the exception. Only one protocol can attempt to recover from an exception at any time.

If there is sufficient FIB space, the protocol with the highest priority tries to recover first. Other protocols under the exception do not start to recover until the previous protocol completes the recovery process by reloading the appropriate FIB table.

### Examples

This example shows how to set the ERM exception-recovery priority:

```
Router(config)#  
mls erm priority ipv4 2 ipv6 1 mpls 3
```

This example shows how to return to the default setting:

```
Router(config)#  
no mls erm priority ipv4 2 ipv6 1 mpls 3
```

### Related Commands

| Command                       | Description                                                        |
|-------------------------------|--------------------------------------------------------------------|
| <b>show mls cef exception</b> | Displays information about the Cisco Express Forwarding exception. |

# mls ip

To enable multilayer switching (MLS) IP for the internal router on the interface, use the **mls ip** command in interface configuration mode. To disable MLS IP on the interface use the **no** form of this command .

**mls ip**

**no mls ip**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Multicast is disabled.

## Command Modes

Interface configuration (config-if)

## Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720.

## Examples

This example shows how to enable MLS IP:

```
Router(config-if)#
mls ip
```

## Related Commands

| Command                                    | Description                                                            |
|--------------------------------------------|------------------------------------------------------------------------|
| <b>mls rp ip (interface configuration)</b> | Allows the external systems to enable MLS IP on a specified interface. |
| <b>show mls ip multicast</b>               | Displays the MLS IP information.                                       |



## mls ip cef accounting per-prefix

To enable Multilayer Switching (MLS) per-prefix accounting, use the **mls ip cef accounting per-prefix** command in global configuration mode. To disable MLS per-prefix accounting, use the **no** form of this command

**mls ip cef accounting per-prefix** *prefix-entry prefix-entry-mask* [ *instance-name* ]

**no mls ip cef accounting per-prefix**

### Syntax Description

|                          |                                                                                |
|--------------------------|--------------------------------------------------------------------------------|
| <i>prefix-entry</i>      | Prefix entry in the format A.B.C.D.                                            |
| <i>prefix-entry-mask</i> | Prefix entry mask in the format A.B.C.D.                                       |
| <i>instance-name</i>     | (Optional) Virtual Private Network (VPN) routing and forwarding instance name. |

### Command Default

MLS per-prefix accounting is disabled by default.

### Command Modes

Global configuration (config)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(18)SXF  | Support for this command was implemented on the Supervisor Engine 32.                     |

### Usage Guidelines

Per-prefix accounting collects the adjacency counters used by the prefix. When the prefix is used for accounting, the adjacency cannot be shared with other prefixes. You can use per-prefix accounting to account for the packets sent to a specific destination.

### Examples

This example shows how to enable MLS per-prefix accounting:

```
Router(config)#  
mls ip cef accounting per-prefix 172.20.52.18 255.255.255.255
```

This example shows how to disable MLS per-prefix accounting:

```
Router(config)#  
no mls ip cef accounting per-prefix
```

#### Related Commands

| Command                | Description                                                                 |
|------------------------|-----------------------------------------------------------------------------|
| <b>show mls cef ip</b> | Displays all the prefixes that are configured for the statistic collection. |

## mls ip cef load-sharing

To configure the Cisco Express Forwarding load balancing, use the **mls ip cef load-sharing** command in global configuration mode. To return to the default settings, use the **no** form of this command.

**mls ip cef load-sharing [full] [exclude-port {destination| source}] [simple]**

**no mls ip cef load-sharing**

### Syntax Description

|                                 |                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>full</b>                     | (Optional) Sets the Cisco Express Forwarding load balancing to include source and destination Layer 4 ports and source and destination IP addresses (Layer 3). |
| <b>exclude-port destination</b> | (Optional) Excludes the destination Layer 4 ports and source and destination IP addresses (Layer 3) from the load-balancing algorithm.                         |
| <b>exclude-port source</b>      | (Optional) Excludes the source Layer 4 ports and source and destination IP addresses (Layer 3) from the load-balancing algorithm.                              |
| <b>simple</b>                   | (Optional) Sets the Cisco Express Forwarding load balancing for single-stage load sharing.                                                                     |

### Command Default

Source and destination IP address and universal identification

### Command Modes

Global configuration (config)

### Command History

| Release       | Modification                                                                                                                                                                                                   |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(17d)SXB  | Support for this command on the Supervisor Engine 2 was introduced in Release 12.2(17d)SXB.                                                                                                                    |
| 12.2(17d)SXB2 | This command was changed as follows: <ul style="list-style-type: none"> <li>• The <b>simple</b> keyword was added.</li> <li>• Support for this command was introduced on the Supervisor Engine 720.</li> </ul> |
| 12.2(18)SXE   | This command was changed to include the <b>exclude-port</b> , <b>destination</b> , and <b>source</b> keywords on the Supervisor Engine 720 only.                                                               |

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

### Usage Guidelines

The **mls ip cef load-sharing** command affects the IPv4, the IPv6, and the Multiprotocol Label Switching (MPLS) forwardings.

The **mls ip cef load-sharing** command is structured as follows:

- **mls ip cef load-sharing full** --Uses Layer 3 and Layer 4 information with multiple adjacencies.
- **mls ip cef load-sharing full simple** --Uses Layer 3 and Layer 4 information without multiple adjacencies.
- **mls ip cef load-sharing simple** --Uses Layer 3 information without multiple adjacencies.

For additional guidelines, refer to the Cisco 7600 Series Router Cisco IOS Software Configuration Guide.

### Examples

This example shows how to set load balancing to include Layer 3 and Layer 4 ports with multiple adjacencies:

```
Router(config)# mls ip cef load-sharing full
```

This example shows how to set load balancing to exclude the destination Layer 4 ports and source and destination IP addresses (Layer 3) from the load-balancing algorithm:

```
Router(config)# mls ip cef load-sharing full exclude-port destination
```

This example shows how to set load balancing to exclude the source Layer 4 ports and source and destination IP addresses (Layer 3) from the load-balancing algorithm:

```
Router(config)# mls ip cef load-sharing full exclude-port source
```

This example shows how to return to the default setting:

```
Router(config)# no mls ip cef load-sharing
```

### Related Commands

| Command                | Description                                                          |
|------------------------|----------------------------------------------------------------------|
| <b>show mls cef ip</b> | Displays the IP entries in the MLS-hardware Layer 3-switching table. |

## mls ip cef rate-limit

To rate-limit Cisco Express Forwarding-punted data packets, use the **mls ip cef rate-limit** command in global configuration mode. To disable the rate-limited Cisco Express Forwarding-punted data packets, use the **no** form of this command.

**mls ip cef rate-limit** *packets-per-second*

**no mls ip cef rate-limit**

### Syntax Description

|                           |                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------|
| <i>packets-per-second</i> | Number of data packets per second; see the "Usage Guidelines" section for the valid values. |
|---------------------------|---------------------------------------------------------------------------------------------|

### Command Default

No rate limit is configured.

### Command Modes

Global configuration (config)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Usage Guidelines

The valid values for the number of data packets per second are as follows:

- For Cisco 7600 series routers that are configured with a Supervisor Engine 2, the valid values are from 1 to 1000000.
- For Cisco 7600 series routers that are configured with a Supervisor Engine 720, the valid values are from 0 to 1000000.

Certain denial-of-service attacks target the route processing engines of routers. Certain packets that cannot be forwarded by the Policy Feature Card (PFC) are directed to the Multilayer Switch Feature Card (MSFC) for processing. Denial-of-service attacks can overload the route processing engine and cause routing instability when running dynamic routing protocols. You can use the **mls ip cef rate-limit** command to limit the amount of traffic that is sent to the MSFC to prevent denial-of-service attacks against the route processing engine.

This command rate limits all Cisco Express Forwarding-punted data packets including the following:

- Data packets going to the local interface IP address

- Data packets requiring Address Resolution Protocol (ARP)

Setting the rate to a low value could impact the packets that are destined to the IP addresses of the local interfaces and the packets that require ARP.

You should use this command to limit these packets to a normal rate and to avoid abnormal incoming rates.

For additional guidelines, see the Cisco 7600 Series Router Cisco IOS Software Configuration Guide.

## Examples

This example shows how to enable and set rate limiting:

```
Router(config)#  
mls ip cef rate-limit 50000
```

## Related Commands

| Command                | Description                                                          |
|------------------------|----------------------------------------------------------------------|
| <b>show mls cef ip</b> | Displays the IP entries in the MLS-hardware Layer 3-switching table. |

## mls ip cef rpf hw-enable-rpf-acl

To enable hardware unicast Reverse Path Forwarding (uRPF) for packets matching the deny Access Control List (ACL) when uRPF with ACL is enabled, use the **mls ip cef rpf hw-enable-rpf-acl** command in global configuration mode. To disable hardware uRPF when RPF and ACL are enabled, use the **no** form of this command.

**mls ip cef rpf hw-enable-rpf-acl**

**no mls ip cef rpf hw-enable-rpf-acl**

**Syntax Description** This command has no arguments or keywords.

**Command Default** uRPF is disabled.

**Command Modes** Global configuration (config)

| Release      | Modification                 |
|--------------|------------------------------|
| 12.2(18)SXF6 | This command was introduced. |

**Usage Guidelines** This command is supported on systems configured with a PFC3 (Supervisor Engine 720 and Supervisor Engine 32) only.

If you do not enter the **mls ip cef rpf hw-enable-rpf-acl** command, when the uRPF with ACL is specified, packets that are permitted by the uRPF ACL are forwarded in hardware and the denied packets are sent to the Multilayer Switching Feature Card (MSFC) for the uRPF check. This command enables hardware forwarding with the uRPF check for the packets that are denied by the uRPF ACL. However, in this case packets permitted by the uRPF ACL are sent to the MSFC for forwarding.

**Examples** This example shows how to enable hardware uRPF when RPF and ACL are enabled:

```
mls ip cef rpf hw-enable-rpf-acl
```

This example shows how to disable hardware uRPF when RPF and ACL are enabled:

```
no mls ip cef rpf hw-enable-rpf-acl
```

**Related Commands**

| Command                                       | Description                                 |
|-----------------------------------------------|---------------------------------------------|
| <b>ip verify unicast source reachable-via</b> | Enables and configures RPF checks with ACL. |

## mls ip cef rpf interface-group

To define an interface group in the Reverse Path Forwarding (RPF)-VLAN table, use the **mls ip cef rpf interface-group** command in global configuration mode. To delete the interface group, use the **no** form of this command.

**mls ip cef rpf interface-group** *group-number interface1 interface2 interface3* [. . .]

**no mls ip cef rpf interface-group** *group-number interface1 interface2 interface3* [. . .]

### Syntax Description

|                     |                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|
| <i>group-number</i> | Interface group number; valid values are from 1 to 4.                                                   |
| <i>interface</i>    | Interface number; see the "Usage Guidelines" section for formatting guidelines.                         |
| ...                 | (Optional) Additional interface numbers; see the "Usage Guidelines" section for additional information. |

### Command Default

No groups are configured.

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

### Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. A single interface group contains three to six interfaces. You can configure up to four interface groups. For each interface group, the first four entries are installed in the hardware RPF-VLAN table.

Enter the *interface* as *interface-type**mod/port*.

Separate each interface entry with a space. You do not have to include a space between the *interface-type* and the *mod/port* arguments. See the "Examples" section for a sample entry.

### Examples

This example shows how to define an interface group:

```
Router(config)#
mls ip cef rpf interface-group 0 F2/1 F2/2 F2/3 F2/4 F2/5 F2/6
```



## mls ip cef rpf multipath

To configure the Reverse Path Forwarding (RPF) modes, use the **mls ip cef rpf multipath** command in global configuration mode. To return to the default settings, use the **no** form of this command.

**mls ip cef rpf multipath** {interface-group| punt| pass}

**no mls ip cef rpf multipath** {interface-group| punt| pass}

### Syntax Description

|                        |                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>interface-group</b> | Disables the RPF check for packets coming from multiple path routes; see the "Usage Guidelines" section for additional information. |
| <b>punt</b>            | Redirects the RPF-failed packets to the route processor for multiple path prefix support.                                           |
| <b>pass</b>            | Disables the RPF check for packets coming from multiple path routes.                                                                |

### Command Default

punt

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

### Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

The interface-group mode is similar to the pass mode but utilizes the RPF\_VLAN global table for the RPF check. Packets from other multiple path prefixes always pass the RPF check.

You enter the **mls ip cef rpf multipath interface-group** command to define an RPF\_VLAN table interface group. One interface group contains from three to six interfaces, and you can configure up to four interface groups. For each interface group, the first four entries are installed in the hardware RPF\_VLAN table. For the prefix that has more than three multiple paths, and all paths except two are part of that interface group, the FIB entry of that prefix uses this RPF\_VLAN entry.

## Examples

This example shows how to redirect the RPF-failed packets to the route processor for multiple path prefix support:

```
Router(config)#  
mls ip cef rpf multipath interface-group
```

## Related Commands

| Command                | Description                                                          |
|------------------------|----------------------------------------------------------------------|
| <b>show mls cef ip</b> | Displays the IP entries in the MLS-hardware Layer 3-switching table. |

## monitor elog trigger position

To monitor system events using event-logging control and trigger control parameters, use the **monitor elog trigger position** command in privileged EXEC configuration mode.

**monitor elog trigger position** *position-percentage*

### Syntax Description

|                            |                                                                    |
|----------------------------|--------------------------------------------------------------------|
| <i>position-percentage</i> | The position of the trigger in the buffer expressed in percentage. |
|----------------------------|--------------------------------------------------------------------|

### Command Default

System events are not monitored and logged.

### Command Modes

Privileged EXEC (#)

### Command History

| Release  | Modification                                                                      |
|----------|-----------------------------------------------------------------------------------|
| 15.0(1)M | This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M. |

### Examples

The following example shows how to monitor 50 percent of the system events using event-logging control and trigger control parameters:

```
Router# monitor elog trigger position 50
```

### Related Commands

| Command                           | Description                                                 |
|-----------------------------------|-------------------------------------------------------------|
| <b>monitor call leg event-log</b> | Displays the event log for an active call leg in real time. |

## monitor event-trace (EXEC)

To monitor and control the event trace function for a specified Cisco IOS software subsystem component, use the **monitor event-trace** command in privileged EXEC mode.

**monitor event-trace** *component* {**clear**| **continuous**| **disable**| **dump** [**pretty**]| **enable**| **one-shot**}

### Cisco 10000 Series Routers

**monitor event-trace** *component* {**disable**| **dump**| **enable**| **size**| **stacktrace**}

### Catalyst 6500 Series Switches and Cisco 7600 Series Routers

**monitor event-trace all-traces** {**continuous** [**cancel**]| **dump** [**merged**] [**pretty**]}

**monitor event-trace l3** {**clear**| **continuous** [**cancel**]| **disable**| **dump** [**pretty**]| **enable**| **interface** *type mod/port*| **one-shot**}

**monitor event-trace spa** {**clear**| **continuous** [**cancel**]| **disable**| **dump** [**pretty**]| **enable**| **one-shot**}

**monitor event-trace subsys** {**clear**| **continuous** [**cancel**]| **disable**| **dump** [**pretty**]| **enable**| **one-shot**}

### Syntax Description

|                   |                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>component</i>  | Name of the Cisco IOS software subsystem component that is the subject of the event trace. To get a list of components that support event tracing, use the <b>monitor event-trace ?</b> command.                           |
| <b>clear</b>      | Clears existing trace messages for the specified component from memory on the networking device.                                                                                                                           |
| <b>continuous</b> | Continuously displays the latest event trace entries.                                                                                                                                                                      |
| <b>disable</b>    | Turns off event tracing for the specified component.                                                                                                                                                                       |
| <b>dump</b>       | Writes the event trace results to the file configured using the <b>monitor event-trace</b> command in global configuration mode. The trace messages are saved in binary format.                                            |
| <b>pretty</b>     | (Optional) Saves the event trace message in ASCII format.                                                                                                                                                                  |
| <b>enable</b>     | Turns on event tracing for the specified component.                                                                                                                                                                        |
| <b>one-shot</b>   | Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the <b>monitor event-trace</b> command in global configuration mode. |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| size                             | <p>Sets the number of messages that can be written to memory for a single instance of a trace.</p> <p><b>Note</b> Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the <b>show monitor event-trace component parameters</b> command.</p> <p>When the number of event trace messages in memory exceeds the size, new messages will begin to overwrite the older messages in the file.</p> |
| stacktrace                       | Enables the stack trace at tracepoints.                                                                                                                                                                                                                                                                                                                                                                                                          |
| all-traces                       | Displays the configured merged-event traces.                                                                                                                                                                                                                                                                                                                                                                                                     |
| merged                           | (Optional) Dumps the entries in all event traces sorted by time.                                                                                                                                                                                                                                                                                                                                                                                 |
| l3                               | Displays information about the Layer 3 trace.                                                                                                                                                                                                                                                                                                                                                                                                    |
| spa                              | Displays information about the Shared Port Adapter (SPA) trace.                                                                                                                                                                                                                                                                                                                                                                                  |
| interface <i>type mod / port</i> | Specifies the interface to be logged.                                                                                                                                                                                                                                                                                                                                                                                                            |
| cancel                           | (Optional) Cancels the continuous display of latest trace entries.                                                                                                                                                                                                                                                                                                                                                                               |
| subsys                           | Displays information about the subsystem's initial trace.                                                                                                                                                                                                                                                                                                                                                                                        |

**Command Default** The event trace function is disabled by default.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                                                                                                                            |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(18)S  | This command was introduced.                                                                                                                                            |
|                 | 12.2(8)T   | This command was integrated into Cisco IOS Release 12.2(8)T.                                                                                                            |
|                 | 12.2(14)SX | Support for this command was introduced on the Supervisor Engine 720.                                                                                                   |
|                 | 12.2(25)S  | This command was integrated into Cisco IOS Release 12.2(25)S. The <b>monitor event-trace cef ipv4 clear</b> command replaces the <b>clear ip cef event-log</b> command. |

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

### Usage Guidelines

Use the **monitor event-trace** command to control what, when, and how event trace data is collected. Use this command after you have configured the event trace functionality on the networking device using the **monitor event-trace** command in global configuration mode.



#### Note

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace** command in global configuration mode for each instance of a trace.

The Cisco IOS software allows for the subsystem components to define whether support for event tracing is enabled or disabled at boot time. You can enable or disable event tracing in two ways: using the **monitor event-trace** command in privileged EXEC mode or using the **monitor event-trace** command in global configuration mode. To disable event tracing, you would enter either of these commands with the **disable** keyword. To enable event tracing again, you would enter either of these commands with the **enable** keyword.

To determine whether you can enable event tracing on a subsystem, use the **monitor event-trace ?** command to get a list of software components that support event tracing. To determine whether event tracing is enabled by default for the subsystem, use the **show monitor event-trace** command to display trace messages.

Use the **show monitor event-trace** command to display trace messages. Use the **monitor event-trace component dump** command to save trace message information for a single event. By default, trace information is saved in binary format. If you want to save trace messages in ASCII format, possibly for additional application processing, use the **monitor event-trace component dump pretty** command.

To write the trace messages for all events currently enabled on a networking device to a file, enter the **monitor event-trace dump** command.

To configure the file where you want to save trace information, use the **monitor event-trace** command in global configuration mode. The trace messages are saved in a binary format.

### Examples

The following example shows the privileged EXEC commands to stop event tracing, clear the current contents of memory, and reenables the trace function for the interprocess communication (IPC) component. This example assumes that the tracing function is configured and enabled on the networking device.

```
Router# monitor event-trace ipc disable
Router# monitor event-trace ipc clear
Router# monitor event-trace ipc enable
```

The following example shows how the **monitor event-trace one-shot** command accomplishes the same function as the previous example except in one command. In this example, once the size of the trace message file has been exceeded, the trace is terminated.

```
Router# monitor event-trace ipc one-shot
```

The following example shows the command for writing trace messages for an event in binary format. In this example, the trace messages for the IPC component are written to a file.

```
Router# monitor event-trace ipc dump
```

The following example shows the command for writing trace messages for an event in ASCII format. In this example, the trace messages for the MBUS component are written to a file.

```
Router# monitor event-trace mbus dump pretty
```

## Examples

This example shows how to stop event tracing, clear the current contents of memory, and reenables the trace function for the SPA component. This example assumes that the tracing function is configured and enabled on the networking device.

```
Router# monitor event-trace spa disable
```

```
Router# monitor event-trace spa clear
```

```
Router# monitor event-trace spa enable
```

## Related Commands

| Command                                | Description                                                                           |
|----------------------------------------|---------------------------------------------------------------------------------------|
| <b>monitor event-trace (global)</b>    | Configures event tracing for a specified Cisco IOS software subsystem component.      |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device. |
| <b>show monitor event-trace</b>        | Displays event trace messages for Cisco IOS software subsystem components.            |

## monitor event-trace (global)

To configure event tracing for a specified Cisco IOS software subsystem component, use the **monitor event-trace** command in global configuration mode.

**monitor event-trace** *component* {**disable**| **dump-file** *filename*| **enable**| **size** *number*| **stacktrace** *number*}  
**timestamps** [**datetime** | **localtime**] [**msec**] [**show-timezone**]| **uptime**

### Cisco 10000 Series Routers

**monitor event-trace** *component* {**disable**| **dump-file** *filename*| **enable**| **clear**| **continuous**| **one-shot**}

### Syntax Description

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>component</i>                 | Name of the Cisco IOS software subsystem component that is the object of the event trace. To get a list of components that support event tracing, use the <b>monitor event-trace ?</b> command.                                                                                                                                                                                                                                                                                        |
| <b>disable</b>                   | Turns off event tracing for the specified component.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>dump-file</b> <i>filename</i> | Specifies the file where event trace messages are written from memory on the networking device. The maximum length of the filename (path and filename) is 100 characters, and the path can point to flash memory on the networking device or to a TFTP or FTP server.                                                                                                                                                                                                                  |
| <b>enable</b>                    | Turns on event tracing for the specified component provided that the component has been configured using the <b>monitor event-trace</b> command.                                                                                                                                                                                                                                                                                                                                       |
| <b>size</b> <i>number</i>        | Sets the number of messages that can be written to memory for a single instance of a trace. Valid values are from 1 to 65536.<br><br><b>Note</b> Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the <b>show monitor event-trace component parameters</b> command.<br><br>When the number of event trace messages in memory exceeds the configured size, new messages will begin to overwrite the older messages in the file. |
| <b>stacktrace</b> <i>number</i>  | Enables the stack trace at tracepoints and specifies the depth of the stack trace stored. Valid values are from 1 to 16.                                                                                                                                                                                                                                                                                                                                                               |
| <b>timestamps</b>                | (Optional) Includes time stamp information with the event trace messages for the specified component.                                                                                                                                                                                                                                                                                                                                                                                  |



|                      |                                                                                                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>datetime</b>      | (Optional) Specifies that the time stamp information included with event trace messages will consist of the date and time of the event trace.                                                 |
| <b>localtime</b>     | (Optional) Specifies that the time given in the time stamp will be local time.                                                                                                                |
| <b>msec</b>          | (Optional) Includes milliseconds in the time stamp.                                                                                                                                           |
| <b>show-timezone</b> | (Optional) Includes time zone information in the time stamp.                                                                                                                                  |
| <b>uptime</b>        | (Optional) Displays time stamped information about the system uptime.                                                                                                                         |
| <b>clear</b>         | Clears existing trace messages for the specified component from memory on the networking device.                                                                                              |
| <b>continuous</b>    | Continuously displays the latest event trace entries.                                                                                                                                         |
| <b>one-shot</b>      | Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the <b>monitor event-trace</b> command. |

**Command Default** Event tracing is enabled or disabled depending on the software component.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>                                                                                              |
|------------------------|----------------|------------------------------------------------------------------------------------------------------------------|
|                        | 12.0(18)S      | This command was introduced.                                                                                     |
|                        | 12.2(8)T       | This command was integrated into Cisco IOS Release 12.2(8)T.                                                     |
|                        | 12.2(14)SX     | This command was integrated into Cisco IOS Release 12.2(14)SX and implemented on the Supervisor Engine 720.      |
|                        | 12.2(25)S      | This command was integrated into Cisco IOS Release 12.2(25)S.                                                    |
|                        | 12.2(28)SB     | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
|                        | 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
|                        | 12.4(20)T      | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

## Usage Guidelines

Use the **monitor event-trace** command to enable or disable event tracing and to configure event trace parameters for Cisco IOS software subsystem components.



### Note

Event tracing is intended for use as a software diagnostic tool and should be configured only under the direction of a Technical Assistance Center (TAC) representative. In Cisco IOS software images that do not provide subsystem support for the event trace function, the **monitor event-trace** command is not available.

The Cisco IOS software allows the subsystem components to define whether support for event tracing is enabled or disabled by default. The command interface for event tracing allows you to change the default two ways: using the **monitor event-trace** command in privileged EXEC mode or using the **monitor event-trace** command in global configuration mode.

Additionally, default settings do not show up in the configuration file. If the subsystem software enables event tracing by default, the **monitor event-trace component enable** command will not show up in the configuration file of the networking device; however, disabling event tracing that has been enabled by default by the subsystem will create a command entry in the configuration file.



### Note

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace** command for each instance of a trace.

To determine whether you can enable event tracing on a subsystem, use the **monitor event-trace ?** command to get a list of software components that support event tracing.

To determine whether event tracing is enabled by default for the subsystem, use the **show monitor event-trace** command to display trace messages.

To specify the trace call stack at tracepoints, you must first clear the trace buffer.

## Examples

The following example shows how to enable event tracing for the interprocess communication (IPC) subsystem component in Cisco IOS software and configure the size to 4096 messages. The trace messages file is set to ipc-dump in slot0 (flash memory).

```
configure terminal
!
monitor event-trace ipc enable
monitor event-trace ipc dump-file slot0:ipc-dump
monitor event-trace ipc size 4096
```

When you select Cisco Express Forwarding as the component for which to enable event tracing, you can use the following additional arguments and keywords: **monitor event-trace cef [events | interface | ipv6 | ipv4][all]**. The following example shows how to enable event tracing for IPv4 or IPv6 events of the Cisco Express Forwarding component in Cisco IOS software:

```
configure terminal
!
monitor event-trace cef ipv4 enable
configure terminal
!
monitor event-trace cef ipv6 enable
exit
```

The following example shows what happens when you try to enable event tracing for a component (in this case, adjacency events) when it is already enabled:

```
configure terminal
!
monitor event-trace adjacency enable
%EVENT_TRACE-6-ENABLE: Trace already enabled.
```

### Related Commands

| Command                                | Description                                                                               |
|----------------------------------------|-------------------------------------------------------------------------------------------|
| <b>monitor event-trace (EXEC)</b>      | Controls the event trace function for a specified Cisco IOS software subsystem component. |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device.     |
| <b>show monitor event-trace</b>        | Displays event trace messages for Cisco IOS software subsystem components.                |

## monitor event-trace cef (EXEC)

To monitor and control the event trace function for Cisco Express Forwarding, use the **monitor event-trace cef** command in privileged EXEC mode.

**monitor event-trace cef** {**dump** [**merged pretty**|**pretty**] {**events**|**interface**|**ipv4**|**ipv6**} {**clear**|**continuous**|**cancel**]|**disable**|**dump** [**pretty**]|**enable**|**one-shot**}}

### Syntax Description

|                      |                                                                                                                                                                                                           |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dump</b>          | Writes the event trace results to the file configured with the global configuration <b>monitor event-trace cef</b> command. The trace messages are saved in binary format.                                |
| <b>merged pretty</b> | (Optional) Sorts all event trace entries by time and writes the entries to a file in ASCII format.                                                                                                        |
| <b>pretty</b>        | (Optional) Saves the event trace message in ASCII format.                                                                                                                                                 |
| <b>events</b>        | Monitors Cisco Express Forwarding events.                                                                                                                                                                 |
| <b>interface</b>     | Monitors Cisco Express Forwarding interface events.                                                                                                                                                       |
| <b>ipv4</b>          | Monitors Cisco Express Forwarding IPv4 events.                                                                                                                                                            |
| <b>ipv6</b>          | Monitors Cisco Express Forwarding IPv6 events.                                                                                                                                                            |
| <b>clear</b>         | Clears existing trace messages for Cisco Express Forwarding from memory on the networking device.                                                                                                         |
| <b>continuous</b>    | Continuously displays the latest event trace entries.                                                                                                                                                     |
| <b>cancel</b>        | (Optional) Cancels the continuous display of the latest trace entries.                                                                                                                                    |
| <b>disable</b>       | Turns off Cisco Express Forwarding event tracing.                                                                                                                                                         |
| <b>enable</b>        | Turns on Cisco Express Forwarding event tracing.                                                                                                                                                          |
| <b>one-shot</b>      | Clears any existing trace information from memory, starts event tracing again, and disables the trace when the size of the trace message file configured in the global configuration command is exceeded. |

### Command Default

Event tracing for Cisco Express Forwarding is enabled by default.

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release                  | Modification                                                                                                                         |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(18)S                | This command was introduced.                                                                                                         |
| 12.2(8)T                 | This command was integrated into Cisco IOS Release 12.2(8)T.                                                                         |
| 12.2(14)SX               | Support for this command was introduced on the Supervisor Engine 720.                                                                |
| 12.2(25)S                | This command was integrated into Cisco IOS Release 12.2(25)S.                                                                        |
| 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                     |
| 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                      |
| 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                      |
| 12.4(20)T                | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                        |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |

**Usage Guidelines**

Use the **monitor event-trace cef** command to control what, when, and how Cisco Express Forwarding event trace data is collected. Use this command after you have configured the event trace functionality on the networking device using the **monitor event-trace cef** command in global configuration mode.

**Note**

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace cef** command in global configuration mode for each instance of a trace.

You can enable or disable Cisco Express Forwarding event tracing in one of two ways: using the **monitor event-trace cef** command in privileged EXEC mode or using the **monitor event-trace cef** command in global configuration mode. To disable event tracing, you would enter either of these commands with the **disable** keyword. To enable event tracing again, you would enter either of these commands with the **enable** keyword.

Use the **show monitor event-trace cef** command to display trace messages. Use the **monitor event-trace cef dump** command to save trace message information for a single event. By default, trace information is saved in binary format. If you want to save trace messages in ASCII format, possibly for additional application processing, use the **monitor event-trace cef dump pretty** command.

To configure the file in which you want to save trace information, use the **monitor event-trace cef** command in global configuration mode. The trace messages are saved in a binary format.

## Examples

The following example shows the privileged EXEC commands that stop event tracing, clear the current contents of memory, and reenable the trace function for Cisco Express Forwarding events. This example assumes that the tracing function is configured and enabled on the networking device.

```
Router# monitor event-trace cef events disable
```

```
Router# monitor event-trace cef events clear
```

```
Router# monitor event-trace cef events enable
```

The following example shows how to configure the continuous display of the latest Cisco Express Forwarding event trace entries for IPv4 events:

```
Router# monitor event-trace cef ipv4 continuous
```

The following example shows how to stop the continuous display of the latest trace entries:

```
Router# monitor event-trace cef ipv4 continuous cancel
```

## Related Commands

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (global)</b>       | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef event s</b>   | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## monitor event-trace cef (global)

To configure event tracing for Cisco Express Forwarding, use the **monitor event-trace cef** command in global configuration mode. To disable event tracing for Cisco Express Forwarding, use the **no** form of this command.

**monitor event-trace cef** {**dump-file** *dump-file-name*} {**events**|**interface**} {**disable**|**dump-file** *dump-file-name*|**enable**|**size** *number*|**stacktrace** [*depth*] }

**no monitor event-trace cef** {**dump-file** *dump-file-name*} {**events**|**interface**} {**disable**|**dump-file** *dump-file-name*|**enable**|**size**|**stacktrace** [*depth*] }

### Syntax Description

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>dump-file</b> <i>dump-file-name</i> | Specifies the file to which event trace messages are written from memory on the networking device. The maximum length of the filename (path and filename) is 100 characters, and the path can point to flash memory on the networking device or to a TFTP or FTP server.                                                                                                                                                                                                 |
| <b>events</b>                          | Turns on event tracing for Cisco Express Forwarding events.                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>interface</b>                       | Turns on event tracing for Cisco Express Forwarding interface events.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>disable</b>                         | Turns off event tracing for Cisco Express Forwarding events.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>enable</b>                          | Turns on event tracing for Cisco Express Forwarding events if it had been enabled with the <b>monitor event-trace cef</b> command.                                                                                                                                                                                                                                                                                                                                       |
| <b>size</b> <i>number</i>              | <p>Sets the number of messages that can be written to memory for a single instance of a trace. Range: 1 to 65536.</p> <p><b>Note</b> Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the <b>show monitor event-trace cef parameters</b> command.</p> <p>When the number of event trace messages in memory exceeds the configured size, new messages will begin to overwrite the older messages in the file.</p> |
| <b>stacktrace</b>                      | Enables the stack trace at tracepoints.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>depth</i>                           | (Optional) Specifies the depth of the stack trace stored. Range: 1 to 16.                                                                                                                                                                                                                                                                                                                                                                                                |

**Command Default** Event tracing for Cisco Express Forwarding is enabled by default.

**Command Modes** Global configuration (config)

| Command History | Release                  | Modification                                                                                                                         |
|-----------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(25)S                | This command was introduced.                                                                                                         |
|                 | 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                     |
|                 | 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                      |
|                 | 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                      |
|                 | 12.4(20)T                | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                        |
|                 | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |

**Usage Guidelines** Use the **monitor event-trace cef** command to enable or disable event tracing and to configure event trace parameters for Cisco Express Forwarding.

The Cisco IOS software allows Cisco Express Forwarding to define whether support for event tracing is enabled or disabled by default. The command interface for event tracing allows you to change the default value in one of two ways: using the **monitor event-trace cef** command in privileged EXEC mode or using the **monitor event-trace cef** command in global configuration mode.

Additionally, default settings do not appear in the configuration file. If Cisco Express Forwarding enables event tracing by default, the **monitor event-trace cef enable** command does not appear in the configuration file of the networking device; however, disabling event tracing that has been enabled by default by the subsystem creates a command entry in the configuration file.



**Note**

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace cef** command for each instance of a trace.

To determine whether event tracing is enabled by default for Cisco Express Forwarding, use the **show monitor event-trace cef** command to display trace messages.

To specify the trace call stack at tracepoints, you must first clear the trace buffer.



## Examples

The following example shows how to enable event tracing for Cisco Express Forwarding and configure the buffer size to 5000 messages. The trace messages file is set to cef-dump in slot0 (flash memory).

```
Router(config)# monitor event-trace cef events enable
Router(config)# monitor event-trace cef dump-file slot0:cef-dump
Router(config)# monitor event-trace cef events size 5000
The following example shows what happens when you try to enable event tracing for Cisco
Express Forwarding events when it is already enabled:
Router(config)# monitor event-trace cef events enable
Router(config)#
00:04:33: %EVENT_TRACE-6-ENABLE: Trace already enabled.
```

## Related Commands

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>         | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef ipv4 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>    | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## monitor event-trace cef ipv4 (global)

To configure event tracing for Cisco Express Forwarding IPv4 events, use the **monitor event-trace cef ipv4** command in global configuration mode. To disable event tracing for Cisco Express Forwarding IPv4 events, use the **no** form of this command.

**monitor event-trace cef ipv4** {**disable**| **distribution**| **dump-file** *dump-file-name*| **enable**| **match** {**global**| *ip-address mask*}| **size** *number*| **stacktrace** [ *depth* ]}| **vrf** *vrf-name* [**distribution**| **match** {**global**| *ip-address mask*}]}

**no monitor event-trace cef** {**ipv4** {**disable**| **distribution**| **dump-file** *dump-file-name*| **enable**| **match**| **size**| **stacktrace** [ *depth* ]}| **vrf**}

### Syntax Description

|                                        |                                                                                                                                                                                                                                                                          |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>disable</b>                         | Turns off event tracing for Cisco Express Forwarding IPv4 events.                                                                                                                                                                                                        |
| <b>distribution</b>                    | Logs events related to the distribution of Cisco Express Forwarding Forwarding Information Base (FIB) tables to the line cards.                                                                                                                                          |
| <b>dump-file</b> <i>dump-file-name</i> | Specifies the file to which event trace messages are written from memory on the networking device. The maximum length of the filename (path and filename) is 100 characters, and the path can point to flash memory on the networking device or to a TFTP or FTP server. |
| <b>enable</b>                          | Turns on event tracing for Cisco Express Forwarding IPv4 events if it had been enabled with the <b>monitor event-trace cef</b> command.                                                                                                                                  |
| <b>match</b>                           | Turns on event tracing for Cisco Express Forwarding IPv4 that matches global events or events that match a specific network address.                                                                                                                                     |
| <b>global</b>                          | Specifies global events.                                                                                                                                                                                                                                                 |
| <i>ip-address mask</i>                 | Specifies an IP address in A.B.C.D format and a subnet mask in A.B.C.D format.                                                                                                                                                                                           |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>size</b> <i>number</i>  | <p>Sets the number of messages that can be written to memory for a single instance of a trace. Range: 1 to 65536.</p> <p><b>Note</b> Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the <b>show monitor event-trace cef parameters</b> command.</p> <p>When the number of event trace messages in memory exceeds the configured size, new messages will begin to overwrite the older messages in the file.</p> |
| <b>stacktrace</b>          | Enables the stack trace at tracepoints.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>depth</i>               | (Optional) Specifies the depth of the stack trace stored. Range: 1 to 16.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>vrf</b> <i>vrf-name</i> | Turns on event tracing for a Cisco Express Forwarding IPv4 Virtual Private Network (VPN) routing and forwarding (VRF) table. The <i>vrf-name</i> argument specifies the name of the VRF.                                                                                                                                                                                                                                                                                 |

**Command Default** Event tracing for Cisco Express Forwarding IPv4 events is enabled by default.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b>           | <b>Modification</b>                                                                                                                  |
|------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(25)S                | This command was introduced.                                                                                                         |
|                        | 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                     |
|                        | 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                      |
|                        | 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                      |
|                        | 12.4(20)T                | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                        |
|                        | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |

**Usage Guidelines** Use the **monitor event-trace cef ipv4** command to enable or disable event tracing for Cisco Express Forwarding IPv4 events.

The Cisco IOS software allows Cisco Express Forwarding to define whether support for event tracing is enabled or disabled by default. The command interface for event tracing allows you to change the default value in one of two ways: using the **monitor event-trace cef ipv4** command in privileged EXEC mode or using the **monitor event-trace cef ipv4** command in global configuration mode.

**Note**

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace cef ipv4** command for each instance of a trace.

To determine whether event tracing is enabled by default for Cisco Express Forwarding, use the **show monitor event-trace cef ipv4** command to display trace messages.

To specify the trace call stack at tracepoints, you must first clear the trace buffer.

**Examples**

The following example shows how to enable event tracing for Cisco Express Forwarding IPv4 events and configure the buffer size to 5000 messages:

```
Router(config)# monitor event-trace cef ipv4 enable
Router(config)# monitor event-trace cef ipv4 size 5000
The following example shows how to enable event tracing for events that match Cisco Express
Forwarding IPv4 VRF vpn1:
Router(config)# monitor event-trace cef ipv4 enable
Router(config)# monitor event-trace cef ipv4 vrf vpn1
```

**Related Commands**

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>         | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>       | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor trace-event cef ipv6 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>    | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## monitor event-trace cef ipv6 (global)

To configure event tracing for Cisco Express Forwarding IPv6 events, use the **monitor event-trace cef ipv6** command in global configuration mode. To disable event tracing for Cisco Express Forwarding, use the **no** form of this command.

**monitor event-trace cef ipv6** {**disable**| **distribution**| **dump-file** *dump-file-name*| **enable**| **math** {**global**| *ipv6-address/n*}| **size** *number*| **stacktrace** [ *depth* ]|| **vrf** *vrf-name* [**distribution**| **match** {**global**| *ipv6-address/n*}]}

**no monitor event-trace cef ipv6** {**disable**| **distribution**| **dump-file** *dump-file-name*| **enable**| **match**| **size**| **stacktrace** [ *depth* ]|| **vrf**}

### Syntax Description

|                                        |                                                                                                                                                                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>disable</b>                         | Turns off event tracing for Cisco Express Forwarding IPv6 events.                                                                                                                                                                                                               |
| <b>distribution</b>                    | Logs events related to the distribution of Cisco Express Forwarding Forwarding Information Base (FIB) tables to the line cards.                                                                                                                                                 |
| <b>dump-file</b> <i>dump-file-name</i> | Specifies the file to which event trace messages are written from memory on the networking device. The maximum length of the filename (path and filename) is 100 characters, and the path can point to flash memory on the networking device or to a TFTP or FTP server.        |
| <b>enable</b>                          | Turns on event tracing for Cisco Express Forwarding IPv6 events if it had been enabled with the <b>monitor event-trace cef ipv6</b> command.                                                                                                                                    |
| <b>match</b>                           | Turns on event tracing for Cisco Express Forwarding IPv6 that matches global events or events that match a specific network address.                                                                                                                                            |
| <b>global</b>                          | Specifies global events.                                                                                                                                                                                                                                                        |
| <i>ipv6-address / n</i>                | Specifies an IPv6 address. This address must be in the form documented in RFC 2373: the address is specified in hexadecimal using 16-bit values between colons. The slash followed by a number ( <i>/ n</i> ) indicates the number of bits that do not change. Range: 0 to 128. |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>size</b> <i>number</i>  | <p>Sets the number of messages that can be written to memory for a single instance of a trace. Range: 1 to 65536.</p> <p><b>Note</b> Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the <b>show monitor event-trace cef parameters</b> command.</p> <p>When the number of event trace messages in memory exceeds the configured size, new messages will begin to overwrite the older messages in the file.</p> |
| <b>stacktrace</b>          | Enables the stack trace at tracepoints.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>depth</i>               | (Optional) Specifies the depth of the stack trace stored. Range: 1 to 16.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>vrf</b> <i>vrf-name</i> | Turns on event tracing for a Cisco Express Forwarding IPv6 Virtual Private Network (VPN) routing and forwarding (VRF) table. The <i>vrf-name</i> argument specifies the name of the VRF.                                                                                                                                                                                                                                                                                 |

**Command Default** Event tracing for Cisco Express Forwarding IPv6 events is enabled by default.

**Command Modes** Global configuration (config)

| <b>Command History</b> | <b>Release</b>           | <b>Modification</b>                                                                                                                  |
|------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                        | 12.2(25)S                | This command was introduced.                                                                                                         |
|                        | 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                     |
|                        | 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                      |
|                        | 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                      |
|                        | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |

**Usage Guidelines** Use the **monitor event-trace cef ipv6** command to enable or disable event tracing for Cisco Express Forwarding IPv6 events.

The Cisco IOS software allows Cisco Express Forwarding to define whether support for event tracing is enabled or disabled by default. The command interface for event tracing allows you to change the default value in one of two ways: using the **monitor event-trace cef ipv6** command in privileged EXEC mode or using the **monitor event-trace cef ipv6** command in global configuration mode.

**Note**

The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace cef ipv6** command for each instance of a trace.

To determine whether event tracing is enabled by default for Cisco Express Forwarding IPv6 events, use the **show monitor event-trace cef ipv6** command to display trace messages.

To specify the trace call stack at tracepoints, you must first clear the trace buffer.

**Examples**

The following example shows how to enable event tracing for Cisco Express Forwarding IPv6 events and configure the buffer size to 10000 messages.

```
Router(config)# monitor event-trace cef ipv6 enable
Router(config)# monitor event-trace cef ipv6 size 10000
```

**Related Commands**

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>         | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>       | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>    | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |







## show adjacency through show ip cef with source

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# show adjacency

To display information about the Cisco Express Forwarding adjacency table or the hardware Layer 3-switching adjacency table, use the **show adjacency** command in user EXEC or privileged EXEC mode.

**show adjacency** [*ip-address*] [*interface-type interface-number*| **null** *number*| **port-channel** *number*| **sysclock** *number*| **vlan** *number*| *ipv6-address*| **fcpa** *number*| **serial** *number*] [**connectionid** *number*] [**link** {**ipv4**| **ipv6**| **mpls**}] [**detail**| **encapsulation**]

**show adjacency summary** [*interface-type interface-number*]

## Syntax Description

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>                      | (Optional) An IP address or IPv6 address.<br><br><b>Note</b> On the Cisco 10000 series routers IPv6 is supported on Cisco IOS Release 12.2(28)SB or later releases.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>interface-type interface-number</i> | (Optional) Interface type and number. Valid values for the <i>interface-type</i> argument are <b>atm</b> , <b>async</b> , <b>auto-template</b> , <b>ctunnel</b> , <b>dialer</b> , <b>esconphy</b> , <b>fastethernet</b> , <b>filter</b> , <b>filtergroup</b> , <b>gigabitethernet</b> , <b>group-async</b> , <b>longreachethernet</b> , <b>loopback</b> , <b>mfr</b> , <b>multilink</b> , <b>portgroup</b> , <b>pos</b> , <b>tunnel</b> , <b>vif</b> , <b>virtual-template</b> , <b>voabypassin</b> , <b>voabypassout</b> , <b>voafilterin</b> , <b>voafilterout</b> , <b>voain</b> , and <b>voaout</b> .<br><br><b>Note</b> Not all interface types and numbers are available on all platforms. Enter the <b>show adjacency</b> command to verify the interface types for your platform. |
| <b>null</b> <i>number</i>              | (Optional) Specifies the null interface. The valid value is <b>0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>port-channel</b> <i>number</i>      | (Optional) Specifies the channel interface; valid values are 1 to 282.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>sysclock</b> <i>number</i>          | (Optional) Telecom-bus clock controller; valid values are 1 to 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>vlan</b> <i>number</i>              | (Optional) Specifies the VLAN; valid values are 1 to 4094.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>ipv6-address</i>                    | (Optional) Specifies the associated IPv6 address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>fcpa</b> <i>number</i>              | (Optional) The fiber channel; valid values are 1 to 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>serial</b> <i>number</i>            | (Optional) Specifies the serial interface number; valid values are 1 to 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                                         |                                                                                                                  |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>connectionid</b> <i>number</i>                       | (Optional) Specifies the client connection identification number.                                                |
| <b>link</b> { <b>ipv4</b>   <b>ipv6</b>   <b>mpls</b> } | (Optional) Specifies the link type (IP, IPv6, or Multiprotocol Label Switching (MPLS) traffic of the adjacency). |
| <b>detail</b>                                           | (Optional) Displays the protocol detail and timer information.                                                   |
| <b>summary</b>                                          | (Optional) Displays a summary of Cisco Express Forwarding adjacency information.                                 |

**Command Modes**

User EXEC (&gt;) Privileged EXEC (#)

**Command History**

| <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS         | This command was introduced.                                                                                                                                                                                        |
| 11.1CC         | Multiple platform support was added.                                                                                                                                                                                |
| 12.0(7)XE      | Support was added for the Cisco 7600 series routers.                                                                                                                                                                |
| 12.1(5c)EX     | This command was modified to include Layer 3 information.                                                                                                                                                           |
| 12.1(11b)E     | The <b>atm</b> , <b>ge-wan</b> , and <b>pos</b> keywords were added.                                                                                                                                                |
| 12.2(8)T       | The <b>detail</b> keyword output was modified to show the epoch value for each entry of the adjacency table.<br><br>The <b>summary</b> keyword output was modified to show the table epoch for the adjacency table. |
| 12.2(14)SX     | Support for this command was added for the Supervisor Engine 720.                                                                                                                                                   |
| 12.2(17d)SXB   | Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.                                                                                                                 |
| 12.2(25)S      | This command was integrated into Cisco IOS Release 12.2(25)S . The <b>link ipv4</b> , <b>link ipv6</b> , and <b>link mpls</b> keywords and the <i>prefix</i> argument were added.                                   |
| 12.2(28)SB     | Support for IPv6 was added for the Cisco 10000 series routers.                                                                                                                                                      |
| 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                     |
| 12.2(33)SXH    | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                                                     |

| Release                  | Modification                                                                        |
|--------------------------|-------------------------------------------------------------------------------------|
| Cisco IOS XE Release 2.1 | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |
| 12.4(20)T                | This command was integrated into Cisco IOS Release 12.4(20)T.                       |

### Usage Guidelines

The **show adjacency** command is used to verify that an adjacency exists for a connected device, that the adjacency is valid, and that the MAC header rewrite string is correct.

For line cards, you must specify the line card if\_number (interface number). Use the **show cef interface** command to obtain line card if\_numbers.

You can use any combination of the *ip-address*, *interface-type*, and other keywords and arguments (in any order) as a filter to display a specific subset of adjacencies.

On Cisco 7600 series routers, hardware Layer 3-switching adjacency statistics are updated every 60 seconds.



#### Note

On the Cisco 10000 series routers, Pv6 is supported on Cisco IOS Release 12.2(28)SB or later releases.

The following information may be displayed by the **show adjacency** commands:

- Protocol
- Interface
- Type of routing protocol that is configured on the interface
- Type of routed protocol traffic using this adjacency
- Next hop address
- Method of adjacency that was learned
- Adjacency source (for example, Address Resolution Protocol (ARP) or ATM Map)
- Encapsulation prepended to packet switched through this adjacency
- Chain of output chain elements applied to packets after an adjacency
- Packet and byte counts
- High availability (HA) epoch and summary event epoch
- MAC address of the adjacent router
- Time left before the adjacency rolls out of the adjacency table. After the adjacency rolls out, a packet must use the same next hop to the destination.

### Examples

The following examples show how to display adjacency information:

### Examples

```
Router# show adjacency
Protocol Interface Address
```

```

IP      FastEthernet2/3      172.20.52.1 (3045)
IP      FastEthernet2/3      172.20.52.22 (11)

```

The following example shows how to display adjacency information for a specific interface:

```

Router# show adjacency fastethernet 0/0
Protocol Interface      Address
IP      FastEthernet0/0  10.4.9.2 (5)
IP      FastEthernet0/0  10.4.9.3 (5)

```

### Examples

```

Router# show adjacency
Protocol Interface      Address
IP      FastEthernet2/0/0  172.20.52.1 (3045)
IP      FastEthernet2/0/0  172.20.52.22 (11)

```

### Examples

The following example shows how to display detailed adjacency information for adjacent IPv6 routers:

```

Router# show adjacency detail
Protocol Interface      Address
IP      Tunnel0          point2point(6)
                                0 packets, 0 bytes
                                00000000
                                CEF expires: 00:02:57
                                refresh: 00:00:57
                                Epoch: 0
IPV6     Tunnel0          point2point(6)
                                0 packets, 0 bytes
                                00000000
                                IPv6 CEF never
                                Epoch: 0
IPV6     Ethernet2/0      FE80::A8BB:CCFF:FE01:9002 (3)
                                0 packets, 0 bytes
                                AABBC019002AABCC012C0286DD
                                IPv6 ND never
                                Epoch: 0
IPV6     Ethernet2/0      3FFE:2002::A8BB:CCFF:FE01:9002 (5)
                                0 packets, 0 bytes
                                AABBC019002AABCC012C0286DD
                                IPv6 ND never
                                Epoch: 0

```

The table below describes the significant fields shown in the displays.

**Table 3: show adjacency Field Descriptions**

| Field     | Description                |
|-----------|----------------------------|
| Protocol  | Type of Internet protocol. |
| Interface | Outgoing interface.        |
| Address   | Next hop IP address.       |

The following example shows how to display a summary of adjacency information:

```

Router# show adjacency summary
Adjacency table has 7 adjacencies:
  each adjacency consumes 368 bytes (4 bytes platform extension)
  6 complete adjacencies
  1 incomplete adjacency
  4 adjacencies of linktype IP

```

```

    4 complete adjacencies of linktype IP
    0 incomplete adjacencies of linktype IP
    0 adjacencies with fixups of linktype IP
    2 adjacencies with IP redirect of linktype IP
    3 adjacencies of linktype IPV6
    2 complete adjacencies of linktype IPV6
    1 incomplete adjacency of linktype IPV6
Adjacency database high availability:
  Database epoch: 8 (7 entries at this epoch)
Adjacency manager summary event processing:
  Summary events epoch is 52
  Summary events queue contains 0 events (high water mark 113 events)
  Summary events queue can contain 49151 events
  Adj last sourced field refreshed every 16384 summary events
RP adjacency component enabled
The following examples show how to display protocol detail and timer information:

```

### Examples

```

Router# show adjacency detail
Protocol Interface Address
IP      FastEthernet0/0 10.4.9.2(5)
                                0 packets, 0 bytes
                                epoch 0
                                sourced in sev-epoch 2
                                Encap length 14
                                00307131ABFC000500509C080800
                                ARP
IP      FastEthernet0/0 10.4.9.3(5)
                                0 packets, 0 bytes
                                epoch 0
                                sourced in sev-epoch 2
                                Encap length 14
                                000500506C08000500509C080800
                                ARP

```

### Examples

```

Router# show adjacency detail
Protocol Interface Address
IP      FastEthernet2/3 172.20.52.1(3045)
                                0 packets, 0 bytes
                                0000000000FF9200003800000000000000
                                00000000000000000000000000000000
                                00605C865B2800D0BB0F980B0800
                                ARP      03:58:12
IP      FastEthernet2/3 172.20.52.22(11)
                                0 packets, 0 bytes
                                0000000000FF9200003800000000000000
                                00000000000000000000000000000000
                                00801C93804000D0BB0F980B0800
                                ARP      03:58:06

```

### Examples

```

Router# show adjacency detail
Protocol Interface Address
IP      FastEthernet2/0/0 10.4.9.2(5)
                                0 packets, 0 bytes
                                epoch 0
                                sourced in sev-epoch 2
                                Encap length 14
                                00307131ABFC000500509C080800
                                ARP
IP      FastEthernet2/0/0 10.4.9.3(5)
                                0 packets, 0 bytes
                                epoch 0
                                sourced in sev-epoch 2
                                Encap length 14

```

000500506C08000500509C080800  
ARP

The following examples show how to display protocol detail and timer adjacency information for IP links for a specific interface:

Examples

```
Router# show adjacency tunnel 1 link detail
Protocol Interface      Address
IP         Tunnell      point2point(7)
              0 packets, 0 bytes
              epoch 1
              sourced in sev-epoch 4
              empty encap string
              P2P-ADJ
              Next chain element:
                label 16 TAG adj out of Ethernet1/0, addr 10.0.0.0
```

Examples

```
Router# show adjacency fastethernet 2/3
Protocol Interface      Address
IP         FastEthernet2/3 172.20.52.1 (3045)
IP         FastEthernet2/3 172.20.52.22 (11)
```

Examples

```
Router# show adjacency tunnel 1 link detail
Protocol Interface      Address
IP         Tunnell      point2point(7)
              0 packets, 0 bytes
              epoch 1
              sourced in sev-epoch 4
              empty encap string
              P2P-ADJ
              Next chain element:
                label 16 TAG adj out of FastEthernet0/0, addr 10.0.0.0
```

Related Commands

| Command                | Description                                                                |
|------------------------|----------------------------------------------------------------------------|
| clear adjacency        | Clears the Cisco Express Forwarding adjacency table.                       |
| clear arp-cache        | Deletes all dynamic entries from the ARP cache.                            |
| show adjacency         | Enables the display of information about the adjacency database.           |
| show mls cef adjacency | Displays information about the hardware Layer 3-switching adjacency node.  |
| show cef interface     | Displays detailed Cisco Express Forwarding information for all interfaces. |



# show cef

To display information about packets forwarded by Cisco Express Forwarding, use the **show cef** command in privileged EXEC mode.

**show cef** {**accounting**| **background** [**detail**]| **broker** *broker-name* [**detail**]| **error**| **fib**| **hardware vectors**| **idb**| **loadinfo**| **non-ip**| **nsf**| **path** [**list** [**walk**]]| **sets** [**detail**| **id** *path-set-id*| **summary**]| **switching background** [**detail**]| **walks** [**process**| **queue**]}

## Syntax Description

|                                  |                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>accounting</b>                | Displays Cisco Express Forwarding accounting state.                                                   |
| <b>background</b>                | Displays Cisco Express Forwarding background processing.                                              |
| <b>detail</b>                    | (Optional) Displays detailed Cisco Express Forwarding information.                                    |
| <b>broker</b> <i>broker-name</i> | (Distributed platforms only) Displays Cisco Express Forwarding information related to update brokers. |
| <b>error</b>                     | Displays information about the state of Cisco Express Forwarding errors.                              |
| <b>fib</b>                       | Displays Cisco Express Forwarding Forwarding Information Base (FIB) entries.                          |
| <b>hardware vectors</b>          | Displays the hardware application programming interface (API) vector function table.                  |
| <b>idb</b>                       | Displays Cisco Express Forwarding interface descriptor blocks.                                        |
| <b>loadinfo</b>                  | Displays Cisco Express Forwarding loadinfo events.                                                    |
| <b>non-ip</b>                    | Displays Cisco Express Forwarding paths for non-IP traffic.                                           |
| <b>nsf</b>                       | (Distributed platforms only) Displays Cisco Express Forwarding nonstop forwarding (NSF) statistics.   |
| <b>path</b>                      | Displays Cisco Express Forwarding paths.                                                              |
| <b>list</b>                      | (Optional) Displays a list of Cisco Express Forwarding paths.                                         |
| <b>walk</b>                      | (Optional) Displays the walk through the list of Cisco Express Forwarding paths.                      |

|                              |                                                                                                    |
|------------------------------|----------------------------------------------------------------------------------------------------|
| <b>sets</b>                  | (Optional) Displays point-to-multipoint path set information.                                      |
| <b>detail</b>                | (Optional) Displays detailed point-to-multipoint path set information.                             |
| <b>id</b> <i>path-set-id</i> | (Optional) Displays information about the specified path set. Enter the path set ID in hex format. |
| <b>summary</b>               | (Optional) Displays high-level information about point-to-multipoint path sets.                    |
| <b>switching background</b>  | Display Cisco Express Forwarding background switching processing.                                  |
| <b>walks</b>                 | Specifies a walk through Cisco Express Forwarding infrastructure.                                  |
| <b>process</b>               | (Optional) Displays the process that services the background work queue.                           |
| <b>queue</b>                 | (Optional) Displays the work queue of background walks.                                            |

**Command Modes**

Privileged EXEC (#)

**Command History**

| <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS         | This command was introduced to support the Cisco 12012 Internet router.                                                                                                                                                                                                               |
| 11.1CC         | Support was added for multiple platforms.                                                                                                                                                                                                                                             |
| 12.0(22)S      | The display output for this command was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 packets.                                                                                                                  |
| 12.2(13)T      | This command was integrated into Cisco IOS Release 12.2(13)T.                                                                                                                                                                                                                         |
| 12.2(14)S      | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                                                                                                                         |
| 12.2(25)S      | The <b>drop</b> and <b>not-cef-switched</b> keywords were removed. The <b>accounting</b> , <b>background</b> , <b>broker</b> , <b>fib</b> , <b>hardware vectors</b> , <b>idb</b> , <b>loadinfo</b> , <b>non-ip</b> , <b>nsf</b> , <b>path</b> , and <b>walks</b> keywords were added. |
| 12.2(28)SB     | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                                                                        |
| 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                       |

| Release     | Modification                                                                                             |
|-------------|----------------------------------------------------------------------------------------------------------|
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                          |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                            |
| 12.2(33)SRE | This command was modified. The <b>sets</b> keyword was added to display point-to-multipoint information. |

### Usage Guidelines

Use this command to display and monitor information about traffic forwarded by Cisco Express Forwarding. A line card might drop packets because of encapsulation failure, absence of route information, or absence of adjacency information.

A packet is punted (sent to another switch path) because Cisco Express Forwarding may not support a specified encapsulation or feature, the packet may be destined for the router, or the packet may have IP options (such as time stamp and record route). IP options are process switched.

### Examples

The following example shows how to display Cisco Express Forwarding accounting information:

```
Router# show cef accounting
IPv4 accounting state:
  Enabled accounting:      per-prefix, non-recursive, prefix-length
  Non-recursive load interval: 30 (default 30)
  Non-recursive update interval: 0 (default 0)
IPv6 accounting state:
  Enabled accounting:      None
  Non-recursive load interval: 30 (default 30)
  Non-recursive update interval: 0 (default 0)
```

The table below describes the significant fields shown in the example.

**Table 4: show cef accounting Field Descriptions**

| Field              | Description                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enabled accounting | Type or types of Cisco Express Forwarding accounting that are enabled: load-balance-hash, non-recursive, per-prefix, prefix-length, or none.                        |
| per-prefix         | Indicates that Cisco Express Forwarding accounting is enabled for the collection of the number of packets and bytes express-forwarded to a destination (or prefix). |
| non-recursive      | Indicates that Cisco Express Forwarding accounting is enabled through nonrecursive prefixes.                                                                        |
| prefix-length      | Indicates that Cisco Express Forwarding accounting is enabled through prefix length.                                                                                |

The following example shows how to display Cisco Express Forwarding background information:

```
Router# show cef background
CEF background process process (pid 77) running
0 events awaiting registration on background process
9 events registered on background process
boolean    FIB malloc failed, 0 occurrences
boolean    FIB assert failed, 0 occurrences
boolean    FIB hw_api_failure failed, 0 occurrences
timer      FIB checkers: auto-repair delay, init, !run, 0 occurrences
timer      FIB checkers: auto-repair delay, init, !run, 0 occurrences
timer      FIB checkers: IPv4 scan-rib-ios scanner, init, run, 2 occurrences
timer      FIB checkers: IPv4 scan-ios-rib scanner, init, run, 2 occurrences
timer      FIB checkers: IPv6 scan-ios-rib scanner, init, run, 2 occurrences
timer      FIB table: rate monitor, init, run, 0 occurrences
```

The table below describes the significant fields shown in the example.

**Table 5: show cef background Field Descriptions**

| Field                                                              | Description                                                                                                                                                                                                                    |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| boolean                                                            | The background process is waiting for a true or false flag to be set.                                                                                                                                                          |
| FIB malloc failed, 0 occurrences                                   | No instances of memory allocation failure have occurred for the FIB.                                                                                                                                                           |
| FIB assert failed, 0 occurrences                                   | No instances of assertion failure have occurred for the FIB.                                                                                                                                                                   |
| FIB hw_api_failure failed; 0 occurrences                           | No failures are reported during the programming of hardware forwarding.                                                                                                                                                        |
| timer                                                              | The background process is waiting for a timer to be triggered. Once the timer is triggered, the operation begins. In the FIB checkers cases that follow, the timer is linked to Cisco Express Forwarding consistency checkers. |
| FIB checkers: auto-repair delay, init, !run, 0 occurrences         | FIB auto repair timer is initialized, but the timer is not running and has not been running (0 occurrences).                                                                                                                   |
| FIB checkers: IPv4 scan-rib-ios scanner, init, !run, 2 occurrences | FIB IPv4 scan-rib-ios timer is initialized and running. The timer has been triggered twice.                                                                                                                                    |
| FIB checkers: IPv4 scan-ios-rib scanner, init, run, 2 occurrences  | FIB IPv4 scan-ios-rib timer is initialized and running. The timer has been triggered twice.                                                                                                                                    |
| FIB table: rate monitor, init, run, 0 occurrences                  | FIB table rate monitor timer is initialized and running, but has yet to be triggered.                                                                                                                                          |

The following example shows how to display information about Cisco Express Forwarding FIB entries:

```
Router# show cef fib
```

```
9 allocated IPv4 entries, 0 failed allocations
1 allocated IPv6 entry, 0 failed allocations
```

The table below describes the significant fields shown in the example.

**Table 6: show cef fib Field Descriptions**

| Field                                          | Description                                               |
|------------------------------------------------|-----------------------------------------------------------|
| 9 allocated IPv4 entries, 0 failed allocations | Number of successfully allocated and failed IPv4 entries. |
| 1 allocated IPv6 entry, 0 failed allocations   | Number of successfully allocated and failed IPv6 entries. |

The following example shows how to display information about Cisco Express Forwarding loadinfo:

```
Router# show cef loadinfo

0 allocated loadinfos, 0 failed allocations
0 allocated loadinfo hash usage gsbs
0 inplace modifies (enabled)
0 identical modifies
```

The table below describes the significant fields shown in the example.

**Table 7: show cef loadinfo Field Descriptions**

| Field                                       | Description                                                                                             |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 0 allocated loadinfos, 0 failed allocations | Number of successfully allocated and failed allocated loadinfos.                                        |
| 0 allocated loadinfo hash usage gsbs        | Number of allocated subblocks for per-hash bucket accounting when load balancing is used.               |
| 0 inplace modifies (enabled)                | In-place modification is enabled. No in-place modifications have occurred.                              |
| 0 identical modifies                        | Number of in-place modifications that were skipped because the replacement was identical to the target. |

The following example shows how to display information for Cisco Express Forwarding paths:

```
Router# show cef path

28 allocated IPv4 paths, 0 failed allocations
4 allocated IPv6 paths, 0 failed allocations
32 Total Paths, 587 Recursive Paths, 0 Unresolved Paths
```

The table below describes the significant fields shown in the example.

**Table 8: show cef path Field Descriptions**

| Field                                                   | Definition                                              |
|---------------------------------------------------------|---------------------------------------------------------|
| 28 allocated IPv4 paths                                 | Number of successfully allocated and failed IPv4 paths. |
| 4 allocated IPv6 paths                                  | Number of successfully allocated and failed IPv6 paths. |
| 32 Total Paths, 587 Recursive Paths, 0 Unresolved Paths | Information on all Cisco Express Forwarding paths.      |

The following example shows how to display information about Cisco Express Forwarding background switching processes:

```
Router# show cef switching background
```

```
CEF switching background process (pid 46) running
 0 events awaiting registration on background process
 1 event registered on background process
  boolean OCE unlock queue, 0 occurrences
```

The table below describes the significant fields shown in the example.

**Table 9: show cef switching background Field Descriptions**

| Field                                                | Description                                                          |
|------------------------------------------------------|----------------------------------------------------------------------|
| 0 events awaiting registration on background process | Number of events waiting to be registered on the background process. |
| 1 event registered on background process             | Number of events registered on the background process.               |
| boolean OCE unlock queue, 0 occurrences              | Number of output chain element (OCE) unlock queue events.            |

The following example shows how to display information about Cisco Express Forwarding:

```
Router# show cef walks
```

```
Calling process:
```

```
-----
```

```
Number of initial walks:
```

```

      started
mode / priority      low      high      very high
sync                3         0         0
atomic              0         0         0
      finished
mode / priority      low      high      very high
sync                3         0         0
atomic              0         0         0
      restarted
mode / priority      low      high      very high
sync                0         0         0
```

```

atomic                0                0                0
Number of sub walks:
mode / priority      started
mode / priority      low                high                very high
sync                0                0                0
atomic              0                0                0
mode / priority      finished
mode / priority      low                high                very high
sync                0                0                0
atomic              0                0                0

```

The table below describes the significant fields shown in the example.

**Table 10: show cef walks Field Description**

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mode     | <p>Indicates the mode of the Cisco Express Forwarding infrastructure walk:</p> <ul style="list-style-type: none"> <li>• sync--The walk takes place in the current process context and completes before the start function returns. Other processes are allowed to run.</li> <li>• atomic--The walk takes place in the current process context and completes before the start function returns. No other processes are allowed to run.</li> </ul> |
| priority | Indicate the priority of the infrastructure walk: low, medium, or high.                                                                                                                                                                                                                                                                                                                                                                          |

## Related Commands

| Command                         | Description                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>clear cef linecard</b>       | Clears Cisco Express Forwarding information from line cards.                                            |
| <b>show cef features global</b> | Displays Cisco Express Forwarding features for any interface.                                           |
| <b>show cef interface</b>       | Displays detailed Cisco Express Forwarding information for a specified interface or for all interfaces. |
| <b>show cef linecard</b>        | Displays Cisco Express Forwarding-related information by line card.                                     |
| <b>show cef memory</b>          | Displays information about Cisco Express Forwarding memory usage.                                       |
| <b>show cef state</b>           | Displays the state of Cisco Express Forwarding on a networking device.                                  |

| Command                                | Description                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------|
| <b>show cef subtree context client</b> | Displays Cisco Express Forwarding prefix subtrees.                                          |
| <b>show cef table</b>                  | Displays the configuration and operational state of the Cisco Express Forwarding FIB table. |
| <b>show cef timers</b>                 | Displays the current state of the timers internal to the Cisco Express Forwarding process.  |



# show cef drop



## Note

The **show cef drop** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To display a list of which packets each line card dropped, use the **show cef drop** command in user EXEC or privileged EXEC mode.

## show cef drop

## Syntax Description

This command has no arguments or keywords.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2 GS     | This command was introduced to support the Cisco 12012 Internet router.                                                                                              |
| 11.1 CC     | Multiple platform support was added.                                                                                                                                 |
| 12.0(22)S   | The display output for this command was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 packets. |
| 12.0(23)S   | This command was integrated into Cisco IOS Release 12.0(23)S.                                                                                                        |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T. Previously there was a <b>show cef</b> command, and <b>drop</b> was a keyword of that command.         |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                        |
| 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.                                                     |
| 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.                                                   |
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases.                                                  |
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2S releases.                                                   |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.                                                     |

**Usage Guidelines**

A line card might drop packets because of encapsulation failure, absence of route information, or absence of adjacency information.

A packet is sent to a different switching path (punted) because Cisco Express Forwarding does not support the encapsulation or feature, the packet is destined for the router, or the packet has IP options, such as time stamp and record route. IP options are process switched.

**Note**

If Cisco Express Forwarding for IPv6 or distributed Cisco Express Forwarding for IPv6 is enabled globally on the router, the **show cef drop** command displays IPv6 Cisco Express Forwarding counter information and IPv4 Cisco Express Forwarding counter information. If Cisco Express Forwarding for IPv6 or distributed Cisco Express Forwarding for IPv6 is not enabled globally on the router, the command displays only IPv4 Cisco Express Forwarding counter information.

**Examples**

The following is sample output from the **show cef drop** command:

```
Router# show cef drop
CEF Drop Statistics
Slot  Encap_fail  Unresolved  Unsupported  No_route  No_adj  ChksumErr
RP
1      0             0           0           0         0       0
2      0             0           5           0         0       5
IPv6 CEF Drop Statistics
Slot  Encap_fail  Unresolved  Unsupported  No_route  No_adj
RP
1      0             0           3           0         0
2      0             0           0           0         0
```

The table below describes the significant fields shown in the display.

**Table 11: show cef drop Field Descriptions**

| Field       | Description                                                                                                                                                                                                                                                       |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slot        | The slot number on which the packets were received.                                                                                                                                                                                                               |
| Encap_fail  | Indicates the number of packets dropped after exceeding the limit for packets punted to the processor due to missing adjacency information (Cisco Express Forwarding throttles packets passed up to the process level at a rate of one packet every two seconds). |
| Unresolved  | Indicates the number of packets dropped due to an unresolved prefix in the Forwarding Information Base (FIB) table.                                                                                                                                               |
| Unsupported | Indicates the number of packets fast-dropped by Cisco Express Forwarding (drop adjacency).                                                                                                                                                                        |
| No_route    | Indicates the number of packets dropped due to a missing prefix in the FIB table.                                                                                                                                                                                 |

| Field     | Description                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
| No_adj    | Indicates the number of packets dropped due to incomplete adjacency.                                                                  |
| ChksumErr | Indicates the number of IPv4 packets received with a checksum error.<br><br><b>Note</b> This field is not supported for IPv6 packets. |

### Related Commands

| Command                   | Description                                                      |
|---------------------------|------------------------------------------------------------------|
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information. |
| <b>show ipv6 cef</b>      | Displays entries in the IPv6 FIB.                                |

# show cef events



**Note** The **show cef events** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To display a list of events internal to the Cisco Express Forwarding process, use the **show cef events** command in user EXEC or privileged EXEC mode.

## show cef events

**Syntax Description** This command has no arguments or keywords.

**Command Modes** User EXEC (>) Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                        |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(23)S   | This command was introduced.                                                                                        |
|                 | 12.0(24)S   | This command was integrated into Cisco IOS Release 12.0(24)S.                                                       |
|                 | 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T.                                                       |
|                 | 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
|                 | 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.  |
|                 | 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
|                 | 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2S releases.  |
|                 | 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

**Examples** The following is sample output from the **show cef events** command:

```
Router# show cef events
CEF events (14/0 recorded/ignored)
Time          Event      Details
+00:00:00.000 SubSys    ipfib init
+00:00:00.000 SubSys    ipfib_ios init
```

```

+00:00:00.000 SubSys ipfib_util init
+00:00:00.000 SubSys adj_ios init
+00:00:00.000 SubSys ipfib_les init
+00:00:01.272 Flag FIB enabled set to yes
+00:00:01.272 Flag FIB switching enabled set to yes
+00:00:01.272 GState CEF enabled
+00:00:02.872 Process Background created
+00:00:02.872 Flag FIB running set to yes
+00:00:02.872 Process Background event loop enter
+00:00:02.912 Flag FIB switching running set to yes
+00:00:02.920 Process Scanner created
+00:00:02.920 Process Scanner event loop enter

```

The table below describes the significant fields shown in the display.

**Table 12: show cef events Field Descriptions**

| Field   | Description                        |
|---------|------------------------------------|
| Time    | Time that the event occurred.      |
| Event   | Type of event that occurred.       |
| Details | Detailed description of the event. |

#### Related Commands

| Command                   | Description                                                                   |
|---------------------------|-------------------------------------------------------------------------------|
| <b>show cef drop</b>      | Displays a list of which packets each line card dropped.                      |
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information.              |
| <b>show cef linecard</b>  | Displays Cisco Express Forwarding-related interface information by line card. |

# show cef features global

To display Cisco Express Forwarding features for any interface, use the **show cef features global** command in privileged EXEC mode.

**show cef features global**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2(28)SB  | This command was introduced.                                    |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
|                 | 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
|                 | 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

**Usage Guidelines** This command is used to determine if Cisco Express Forwarding is enabled for all interfaces.

**Examples** The following is sample output from the **show cef features global** command:

```
Router# show cef features global
Global Drop features not attached to a specific interface:
Input FNF
Global Punt features not attached to a specific interface:
Input FNF, SPD Classify
```

The table below describes the significant fields shown in the display.

**Table 13: show cef features global Field Descriptions**

| Field        | Description                     |
|--------------|---------------------------------|
| Input FNF    | Flexible NetFlow (FNF) feature. |
| SPD Classify | Flexible NetFlow (FNF) feature. |

This output shows the global drop feature, Flexible NetFlow (Input FNF), and two global punt features, Input FNF and SPD Classify. SPD Classify is present by default. The punt features are invoked for all punted packets regardless of the interface upon which they are received.

**Related Commands**

| Command                   | Description                                                                |
|---------------------------|----------------------------------------------------------------------------|
| <b>show cef interface</b> | Displays detailed Cisco Express Forwarding information for all interfaces. |

# show cef interface

To display detailed Cisco Express Forwarding information for a specified interface or for all interfaces, use the **show cef interface** command in user EXEC or privileged EXEC mode.

**show cef interface** [*type number*] [**statistics**|**detail**|**internal**|**brief**|**policy-statistics** [**input**|**output**]]

## Syntax Description

|                          |                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <i>type number</i>       | (Optional) Interface type and number.<br>No space is required between the interface type and number.                             |
| <b>statistics</b>        | (Optional) Displays switching statistics for an interface or interfaces.                                                         |
| <b>detail</b>            | (Optional) Displays detailed Cisco Express Forwarding information for the specified interface type and number.                   |
| <b>internal</b>          | (Optional) Displays internal Cisco Express Forwarding interface status and configuration.                                        |
| <b>brief</b>             | (Optional) Summarizes the Cisco Express Forwarding interface state.                                                              |
| <b>policy-statistics</b> | (Optional) Displays Border Gateway Protocol (BGP) policy statistical information for a specific interface or for all interfaces. |
| <b>input</b>             | (Optional) Displays BGP accounting policy statistics for traffic that is traveling through an input interface.                   |
| <b>output</b>            | (Optional) Displays BGP accounting policy statistics for traffic that is traveling through an output interface.                  |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release    | Modification                                                                                                |
|------------|-------------------------------------------------------------------------------------------------------------|
| 11.2GS     | This command was introduced to support the Cisco 12012 Internet router.                                     |
| 11.1CC     | Support for multiple platforms was added.                                                                   |
| 12.0(14)ST | This command was integrated into Cisco IOS Release 12.0(14)ST, and the <b>statistics</b> keyword was added. |



| Release     | Modification                                                                                                                                                                                                                                                                                                                                   |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(2)T    | This command was integrated into Cisco IOS Release 12.2(2)T, and the <b>detail</b> keyword was added.                                                                                                                                                                                                                                          |
| 12.2(13)T   | The <b>policy-statistics</b> keyword was added.                                                                                                                                                                                                                                                                                                |
| 12.0(22)S   | The <b>input</b> and <b>output</b> keywords were added.<br><br>The display output was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding interface information. Output fields that support BGP policy accounting were added for the Cisco 7200 series and Cisco 7500 series platforms. |
| 12.3(4)T    | The <b>input</b> and <b>output</b> keywords were added.<br><br>The display output was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding interface information. Output fields that support BGP policy accounting were added for the Cisco 7200 series and Cisco 7500 series platforms. |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                                                                                                                                                                                  |
| 12.2(25)S   | The <b>internal</b> keyword was added.                                                                                                                                                                                                                                                                                                         |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                                                                                                                                 |
| 12.2(25)SG  | This command was integrated into Cisco IOS Release 12.2(25)SG.                                                                                                                                                                                                                                                                                 |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                                                                                |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                                                                                                                                                                                |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                                                                                                                                                                                  |

### Usage Guidelines

You can use this command to display the detailed Cisco Express Forwarding status for all interfaces.

Values entered for the *type* and *number* arguments display Cisco Express Forwarding status information for the specified interface type and number.

The **policy-statistics**, **input**, and **output** keywords are available only on distributed switching platforms.

### Examples

The following example shows how to display a summary of Cisco Express Forwarding information for an interface named Ethernet 3/0:

```
Router# show cef interface ethernet 3/0 brief
Interface      IP-Address      Status  Switching
Ethernet3/0    10.0.212.6      up      CEF
Router#
```

The following is sample output from the **show cef interface** command for Fast Ethernet interface 1/0/0 with BGP policy accounting configured for input traffic:

```
Router# show cef interface fastethernet 1/0/0
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  Internet address is 10.1.1.1/24
  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
  BGP based policy accounting on input is enabled
  BGP based policy accounting on output is disabled
Hardware idb is FastEthernet1/0/0 (6)
Software idb is FastEthernet1/0/0 (6)
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 0x100, Output fast flags 0x0, Flags 0x0
ifindex 7(7)
Slot 1 Slot unit 0 VC -1
Transmit limit accumulator 0xE8001A82 (0xE8001A82)
IP MTU 1500
```

The following is sample output from the **show cef interface detail** command for Ethernet interface 1/0/0:

```
Router# show cef interface ethernet 1/0/0 detail
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  Internet address is 10.1.1.1/24
  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
  BGP based policy accounting on input is enabled
  BGP based policy accounting on output is disabled
Hardware idb is FastEthernet1/0/0 (6)
Software idb is FastEthernet1/0/0 (6)
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 0x100, Output fast flags 0x0, Flags 0x0
ifindex 7(7)
Slot 1 Slot unit 0 VC -1
Transmit limit accumulator 0xE8001A82 (0xE8001A82)
IP MTU 1500
```

The following is sample output from the **show cef interface Null 0 detail** command:

```
Router# show cef interface null 0 detail
Null0 is up (if_number 1)
  Corresponding hwidb fast_if_number 1
  Corresponding hwidb firstsw->if_number 1
  Internet Protocol processing disabled
  Interface is marked as nullidb
  Packets switched to this interface on linecard are dropped to next slow path
Hardware idb is Null0
Fast switching type 13, interface type 0
IP CEF switching enabled
IP Feature CEF switching turbo vector
Input fast flags 0x0, Output fast flags 0x0
ifindex 0(0)
Slot -1 Slot unit -1 VC -1
```

```
Transmit limit accumulator 0x0 (0x0)
IP MTU 1500
```

The following is sample output for internal Cisco Express Forwarding interface status and configuration for the Ethernet 3/1 interface:

```
Router# show cef interface ethernet 3/1 internal
Ethernet3/1 is up (if_number 13)
  Corresponding hwidb fast_if_number 13
  Corresponding hwidb firstsw->if_number 13
  Internet address is 10.0.212.6/24
  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
  BGP based policy accounting on input is disabled
  BGP based policy accounting on output is disabled
  Hardware idb is Ethernet3/1
  Fast switching type 1, interface type 63
  IP CEF switching enabled
  IP CEF switching turbo vector
  IP CEF turbo switching turbo vector
  IP prefix lookup IPv4 mtrie 8-8-8-8 optimized
  Input fast flags 0x0, Output fast flags 0x0
  ifindex 11(11)
  Slot 3 Slot unit 0 VC -1
  Transmit limit accumulator 0x0 (0x0)
  IP MTU 1500
  Subblocks:
    IPv6: enabled 1 unreachable FALSE redirect TRUE mtu 1500 flags 0x0
          link-local address is FE80::20C:CFFF:FEF9:4854
          Global unicast address(es):
          10:6:6:6:20C:CFFF:FEF9:4854, subnet is 10:6:6:6::/64 [EUI]
    IPv4: Internet address is 10.0.212.6/24
          Broadcast address 255.255.255.255
          Per packet load-sharing is disabled
          IP MTU 1500
```

The table below describes the significant fields shown in the displays.

**Table 14: show cef interface Field Descriptions**

| Field                               | Description                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| FastEthernet1/0/0 is up             | Indicates type, number, and status of the interface.                                                                                 |
| Internet address is                 | Internet address of the interface.                                                                                                   |
| ICMP redirects are always sent      | Indicates how packet forwarding is configured.                                                                                       |
| Per packet load-sharing is disabled | Indicates status of load sharing on the interface.                                                                                   |
| IP unicast RPF check is disabled    | Indicates status of IP unicast Reverse Path Forwarding (RPF) check on the interface.                                                 |
| Inbound access list is not set      | Indicates the number or name of the inbound access list if one is applied to this interface. Also indicates whether the list is set. |

| Field                                             | Description                                                                                                                               |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Outbound access list is not set                   | Indicates the number or name of the outbound access list if one is applied to this interface. Also indicates whether the list is set.     |
| IP policy routing is disabled                     | Indicates the status of IP policy routing on the interface.                                                                               |
| BGP based policy accounting on input is enabled   | Indicates the status of BGP policy accounting on the input interface.                                                                     |
| BGP based policy accounting on output is disabled | Indicates the status of BGP policy accounting on the output interface.                                                                    |
| Hardware idb is Ethernet1/0/0                     | Interface type and number configured.                                                                                                     |
| Fast switching type                               | Used for troubleshooting; indicates switching mode in use.                                                                                |
| Interface type                                    | Indicates interface type.                                                                                                                 |
| IP Distributed CEF switching enabled              | Indicates whether distributed Cisco Express Forwarding is enabled on this interface. (Cisco 7500 and 12000 series Internet routers only.) |
| IP Feature Fast switching turbo vector            | Indicates IP fast switching type configured.                                                                                              |
| IP Feature CEF switching turbo vector             | Indicates IP feature Cisco Express Forwarding switching type configured.                                                                  |

| Field            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input fast flags | <p>Indicates the input status of various switching features:</p> <ul style="list-style-type: none"> <li>• 0x0001 (input Access Control List [ACL] enabled)</li> <li>• 0x0002 (policy routing enabled)</li> <li>• 0x0004 (input rate limiting)</li> <li>• 0x0008 (MAC/Prec accounting)</li> <li>• 0x0010 (DSCP/PREC/QOS GROUP)</li> <li>• 0x0020 (input named access lists)</li> <li>• 0x0040 (NAT enabled on input)</li> <li>• 0x0080 (crypto map on input)</li> <li>• 0x0100 (QPPB classification)</li> <li>• 0x0200 (inspect on input)</li> <li>• 0x0400 (input classification)</li> <li>• 0x0800 (<sup>1</sup>casa input enable)</li> <li>• 0x1000 (Virtual Private Network [VPN] enabled on a <sup>2</sup>swidb)</li> <li>• 0x2000 (input idle timer enabled)</li> <li>• 0x4000 (unicast Reverse Path Forwarding [RPF] check)</li> <li>• 0x8000 (per-address ACL enabled)</li> <li>• 0x10000 (deaggregating a packet)</li> <li>• 0x20000 (<sup>3</sup>GPRS enabled on input)</li> <li>• 0x40000 (URL RenDezvous)</li> <li>• 0x80000 (QoS classification)</li> <li>• 0x100000 (FR switching on interface)</li> <li>• 0x200000 (<sup>4</sup>WCCP redirect on input)</li> <li>• 0x400000 (input classification)</li> </ul> |

| Field                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output fast flags          | <p>Indicates the output status of various switching features, as follows:</p> <ul style="list-style-type: none"> <li>• 0x0001 (output ACL enabled)</li> <li>• 0x0002 (IP accounting enabled)</li> <li>• 0x0004 (WCC redirect enabled interface)</li> <li>• 0x0008 (rate limiting)</li> <li>• 0x0010 (MAC/Prec accounting)</li> <li>• 0x0020 (DSCP/PREC/QOS GROUP)</li> <li>• 0x0040 (D-QOS classification)</li> <li>• 0x0080 (output named access lists)</li> <li>• 0x0100 (NAT enabled on output)</li> <li>• 0x0200 (TCP intercept enabled)</li> <li>• 0x0400 (crypto map set on output)</li> <li>• 0x0800 (output firewall)</li> <li>• 0x1000 (RSVP classification)</li> <li>• 0x2000 (inspect on output)</li> <li>• 0x4000 (QoS classification)</li> <li>• 0x8000 (QoS preclassification)</li> <li>• 0x10000 (output stile)</li> </ul> |
| ifindex 7/(7)              | Indicates a Cisco IOS internal index or identifier for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Slot 1 Slot unit 0 VC -1   | The slot number and slot unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Transmit limit accumulator | Indicates the maximum number of packets allowed in the transmit queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| IP MTU                     | The MTU size set on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

<sup>1</sup> Cisco applications and services architecture (CASA)

<sup>2</sup> Software interface descriptor block (SWIDB)

<sup>3</sup> General packet radio system (GPRS)

<sup>4</sup> Web cache communication protocol (WCCP)

<sup>5</sup> Resource reservation protocol (RSVP)

The following is sample output from the **show cef interface command** using the **policy-statistics** keyword:

```
Router# show cef interface policy-statistics
```

```

POS7/0 is up (if_number 8)
Index   Packets   Bytes
1       0       0
2       0       0
3       50     5000
4      100    10000
5      100    10000
6       10     1000
7       0       0
8       0       0

```

The following is sample output from the **show cef interface** command using the **policy-statistics** keyword. It shows policy statistics for Ethernet interface 1/0.

```

Router# show cef interface ethernet 1/0 policy-statistics
Ethernet1/0 is up (if_number 3)
  Corresponding hwidb fast_if_number 3
  Corresponding hwidb firstsw->if_number 3
Index   Packets   Bytes
1       0       0
2       0       0
3       0       0
4       0       0
5       0       0
6       0       0
7       0       0
8       0       0

```

The following is sample output from the **show cef interface** command using the **policy-statistics** keyword. It shows policy statistics for Fast Ethernet interface 1/0/0 with the policy accounting based on input traffic.

```

Router# show cef interface fastethernet 1/0/0 policy-statistics input
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  BGP based Policy accounting on input is enabled
Index   Packets   Bytes
1      9999   999900
2       0       0
3       0       0
4       0       0
5       0       0
6       0       0
7       0       0
8       0       0
9       0       0
10      0       0
11      0       0
12      0       0
13      0       0
14      0       0
15      0       0
16      0       0
17      0       0
18      0       0
19      0       0
20      0       0
21      0       0
22      0       0
23      0       0
24      0       0
25      0       0
26      0       0
27      0       0
28      0       0
29      0       0
30      0       0
31      0       0
32      0       0
33      0       0
34     1234   123400
35      0       0

```

|    |      |         |
|----|------|---------|
| 36 | 0    | 0       |
| 37 | 0    | 0       |
| 38 | 0    | 0       |
| 39 | 0    | 0       |
| 40 | 0    | 0       |
| 41 | 0    | 0       |
| 42 | 0    | 0       |
| 43 | 0    | 0       |
| 44 | 0    | 0       |
| 45 | 1000 | 100000  |
| 46 | 0    | 0       |
| 47 | 0    | 0       |
| 48 | 0    | 0       |
| 49 | 0    | 0       |
| 50 | 0    | 0       |
| 51 | 0    | 0       |
| 52 | 0    | 0       |
| 53 | 0    | 0       |
| 54 | 5123 | 1198782 |

The following is sample output from the **show cef interface** command using the **policy-statistics** keyword. It shows policy statistics for serial interface 1/1/2 with the policy accounting based on output traffic.

```
Router# show cef interface serial 1/1/2 policy-statistics output
Serial1/1/2 is up (if_number 9)
  Corresponding hwidb fast_if number 9
  Corresponding hwidb firstsw->if_number 9
  BGP based Policy accounting on output is enabled
Index      Packets      Bytes
  1         9999      999900
  2           0           0
  .
  .
  .
 18           0           0
 19           0           0
 20           0           0
  .
  .
  .
 34         1234      123400
 35           0           0
  .
  .
  .
 44           0           0
 45         1000      100000
 46           0           0
 47           0           0
 48           0           0
 49           0           0
 50           0           0
 51           0           0
 52           0           0
 53           0           0
 54         5123      1198782
 55           0           0
 56           0           0
 57           0           0
 58           0           0
 59           0           0
 60           0           0
 61           0           0
 62           0           0
 63           0           0
 64           0           0
```

The table below describes the significant fields shown in the display.



**Table 15: show cef interface policy-statistics Field Descriptions**

| Field   | Description                                                 |
|---------|-------------------------------------------------------------|
| Index   | Traffic index set with the <b>route-map</b> command.        |
| Packets | Number of packets switched that match the index definition. |
| Bytes   | Number of bytes switched that match the index definition.   |

**Related Commands**

| Command                   | Description                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>clear cef linecard</b> | Clears Cisco Express Forwarding information from line cards.                                                      |
| <b>route-map (IP)</b>     | Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing. |
| <b>show cef</b>           | Displays information about packets forwarded by Cisco Express Forwarding.                                         |
| <b>show cef drop</b>      | Displays which packets the line cards dropped, or displays which packets were not express forwarded.              |
| <b>show cef linecard</b>  | Displays Cisco Express Forwarding interface information by line card.                                             |

## show cef interface policy-statistics

To display Cisco Express Forwarding policy statistical information for a specific interface or for all interfaces, use the **show cef interface policy-statistics** command in user EXEC or privileged EXEC mode.

**show cef interface** [*type number*] **policy-statistics** [**input**| **output**]

### Syntax Description

|                    |                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <i>type number</i> | (Optional) Interface type and number. A space is not required between the interface type and number.                                     |
| <b>input</b>       | (Optional) Displays Border Gateway Protocol (BGP) policy accounting statistics for traffic that is traveling through an input interface. |
| <b>output</b>      | (Optional) Displays BGP policy accounting statistics for traffic that is traveling through an output interface.                          |

### Command Default

By default, this command displays the input statistics only.

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                                                                                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(9)S    | This command was introduced on the Cisco 12000 series Internet routers.                                                                                                                                                                                                                                                                                 |
| 12.0(14)ST  | This command was integrated into Cisco IOS Release 12.0(14)ST.                                                                                                                                                                                                                                                                                          |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T.                                                                                                                                                                                                                                                                                           |
| 12.0(22)S   | The <b>input</b> and <b>output</b> keywords were added.<br><br>The display output was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 interface information. Output fields that support BGP policy accounting were added for the Cisco 7200 series and Cisco 7500 series platforms. |
| 12.2(14)SX  | Support for this command was implemented on the Supervisor Engine 720.                                                                                                                                                                                                                                                                                  |
| 12.3(4)T    | Changes to this command were integrated into Cisco IOS Release 12.3(4)T.                                                                                                                                                                                                                                                                                |
| 12.2(25)S   | This command was integrated into Cisco IOS Release 12.2(25)S.                                                                                                                                                                                                                                                                                           |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                                                                                         |

## Usage Guidelines

This command is available on all software switching platforms, such as the Cisco 7200 series router, and distributed switched platforms, such as the Route Switch Processor (RSP), Gigabit Switch Router (GSR), and the Catalyst 6000 series router.

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

Two sets of counters are displayed for BGP policy accounting: input counters and output counters. If you enter the **show cef interface policy-statistics** command without an optional keyword, the command displays only input counters. If you want to display the output counters, you must enter the command with the **output** keyword. You can also display the input counters by entering the **input** keyword with the command.

The number of lines in the output of the **show cef interface policy-statistics** command varies from platform to platform. The software switched platforms support 64 input and 64 output counters and thus 64 lines of output. The Catalyst 6000 family switches and Cisco 7600 series routers support seven input and seven output counters and seven lines of output.

You enable BGP policy accounting on a particular interface when you enter the **bgp-policy accounting** command in interface configuration mode. To define the conditions for BGP policy accounting, you use the **set traffic-index** command in route-map configuration mode, the **route-map** command in global configuration mode, the **table-map** command in route-map configuration mode, and the **match** command in route-map configuration mode. The **table-map** command adds the named route map to the BGP routing table. BGP uses the route map name to set traffic indexes for routes in the IP routing table. The **match** commands specify the match criteria--the conditions under which policy routing occurs. The **set traffic-index** command sets the traffic indexes for matching prefixes. The **show ip cef detail** command displays the traffic index for any particular route.

## Examples

The following is sample output from the **show cef interface policy-statistics** command:

```
Router# show cef interface policy-statistics
POS7/0 is up (if_number 8)
Index   Packets   Bytes
1       0         0
2       0         0
3       50        5000
4      100       10000
5      100       10000
6       10       1000
7       0         0
8       0         0
```

The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for Ethernet interface 1/0:

```
Router# show cef interface ethernet 1/0 policy-statistics
Ethernet1/0 is up (if_number 3)
  Corresponding hwidb_fast_if_number 3
  Corresponding hwidb_firstsw->if_number 3
Index   Packets   Bytes
1       0         0
2       0         0
3       0         0
4       0         0
5       0         0
6       0         0
7       0         0
8       0         0
```

The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for Fast Ethernet interface 1/0/0 with the policy accounting based on input traffic:

```
Router# show cef interface fastethernet 1/0/0 policy-statistics input
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  BGP based Policy accounting on input is enabled
Index      Packets      Bytes
  1         9999      999900
  2          0          0
  3          0          0
  4          0          0
  5          0          0
  6          0          0
  7          0          0
  8          0          0
  9          0          0
 10          0          0
 11          0          0
 12          0          0
 13          0          0
 14          0          0
 15          0          0
 16          0          0
 17          0          0
 18          0          0
 19          0          0
 20          0          0
 21          0          0
 22          0          0
 23          0          0
 24          0          0
 25          0          0
 26          0          0
 27          0          0
 28          0          0
 29          0          0
 30          0          0
 31          0          0
 32          0          0
 33          0          0
 34        1234      123400
 35          0          0
 36          0          0
 37          0          0
 38          0          0
 39          0          0
 40          0          0
 41          0          0
 42          0          0
 43          0          0
 44          0          0
 45        1000      100000
 46          0          0
 47          0          0
 48          0          0
 49          0          0
 50          0          0
 51          0          0
 52          0          0
 53          0          0
 54        5123      1198782
 55          0          0
 56          0          0
 57          0          0
 58          0          0
 59          0          0
 60          0          0
 61          0          0
 62          0          0
```

```

63          0          0
64          0          0

```

The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for serial interface 1/1/2 with the policy accounting based on output traffic:

```

Router# show cef interface serial 1/1/2 policy-statistics output
Serial1/1/2 is up (if_number 9)
  Corresponding hwidb fast_if_number 9
  Corresponding hwidb firstsw->if_number 9
  BGP based Policy accounting on output is enabled
Index      Packets      Bytes
  1          9999      999900
  2           0           0
  3           0           0
  4           0           0
  5           0           0
  6           0           0
  7           0           0
  8           0           0
  9           0           0
 10           0           0
 11           0           0
 12           0           0
 13           0           0
 14           0           0
 15           0           0
 16           0           0
 17           0           0
 18           0           0
 19           0           0
 20           0           0
 21           0           0
 22           0           0
 23           0           0
 24           0           0
 25           0           0
 26           0           0
 27           0           0
 28           0           0
 29           0           0
 30           0           0
 31           0           0
 32           0           0
 33           0           0
 34          1234      123400
 35           0           0
 36           0           0
 37           0           0
 38           0           0
 39           0           0
 40           0           0
 41           0           0
 42           0           0
 43           0           0
 44           0           0
 45          1000      100000
 46           0           0
 47           0           0
 48           0           0
 49           0           0
 50           0           0
 51           0           0
 52           0           0
 53           0           0
 54          5123      1198782
 55           0           0
 56           0           0
 57           0           0
 58           0           0
 59           0           0
 60           0           0

```

```

61          0          0
62          0          0
63          0          0
64          0          0

```

The table below describes the significant fields shown in these displays.

**Table 16: show cef interface policy-statistics Field Descriptions**

| Field   | Description                                                 |
|---------|-------------------------------------------------------------|
| Index   | Traffic index set with the <b>route-map</b> command.        |
| Packets | Number of packets switched that match the index definition. |
| Bytes   | Number of bytes switched that match the index definition.   |

## Related Commands

| Command                       | Description                                                                                                      |
|-------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>bgp-policy</b>             | Enables BGP policy accounting or policy propagation on an interface.                                             |
| <b>match as-path</b>          | Matches a BGP autonomous system path access list.                                                                |
| <b>match community</b>        | Matches a BGP community.                                                                                         |
| <b>match extcommunity</b>     | Matches BGP extended community list attributes.                                                                  |
| <b>match local-preference</b> | Configures a route map to match routes based on the BGP local-preference attribute.                              |
| <b>match policy-list</b>      | Configures a route map to evaluate and process a BGP policy list in a route map.                                 |
| <b>route-map (IP)</b>         | Defines the conditions for redistributing routes from one routing protocol to another or enables policy routing. |
| <b>set traffic-index</b>      | Indicates how to classify packets that pass a match clause of a route map for BGP policy accounting.             |
| <b>show cef drop</b>          | Displays which packets were dropped by the line cards or displays which packets were not express forwarded.      |
| <b>show cef linecard</b>      | Displays Cisco Express Forwarding-related interface information by line card.                                    |
| <b>show ip cef detail</b>     | Displays a detailed summary of the FIB.                                                                          |

| Command          | Description                                                                                  |
|------------------|----------------------------------------------------------------------------------------------|
| <b>table-map</b> | Modifies metric and tag values when the IP routing table is updated with BGP learned routes. |

# show cef linecard

To display Cisco Express Forwarding-related information by line card, use the **show cef linecard** command in user EXEC or privileged EXEC mode.

**show cef linecard** [*slot-number*] [**detail**] [**internal**]

## Syntax Description

|                    |                                                                                                                                                                                           |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>slot-number</i> | (Optional) Slot number for the line card about which to display Cisco Express Forwarding-related information. When you omit this argument, information about all line cards is displayed. |
| <b>detail</b>      | (Optional) Displays detailed Cisco Express Forwarding information for the specified line card.                                                                                            |
| <b>internal</b>    | (Optional) Displays internal Cisco Express Forwarding information for the specified line card.                                                                                            |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2 GS     | This command was introduced to support the Cisco 12012 Internet router.                                                                                                                                                             |
| 11.1 CC     | Multiple platform support was added.                                                                                                                                                                                                |
| 12.0(10)S   | Output display was changed.                                                                                                                                                                                                         |
| 12.1(2)T    | This command was integrated into Cisco IOS Release 12.1(2)T.                                                                                                                                                                        |
| 12.0(22)S   | This command was integrated into Cisco IOS Release 12.0(22)S, and the display output was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 line card information. |
| 12.2(13)T   | The display output modifications made in Cisco IOS Release 12.0(22)S were integrated into Cisco IOS Release 12.2(13)T.                                                                                                              |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                                                                       |
| 12.2(25)S   | The <b>events</b> keyword was removed.                                                                                                                                                                                              |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                     |



| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

### Usage Guidelines

This command is available only on distributed switching platforms.

When you omit the *slot-number* argument, information about all line cards is displayed. When you omit the *slot-number* argument and include the **detail** keyword, detailed information is displayed for all line cards. When you omit the *slot-number* argument and include the **internal** keyword, detailed internal information is displayed for all line cards. When you omit all keywords and arguments, the **show cef linecard** command displays important information about all line cards in table format.

### Examples

The following is sample output from the **show cef linecard** command. The command displays information for all line cards in table format.

```
Router# show cef linecard
Slot      MsgSent    XDRSent    Window    LowQ    MedQ    HighQ    Flags
0          6           95         24         0       0       0       up
1          6           95         24         0       0       0       up
VRF Default-table, version 8, 6 routes
Slot Version    CEF-XDR    I/Fs State    Flags
0          7           4          8 Active    up, sync
1          7           4         10 Active    up, sync
```

The following is sample output from the **show cef linecard detail** command for all line cards:

```
Router# show cef linecard detail
CEF linecard slot number 0, status up
Sequence number 4, Maximum sequence number expected 28, Seq Epoch 2
Send failed 0, Out Of Sequence 0, drops 0
Linecard CEF reset 0, reloaded 1
95 elements packed in 6 messages(3588 bytes) sent
69 elements cleared
linecard in sync after reloading
0/0/0 xdr elements in LowQ/MediumQ/HighQ
11/9/69 peak elements on LowQ/MediumQ/HighQ
Input  packets 0, bytes 0
Output packets 0, bytes 0, drops 0
CEF Table statistics:
Table name          Version Prefix-xdr Status
Default-table       7         4 Active, up, sync
CEF linecard slot number 1, status up
Sequence number 4, Maximum sequence number expected 28, Seq Epoch 2
Send failed 0, Out Of Sequence 0, drops 0
Linecard CEF reset 0, reloaded 1
95 elements packed in 6 messages(3588 bytes) sent
69 elements cleared
linecard in sync after reloading
0/0/0 xdr elements in LowQ/MediumQ/HighQ
11/9/69 peak elements on LowQ/MediumQ/HighQ
Input  packets 0, bytes 0
Output packets 0, bytes 0, drops 0
CEF Table statistics:
Table name          Version Prefix-xdr Status
Default-table       7         4 Active, up, sync
```

The following is sample output from the **show cef linecard internal** command for all line cards:

```
Router# show cef linecard internal
```

```

CEF linecard slot number 0, status up
Sequence number 11, Maximum sequence number expected 35
Send failed 0, Out Of Sequence 0
Linecard CEF reset 2, reloaded 2
Total elements queued:
  prefix                4
  adjacency              4
  interface             91
  address               2
  policy routing        2
  hw interface          57
  state                 6
  resequence            2
  control               13
  table                 2
  time                 4484
  flow features deactivate 2
  flow cache config     2
  flow export config    2
  dss                   2
  isl                    2
  mpls atm vc remove    2
  mpls atm vc set label 2
                        2
                        3
                        1
4574 elements packed in 4495 messages(90286 bytes) sent
115 elements cleared
Total elements cleared:
  prefix                2
  adjacency              1
  interface             63
  address               1
  policy routing        1
  hw interface          29
  state                 2
  control               5
  table                 1
  flow features deactivate 1
  flow cache config     1
  flow export config    1
  dss                   1
  isl                    1
  mpls atm vc remove    1
  mpls atm vc set label 1
                        1
                        1
                        1
linecard disabled - failed a reload
0/0/0 xdr elements in LowQ/MediumQ/HighQ
Input  packets 0, bytes 0
Output packets 0, bytes 0, drops 0
CEF Table statistics:
Table name          Version Prefix-xdr Status
Default-table       8          4 Active, sync

```

The table below describes the significant fields shown in the displays.

**Table 17: show cef linecard Field Descriptions**

| Field      | Description                                                    |
|------------|----------------------------------------------------------------|
| Table name | Name of the Cisco Express Forwarding table.                    |
| Version    | Number of the Forwarding Information Base (FIB) table version. |

| Field           | Description                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prefix-xdr      | Number of prefix IPC information elements external data representation (XDRs) processed.                                                                                                                                                                                                                                                                                                     |
| Status          | State of the Cisco Express Forwarding table.                                                                                                                                                                                                                                                                                                                                                 |
| Slot            | Slot number of the line card.                                                                                                                                                                                                                                                                                                                                                                |
| MsgSent         | Number of interprocess communications (IPC) messages sent.                                                                                                                                                                                                                                                                                                                                   |
| XDRSent         | XDRs packed into IPC messages sent from the Route Processor (RP) to the line card.                                                                                                                                                                                                                                                                                                           |
| Window          | Size of the IPC window between the line card and the RP.                                                                                                                                                                                                                                                                                                                                     |
| LowQ/MedQ/HighQ | Number of XDR elements in the Low, Medium, and High priority queues.                                                                                                                                                                                                                                                                                                                         |
| Flags           | Indicates the status of the line card. States are: <ul style="list-style-type: none"> <li>• up--Line card is up.</li> <li>• sync--Line card is in synchronization with the main FIB.</li> <li>• FIB is repopulated on the line card.</li> <li>• reset--Line card FIB is reset.</li> <li>• reloading--Line card FIB is being reloaded.</li> <li>• disabled--Line card is disabled.</li> </ul> |
| CEF-XDR         | Number of Cisco Express Forwarding XDR messages processed.                                                                                                                                                                                                                                                                                                                                   |
| I/Fs            | Interface numbers.                                                                                                                                                                                                                                                                                                                                                                           |

## Related Commands

| Command                   | Description                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------|
| <b>show cef</b>           | Displays which packets the line cards dropped or displays which packets were not express-forwarded. |
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information.                                    |
| <b>show ipv6 cef</b>      | Displays entries in the IPv6 FIB.                                                                   |



# show cef memory

To display information about Cisco Express Forwarding memory usage, use the **show cef memory** command in privileged EXEC mode.

**show cef memory** [**changes**|**chunk-utilisation** [**changes**|**summary** [**changes**]]] **snapshot**|**summary**]

## Syntax Description

|                          |                                                                                 |
|--------------------------|---------------------------------------------------------------------------------|
| <b>changes</b>           | Displays Cisco Express Forwarding memory usage changes since the last snapshot. |
| <b>chunk-utilisation</b> | Displays Cisco Express Forwarding chunk memory utilization.                     |
| <b>summary</b>           | Displays a summary of Cisco Express Forwarding memory usage.                    |
| <b>snapshot</b>          | Displays Cisco Express Forwarding memory information and takes a snapshot.      |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

Use this command to monitor the memory usage of Cisco Express Forwarding processes. You can display a summary of Cisco Express Forwarding memory usage, display a snapshot of memory use, and display changes to memory use since the last snapshot was taken.

## Examples

The following is sample output from the **show cef memory** command:

```
Router# show cef memory

Memory                               in use/allocated          Count
```

```

-----
ADJ: NULL adjacency      :      276/328      ( 84%) [1]
ADJ: adj sev context     :      208/312      ( 66%) [2]
ADJ: adjacency           :      856/960      ( 89%) [2]
ADJ: request resolve     :     2200/2304      ( 95%) [2]
ADJ: sevs                :      256/360      ( 71%) [2]
CEF: FIB subtree context :       28/80      ( 35%) [1]
CEF: FIBHWIDB            :     19440/20480    ( 94%) [20]
CEF: FIBIDB              :     6352/7392    ( 85%) [20]
CEF: FIBSWSB control     :      496/600      ( 82%) [2]
CEF: IPv4 ARP throttle   :     1028/1080    ( 95%) [1]
CEF: IPv4 not-sw cnt     :       76/128      ( 59%) [1]
CEF: IPv4 not-sw si      :       76/128      ( 59%) [1]
CEF: OCE get hash callbac :      28/80      ( 35%) [1]
CEF: Table rate Monitor S :      88/192      ( 45%) [2]
CEF: arp throttle chunk  :     22096/22200    ( 99%) [2]
CEF: dQ elems            :      208/312      ( 66%) [2]
CEF: fib                 :     1640/1744    ( 94%) [2]
CEF: fib GSB             :     2496/2808    ( 88%) [6]
CEF: fib deps            :      208/312      ( 66%) [2]
CEF: fib_fib_s           :     456/560      ( 81%) [2]
CEF: fib_fib_src_interfac :      208/312      ( 66%) [2]
CEF: fib_fib_src_special_ :      208/312      ( 66%) [2]
CEF: fib_rib_route_update :     4840/4944      ( 97%) [2]
CEF: fibhwidb table      :     40004/40056    ( 99%) [1]
CEF: fibidb table        :     40004/40056    ( 99%) [1]
CEF: hash table          :     262152/262256    ( 99%) [2]
CEF: ipv6 feature error c :     1260/1312      ( 96%) [1]
CEF: ipv6 feature error s :     1260/1312      ( 96%) [1]
CEF: ipv6 not cef switche :     484/536      ( 90%) [1]
CEF: ipv6 not cef switche :     484/536      ( 90%) [1]
CEF: loadinfos           :     504/608      ( 82%) [2]
CEF: mpls long path exts :     280/384      ( 72%) [2]
CEF: mpls path exts      :     200/304      ( 65%) [2]
CEF: nh entry context    :     280/384      ( 72%) [2]
CEF: non_ip entry context :     280/384      ( 72%) [2]
CEF: pathl               :     2424/2736    ( 88%) [6]
CEF: pathl ifs           :     280/384      ( 72%) [2]
CEF: pathl its           :     352/456      ( 77%) [2]
CEF: pathloutputchain    :     432/536      ( 80%) [2]

```

The table below describes the significant fields shown in the display.

**Table 18: show cef memory Field Descriptions**

| Field            | Description                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------|
| Memory           | The type of Cisco Express Forwarding process that is using memory.                                                        |
| in use/allocated | Number of bytes in use by Cisco Express Forwarding and the number of bytes allocated for use by Cisco Express Forwarding. |
| Count            | Number of blocks in use.                                                                                                  |
| ADJ              | Indicates a Cisco Express Forwarding adjacency process.                                                                   |
| CEF              | Indicates a Cisco Express Forwarding process.                                                                             |

The following is sample output from the **show cef memory summary** command:

```
Router# show cef memory summary
CEF has allocated 502888 bytes of memory (7904 bytes overhead)
This example shows that Cisco Express Forwarding allocated 502888 bytes of memory. The difference between the amount of memory in use and the amount of memory allocated is 7904 bytes.
```

The following is sample output from the **show cef memory snapshot** command:

```
Router# show cef memory snapshot
CEF memory snapshot taken at 00:26:01.116
This example shows when you last took a snapshot of Cisco Express Forwarding memory.
```

The following is sample output from the **show cef memory changes** command:

```
Router# show cef memory changes
No changes in CEF memory allocation in last 00:36:05.064
This examples shows the Cisco Express Forwarding memory changes, if any, that have occurred since the last memory snapshot was taken.
```

#### Related Commands

| Command         | Description                                                               |
|-----------------|---------------------------------------------------------------------------|
| <b>show cef</b> | Displays information about packets forwarded by Cisco Express Forwarding. |

# show cef not-cef-switched



## Note

The **show cef not-cef-switched** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To display which packets were sent to a different switching path, use the **show cef not-cef-switched** command in user EXEC or privileged EXEC mode.

## show cef not-cef-switched

## Syntax Description

This command has no arguments or keywords.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2 GS     | This command was introduced to support the Cisco 12012 Internet router.                                                                                              |
| 11.1 CC     | Support for multiple platforms was added.                                                                                                                            |
| 12.0(22)S   | The display output for this command was modified to include support for Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 packets. |
| 12.0(23)S   | This command was integrated into Cisco IOS Release 12.0(23)S.                                                                                                        |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T. Previously there was a <b>show cef</b> command, and <b>drop</b> was a keyword of that command.         |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                        |
| 12.2(25)S   | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.                                                     |
| 12.2(28)SB  | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases.                                                   |
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases.                                                  |
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2S releases.                                                   |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.                                                     |



**Usage Guidelines**

If packets are not being cef switched and you want to determine why, enter the **show cef not-cef switched** command.

**Note**

If Cisco Express Forwarding for IPv6 or distributed Cisco Express Forwarding for IPv6 is enabled globally on the router, the **show cef not-cef-switched** command displays IPv6 Cisco Express Forwarding counter information and IPv4 Cisco Express Forwarding counter information. If Cisco Express Forwarding for IPv6 or distributed Cisco Express Forwarding for IPv6 is not enabled globally on the router, the command displays only IPv4 Cisco Express Forwarding counter information.

**Examples**

The following is sample output from the **show cef not-cef-switched** command:

```
Router# show cef not-cef-switched
```

```
CEF Packets passed on to next switching layer
Slot No_adj No_encap Unsupp'ted Redirect Receive Options Access Frag
RP      0      0      0      0      91584      0      0      0
1       0      0      0      0      0      0      0      0
2       0      0      0      0      0      0      0      0
IPv6 CEF Packets passed on to next switching layer
Slot No_adj No_encap Unsupp'ted Redirect Receive Options Access MTU
RP      0      0      0      0      92784      0      0      0
1       0      0      0      0      0      0      0      0
2       0      0      0      0      0      0      0      0
```

The table below describes the significant fields shown in the display.

**Table 19: show cef not-cef-switched Field Descriptions**

| Field      | Meaning                                                                                                                                                                                                                                  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slot       | The slot number on which the packets were received.                                                                                                                                                                                      |
| No_adj     | Indicates the number of packets sent to the processor due to incomplete adjacency.                                                                                                                                                       |
| No_encap   | Indicates the number of packets sent to the processor for Address Resolution Protocol (ARP) resolution.                                                                                                                                  |
| Unsupp'ted | Indicates the number of packets punted to the next switching level due to unsupported features.                                                                                                                                          |
| Redirect   | Records packets that are ultimately destined to the router, and packets destined to a tunnel endpoint on the router. If the decapsulated tunnel is IP, it is Cisco Express Forwarding switched; otherwise, packets are process switched. |

| Field   | Meaning                                                                                                                                                                                                                                                       |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Receive | Indicates the number of packets ultimately destined to the router, or packets destined to a tunnel endpoint on the router. If the decapsulated tunnel packet is IP, the packet is Cisco Express Forwarding switched. Otherwise, packets are process switched. |
| Options | Indicates the number of packets with options. Packets with IP options are handled only at the process level.                                                                                                                                                  |
| Access  | Indicates the number of packets punted due to an access list failure.                                                                                                                                                                                         |
| Frag    | Indicates the number of packets punted due to fragmentation failure.<br><b>Note</b> This field is not supported for IPv6 packets.                                                                                                                             |
| MTU     | Indicates the number of packets punted due to maximum transmission unit (MTU) failure.<br><b>Note</b> This field is not supported for IPv4 packets.                                                                                                           |

**Related Commands**

| Command                   | Description                                                      |
|---------------------------|------------------------------------------------------------------|
| <b>show cef drop</b>      | Displays a list of which packets each line card dropped.         |
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information. |
| <b>show ipv6 cef</b>      | Displays entries in the IPv6 FIB.                                |

# show cef state

To display the state of Cisco Express Forwarding on a networking device, use the **show cef state** command in privileged EXEC mode.

**show cef state**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                               |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(22)S   | This command was introduced on Cisco 7500, 10000, and 12000 series Internet routers.                                       |
|                 | 12.2(18)S   | This command was integrated into Cisco IOS Release 12.2(18)S on Cisco 7500 series routers.                                 |
|                 | 12.2(20)S   | Support for the Cisco 7304 router was added. The Cisco 7500 series router is not supported in Cisco IOS Release 12.2(20)S. |
|                 | 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                             |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                            |
|                 | 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                            |
|                 | 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                              |

## Examples

**Examples** The following example shows the state of Cisco Express Forwarding on the active Route Processor (RP):

```
Router# show cef state
CEF Status:
  RP instance
  common CEF enabled
IPv4 CEF Status:
  CEF enabled/running
  dCEF disabled/not running
  CEF switching enabled/running
  universal per-destination load sharing algorithm, id A189DD49
IPv6 CEF Status:
  CEF enabled/running
  dCEF disabled/not running
  original per-destination load sharing algorithm, id A189DD49
```

The table below describes the significant fields shown in the display.

**Table 20: show cef state Field Description (New)**

| Field                                            | Description                                                                                              |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| RP instance                                      | Cisco Express Forwarding status is for the RP.                                                           |
| common CEF enabled                               | Common Cisco Express Forwarding is enabled.                                                              |
| IPv4 CEF Status                                  | Cisco Express Forwarding mode and status is for IPv4.                                                    |
| universal per-destination load sharing algorithm | IPv4 is using the universal per-destination load sharing algorithm for Cisco Express Forwarding traffic. |
| IPv6 CEF Status                                  | Cisco Express Forwarding mode and status is for IPV6.                                                    |
| original per-destination load sharing algorithm  | IPv6 is using the original per-destination load sharing algorithm for Cisco Express Forwarding traffic.  |

**Examples**

The following example shows the state of Cisco Express Forwarding on the active Route Processor (RP):

```
Router# show cef state
RRP state:
  I am standby RRP:          no
  RF Peer Presence:          yes
  RF PeerComm reached:       yes
  Redundancy mode:           SSO(7)
  CEF NSF:                   enabled/running
```

The table below describes the significant fields shown in the display.

**Table 21: show cef state Field Descriptions**

| Field                    | Description                                                                         |
|--------------------------|-------------------------------------------------------------------------------------|
| I am standby RRP: no     | This RP is not the standby.                                                         |
| RF Peer Presence: yes    | This RP does have RF peer presence.                                                 |
| RF PeerComm reached: yes | This RP has reached RF peer communication.                                          |
| Redundancy mode: SSO(&)  | Type of redundancy mode on this RP.                                                 |
| CEF NSF: enabled/running | States whether Cisco Express Forwarding nonstop forwarding (NSF) is running or not. |

The following example shows the state of Cisco Express Forwarding on the standby RP:

```
Router# show cef state
```

```
RRP state:
  I am standby RRP:      yes
  My logical slot:       0
  RF Peer Presence:      yes
  RF PeerComm reached:   yes
  CEF NSF:               running
```

**Related Commands**

| Command                   | Description                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------|
| <b>clear ip cef epoch</b> | Begins a new epoch and increments the epoch number for a Cisco Express Forwarding table.       |
| <b>show cef nsf</b>       | Displays the current NSF state of Cisco Express Forwarding on both the active and standby RPs. |

# show cef subtree context client

To display Cisco Express Forwarding prefix subtrees, use the **show cef subtree context client** command in privileged EXEC mode.

**show cef subtree context client** {all| ip-session| test}

## Syntax Description

|            |                                                                                      |
|------------|--------------------------------------------------------------------------------------|
| all        | Displays all Cisco Express Forwarding clients that provide prefix subtree context.   |
| ip-session | Displays Cisco Express Forwarding IP sessions that provide prefix subtree context.   |
| test       | Tests all Cisco Express Forwarding applications that provide prefix subtree context. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

### Note

This command is for debugging purposes only. Do not use it unless instructed to do so by a Cisco service engineer.

## Examples

The following example shows how to display information about all clients that provide subtree context:

```
Router# show cef subtree context client all
Client: FIB_SC: Test
        instances: 0
        app space: 0
        platform space: 0
```

The table below describes the significant fields shown in the display.

**Table 22: show cef subtree context client all Field Descriptions**

| Field             | Description                                                                                   |
|-------------------|-----------------------------------------------------------------------------------------------|
| FIB_SC: Test      | Identifies the name of the client. This is useful information for the Cisco service engineer. |
| instances: 0      | Number of instances of the subtree context.                                                   |
| app space: 0      | Amount of extra space requested by the application for each instance of the subtree context.  |
| platform space: 0 | Amount of extra space requested by the platform for each instance of the subtree context.     |

#### Related Commands

| Command  | Description                                                               |
|----------|---------------------------------------------------------------------------|
| show cef | Displays information about packets forwarded by Cisco Express Forwarding. |

# show cef table

To display the configuration and operational state of the Cisco Express Forwarding Forwarding Information Base (FIB) table, use the **show cef table** command in privileged EXEC mode.

## Cisco IOS 12.2(33)SRB and Later S-Based Releases

**show cef table** [**consistency-check**| **detail**| **internal**] [**ipv4**| **ipv6**] [**vrf** {**\***| **Default**| *vrf-name*}] [**topology** {**\***| *base*| *topology-name*}] [**detail**| **internal**]

## Cisco IOS 12.4(20)T and Later T-Based Releases

**show cef table** [**consistency-check**| **detail**| **internal**] [**ipv4**| **ipv6**] {**Default**| *vrf-name*} [**detail**| **internal**]

### Syntax Description

|                          |                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>consistency-check</b> | (Optional) Displays the status of consistency checkers in the FIB.                                                           |
| <b>detail</b>            | (Optional) Displays detailed Cisco Express Forwarding operational status and configuration.                                  |
| <b>internal</b>          | (Optional) Displays internal Cisco Express Forwarding operational status and configuration.                                  |
| <b>ipv4</b>              | (Optional) Displays operational status for IPv4 from the IPv4 FIB.                                                           |
| <b>ipv6</b>              | (Optional) Displays operational status for IPv6 from the IPv6 FIB.                                                           |
| <b>vrf</b>               | (Optional) Specifies a Virtual Private Network (VPN) routing and forwarding (VRF) instance for the specified address family. |
| <b>*</b>                 | Displays operational status for all configured VRFs ( <b>vrf *</b> ) or all topologies ( <b>topology *</b> ), respectively.  |
| <b>Default</b>           | Displays operational status for the default VRF for the specified address family.                                            |
| <i>vrf-name</i>          | Displays operational status for the named VRF configured for the specified address family.                                   |
| <b>topology</b>          | (Optional) Specifies a topology for the selected address family.                                                             |
| <b>base</b>              | Displays operational status for the base topology for the specified address family.                                          |



|                      |                                                                         |
|----------------------|-------------------------------------------------------------------------|
| <i>topology-name</i> | Displays operational status for the identified topology-specific table. |
|----------------------|-------------------------------------------------------------------------|

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 2.2(28)SB.   |
| 12.2(33)SRA | This command was introduced.                                    |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

**Usage Guidelines**

Use this command to display information about the configuration and operational statistics for Cisco Express Forwarding IPv4 FIB and IPv6 FIB.

**Cisco IOS 12.4(20)T and Later T-based Releases**

When you enter an **ipv4** or **ipv6** keyword with the **show cef table** command, you must enter the name of a configured VRF or the **Default** keyword.

**Cisco IOS 12.2(33)SRB and Later S-based Releases**

The **vrf** and **topology** keywords are optional when you enter the **ipv4** or **ipv6** keyword with the **show cef table** command.

**Examples**

The following is sample output from the **show cef table** command:

```
Router# show cef table
Global information:
  Output chain build favors:
    platform:      not configured
    CLI:           not configured
    operational:   convergence-speed
  Output chain build characteristics:
    Inplace modify
      operational for:    load-sharing
  Collapse
      operational for:    load-sharing
  Indirection
      operational for:    recursive-prefix
MTRIE information:
  TAL: node pools:
    pool[C/8 bits]: 12 allocated (0 failed), 12480 bytes {1 refcount}
  1 active IPv4 table (9 prefixes total) out of a maximum of 10000.
VRF          Prefixes      Memory  Flags
Default          9         13520
  1 active IPv6 table (1 prefix total) out of a maximum of 10000.
```

```

VRF          Prefixes      Memory  Flags
VRF          Prefixes      Memory  Flags
Default      1             208

```

The table below describes significant fields shown in the display.

**Table 23: show cef table Field Descriptions**

| Field                                         | Description                                                                                                                                                            |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output chain build favors:                    | Indicates table output chain building operational preferences.                                                                                                         |
| Platform: not configured                      | Output chain building characteristics are not explicitly set or supported by the platform. The default output chain building characteristics are used.                 |
| CLI: not configured                           | Output chain building characteristics are not explicitly configured. The default is used.                                                                              |
| operational: convergence speed                | Output chain building favors convergence. This is the default operational behavior.                                                                                    |
| Output chain build characteristics            | Indicates the output chain building characteristics.                                                                                                                   |
| Inplace modify operational for: load-sharing  | Indicates that the load sharing information in effect can be changed if the output information of the Interior Gateway Protocol (IGP) changes.                         |
| Collapse operational for: load-sharing        | Indicates that the load-sharing tree is collapsed if load balancing is not affected.                                                                                   |
| Indirection operational for: recursive-prefix | Indicates that the use of indirection objects is enabled for recursive prefixes.                                                                                       |
| MTRIE information:                            | Indicates that information about the multi-array retrieval (MTRIE) follows.                                                                                            |
| TAL: node pools:                              | Indicates that node pool information for the Tree Abstraction Layer (TAL) follows.                                                                                     |
| pool (C/8 bits):                              | Indicates the memory management technique for the pool and the stride size (8 bits). The C indicates the use of a chunk pool. An M would indicate the use of a malloc. |

The following is sample output from the **show cef table internal** command:

```

Router# show cef table internal

Table: IPv4:Default (id 0)
sources:      Default table
ref count:    31

```

```

flags (0x00):          none
smp allowed:           yes
default network:       none
route count:           9
route count (fwd):     9
route count (non-fwd): 0
Database epoch:        0 (9 entries at this epoch)
Subblocks:
  These rates are ndbs/minute.
  RIB update rate:      0
  RIB update peak rate: 0
Internals:
  table:                0x4BFA060
  extra:                0x000000
  broker record:        0x000000
  tal root:             0x4C01988
  lookup OCE:           0x4C12B50
Table: IPv6:Default (id 0)
sources:               Default table
ref count:             3
flags (0x00):          none
smp allowed:           no
default network:       none
route count:           1
route count (fwd):     1
route count (non-fwd): 0
Database epoch:        0 (1 entry at this epoch)
Subblocks:
  These rates are ndbs/minute.
  RIB update rate:      0
  RIB update peak rate: 0
Internals:
  table:                0x4BF9FF0
  extra:                0x000000
  broker record:        0x000000
  tal root:             0x4C96328
  lookup OCE:           0x4C12B30

```

The table below describes significant fields shown in the display.

**Table 24: show cef table internal Field Descriptions**

| Field                       | Description                                                         |
|-----------------------------|---------------------------------------------------------------------|
| Table: IPv4: Default (id 0) | The FIB table, IPv4 or IPv6, for which operation statistics follow. |
| sources: Default table      | The source of the information comes from the Default table.         |
| ref count: 3                | The number of internal pointers to the VRF table structure.         |
| flags (0x00): none          | No flags are configured.                                            |
| smp allowed: yes            | Symmetrical Multi-Processing (SMP) is allowed.                      |
| default network: none       | A default network is not configured.                                |
| route count: 9              | Total number of routes is 9.                                        |
| route count (fwd): 9        | The number of routes forwarded is 9.                                |

| Field                                       | Description                                                      |
|---------------------------------------------|------------------------------------------------------------------|
| route count (non-fwd): 0                    | The number of routes not forwarded is 0.                         |
| Database epoch: 0 (9 entries at this epoch) | Epoch number (table version) is 0 and contains 9 entries.        |
| Subblocks:                                  | No subblocks are defined.                                        |
| RIB update rate: 0                          | No update rate is configured for the RIB.                        |
| RIB update peak rate 0                      | No peak update rate is defined for the RIB.                      |
| Internal:                                   | Identification for Cisco Express Forwarding internal operations. |

The following is sample output from the **show cef table consistency-check** command:

```
Router# show cef table consistency-check
Consistency checker master control: enabled
IPv4:
Table consistency checker state:
  scan-rib-ios: disabled
    0/0/0/0 queries sent/ignored/checked/iterated
  scan-ios-rib: disabled
    0/0/0/0 queries sent/ignored/checked/iterated
  full-scan-rib-ios: enabled [1000 prefixes checked every 60s]
    0/0/0/0 queries sent/ignored/checked/iterated
  full-scan-ios-rib: enabled [1000 prefixes checked every 60s]
    0/0/0/0 queries sent/ignored/checked/iterated
Checksum data checking disabled
Inconsistency error messages are disabled
Inconsistency auto-repair is enabled (10s delay, 300s holddown)
Inconsistency auto-repair runs: 0
Inconsistency statistics: 0 confirmed, 0/16 recorded
IPv6:
Table consistency checker state:
  scan-ios-rib: disabled
    0/0/0/0 queries sent/ignored/checked/iterated
  full-scan-rib-ios: enabled [1000 prefixes checked every 60s]
    0/0/0/0 queries sent/ignored/checked/iterated
  full-scan-ios-rib: enabled [1000 prefixes checked every 60s]
    0/0/0/0 queries sent/ignored/checked/iterated
Checksum data checking disabled
Inconsistency error messages are disabled
Inconsistency auto-repair is enabled (10s delay, 300s holddown)
Inconsistency auto-repair runs: 0
Inconsistency statistics: 0 confirmed, 0/16 recorded
```

The table below describes significant fields shown in the display.

**Table 25: show cef table consistency-check Field Descriptions**

| Field                  | Description                                                                                                                                                          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| scan-rib-ios: disabled | The consistency checker that compares the Routing Information Base (RIB) to the FIB table and provides the number of entries missing from the FIB table is disabled. |

| Field                                                           | Description                                                                                                                         |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| scan-ios-rib: disabled                                          | The consistency checker that compares the FIB table to the RIB and provides the number of entries missing from the RIB is disabled. |
| full-scan-rib-ios: enabled                                      | A full scan is enabled that compares the RIB to the FIB table. Every 60 seconds, 1000 prefixes are checked.                         |
| full-scan-ios-rib: enabled                                      | A full scan is enabled that compares the FIB table to the RIB. Every 60 seconds, 1000 prefixes are checked.                         |
| Checksum data checking disabled                                 | The data-checking function is disabled.                                                                                             |
| Inconsistency error messages are disabled                       | The consistency checker to generate inconsistency error messages is disabled.                                                       |
| Inconsistency auto-repair is enabled (10s delay, 300s holddown) | The auto repair function is enabled with the default settings of a 10-second delay and a 300-second holddown.                       |

The following is sample output from the **show cef table IPv4 Default** command:

```
Router# show cef table ipv4 Default
Table: IPv4:Default (id 0)
sources:           Default table
ref count:         31
flags (0x00):      none
smp allowed:       yes
default network:   none
route count:       9
route count (fwd): 9
route count (non-fwd): 0
Database epoch:    0 (9 entries at this epoch)
Subblocks:
  These rates are ndbs/minute.
  RIB update rate: 0
  RIB update peak rate: 0
```

For a description of significant fields shown in the display, see the *show cef table internal Field Descriptions* table.

The following is sample output from the **show cef table IPv6 Default internal** command:

```
Router# show cef table ipv6 Default internal
Table: IPv6:Default (id 0)
sources:           Default table
ref count:         3
flags (0x00):      none
smp allowed:       no
default network:   none
route count:       1
route count (fwd): 1
route count (non-fwd): 0
Database epoch:    0 (1 entry at this epoch)
Subblocks:
  These rates are ndbs/minute.
```

show cef table

```

RIB update rate:          0
RIB update peak rate:    0
Internals:
table:                    0x4BF9FF0
extra:                    0x000000
broker record:           0x000000
tal root:                 0x4C96328
lookup OCE:              0x4C12B30

```

For a description of significant fields shown in the display, see the *show cef table internal Field Descriptions* table.

Related Commands

| Command                             | Description                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>cef table consistency-check</b>  | Enables Cisco Express Forwarding table consistency checker types and parameters.                                                  |
| <b>cef table output-chain build</b> | Configures Cisco Express Forwarding table output chain building characteristics for the forwarding of packet through the network. |
| <b>show cef</b>                     | Displays information about packets forwarded by Cisco Express Forwarding.                                                         |

# show cef table download priority

To display the configured download priority of Cisco Express Forwarding routes, use the **show cef table download priority** command in privileged EXEC mode.

**show cef table download priority**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                 |
|-----------------|-------------|------------------------------|
|                 | 12.2(33)SRE | This command was introduced. |

**Usage Guidelines** Use this command to display the configured priority for Cisco Express Forwarding routes that are downloaded from the Route Processor (RP) to the line cards.

You can change the default priority for a route type with the **cef table download** configuration command. If you change the default priority for a route type, the **show cef table download priority** command displays the user-configured priority followed by the default priority in parentheses.

**Examples** The following sample output shows the configured download priority of the routes and prefixes from the Cisco Express Forwarding table on the RP to the line cards:

```
Router# show cef table download priority
Route type                                priority
Route with recursive dependents          1st
Default route, 0.0.0.0/0 or ::/0         1st
Directly connected route                 2nd
Receive route, local address on router    2nd
Route is in a VRF                        3rd
Any other route not matched               4th
```

This example shows that the default download priorities are in effect.

The table below describes the significant fields shown in the display.

**Table 26: show cef table download priority Field Descriptions**

| Field      | Description                                                                                   |
|------------|-----------------------------------------------------------------------------------------------|
| Route type | Type of route in the Cisco Express Forwarding table downloaded from the RP to the line cards. |
| priority   | Order in which the route type is downloaded from the RP to the line cards.                    |

In the following example, the default priority of a default route and a receive route was changed with the **cef table download** command:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cef table download default-route priority 2
Router(config)# cef table download receive-route priority 4
Router(config)# exit
```

The following **show cef table download priority** command displays the newly configured download priority and the default priority (in parentheses) for the default route and the receive route:

```
Router# show cef table download priority
Route type                                priority
Route with recursive dependents          1st
Default route, 0.0.0.0/0 or ::/0         2nd (default 1st)
Directly connected route                 2nd
Receive route, local address on router    4th (default 2nd)
Route is in a VRF                        3rd
Any other route not matched              4th
See the table above for a description of the significant fields shown in the display.
```

Related Commands

| Command            | Description                                                                                  |
|--------------------|----------------------------------------------------------------------------------------------|
| cef table download | Sets download characteristics for prefixes and routes in the Cisco Express Forwarding table. |



# show cef timers

To display the current state of the timers internal to the Cisco Express Forwarding process, use the **show cef timers** command in user EXEC or privileged EXEC mode.

**show cef timers**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** User EXEC (>) Privileged EXEC (#)

| Command History | Release   | Modification                                                  |
|-----------------|-----------|---------------------------------------------------------------|
|                 | 12.3(2)T  | This command was introduced.                                  |
|                 | 12.2(25)S | Command output was changed.                                   |
|                 | 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Examples

**Examples** The following is sample output from the **show cef timer** command:

```
Router# show cef timers
CEF background process
  Expiration    Type
    13.248    (parent)
    13.248    FIB checkers: IPv4 scan-rib-ios scanner
    13.248    FIB checkers: IPv4 scan-ios-rib scanner
    13.248    FIB checkers: IPv6 scan-ios-rib scanner
Platform counter polling is not enabled
IPv4 CEF background process
  Expiration    Type
    0.600    (parent)
    0.600    ARP throttle
    0.600    adjacency update hwidb
```

The table below describes the significant fields shown in the display.

**Table 27: show cef timers Field Descriptions**

| Field      | Description                             |
|------------|-----------------------------------------|
| Expiration | Seconds in which the timers will expire |
| Type       | Identification of the counter           |

**Examples**

The following is sample output from the **show cef timers** command:

```
Router# show cef timers
CEF background process
  Expiration  Type
    0.208 (parent)
    0.208 adjacency update hwidb
    0.540 slow resolution
    1.208 ARP throttle
CEF FIB scanner process
  Expiration  Type
    44.852 (parent)
    44.852 checker scan-rib
```

The table below describes the significant fields shown in the display.

**Table 28: show cef timers Field Descriptions**

| Field      | Description                             |
|------------|-----------------------------------------|
| Expiration | Seconds in which the timers will expire |
| Type       | Identification of the timer             |

**Related Commands**

| Command                   | Description                                                      |
|---------------------------|------------------------------------------------------------------|
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information. |
| <b>show ipv6 cef</b>      | Displays entries in the IPv6 FIB.                                |

# show cef vrf

To display information about Cisco Express Forwarding Virtual Private Networks (VPN) routing and forwarding (VRF) instances, use the **show cef vrf** command in privileged EXEC mode.

**show cef vrf** [**ipv4**|**ipv6**] [**Default**| *vrf-name*]

## Syntax Description

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| <b>ipv4</b>     | (Optional) Displays IPv4 address-family type VRF instances. |
| <b>ipv6</b>     | (Optional) Displays IPv6 address-family type VRF instances. |
| <b>Default</b>  | (Optional) Default VRF for the specified address family.    |
| <i>vrf-name</i> | (Optional) Name assigned to a VRF.                          |

## Command Default

If you do not specify any arguments or keywords, the command displays information about all VRFs in the Cisco Express Forwarding Forwarding Information Base (FIB).

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |

## Usage Guidelines

Use this command to display information about specified VRF instances or all VRF instances in the Cisco Express Forwarding FIB. To display information about all VRF instances in the FIB, omit arguments and keywords.

## Examples

The following is sample output from the **show cef vrf** command:

```
Router# show cef vrf
AF: IPv4, VRF: Default(0)
  Contains 1 table:
    IPv4:Default
```

```
AF: IPv6, VRF: Default(0)
  Contains 1 table:
    IPv6:Default
```

The table below describes significant fields shown in the display.

**Table 29: show cef vrf Field Descriptions**

| Field            | Description                      |
|------------------|----------------------------------|
| AF: IPv4         | The address-family type is IPv4. |
| VRF: Default (0) | Identifies the default VRF.      |
| AF: IPv6         | The address-family type is IPv6. |

The following is sample output from the **show cef vrf ipv4** command:

```
Router# show cef vrf ipv4
AF: IPv4, VRF: Default(0)
  Contains 1 table:
    IPv4:Default
```

The following is sample output from the **show cef vrf ipv6** command:

```
Router# show cef vrf ipv6
AF: IPv6, VRF: Default(0)
  Contains 1 table:
    IPv6:Default
```

For a description of significant fields in the displays, see the table above.

## Related Commands

| Command         | Description                                                               |
|-----------------|---------------------------------------------------------------------------|
| <b>show cef</b> | Displays information about packets forwarded by Cisco Express Forwarding. |

# show interface stats

To display numbers of packets that were process switched, fast switched, and distributed switched, use the **show interface stats** command in user EXEC or privileged EXEC mode.

**show interface** *type number* **stats**

## Syntax Description

|                    |                                                              |
|--------------------|--------------------------------------------------------------|
| <i>type number</i> | Interface type and number about which to display statistics. |
|--------------------|--------------------------------------------------------------|

## Command Modes

User EXEC ( > ) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.0        | This command was introduced.                                                                                                                                                      |
| 12.3(14)YM2 | This command was modified to show the counter for Multi-Processor Forwarding (MPF) switched packets.                                                                              |
| 12.4(4)T    | This command was integrated into Cisco IOS Release 12.4(4)T.                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

Use this command on the Route Processor (RP).



### Note

When fast switching is configured on the outbound interface, and RSP optimum, RSP flow, and VIP DFS switching modes are all specified on the incoming interface, the interface on which RSP optimum, RSP flow, and VIP DFS switching modes is not enabled can still show packets switched out via those switching paths when packets are received from other interfaces with RSP optimum, RSP flow, and VIP DES switching modes enabled.

**Examples**

The following sample output is from Cisco IOS Release 12.3(14)YM2 and shows counters for both Multi-Processor Forwarding (MPF) switched packets on native GigabitEthernet interfaces and for non-MPF FastEthernet interfaces:

```
Router# show interface stats
GigabitEthernet0/0
  Switching path    Pkts In   Chars In   Pkts Out   Chars Out
  Processor         0         0         225       77625
  Route cache       0         0         0         0
  Multi-Processor Fwding 950      221250    500       57000
  Total             950      221250    725       134625
GigabitEthernet0/1
  Switching path    Pkts In   Chars In   Pkts Out   Chars Out
  Processor         1         60        226       77685
  Route cache       0         0         0         0
  Multi-Processor Fwding 500      57000    500       57000
  Total            501      57060    726       134685
GigabitEthernet0/2
  Switching path    Pkts In   Chars In   Pkts Out   Chars Out
  Processor         1         60        226       77685
  Route cache       0         0         0         0
  Multi-Processor Fwding 0         0         0         0
  Total            1         60        226       77685
FastEthernet1/0
  Switching path    Pkts In   Chars In   Pkts Out   Chars Out
  Processor        34015    5331012    1579      158190
  Route cache      0         0         0         0
  Total           34015    5331012    1579      158190
```

The following is sample output from the **show interface stats** command:

```
Router# show interface fddi 3/0/0 stats
Fddi3/0/0
  Switching path    Pkts In   Chars In   Pkts Out   Chars Out
  Processor        3459994  1770812197  4141096  1982257456
  Route cache     10372326  3693920448   439872  103743545
  Distributed cache 19257912  1286172104  86887377 1184358085
  Total          33090232  2455937453  91468345 3270359086
```

The table below describes the significant fields in the display.

**Table 30: show interface stats Field Descriptions**

| Field          | Description                                               |
|----------------|-----------------------------------------------------------|
| Fddi3/0/0      | Interface for which information is shown                  |
| Switching path | Column heading for the various switching paths below it   |
| Pkts In        | Number of packets received in each switching mechanism    |
| Chars In       | Number of characters received in each switching mechanism |
| Pkts Out       | Number of packets sent out each switching mechanism       |

| Field     | Description                                            |
|-----------|--------------------------------------------------------|
| Chars Out | Number of characters sent out each switching mechanism |

# show interfaces switching

To display the number of packets sent and received on an interface classified by the switching path, use the **show interfaces switching** command in user EXEC and privileged EXEC mode.

**show interfaces** [*type number*] **switching**

Syntax Description

|                    |                                                                                     |
|--------------------|-------------------------------------------------------------------------------------|
| <i>type number</i> | Interface type and number about which to display packet switching path information. |
|--------------------|-------------------------------------------------------------------------------------|

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.3    | This command was introduced. |

Usage Guidelines

Use the **show interfaces switching** command to show which path the router uses and how the traffic is switched. This command is also useful for troubleshooting CPU utilization.

Statistics for packets in, bytes in, packets out, and bytes out are displayed for the available protocols. The statistics are arranged by process, cache misses, fast-path, and autonomous path. All values displayed by the **show interfaces switching** command are absolute. The **clear interface counters** command has no effect on these values.

You must enter at least seven characters of the **switching** keyword (**switchi**) when you use the **show interfaces switching** command.

Examples

The following shows sample output from the **show interfaces switching** command:

```
Router# show interfaces switching
FastEthernet0/0
  Throttle count      0
    Drops             RP          0          SP          0
  SPD Flushes        Fast      0          SSE          0
  SPD Aggress        Fast      0
  SPD Priority        Inputs    0          Drops          0
Protocol IP
  Switching path      Pkts In    Chars In    Pkts Out    Chars Out
    Process           24          8208          0          0
  Cache misses
    Fast              0          0          0          0
    Auton/SSE         0          0          0          0
Protocol DECnet
  Switching path      Pkts In    Chars In    Pkts Out    Chars Out
    Process           0          0          0          0
  Cache misses
    Fast              0          0          0          0
    Auton/SSE         0          0          0          0
```



```

.....
.....
Protocol IPv6
  Switching path  Pkts In   Chars In   Pkts Out   Chars Out
    Process              0         0         0         0
    Cache misses         0         -         -         -
      Fast              0         0         0         0
    Auton/SSE           0         0         0         0
Protocol Other
  Switching path  Pkts In   Chars In   Pkts Out   Chars Out
    Process              2        120         3        180
    Cache misses         0         -         -         -
      Fast              0         0         0         0
    Auton/SSE           0         0         0         0
NOTE: all counts are cumulative and reset only after a reload.

```

Interface POS4/0 is disabled

The following shows sample output from the **show interfaces switching** command for the interface FastEthernet 0/0:

```

Router> show interfaces FastEthernet 0/0 switching
FastEthernet0/0
  Throttle count      0
    Drops              RP          0          SP          0
    SPD Flushes        Fast        218        SSE          0
    SPD Aggress        Fast          0
    SPD Priority        Inputs      0          Drops      0
Protocol IP
  Switching path  Pkts In   Chars In   Pkts Out   Chars Out
    Process              239    23422     237    23226
    Cache misses         0         -         -         -
      Fast              0         0         0         0
    Auton/SSE           0         0         0         0
Protocol ARP
  Switching path  Pkts In   Chars In   Pkts Out   Chars Out
    Process              4        240         3        180
    Cache misses         0         -         -         -
      Fast              0         0         0         0
    Auton/SSE           0         0         0         0
Protocol CDP
  Switching path  Pkts In   Chars In   Pkts Out   Chars Out
    Process              8    2632      15    5477
    Cache misses         0         -         -         -
      Fast              0         0         0         0
    Auton/SSE           0         0         0         0
NOTE: all counts are cumulative and reset only after a reload.

```

The table below describes the significant fields shown in the display.

**Table 31: show interfaces switching Field Descriptions**

| Field          | Description                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Throttle count | Number of times input packet processing was throttled on this interface.                                                                |
| Drops          | RP--Number of packets dropped for input congestion.<br>SP--Number of packets flushed by external throttling.                            |
| SPD Flushes    | Fast--Number of packets flushed by selective packet discard on RP. SSE--Number of packets flushed by external selective packet discard. |
| SPD Aggress    | Fast--Input packets dropped by aggressive selective packet discard.                                                                     |

| Field          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPD Priority   | Inputs--Number of priority packets received.<br>Drops--Number of priority packets dropped.                                                                                                                                                                                                                                                                                                                                                               |
| Protocol       | Name of the protocol for which packet switching information is displayed.                                                                                                                                                                                                                                                                                                                                                                                |
| Switching Path | Indicates the traffic switching path.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Pkts In        | Number of incoming packets.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chars In       | Number of incoming bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pkts Out       | Number of outgoing packets.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chars Out      | Number of outgoing bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Process        | Process switching. With this type of switching, an incoming packet is associated with a destination network or subnet entry in the routing table located in main memory. Process switching is performed by the system processor.                                                                                                                                                                                                                         |
| Cache misses   | Packets that were forwarded through the process level (for which there was no entry in fast switching cache).                                                                                                                                                                                                                                                                                                                                            |
| Fast           | Fast switching. With this type of switching, an incoming packet matches an entry in the fast-switching cache located in main memory. Fast switching is done via asynchronous interrupts, which are handled in real time. Fast switching allows higher throughput by switching a packet using a cache created by previous packets.                                                                                                                        |
| Auton          | Autonomous switching. With this type of switching, an incoming packet matches an entry in the autonomous-switching cache located on the interface processor. Autonomous switching provides faster packet switching by allowing the ciscoBus controller to switch packets independently without having to interrupt the system processor. It is available only on Cisco 7000 series routers and in AGS+ systems with high-speed network controller cards. |

| Field | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SSE   | Silicon switching engine switching. With this type of switching, an incoming packet matches an entry in the silicon-switching cache located in the silicon switching engine (SSE) of the Silicon Switch Processor (SSP) module. This module is available only on Cisco 7000 series routers. Silicon switching provides very fast, dedicated packet switching by allowing the SSE to switch packets independently without having to interrupt the system processor. |

**Related Commands**

| Command                     | Description                                                                                      |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| <b>show interface stats</b> | Displays numbers of packets that were process switched, fast switched, and distributed switched. |

# show ip cache

To display the routing table cache used to fast switch IP traffic, use the **show ip cache** command in user EXEC or privileged EXEC mode.

**show ip cache** [*prefix mask*] [*type number*]

## Syntax Description

|                    |                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------|
| <i>prefix mask</i> | (Optional) Displays only the entries in the cache that match the prefix and mask combination.           |
| <i>type number</i> | (Optional) Displays only the entries in the cache that match the interface type and number combination. |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.0        | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

The **show ip cache** display shows MAC headers up to 92 bytes.

## Examples

The following is sample output from the **show ip cache** command:

```
Router# show ip cache
IP routing cache version 4490, 141 entries, 20772 bytes, 0 hash overflows
Minimum invalidation interval 2 seconds, maximum interval 5 seconds,
  quiet interval 3 seconds, threshold 0 requests
Invalidation rate 0 in last 7 seconds, 0 in last 3 seconds
Last full cache invalidation occurred 0:06:31 ago
Prefix/Length      Age      Interface  MAC Header
131.108.1.1/32     0:01:09  Ethernet0/0 AA000400013400000C0357430800
131.108.1.7/32     0:04:32  Ethernet0/0 00000C01281200000C0357430800
131.108.1.12/32    0:02:53  Ethernet0/0 00000C029FD000000C0357430800
131.108.2.13/32    0:06:22  Fddi2/0      00000C05A3E000000C035753AAAA0300
                  00000800
131.108.2.160/32   0:06:12  Fddi2/0      00000C05A3E000000C035753AAAA0300
                  00000800
131.108.3.0/24     0:00:21  Ethernet1/2 00000C026BC600000C03574D0800
131.108.4.0/24     0:02:00  Ethernet1/2 00000C026BC600000C03574D0800
131.108.5.0/24     0:00:00  Ethernet1/2 00000C04520800000C03574D0800
```

```

131.108.10.15/32    0:05:17    Ethernet0/2    00000C025FF500000C0357450800
131.108.11.7/32    0:04:08    Ethernet1/2    00000C010E3A00000C03574D0800
131.108.11.12/32   0:05:10    Ethernet0/0    00000C01281200000C0357430800
131.108.11.57/32   0:06:29    Ethernet0/0    00000C01281200000C0357430800

```

The table below describes the significant fields shown in the display.

**Table 32: show ip cache Field Descriptions**

| Field                                                | Description                                                                             |
|------------------------------------------------------|-----------------------------------------------------------------------------------------|
| IP routing cache version                             | Version number of this table. This number is incremented any time the table is flushed. |
| entries                                              | Number of valid entries.                                                                |
| bytes                                                | Number of bytes of processor memory for valid entries.                                  |
| hash overflows                                       | Number of times autonomous switching cache overflowed.                                  |
| Minimum invalidation interval                        | Minimum time delay between cache invalidation request and actual invalidation.          |
| maximum interval                                     | Maximum time delay between cache invalidation request and actual invalidation.          |
| quiet interval                                       | Length of time between cache flush requests before the cache will be flushed.           |
| threshold <n> requests                               | Maximum number of requests that can occur while the cache is considered quiet.          |
| Invalidation rate <n> in last <m> seconds            | Number of cache invalidations during the last <m> seconds.                              |
| 0 in last 3 seconds                                  | Number of cache invalidation requests during the last quiet interval.                   |
| Last full cache invalidation occurred <hh:mm:ss> ago | Time since last full cache invalidation was performed.                                  |
| Prefix/Length                                        | Network reachability information for cache entry.                                       |
| Age                                                  | Age of cache entry.                                                                     |
| Interface                                            | Output interface type and number.                                                       |
| MAC Header                                           | Layer 2 encapsulation information for cache entry.                                      |

The following is sample output from the **show ip cache** command with a prefix and mask specified:

```
Router# show ip cache 131.108.5.0 255.255.255.0
IP routing cache version 4490, 119 entries, 17464 bytes, 0 hash overflows
Minimum invalidation interval 2 seconds, maximum interval 5 seconds,
  quiet interval 3 seconds, threshold 0 requests
Invalidation rate 0 in last second, 0 in last 3 seconds
Last full cache invalidation occurred 0:11:56 ago
Prefix/Length      Age      Interface  MAC Header
131.108.5.0/24     0:00:34  Ethernet1/2  00000C0452080000C03574D0800
The following is sample output from the show ip cache command with an interface specified:
```

```
Router# show ip cache e0/2
IP routing cache version 4490, 141 entries, 20772 bytes, 0 hash overflows
Minimum invalidation interval 2 seconds, maximum interval 5 seconds,
  quiet interval 3 seconds, threshold 0 requests
Invalidation rate 0 in last second, 0 in last 3 seconds
Last full cache invalidation occurred 0:06:31 ago
Prefix/Length      Age      Interface  MAC Header
131.108.10.15/32   0:05:17  Ethernet0/2  00000C025FF500000C0357450800
```

Related Commands

| Command        | Description                                                                |
|----------------|----------------------------------------------------------------------------|
| clear ip cache | Deletes entries in the routing table cache used to fast switch IP traffic. |

# show ip cef

To display entries in the Cisco Express Forwarding Forwarding Information Base (FIB) or to display a summary of the FIB, use the **show ip cef** command in user EXEC or privileged EXEC mode.

## Privileged EXEC Mode

**show ip cef** [[[*network* [*network-mask* ]| *network/mask*] [**longer-prefixes**] *interface-type* *number*] [**platform**] [**detail**| **internal** [**checksum**]]] [*network* [*network-mask* ]| *network/mask*] [**dependents**| **same-routing**] [**prefix-statistics**]

## User EXEC Mode

**show ip cef** [[[*network* [*network-mask* ]| *network/mask*] [**longer-prefixes**] *interface-type* *number*] [**platform**] [**detail**] [*network* [*network-mask* ]| *network/mask*] [**dependents**| **same-routing**] [**prefix-statistics**]

## Syntax Description

|                        |                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>network</i>         | (Optional) Network number for which to display a FIB entry.                                                                                                              |
| <i>network-mask</i>    | (Optional) Network mask to be used with the specified <i>network</i> value.                                                                                              |
| <i>network / mask</i>  | (Optional) The network number assigned to the interface and the length of the prefix.                                                                                    |
| <b>longer-prefixes</b> | (Optional) Displays FIB entries for more specific destinations.                                                                                                          |
| <i>interface-type</i>  | (Optional) Interface type. For more information, use the question mark (?) online help function.                                                                         |
| <i>number</i>          | (Optional) Interface or subinterface number. For more information about the numbering syntax for your networking device, use the question mark (?) online help function. |
| <b>platform</b>        | (Optional) Displays platform-specific data structure only.                                                                                                               |
| <b>detail</b>          | (Optional) Displays detailed FIB entry information.                                                                                                                      |
| <b>internal</b>        | (Optional) Displays the FIB internal data structure. The <b>internal</b> keyword is available in privileged EXEC mode only.                                              |
| <b>checksum</b>        | (Optional) Displays FIB entry checksum values. The <b>checksum</b> keyword is available in privileged EXEC mode only.                                                    |

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| <b>dependents</b>        | (Optional) Displays all prefixes recursing through the FIB. |
| <b>same-routing</b>      | (Optional) Displays all prefixes with the same routing.     |
| <b>prefix-statistics</b> | (Optional) Displays nonzero prefix statistics.              |

**Command Modes**

User EXEC (>) Privileged EXEC (#)

**Command History**

| <b>Release</b> | <b>Modification</b>                                                                                                                                                                 |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2GS         | This command was introduced on the Cisco 12012 Internet router.                                                                                                                     |
| 11.1CC         | This command was modified. Multiple platform support was added.                                                                                                                     |
| 12.0(5)T       | This command was integrated into Cisco IOS Release 12.0(5)T.                                                                                                                        |
| 12.0(17)ST     | This command was modified. The display of a message indicating support for Border Gateway Protocol (BGP) policy accounting was added.                                               |
| 12.0(26)S      | This command was integrated into Cisco IOS Release 12.0(26)S.                                                                                                                       |
| 12.2(25)S      | This command was modified. The <b>checksum</b> , <b>internal</b> , <b>platform</b> , and <b>prefix-statistics</b> keywords were added. Output was changed to show IPv4 output only. |
| 12.2(28)SB     | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                      |
| 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                     |
| 12.2(33)SXH    | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                     |
| 12.2(50)SY     | This command was integrated into Cisco IOS Release 12.2(50)SY.                                                                                                                      |
| 12.4(24)T      | This command was modified. The <b>dependents</b> , <b>longer-prefixes</b> , and <b>same-routing</b> keywords were added.                                                            |
| 15.0(1)S       | This command was integrated into Cisco IOS Release 15.0(1)S.                                                                                                                        |
| 15.2(2)SNI     | This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers                                                                                               |

**Usage Guidelines**

Use of the **show ip cef** command without any keywords or arguments shows a brief display of all FIB entries. The **show ip cef detail** command shows detailed FIB entry information for all FIB entries.



## Examples

The following is sample output from the **show ip cef detail** command for Ethernet interface 0. It shows all the prefixes resolving through adjacency pointing to next hop Ethernet interface 0/0 and next hop interface IP address 192.0.2.233.

```
Device# show ip cef Ethernet 0/0 detail
IP Distributed CEF with switching (Table Version 136808)
45800 routes, 8 unresolved routes (0 old, 8 new) 45800 leaves, 2868 nodes, 8444360 bytes,
136808 inserts, 91008 invalidations 1 load sharing elements, 208 bytes, 1 references 1 CEF
resets, 1 revisions of existing leaves refcounts: 527343 leaf, 465638 node
172.16.0.0/12, version 7417, cached adjacency 192.0.2.230 0 packets, 0 bytes, Adjacency-prefix
via 192.0.2.231, Ethernet0/0, 0 dependencies
next hop 192.0.2.232, Ethernet0/0
valid cached adjacency
```

The table below describes the significant fields shown in the display.

**Table 33: show ip cef detail Field Descriptions**

| Field                                    | Description                                                                                                                     |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| routes                                   | Total number of entries in the Cisco Express Forwarding table.                                                                  |
| unresolved routes                        | Number of entries in the Cisco Express Forwarding table that do not have resolved recursions categorized by old and new routes. |
| leaves, nodes, bytes                     | Number of elements in the Cisco Express Forwarding table and how much memory they use.                                          |
| inserts                                  | Number of nodes inserted.                                                                                                       |
| invalidations                            | Number of entries that have been invalidated.                                                                                   |
| load sharing elements, bytes, references | Information about load sharing elements: how many, number of associated bytes, and number of associated references.             |
| CEF resets                               | Number of times the Cisco Express Forwarding table has reset.                                                                   |
| revisions of existing leaves refcounts   | Number of revisions of the existing elements in the Cisco Express Forwarding table.                                             |
| version                                  | Version of the Cisco Express Forwarding table.                                                                                  |
| cached adjacency                         | Type of adjacency to which this Cisco Express Forwarding table entry points.                                                    |
| packets, bytes                           | Number of packets and bytes switched through the name entry.                                                                    |
| dependencies                             | Number of table entries that point to the named entry.                                                                          |

| Field    | Description                                               |
|----------|-----------------------------------------------------------|
| next hop | Type of adjacency or the next hop toward the destination. |

The following is sample output from the **show ip cef detail** command for the prefix 192.0.2.1, showing that the BGP policy accounting bucket number 4 (traffic\_index 4) is assigned to this prefix:

```
Device# show ip cef 192.0.2.1 detail
192.168.5.0/24, version 21, cached adjacency to POS7/2
0 packets, 0 bytes, traffic_index 4
via 192.0.2.233, 0 dependencies, recursive
next hop 192.0.2.234, POS7/2 via 172.16.0.0/12
valid cached adjacency
```

The table above describes the significant fields shown in the display.

### Related Commands

| Command                      | Description                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>show cef</b>              | Displays the packets dropped by the line cards, or displays the packets that were not express forwarded. |
| <b>show cef interface</b>    | Displays Cisco Express Forwarding-related interface information.                                         |
| <b>show ipv6 cef</b>         | Displays entries in the IPv6 FIB.                                                                        |
| <b>show ipv6 cef summary</b> | Displays a summary of the entries in the IPv6 FIB.                                                       |

# show ip cef adjacency

To display Cisco Express Forwarding and distributed Cisco Express Forwarding recursive and direct prefixes resolved through an adjacency, use the **show ip cef adjacency** command in user EXEC or privileged EXEC mode.

## Recursive and Direct Prefixes

**show ip cef** [**vrf** *vrf-name*] **adjacency** *interface-type interface-number ip-prefix* [**checksum**| **detail**| **epoch** *epoch-number*] [**internal**| **platform**| **source**]

## Special Adjacency Types Representing Nonstandard Switching Paths

**show ip cef** [**vrf** *vrf-name*] **adjacency** {**discard**| **drop**| **glean**| **null**| **punt**} [**detail**] [**checksum**| **detail**| **epoch** *epoch-number*] [**internal**| **platform**| **source**]

## Recursive and Direct Prefixes (Cisco 10000 Series Routers)

**show ip cef** [**vrf** *vrf-name*] **adjacency** *interface-type interface-number ip-prefix* [**detail**| **internal**| **platform**]

## Special Adjacency Types Representing Nonstandard Switching Paths (Cisco 10000 Series Routers)

**show ip cef** [**vrf** *vrf-name*] **adjacency** {**discard**| **drop**| **glean**| **null**| **punt**} [**detail**] [**internal**| **platform**]

### Syntax Description

|                                        |                                                                                                               |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>vrf</b>                             | (Optional) Specifies a Virtual Private Network (VPN) routing and forwarding (VRF) instance.                   |
| <i>vrf-name</i>                        | (Optional) Name assigned to the VRF.                                                                          |
| <i>interface-type interface-number</i> | Interface type and number for which to display Forwarding Information Base (FIB) entries.                     |
| <i>ip-prefix</i>                       | Next-hop IP prefix, in dotted decimal format (A.B.C.D).                                                       |
| <b>checksum</b>                        | (Optional) Displays FIB entry checksums.                                                                      |
| <b>detail</b>                          | (Optional) Displays detailed information for each Cisco Express Forwarding adjacency type entry.              |
| <b>epoch</b> <i>epoch-number</i>       | (Optional) Displays adjacency type entries filtered by epoch number. The epoch number range is from 0 to 255. |
| <b>internal</b>                        | (Optional) Displays data for adjacency type entries.                                                          |
| <b>platform</b>                        | (Optional) Displays platform-specific adjacency information.                                                  |

|                |                                                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>source</b>  | (Optional) Displays source-specific adjacency information.                                                                   |
| <b>discard</b> | Discards adjacency. Sets up the adjacency for loopback interfaces. Loopback IP addresses receive entries in the FIB table.   |
| <b>drop</b>    | Drops the packets that are forwarded to this adjacency.                                                                      |
| <b>glean</b>   | Represents destinations on a connected interface for which no Address Resolution Protocol (ARP) cache entry exists.          |
| <b>null</b>    | Drops the packets forwarded to the adjacency formed for the null 0 interface.                                                |
| <b>punt</b>    | Represents destinations that cannot be switched in the normal path and that are punted to the next-fastest switching vector. |

**Command Modes**

User EXEC (&gt;) Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 11.1CC      | This command was introduced.                                                                                     |
| 12.0(5)T    | The <b>vrf</b> keyword was added.                                                                                |
| 12.0(22)S   | This command was integrated into Cisco IOS Release 12.0(22)S.                                                    |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                    |
| 12.2(25)S   | The <b>internal</b> , <b>platform</b> , and <b>source</b> keywords were added.                                   |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

An adjacency is a node that can be reached by one Layer 2 hop.

Distributed Cisco Express Forwarding is not supported on Cisco 10000 series routers.

### Adjacencies and Dialer Interfaces

By default, an IP adjacency node is installed in the Cisco Express Forwarding table for the aggregate (dialer) interface. When an asynchronous interface of type AUX\_LINE is connected to the aggregate (dialer) interface, a punt adjacency node is installed. However, when the asynchronous interface is disconnected from the aggregate (dialer) interface, the IP adjacency node is restored.

## Examples

The following is sample output from the **show ip cef adjacency** command when the **glean** keyword is specified:

```
Router# show ip cef adjacency glean
Prefix      Next Hop      Interface
10.2.61.0/24    attached      Ethernet1/0/0
10.17.250.252/32  10.2.61.1    Ethernet1/0/0
```

The following is sample output from the **show ip cef adjacency drop** command with the **detail** keyword specified:

```
Router# show ip cef adjacency drop detail
IP CEF with switching (Table Version 4), flags=0x0
  4 routes, 0 reresolve, 0 unresolved (0 old, 0 new), peak 0
  4 leaves, 8 nodes, 8832 bytes, 13 inserts, 9 invalidations
  0 load sharing elements, 0 bytes, 0 references
  universal per-destination load sharing algorithm, id 00B999CA
  3 CEF resets, 0 revisions of existing leaves
  Resolution Timer: Exponential (currently 1s, peak 1s)
  0 in-place modifications
  refcounts: 533 leaf, 536 node
10.0.0.0/4, version 3
0 packets, 0 bytes, Precedence routine (0)
  via 0.0.0.0, 0 dependencies
    next hop 0.0.0.0
    valid drop adjacency
```

The following sample output shows the direct IP prefix when the next hop Gigabit Ethernet interface 3/0 is specified:

```
Router# show ip cef adjacency GigabitEthernet 3/0 172.20.26.29
Prefix      Next Hop      Interface
10.1.1.0/24    10.20.26.29    GigabitEthernet3/0
```

## Examples

The **show ip cef adjacency** command shows all prefixes resolved through a regular next-hop adjacency or through the usage of a special adjacency type keyword such as **discard**, **drop**, **glean**, **null**, or **punt**.

The following is sample output from the **show ip cef adjacency** command when the **glean** keyword is specified:

```
Router# show ip cef adjacency glean
Prefix      Next Hop      Interface
10.2.61.0/24    attached      GigabitEthernet1/0/0
10.17.250.252/32  10.2.61.1    GigabitEthernet1/0/0
```

The following is sample output from the **show ip cef adjacency drop** command with the **detail** keyword specified:

```
Router# show ip cef adjacency drop detail
IPv4 CEF is enabled for distributed and running
VRF Default:
  42 prefixes (42/0 fwd/non-fwd)
  Table id 0
  Database epoch: 3 (42 entries at this epoch)
10.0.0.0/4, epoch 3
  Special source: drop
  drop
```

The following sample output shows the direct IP prefix when the next hop Gigabit Ethernet interface 3/0/0 is specified (before Cisco IOS Release 12.2(25)S):

```
Router# show ip cef adjacency GigabitEthernet 3/0/0 172.20.26.29
Prefix          Next Hop          Interface
10.1.1.0/24      10.20.26.29       GigabitEthernet3/0/0
```

The table below describes the significant fields shown in the display.

**Table 34: show ip cef adjacency Field Descriptions (Before Cisco IOS Release 12.2(25)S)**

| Field     | Description            |
|-----------|------------------------|
| Prefix    | Destination IP prefix. |
| Next Hop  | Next hop IP address.   |
| Interface | Next hop interface.    |

For Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T, and later releases the information in the output is the same, but the format of the output is changed.

```
Router# show ip cef adjacency FastEthernet 0/1 172.17.22.1
10.10.1.2/32
  nexthop 172.17.22.1 FastEthernet0/1
10.20.12.0/24
  nexthop 172.17.22.1 FastEthernet0/1
```

The table below describes the significant fields shown in the display.

**Table 35: show ip cef adjacency Field Descriptions**

| Field               | Description            |
|---------------------|------------------------|
| 10.10.1.2/32        | Destination IP prefix. |
| nexthop 172.17.22.1 | Next hop IP address.   |
| FastEthernet0/1     | Next hop interface.    |

## Related Commands

| Command                    | Description                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show adjacency</b>      | Displays Cisco Express Forwarding adjacency table information.                                                                                            |
| <b>show ip cef summary</b> | Displays a summary of the entries in the FIB.                                                                                                             |
| <b>show ipv6 adjacency</b> | Displays Cisco Express Forwarding for IPv6 and distributed Cisco Express Forwarding for IPv6 recursive and direct prefixes resolved through an adjacency. |



# show ip cef epoch

To display the epoch information for all Forwarding Information Base (FIB) tables, use the **show ip cef epoch** command in user EXEC or privileged EXEC mode

**show ip cef epoch**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                                                           |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                                                  |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.                                              |
| 12.2(25)S    | Table adjacency epoch information was moved from the output of this command to the output of the <b>show adjacency prefix</b> command. |
| 12.2(28)SB   | This command was integrated into the Cisco IOS Release 12.2(28)SB.                                                                     |
| 12.2(33)SRA  | This command was integrated into the Cisco IOS Release 12.2(33)SRA                                                                     |
| 12.2(33) SXH | This command was integrated into the Cisco IOS Release 12.2(33)SXH.                                                                    |
| 12.4(20)T    | This command was integrated into the Cisco IOS Release 12.4(20)T.                                                                      |

## Usage Guidelines

These **show** commands also display the epoch information for the following:

- **show ip cef summary** --Displays the table epoch for a specific FIB table.
- **show ip cef detail** --Displays the epoch value for each entry of a specific FIB table.
- **show adjacency summary** --Displays the adjacency table epoch.
- **show adjacency detail** --Displays the epoch value for each entry of the adjacency table.

## Examples

### Examples

This example shows how to display epoch information. The fields shown in the display are self-explanatory.

```
Router# show ip cef epoch
VRF: Default
Database epoch: 0 (12 entries at this epoch)
```



For adjacency table epoch information, see the **show adjacency prefix** command.

## Examples

This example shows how to display epoch information. The fields shown in the display are self-explanatory.

```
Router# show ip cef epoch
CEF epoch information:
Table:Default-table
  Table epoch:2 (164 entries at this epoch)
Adjacency table
  Table epoch:1 (33 entries at this epoch)
```

This example shows the output after you clear the epoch table and increment the epoch number. The fields shown in the display are self-explanatory.

```
Router# show ip cef epoch
CEF epoch information:
Table:Default-table
  Table epoch:2 (164 entries at this epoch)
Adjacency table
  Table epoch:1 (33 entries at this epoch)
Router# clear ip cef epoch full
Router# show ip cef epoch
CEF epoch information:
Table:Default-table
  Table epoch:3 (164 entries at this epoch)
Adjacency table
  Table epoch:2 (33 entries at this epoch)
```

## Related Commands

| Command                       | Description                                                           |
|-------------------------------|-----------------------------------------------------------------------|
| <b>show ip cef</b>            | Displays entries in the FIB or displays a summary of the FIB.         |
| <b>show ip cef summary</b>    | Displays a summary of the FIB.                                        |
| <b>show ip cef detail</b>     | Displays detailed FIB entry information.                              |
| <b>show adjacency detail</b>  | Displays the information about the protocol detail and timer.         |
| <b>show adjacency summary</b> | Displays a summary of Cisco Express Forwarding adjacency information. |

# show ip cef events



**Note** The **show ip cef events** command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases.

To display all recorded Cisco Express Forwarding Forwarding Information Base (FIB) and adjacency events, use the **show ip cef events** command in user EXEC or privileged EXEC mode.

**show ip cef** [*vrf vrf-name*] **events** [*ip-prefix*] [**new**| **within seconds**] [**detail**] [**summary**]

## Syntax Description

|                       |                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------|
| <b>vrf</b>            | (Optional) A Virtual Private Network (VPN) routing and forwarding (VRF) instance.                       |
| <i>vrf-name</i>       | (Optional) Name assigned to the VRF.                                                                    |
| <i>ip-prefix</i>      | (Optional) Next hop IP prefix, in dotted decimal format (A.B.C.D).                                      |
| <b>new</b>            | (Optional) Displays new Cisco Express Forwarding events not previously shown.                           |
| <b>within seconds</b> | (Optional) Displays Cisco Express Forwarding events that occurred within a specified number of seconds. |
| <b>detail</b>         | (Optional) Displays detailed information for each Cisco Express Forwarding event entry.                 |
| <b>summary</b>        | (Optional) Displays a summary of the Cisco Express Forwarding event log.                                |

## Command Modes

User EXEC (>) Privileged EXEC(#)

## 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.                                                       |
| 12.2(25)S  | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.   |
| 12.2(28)SB | This command was removed. It is not available in Cisco IOS Release 12.2(28)SB and later Cisco IOS 12.2SB releases. |

| Release     | Modification                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SRA | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
| 12.2(33)SXH | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXH and later Cisco IOS 12.2S releases.  |
| 12.4(20)T   | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |

### Usage Guidelines

This command shows the state of the table event log and must be enabled for events to be recorded. The **ip cef table event-log** command controls parameters such as event log size.

### Examples

The following is sample output from the **show ip cef events** command with **summary** specified:

```
Router# show ip cef events summary
CEF table events summary:
  Storage for 10000 events (320000 bytes), 822/0 events recorded/ignored
  Matching all events, traceback depth 16
  Last event occurred 00:00:06.516 ago.
```

The following is sample output from the **show ip cef events** command displaying events that occurred within 1 second:

```
Router# show ip cef events within 1
CEF table events (storage for 10000 events, 14 events recorded)
+00:00:00.000:[Default-table] *.*.*/*      New FIB table      [OK]
+00:00:00.000:[Default-table] 10.1.80.194/32 FIB insert in mtrie [OK]
+00:00:00.000:[Default-table] 10.1.80.0/32   FIB insert in mtrie [OK]
+00:00:00.000:[Default-table] 10.1.80.255/32 FIB insert in mtrie [OK]
+00:00:00.004:[Default-table] 10.1.80.0/24   FIB insert in mtrie [OK]
+00:00:00.004:[Default-table] 10.1.80.0/24   NBD up              [OK]
+00:00:00.004:[Default-table] 224.0.0.0/8    FIB insert in mtrie [OK]
+00:00:00.012:[Default-table] 10.1.80.0/24   NBD up              [Ignr]
+00:00:00.012:[Default-table] 224.0.0.0/8    FIB remove          [OK]
+00:00:00.016:[Default-table] 224.0.0.0/8    FIB insert in mtrie [OK]
+00:00:05.012:[Default-table] 224.0.0.0/8    FIB remove          [OK]
+00:00:05.012:[Default-table] 224.0.0.0/8    FIB insert in mtrie [OK]
+00:00:28.440:[Default-table] 224.0.0.0/8    FIB remove          [OK]
+00:00:28.440:[Default-table] 224.0.0.0/8    FIB insert in mtrie [OK]
First event occurred at 00:00:36.568 (00:04:40.756 ago)
Last event occurred at 00:01:05.008 (00:04:12.316 ago)
```

The table below describes the significant fields shown in the display.

**Table 36: show ip cef events Field Descriptions**

| Field           | Description                                          |
|-----------------|------------------------------------------------------|
| +00:00:00.000   | Time stamp of the IP Cisco Express Forwarding event. |
| [Default-table] | Type of VRF table for this event entry.              |
| *.*.*/*         | All IP prefixes.                                     |

| Field               | Description                               |
|---------------------|-------------------------------------------|
| 9.1.80.194/32       | IP prefix associated with the event.      |
| FIB insert in mtrie | IP prefix insert in the FIB table event.  |
| NBD up              | IP prefix up event.                       |
| FIB remove          | FIB entry remove event.                   |
| [Ignr]              | Cisco Express Forwarding ignored event.   |
| [OK]                | Cisco Express Forwarding processed event. |

**Related Commands**

| Command                               | Description                                                                      |
|---------------------------------------|----------------------------------------------------------------------------------|
| <b>ip cef table consistency-check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters. |
| <b>ip cef table event-log</b>         | Controls Cisco Express Forwarding table event-log characteristics.               |

## show ip cef exact-route

To display the exact route for a source-destination IP address pair for a Cisco Express Forwarding (CEF) instance, use the **show ip cef exact-route** command in user EXEC or privileged EXEC mode.

**show ip cef** [**vrf** *vrf-name*] **exact-route** [**virtual**] [**platform**] *source-address* [**src-port** *port-number*] *destination-address* [**dest-port** *port-number*] [**gtp-teid** *teid*]

### Syntax Description

|                                     |                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>vrf</b> <i>vrf-name</i>          | (Optional) Specifies a VPN routing and forwarding (VRF) instance.                                                                                                                                                                                                                                                         |
| <b>virtual</b>                      | Specifies virtual and physical network interfaces.                                                                                                                                                                                                                                                                        |
| <b>platform</b>                     | Specifies the exact route for a hardware session.                                                                                                                                                                                                                                                                         |
| <i>source-address</i>               | The network source address.                                                                                                                                                                                                                                                                                               |
| <b>src-port</b> <i>port-number</i>  | (Optional) Specifies a Layer 4 port number for the source IP address. Valid values for the <i>port-number</i> argument are from 0 to 65535.                                                                                                                                                                               |
| <i>destination-address</i>          | The network destination address.                                                                                                                                                                                                                                                                                          |
| <b>dest-port</b> <i>port-number</i> | (Optional) Specifies a Layer 4 port number for the source IP address. Valid values for the <i>port-number</i> argument are from 0 to 65535.<br><br>To display the exact route for a specific GPRS Tunneling Protocol Tunnel Endpoint Identifier (GTP TEID), the <i>port number</i> for the destination port must be 2152. |
| <b>gtp-teid</b>                     | (Optional) Displays the exact route of a source-destination IP address pair with a specific GTP TEID value.                                                                                                                                                                                                               |
| <i>teid</i>                         | (Optional) GTP TEID value. The value range is from 1 to 4294967295.                                                                                                                                                                                                                                                       |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release  | Modification                 |
|----------|------------------------------|
| 12.1(4)T | This command was introduced. |

| Release                   | Modification                                                                                                                                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S                 | This command was modified. The output of the command was reformatted.                                                                                                             |
| 12.2(33)SRA               | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.4(11)T                 | This command was modified. The <b>src-port</b> <i>port-number</i> and <b>dest-port</b> <i>port-number</i> keywords and arguments were added.                                      |
| 12.2SX                    | This command was integrated into Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T                 | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                     |
| 15.1(3)T                  | This command was modified. Support for the <b>platform</b> keyword was added in a release prior to Cisco IOS Release 15.1(3)T.                                                    |
| 15.1(3)S                  | This command was modified. Support for the <b>platform</b> keyword was added in a release prior to Cisco IOS Release 15.1(3)S.                                                    |
| Cisco IOS XE Release 3.5S | This command was integrated into a release prior to Cisco IOS XE Release 3.5S.                                                                                                    |
| 15.2(4)S                  | This command was modified. The <b>virtual</b> keyword was added.                                                                                                                  |
| 3.10S                     | This command was modified. The <b>gtp-teid</b> keyword and the <i>teid</i> argument were added to the command.                                                                    |

## Usage Guidelines

When you are load-balancing a per-destination pair, the **show ip cef exact-route** command shows the next-hop address that is used for a given IP source-destination address pair.

When you configure the **ip cef load-sharing algorithm include-ports** command with the **source**, **destination**, or **source** and **destination** keywords, you can use the **show ip cef exact-route** command to display the next-hop address for a given source-destination address pair and the source and destination ports.

## Examples

The following is sample output from the **show ip cef exact-route** command:

```
Device# show ip cef exact-route 172.16.1.3 172.16.1.2
172.16.1.3 -> 172.16.1.2 => IP adj out of FastEthernet0/1, addr 172.17.25.1
```

The following is sample output from the **show ip cef exact-route platform** command:

```
Device# show ip cef exact-route platform 172.16.1.3 172.16.1.2
172.16.1.3 -> 172.16.1.2 => IP adj out of Ethernet0/0, addr 172.17.25.1
```

The following is sample output from the **show ip cef exact-route virtual platform** command:

```
Device# show ip cef exact-route virtual platform 172.16.1.3 172.16.1.2
172.16.1.3 -> 172.16.1.2 => IP midchain out of Tunnell 078E0EC0 => IP adj out of Ethernet0/0,
addr 172.17.25.1
```

The following is a sample output of the **show ip cef exact-route** *source-address destination-address* [**dest-port** *port-number*] [**gtp-teid** *teid*] command. (The fields in the display are self-explanatory).

```
Device # show ip cef exact-route 1.1.1.1 src-port 2152 172.16.0.3 dest-port 2152 gtp-teid 31785
1.1.1.1 -> 172.16.0.3 => IP adj out of GigabitEthernet0/0/1, addr 172.16.0.3
```

The table below describes the significant fields shown in the display:

**Table 37: show ip cef exact-route Field Descriptions**

| Field                                  | Description                                                             |
|----------------------------------------|-------------------------------------------------------------------------|
| 172.16.1.3 -> 172.16.1.2               | From source IP address 172.16.1.3 to destination IP address 172.16.1.2. |
| => IP adj out of FastEthernet0/1       | Next-hop interface is FastEthernet0/1.                                  |
| addr 172.17.25.1                       | Next-hop IP address 172.17.25.1.                                        |
| => IP adj out of Ethernet0/0           | Next-hop interface is Ethernet interface 0/0.                           |
| => IP midchain out of Tunnel1 078E0EC0 | Next-hop tunnel interface is Tunnel1 078E0EC0.                          |

#### Related Commands

| Command                              | Description                                                  |
|--------------------------------------|--------------------------------------------------------------|
| <b>ip cef load-sharing algorithm</b> | Selects a Cisco Express Forwarding load-balancing algorithm. |

# show ip cef inconsistency



Note

The show ip cef inconsistency command is not available in Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, 12.2(33)SXH, 12.4(20)T and later releases. This command is replaced by the **test cef table consistency** command.

To display Cisco Express Forwarding IP prefix inconsistencies, use the **show ip cef inconsistency** command in user EXEC or privileged EXEC mode.

**show ip cef** [*vrf vrf-name*] **inconsistency** [*records* [*detail*]]

Syntax Description

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| <b>vrf</b>      | (Optional) A Virtual Private Network (VPN) routing and forwarding (VRF) instance.       |
| <i>vrf-name</i> | (Optional) Name assigned to the VRF.                                                    |
| <b>records</b>  | (Optional) Displays all recorded inconsistencies.                                       |
| <b>detail</b>   | (Optional) Displays detailed information for each Cisco Express Forwarding table entry. |

Command Modes

User EXEC (>) Privileged EXEC (#)

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.                                                        |
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                               |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to 12.2(17d)SXB.                                   |
| 12.2(25)S    | This command was removed. It is not available in Cisco IOS Release 12.2(25)S and later Cisco IOS 12.2S releases.    |
| 12.2(33)SRA  | This command was removed. It is not available in Cisco IOS Release 12.2(33)SRA and later Cisco IOS 12.2SR releases. |
| 12.4(20)T    | This command was removed. It is not available in Cisco IOS Release 12.4(20)T and later Cisco IOS 12.4T releases.    |



### Usage Guidelines

This command is available only on routers with line cards.

This command displays recorded IP Cisco Express Forwarding inconsistency records found by the lc-detect, scan-rp, scan-rib, and scan-lc detection mechanisms.

You can configure the IP Cisco Express Forwarding prefix consistency-detection mechanisms using the **cef table consistency-check** command.

### Examples

The following is sample output from the **show ip cef inconsistency** command:

```
Router# show ip cef inconsistency
Table consistency checkers (settle time 65s)
  lc-detect:running
    0/0/0 queries sent/ignored/received
  scan-lc:running [100 prefixes checked every 60s]
    0/0/0 queries sent/ignored/received
  scan-rp:running [100 prefixes checked every 60s]
    0/0/0 queries sent/ignored/received
  scan-rib:running [1000 prefixes checked every 60s]
    0/0/0 queries sent/ignored/received
Inconsistencies:0 confirmed, 0/16 recorded
```

The table below describes the significant fields shown in the display.

**Table 38: show ip cef inconsistency Field Descriptions**

| Field                                      | Description                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| settle time                                | Time after a recorded inconsistency is confirmed.                                                                         |
| lc-detect running                          | Consistency checker lc-detect is running.                                                                                 |
| 0/0/0 queries                              | Number of queries sent, ignored, and received.                                                                            |
| Inconsistencies:0 confirmed, 0/16 recorded | Number of inconsistencies confirmed, and recorded. Sixteen is the maximum number of inconsistency records to be recorded. |

### Related Commands

| Command                            | Description                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------|
| <b>clear ip cef inconsistency</b>  | Clears the statistics and records for the Cisco Express Forwarding consistency checker. |
| <b>cef table consistency-check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters.        |

# show ip cef non-recursive

To display nonrecursive route entries in the Forwarding Information Base (FIB), use the **show ip cef non-recursive** command in user EXEC or privileged EXEC mode.

```
show ip cef non-recursive [detail| epoch epoch-number| internal| platform| source]
```

## Cisco 10000 Series Routers

```
show ip cef non-recursive [detail| internal| platform]
```

### Syntax Description

|                                  |                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>detail</b>                    | (Optional) Displays detailed nonrecursive route entry information.                                            |
| <b>epoch</b> <i>epoch-number</i> | (Optional) Displays adjacency type entries filtered by epoch number. The epoch number range is from 0 to 255. |
| <b>internal</b>                  | (Optional) Displays data for nonrecursive route entries.                                                      |
| <b>platform</b>                  | (Optional) Displays platform-specific nonrecursive route entries.                                             |
| <b>source</b>                    | (Optional) Displays source-specific nonrecursive route entry information.                                     |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                  |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(22)S   | This command was introduced.                                                                                                                  |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T.                                                                                 |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                 |
| 12.2(25)S   | The <b>epoch</b> , <b>internal</b> , <b>platform</b> , and <b>source</b> keywords were added, and the <i>epoch-number</i> argument was added. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                              |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                               |

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

The **show ip cef non-recursive detail** command shows detailed FIB entry information for all nonrecursive routes.

## Examples

The following is sample output from the **show ip cef non-recursive detail** command:

```
Router# show ip cef non-recursive detail
IPv6 CEF is enabled and running
IPv6 CEF default table
8 prefixes
2001:xx::/35
    nexthop FE80::ssss:CFF:FE3D:DCC9 Tunnel155
2001:zzz:500::/40
    nexthop FE80::nnnn:801A Tunnel132
2001:zzz::/35
    nexthop 3FFE:mmm:8023:21::2 Tunnel126
3FFE:yyy:8023:37::1/128 Receive
    Receive
3FFE:yyy:8023:37::/64 Attached, Connected
    attached to Tunnel37
3FFE:yyy:8023:38::1/128 Receive
    Receive
3FFE:yyy:8023:38::/64 Attached, Connected
    attached to Tunnel40
3FFE:yyy:8023:39::1/128 Receive
    Receive
```

## Examples

The following is sample output from the **show ip cef non-recursive detail** command:

```
Router# show ip cef non-recursive detail
IPv4 CEF is enabled for distributed and running
VRF Default:
  42 prefixes (42/0 fwd/non-fwd)
  Table id 0
  Database epoch: 3 (42 entries at this epoch)
0.0.0.0/0, epoch 3, flags default route handler
  no route
0.0.0.0/32, epoch 3, flags receive
  Special source: receive
  receive
10.2.2.2/32, epoch 3
  local label info: global/24
  nexthop 10.1.1.1 GigabitEthernet1/0/0 label 18
10.4.4.4/32, epoch 3
  local label info: global/30
  nexthop 10.1.1.1 GigabitEthernet1/0/0 label 19
10.5.5.5/32, epoch 3
  local label info: global/29
  nexthop 10.1.1.1 GigabitEthernet1/0/0
10.6.6.6/32, epoch 3, flags receive
  receive
10.1.1.0/24, epoch 3
  local label info: global/23
  nexthop 10.1.1.1 GigabitEthernet1/0/0 label 17
```

The table below describes the significant fields shown in the displays.

**Table 39: show ip cef non-recursive Field Descriptions**

| Field                                                 | Description                                                                                       |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 8 prefixes                                            | Indicates the total number of prefixes in the Cisco Express Forwarding table.                     |
| 2001:xx::/35                                          | Indicates the prefix of the remote network.                                                       |
| 2001:zzz:500::/40<br>nexthop FE80::nnnn:801A Tunnel32 | Indicates that prefix 2001:zzz:500::/40 is reachable through this next-hop address and interface. |
| attached to Tunnel37                                  | Indicates that this prefix is a connected network on Tunnel interface 37.                         |
| Receive                                               | Indicates that this prefix is local to the router.                                                |

#### Related Commands

| Command                       | Description                                   |
|-------------------------------|-----------------------------------------------|
| <b>show ip cef</b>            | Displays entries in the FIB.                  |
| <b>show ip cef summary</b>    | Displays a summary of the entries in the FIB. |
| <b>show ip cef unresolved</b> | Displays unresolved entries in the FIB.       |

# show ip cef platform

To display entries in the Forwarding Information Base (FIB) or to display a summary of the FIB, use the **show ip cef platform** command in privileged EXEC mode.

**show ip cef** [**ip-prefix** [**mask**]] **platform** [**checksum**|**detail**|**internal checksum**]

## Syntax Description

|                          |                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-prefix</i>         | (Optional) IP address prefix of the entries to display.                                                                         |
| <i>mask</i>              | (Optional) Subnet mask of the entries to display.                                                                               |
| <b>checksum</b>          | (Optional) Displays FIB entry checksum information.                                                                             |
| <b>detail</b>            | (Optional) Displays detailed FIB entry information.                                                                             |
| <b>internal checksum</b> | (Optional) Displays internal data structures. The <b>checksum</b> option includes FIB entry checksum information in the output. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release                   | Modification                                                |
|---------------------------|-------------------------------------------------------------|
| 12.2 (28)SB               | The command was introduced.                                 |
| Cisco IOS XE Release 3.4S | This command was integrated into Cisco IOS XE Release 3.4S. |

## Examples

The following example shows FIB entry information for IP address prefix 10.4.4.4:

```
Router# show ip cef 10.4.4.4 platform

10.4.4.4/32
Fib Entry: 0xD6680610 XCM leaf from 0x50805550 (RP) 0xA0805550 (FP):
load_bal_or_adj[0] 0x0 load_bal_or_adj[1] 0x18 load_bal_or_adj[2] 0x1C
leaf points to an adjacency, index 0x607
ip_mask 0x0 as_number 0x0 precedence_num_loadbal_intf 0xF0 qos_group 0x0
Label object OCE Chain:
Label(0x12, real) Adjacency
cl0k_label_data = 0x450467F8
tag_elt_addr = 0x50003038
ipv6_tag_elt_addr = 0x0
tag_index = 0x607
tt_tag_rew = 0x45046800
Tag Rewrite: vcci = 0x9DA, fib_root = 0x0
mac_rewrite_index = 0x395, flags = 0x9
pktswitched = 0 byteswitched = 0
XCM Tag Rewrite: vcci = 0x9DA, fib_root = 0x0
```

```
mac_rewrite_index = 0x395, flags = 0x9
mac_index_extension = 0x0
XCM mac rewrite from index 0x395
mtu from 0x53800E54(RP) 0xA3800E54(FP)
frag_flags = 0x0
mtu = 1496
mac length 0x12 encap length 0x16 upd_offset=0x02FF
mac string start from bank4 0x32001CA8(RP)
0x82001CA8(FP)
mac string end from bank9 0x50801CA8(RP)
0xA0801CA8(FP)
Encap String: 0005DC387B180003A011A57881000002884700012000
The following example shows how to display IP Fast ReRoute (FRR) entry information for IP address prefix 10.4.4.4:
```

```
Router# show ip cef 10.4.4.4 platform

10.4.4.4/32
=== OCE ===

OCE Type: Fast ReRoute OCE, Number of children: 2
  FRR state: : 1
  FRR next hw oce ptr: : 0x89b002f0
  Backup hw oce ptr: : 0x89b00300
=== OCE ===

OCE Type: Adjacency, Number of children: 0
Adj Type: : IPV4 Adjacency
Encap Len: : 14
L3 MTU: : 1500
Adj Flags: : 0
Fixup Flags: : 0
Interface Name: FastEthernet1/2/7
Encap: : 00 1c b1 d7 8a 44 00 1f 6c 24 30 67 08 00
Next Hop Address: : 0b000002 00000000 00000000 00000000
Next HW OCE Ptr: : 00000000
=== OCE ===

OCE Type: Adjacency, Number of children: 0
Adj Type: : IPV4 Adjacency
Encap Len: : 14
L3 MTU: : 1500
Adj Flags: : 0
Fixup Flags: : 0
Interface Name: FastEthernet1/2/6
Encap: : 00 1c b1 d7 8a 43 00 1f 6c 24 30 66 08 00
Next Hop Address: : 0a000002 00000000 00000000 00000000
Next HW OCE Ptr: : 00000000
```

Related Commands

| Command            | Description                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------|
| show cef           | Displays which packets the line cards dropped, or displays which packets were not express forwarded. |
| show cef interface | Displays Cisco Express Forwarding-related interface information.                                     |

# show ip cef summary

To display a summary of the IP Cisco Express Forwarding table, use the **show ip cef summary** command in user EXEC or privileged EXEC mode.

**show ip cef summary**

**Syntax Description** This command has no arguments and keywords.

**Command Modes** User EXEC (>) Privileged EXEC (#)

| Command History | Release      | Modification                                                                              |
|-----------------|--------------|-------------------------------------------------------------------------------------------|
|                 | 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
|                 | 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
|                 | 12.2(25)S    | The command output was changed to display IPv4 forwarding information only.               |
|                 | 12.2(28)SB   | This command was integrated into Cisco IOS Release 12.2(28)SB.                            |
|                 | 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |
|                 | 12.2(33)SXH  | This command was integrated into Cisco IOS Release 12.2(33)SXH.                           |
|                 | 12.4(20)T    | This command was integrated into Cisco IOS Release 12.4(20)T.                             |

## Examples

**Examples** This is sample output for the **show ip cef summary** command for IPv4 information:

```
Router# show ip cef summary
IPv4 CEF is enabled and running
VRF Default:
  22 prefixes (22/0 fwd/non-fwd)
  Table id 0, 1 resets
  Database epoch: 0 (22 entries at this epoch)
The table below describes the significant fields shown in the displays.
```

**Table 40: show ip cef summary Field Descriptions**

| Field                                        | Description                                                           |
|----------------------------------------------|-----------------------------------------------------------------------|
| IPv4 CEF is enabled and running              | Status of IPv4 Cisco Express Forwarding on the router.                |
| 22 prefixes (22/0 fwd/non-fwd)               | Number of prefixes forwarded and not forwarded.                       |
| Table id 0, 1 resets                         | Forwarding table version and the number of times the table was reset. |
| Database epoch: 0 (22 entries at this epoch) | Database version and the number of entries in the database.           |

In Cisco IOS 12.2(25)S, IPv4 and IPv6 output was separated. To display Cisco Express Forwarding summary information for IPv6, use the **show ipv6 cef summary** command as shown below:

```
Router# show ipv6 cef summary
IPv6 CEF is enabled and running
VRF Default:
  20 prefixes (20/0 fwd/non-fwd)
  Table id 0, 0 resets
  Database epoch: 0 (20 entries at this epoch)
```

Sample Output for Cisco IOS Releases Before Cisco IOS Release 12.2(25)S

This example shows how to display a summary of the IP Cisco Express Forwarding table:

```
Router# show ip cef summary
IP Distributed CEF with switching (Table Version 25), flags=0x0
  21 routes, 0 reresolve, 0 unresolved (0 old, 0 new), peak 1
  21 leaves, 16 nodes, 19496 bytes, 36 inserts, 15 invalidations
  0 load sharing elements, 0 bytes, 0 references
  universal per-destination load sharing algorithm, id 5163EC15
  3(0) CEF resets, 0 revisions of existing leaves
  Resolution Timer: Exponential (currently 1s, peak 1s)
  0 in-place/0 aborted modifications
  refcounts: 4377 leaf, 4352 node

  Table epoch: 0 (21 entries at this epoch)
```

Adjacency Table has 9 adjacencies

The table below describes the significant fields shown in the display.

**Table 41: show ip cef summary Field Descriptions**

| Field      | Description                                                                                                                     |
|------------|---------------------------------------------------------------------------------------------------------------------------------|
| routes     | Total number of entries in the Cisco Express Forwarding table.                                                                  |
| unresolved | Number of entries in the Cisco Express Forwarding table that do not have resolved recursions categorized by old and new routes. |
| peak       | Highest number of unresolved recursions.                                                                                        |



| Field                      | Description                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| leaves, nodes, bytes       | Number of elements in the Cisco Express Forwarding table and how much memory they use.                       |
| load sharing algorithm, id | Type of load sharing, whether the router is configured for per destination or per packet and the identifier. |
| Table epoch                | Number indicating the version of a Cisco Express Forwarding table from 0 to 255.                             |

**Related Commands**

| Command                  | Description                                                   |
|--------------------------|---------------------------------------------------------------|
| <b>show ip cef</b>       | Displays entries in the FIB or displays a summary of the FIB. |
| <b>show ipv6 summary</b> | Displays a summary of the entries in the IPv6 FIB.            |

# show ip cef switching statistics

To display switching statistics in the Forwarding Information Base (FIB), use the **show ip cef switching statistics**command in privileged EXEC mode.

**show ip cef switching statistics [feature]**

## Syntax Description

|         |                                              |
|---------|----------------------------------------------|
| feature | (Optional) The output is ordered by feature. |
|---------|----------------------------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced. This command replaces the <b>show cef drop</b> and the <b>show cef not-cef-switched</b> commands. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.               |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                  |

## Usage Guidelines

If the optional **feature** keyword is not used, all switching statistics are displayed, without regard for feature order.

## Examples

The following is sample output from the **show ip cef switching statistics**command:

```
Router# show ip cef switching statistics
Reason                               Drop      Punt    Punt2Host
RP LES Packet destined for us        0        132248      0
RP LES Multicast                     0          2      0
RP LES Link-local                    0         33      0
RP LES Total                         0       132283      0
Slot 4 Packet destined for us        0       129546      0
Slot 4 Link-local                    0         31      0
Slot 4 Total                         0       129577      0
All      Total                       0       261860      0
```

The following example shows how to display switching statistics for all features in a common format:

```
Router# show ip cef switching statistics feature
IPv4 CEF input features:
Path  Feature          Drop      Consume      Punt    Punt2Host    New i/f
```

```

LES    Access List      0          0          1          0          0
RSP    Access List      0          0          1          0          0
Slot 0 Access List     10          0          1          0          0
Slot 0 Verify Unicast   9          0          0          0          0
Slot 4 Verify Unicast   5          0          0          0          0
Total                24          0          3          0          0
IPv4 CEF output features:
Path   Feature          Drop    Consume      Punt    Punt2Host    New i/f
Total                0          0          0          0          0
IPv4 CEF post-encap features:
Path   Feature          Drop    Consume      Punt    Punt2Host    New i/f
Total                0          0          0          0          0

```

## Examples

The following is sample output from the **show ip cef switching statistics** command:

```

Router# show ip cef switching statistics
Path   Reason              Drop      Punt    Punt2Host
RP LES  Packet destined for us  0         1115      0
RP LES  Total                0         1115      0
RP PAS  Packet destined for us  0         385       0
RP PAS  TTL expired           0          0       1833
RP PAS  Total                0         385       1833
All     Total                0         1500       1833

```

The following example shows how to display switching statistics for all features in a common format:

```

Router# show ip cef switching statistics feature
IPv4 CEF input features:
Path   Feature              Drop    Consume      Punt    Punt2Host    Gave route
Total                0          0          0          0          0
IPv4 CEF output features:
Path   Feature              Drop    Consume      Punt    Punt2Host    New i/f
Total                0          0          0          0          0
IPv4 CEF post-encap features:
Path   Feature              Drop    Consume      Punt    Punt2Host    New i/f
Total                0          0          0          0          0

```

The table below describes the significant fields shown in the displays.

**Table 42: show ip cef switching statistics Field Descriptions**

| Field   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Path    | <p>Switch path where the feature was executed. Available switch paths are platform-dependent.</p> <p>Following are example switch paths for the Cisco 7200 series router:</p> <ul style="list-style-type: none"> <li>• RIB--process switching with Cisco Express Forwarding assistance</li> <li>• (low-end switching [LES])--Cisco Express Forwarding switch path</li> <li>• PAS--Cisco Express Forwarding turbo switch path</li> </ul> <p>Following are example switch paths for the Cisco 7500 series router:</p> <ul style="list-style-type: none"> <li>• RIB--centralized process switching with Cisco Express Forwarding assistance</li> <li>• LES--centralized Cisco Express Forwarding switch path on the Route/Switch Processor (RSP)</li> <li>• RSP--centralized Cisco Express Forwarding turbo switch path on the RSP</li> <li>• Slot NN--distributed Cisco Express Forwarding turbo switch path on the Versatile Interface Processor (VIP) in the indicated slot number</li> </ul> |
| Feature | Feature that returned the statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Reason  | Packet description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Consume | <p>Number of packets that the feature removed from the switch path (and will probably reintroduce to the switch path later). For example, with crypto with hardware acceleration, the feature might queue the packets to encryption and decryption; because hardware (and software) encryption is time-consuming, these packets are queued so the main processor can begin handling the next packet while the crypto module processes the removed packet. Also, for example, the feature might queue the packets for process switching through a private queue for that feature.</p>                                                                                                                                                                                                                                                                                                                                                                                                          |
| Drop    | Number of packets dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Punt      | Number of packets that could not be switched in the normal path and were punted to the next-fastest switching vector.                                                                                                                                                                                                                                                                        |
| Punt2Host | <p>Number of packets that could not be switched in the normal path and were punted to the host.</p> <p>For switch paths other than a centralized turbo switch path, punt and punt2host function the same way. With punt2host from a centralized turbo switch path (PAS and RSP), punt will punt the packet to LES, but punt2host will bypass LES and punt directly to process switching.</p> |
| New i/f   | Number of packets for which the feature provided Cisco Express Forwarding with forwarding information (that is, bypassed the normal route lookup).                                                                                                                                                                                                                                           |

**Related Commands**

| Command                   | Description                                                             |
|---------------------------|-------------------------------------------------------------------------|
| <b>show cef interface</b> | Displays Cisco Express Forwarding-related interface information.        |
| <b>show ip cef</b>        | Displays entries in the FIB.                                            |
| <b>show ip route</b>      | Displays router advertisement information received from onlink routers. |

# show ip cef traffic prefix-length

To display Cisco Express Forwarding traffic statistics by prefix size, use the **show ip cef traffic prefix-length**command in user EXEC or privileged EXEC mode.

**show ip cef [*vrf vrf-name*] traffic prefix-length**

## Syntax Description

|                 |                                                                                   |
|-----------------|-----------------------------------------------------------------------------------|
| <b>vrf</b>      | (Optional) A Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
| <i>vrf-name</i> | (Optional) Name assigned to the VRF.                                              |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1CC      | This command was introduced.                                                                                                                                                      |
| 12.0(5)T    | The <b>vrf</b> keyword was added.                                                                                                                                                 |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

This command is used to display Cisco Express Forwarding switched traffic statistics by destination prefix length. The **ip cef accounting prefix-length** command must be enabled for the counters to increment.

## Examples

The following is sample output from the **show ip cef traffic prefix-length**command:

```
Router#
show ip cef traffic prefix-length
IP prefix length switching statistics:
-----
Prefix      Number of      Number of
Length      Packets        Bytes
-----
0           0              0
1           0              0
2           0              0
3           0              0
4           0              0
5           0              0
.
```

```

.
.
28          0          0
29          0          0
30          0          0
31          0          0
32          0          0

```

The table below describes the significant fields shown in the display.

**Table 43: show ip cef traffic prefix-length Field Descriptions**

| Field             | Description                                                                 |
|-------------------|-----------------------------------------------------------------------------|
| Prefix Length     | Destination IP prefix length for Cisco Express Forwarding switched traffic. |
| Number of Packets | Number of packets forwarded for the specified IP prefix length.             |
| Number of Bytes   | Number of bytes transmitted for the specified IP prefix length.             |

#### Related Commands

| Command                  | Description                                              |
|--------------------------|----------------------------------------------------------|
| <b>ip cef accounting</b> | Enables network accounting of Cisco Express Forwarding . |

# show ip cef tree

To display summary information on the default tree in the Forwarding Information Base (FIB), use the **show ip cef tree** command in user EXEC or privileged EXEC mode.

### Cisco 7500 Series Routers

**show ip cef tree** [**statistics**| **dependents** [ *prefix-filter* ]]

### Cisco 10000 Series Routers

**show ip cef tree** [**statistics**]

### Syntax Description

|                      |                                                                                      |
|----------------------|--------------------------------------------------------------------------------------|
| <b>statistics</b>    | (Optional) Displays the default tree statistics.                                     |
| <b>dependents</b>    | (Optional) Displays the dependents of the selected tree with optional prefix filter. |
| <i>prefix-filter</i> | (Optional) A prefix filter on the dependents of the selected tree.                   |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

### Usage Guidelines

If none of the optional keywords or argument is used, all summary information on the default tree in the IP FIB is shown.

### Examples

The following is sample output from the **show ip cef tree** command:



## Examples

```
Router# show ip cef tree
VRF Default tree information:
  RTRIE storing IPv6 addresses
  6 entries (6/0 fwd/non-fwd)
Forwarding & Non-forwarding tree:
  6 inserts, 0 delete
  8 nodes using 288 bytes
```

The table below describes the significant fields shown in the display for a Cisco 7500 series router.

**Table 44: show ip cef tree Field Descriptions**

| Field                                | Description                                                                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| RTRIE storing IPv6 addresses         | Indicates the tree type as RTRIE.                                                                                                                       |
| 6 entries (6/0 fwd/non-fwd)          | Indicates total number of prefix entries as 6 forwarding and 0 nonforwarding entries.                                                                   |
| Forwarding & Non-forwarding tree     | Same tree is used for forwarding and nonforwarding.                                                                                                     |
| 6 inserts, 0 delete                  | Indicates that 6 entries were inserted and 0 entries were deleted from the tree.                                                                        |
| 8 nodes using 288 bytes              | Indicates a total of 8 nodes using a total of 288 bytes of memory.                                                                                      |
| *calloc failures: <i>number</i> node | This line is not present in the example output.<br><br>If this line is present in output, it indicates a memory allocation error at the indicated node. |

## Examples

The following is sample output from the **show ip cef tree** command:

```
Router# show ip cef tree
VRF Default tree information:
  MTRIE/MTRIE storing IPv4 addresses
  42 entries (42/0 fwd/non-fwd)
Forwarding tree:
  Forwarding lookup routine: IPv4 mtrie generic
  82 inserts, 40 deletes
  8-4-6-6-4-4 stride pattern
  short mask protection enabled for <= 4 bits without process suspension
  42 leaves (1176 bytes), 76 nodes (15744 bytes)
  18576 total bytes
  leaf ops: 82 inserts, 40 deletes
  leaf ops with short mask protection: 3 inserts, 1 delete
  per-prefix length stats: lookup off, insert off, delete off
  refcounts: 2933 leaf, 2848 node
  node pools:
    pool[C/4 bits]: 46 allocated (0 failed), 5472 bytes
    pool[C/6 bits]: 29 allocated (0 failed), 9216 bytes
    pool[C/8 bits]: 1 allocated (0 failed), 1056 bytes
Non-Forwarding tree:
  122 inserts, 122 deletes
  8-4-6-6-4-4 stride pattern
  short mask protection enabled for <= 4 bits without process suspension
```

```

0 leaves (0 bytes), 1 node (1040 bytes)
2696 total bytes
leaf ops: 122 inserts, 122 deletes
leaf ops with short mask protection: 4 inserts, 4 deletes
per-prefix length stats: lookup off, insert off, delete off
refcounts: 0 leaf, 0 node
node pools:
  pool[C/4 bits]: 0 allocated (0 failed), 0 bytes
  pool[C/6 bits]: 0 allocated (0 failed), 0 bytes
  pool[C/8 bits]: 1 allocated (0 failed), 1040 bytes

```

The table below describes the significant fields shown in the display for a Cisco 10000 series router.

**Table 45: show ip cef tree Field Descriptions--Cisco 10000 Series Router**

| Field                                | Description                                                                                                                                         |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| MTRIE storing IPv4 addresses         | Indicates the tree type as MTRIE.                                                                                                                   |
| 42 entries (42/0 fwd/ non-fwd)       | Indicates total number of prefix entries as 42 forwarding and 0 nonforwarding entries.                                                              |
| Forwarding & Non-forwarding tree     | Same tree is used for forwarding and nonforwarding.                                                                                                 |
| 82 inserts, 40 delete                | Indicates that 82 entries were inserted and 40 entries were deleted from the tree.                                                                  |
| 76 nodes using 15744 bytes           | Indicates a total of 76 nodes using a total of 15744 bytes of memory.                                                                               |
| *calloc failures: <i>number</i> node | This line is not present in the example output.<br>If this line is present in output, it indicates a memory allocation error at the indicated node. |

#### Related Commands

| Command     | Description                  |
|-------------|------------------------------|
| show ip cef | Displays entries in the FIB. |

# show ip cef unresolved

To display unresolved entries in the Forwarding Information Base (FIB), use the **show ip cef unresolved** command in user EXEC or privileged EXEC mode.

**show ip cef unresolved** [**detail**| **epoch** *epoch-number*| **internal**| **platform**| **source**]

## Cisco 10000 Series Routers

**show ip cef unresolved** [**detail**| **internal**| **platform**]

### Syntax Description

|                                  |                                                                                                                                |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>detail</b>                    | (Optional) Displays detailed FIB entry information.                                                                            |
| <b>epoch</b> <i>epoch-number</i> | (Optional) Displays the basic unresolved routes filtered by a specified epoch number. The epoch number range is from 0 to 255. |
| <b>internal</b>                  | (Optional) Displays data structures for unresolved routes.                                                                     |
| <b>platform</b>                  | (Optional) Displays platform-specific information on unresolved routes.                                                        |
| <b>source</b>                    | (Optional) Displays source-specific information on unresolved routes.                                                          |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                                          |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(22)S   | This command was introduced.                                                                                                                                                          |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T.                                                                                                                         |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                         |
| 12.2(25)S   | The <b>platform</b> , <b>source</b> , and <b>epoch</b> keywords were added. The <i>epoch-number</i> argument was added. The output was changed to list only IPv4 unresolved prefixes. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                       |

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

Usage Guidelines

The **show ip cef unresolved detail** command displays detailed information for all unresolved FIB entries.

Examples

Examples

The following is sample output for the **show ip cef unresolved** command:

```
Router# show ip cef unresolved detail
Prefix                Next Hop                Interface
Nothing is displayed if no unresolved adjacencies exist. For information about unresolved prefixes for IPv6,
use the show ipv6 unresolved command.
```

Examples

The following is sample output from the **show ip cef unresolved** command:

```
Router# show ip cef unresolved

IP Distributed CEF with switching (Table Version 136632)
45776 routes, 13 unresolved routes (0 old, 13 new)
45776 leaves, 2868 nodes, 8441480 bytes, 136632 inserts, 90856 invalidations
1 load sharing elements, 208 bytes, 1 references
1 CEF resets, 1 revisions of existing leaves
refcounts: 527292 leaf, 465617 node
10.214.0.0/16, version 136622
0 packets, 0 bytes
  via 172.17.233.56, 0 dependencies, recursive
  unresolved
10.215.0.0/16, version 136623
0 packets, 0 bytes
  via 172.17.233.56, 0 dependencies, recursive
  unresolved
10.218.0.0/16, version 136624
0 packets, 0 bytes
```

Examples

The following is sample output from the **show ip cef unresolved** command:

```
Router# show ip cef unresolved
10.214.0.0/16, version 136622
0 packets, 0 bytes
  via 172.17.233.56, 0 dependencies, recursive
  unresolved
10.215.0.0/16, version 136623
0 packets, 0 bytes
  via 172.17.233.56, 0 dependencies, recursive
  unresolved
10.218.0.0/16, version 136624
0 packets, 0 bytes
```

**Related Commands**

| Command                     | Description                                              |
|-----------------------------|----------------------------------------------------------|
| <b>show cef interface</b>   | Displays Cisco Express Forwarding interface information. |
| <b>show ip cef</b>          | Displays entries in the FIB.                             |
| <b>show ip cef summary</b>  | Displays a summary of the entries in the FIB.            |
| <b>show ipv6 unresolved</b> | Displays unresolved entries in the IPv6 FIB.             |

# show ip cef vlan

To display the information about the IP Cisco Express Forwarding VLAN interface status, the configuration, and the prefixes for a specific interface, use the **show ip cef vlan** command in user EXEC or privileged EXEC mode.

**show ip cef vlan** *vlan-id* [**detail**]

## Syntax Description

|                |                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| <i>vlan-id</i> | VLAN number; valid values are from 1 to 4094.                                                      |
| <b>detail</b>  | (Optional) Displays the detailed information about the IP Cisco Express Forwarding VLAN interface. |

## Command Default

This command has no default settings.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

## Examples

This example shows how to display the prefixes for a specific VLAN. The fields shown in the display are self-explanatory.

```
Router> show ip cef vlan 1003
Prefix          Next Hop          Interface
0.0.0.0/0       172.20.52.1       FastEthernet3/3
0.0.0.0/32      receive
10.7.0.0/16     172.20.52.1       FastEthernet3/3
10.16.18.0/23   172.20.52.1       FastEthernet3/3
Router>
```

This example shows how to display detailed IP Cisco Express Forwarding information for a specific VLAN. The fields shown in the display are self-explanatory.

```
Router> show ip cef vlan 1003 detail
IP Distributed CEF with switching (Table Version 2364), flags=0x0
 1383 routes, 0 reresolve, 0 unresolved (0 old, 0 new)
 1383 leaves, 201 nodes, 380532 bytes, 2372 inserts, 989 invalidations
 0 load sharing elements, 0 bytes, 0 references
universal per-destination load sharing algorithm, id 9B6C9823
```

```
3 CEF resets, 0 revisions of existing leaves
refcounts: 54276 leaf, 51712 node
Adjacency Table has 5 adjacencies
```

## show ip cef vrf

To display the Cisco Express Forwarding forwarding table associated with a Virtual Private Network (VPN) routing/forwarding instance (VRF), use the **show ip cef vrf** command in privileged EXEC mode.

**show ip cef vrf** *vrf-nam* *e* [*ip-prefix* [*mask* [**longer-prefixes**]] [**detail**] [*output-modifiers* ]] [*interface* *interface-number*] [**adjacency** [*interface* *interface-number*] [**detail**] [**discard**] [**drop**] [**glean**] [**null**] [**punt**] [*output-modifiers* ]] [**detail** [*output-modifiers*]] [**non-recursive** [**detail**] [*output-modifiers* ]] [**summary** [*output-modifiers* ]] [**traffic** [**prefix-length**] [*output-modifiers* ]] [**unresolved** [**detail**] [*output-modifiers* ]]

### Syntax Description

|                         |                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------|
| <i>vrf-name</i>         | Name assigned to the VRF.                                                                              |
| <i>ip-prefix</i>        | (Optional) IP prefix of entries to show, in dotted decimal format (A.B.C.D).                           |
| <i>mask</i>             | (Optional) Mask of the IP prefix, in dotted decimal format.                                            |
| <b>longer-prefixes</b>  | (Optional) Displays table entries for all of the more specific routes.                                 |
| <b>detail</b>           | (Optional) Displays detailed information for each Cisco Express Forwarding table entry.                |
| <i>output-modifiers</i> | (Optional) For a list of associated keywords and arguments, use context-sensitive help.                |
| <i>interface</i>        | (Optional) Type of network interface to use: ATM, Ethernet, Loopback, packet over SONET (POS) or Null. |
| <i>interface-number</i> | Number identifying the network interface to use.                                                       |
| <b>adjacency</b>        | (Optional) Displays all prefixes resolving through adjacency.                                          |
| <b>discard</b>          | (Optional) Discards adjacency.                                                                         |
| <b>drop</b>             | (Optional) Drops adjacency.                                                                            |
| <b>glean</b>            | (Optional) Gleans adjacency.                                                                           |
| <b>null</b>             | (Optional) Nulls adjacency.                                                                            |
| <b>punt</b>             | (Optional) Punts adjacency.                                                                            |
| <b>non-recursive</b>    | (Optional) Displays only nonrecursive routes.                                                          |



|                      |                                                               |
|----------------------|---------------------------------------------------------------|
| <b>summary</b>       | (Optional) Displays a Cisco Express Forwarding table summary. |
| <b>traffic</b>       | (Optional) Displays traffic statistics.                       |
| <b>prefix-length</b> | (Optional) Displays traffic statistics by prefix size.        |
| <b>unresolved</b>    | (Optional) Displays only unresolved routes.                   |

**Command Modes**

Privileged EXEC (#)

**Command History**

| <b>Release</b>           | <b>Modification</b>                                                                                                                                                               |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(5)T                 | This command was introduced.                                                                                                                                                      |
| 12.0(21)ST               | This command was integrated into Cisco IOS Release 12.0(21)ST.                                                                                                                    |
| 12.0(23)S                | This command was integrated into Cisco IOS Release 12.0(23)S.                                                                                                                     |
| 12.2(13)T                | This command was integrated into Cisco IOS Release 12.2(13)T.                                                                                                                     |
| 12.2(14)S                | This command was integrated into Cisco IOS Release 12.2(14)S.                                                                                                                     |
| 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX                   | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.2(33)SRE              | This command was modified. Support for the BGP best external and BGP additional path features was added.                                                                          |
| 12.2(33)XNE              | This command was integrated into Cisco IOS Release 12.2(33)XNE.                                                                                                                   |
| Cisco IOS XE Release 2.5 | This command was integrated into Cisco IOS XE Release 2.5.                                                                                                                        |

**Usage Guidelines**

Used with only the *vrf-name* argument, the **show ip cef vrf** command shows a shortened display of the Cisco Express Forwarding table.

Used with the **detail** keyword, the **show ip cef vrf** command shows detailed information for all Cisco Express Forwarding table entries.

**Examples**

This example shows the forwarding table associated with the VRF called vrf1:

```

Router#
show ip cef vrf vrf1
Prefix      Next Hop      Interface
0.0.0.0/32  receive
10.11.0.0/8  10.50.0.1      Ethernet1/3
10.12.0.0/8  10.52.0.2      POS6/0
10.50.0.0/8  attached       Ethernet1/3
10.50.0.0/32 receive
10.50.0.1/32 10.50.0.1      Ethernet1/3
10.50.0.2/32 receive
10.50.255.255/32 receive
10.51.0.0/8  10.52.0.2      POS6/0
10.224.0.0/24 receive
10.255.255.255/32 receive

```

The following sample output from the **show ip cef vrf vrf-name ip-prefix detail** command shows the **recursive-via-host** and **recursive-via-connected** flags:

```

Router# show ip cef vrf vpn1 10.51.10.1 detail
10.51.10.1/24, epoch 0, flags rib defined all labels
  local label info: other/24
  recursive via 10.6.16.6 label 23
    nexthop 10.2.3.3 Ethernet1/0 label 17
  recursive via 10.1.2.1, repair
  attached

```

The table below describes the fields shown in the example.

**Table 46: show ip cef vrf Field Descriptions**

| Field     | Description                                                   |
|-----------|---------------------------------------------------------------|
| Prefix    | Specifies the network prefix.                                 |
| Next Hop  | Specifies the Border Gateway Protocol (BGP) next hop address. |
| Interface | Specifies the VRF interface.                                  |

**Related Commands**

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

# show ip cef with epoch

To display Cisco Express Forwarding Forwarding Information Base (FIB) information filtered for a specific epoch, use the **show ip cef with epoch** command in privileged EXEC mode.

**show ip cef with epoch** *epoch-number* [**checksum**|**detail**|**internal** [**checksum**]|**platform** [**checksum**|**detail**|**internal** [**checksum**]]

## Syntax Description

|                     |                                                            |
|---------------------|------------------------------------------------------------|
| <i>epoch-number</i> | Number of the epoch, from 0 to 255.                        |
| <b>checksum</b>     | (Optional) Displays FIB entry checksums.                   |
| <b>detail</b>       | (Optional) Displays detailed information about FIB epochs. |
| <b>internal</b>     | (Optional) Displays internal data structure information.   |
| <b>platform</b>     | (Optional) Displays platform-specific data structures.     |

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

Use this command to display information about prefix properties for a specified epoch in the Cisco Express Forwarding FIB. This command is similar to the **show ipv6 cef with epoch** command, except that it is IPv4 specific. Use the **show ip cef epoch** command to display the epoch number.

## Examples

The following is sample output from the **show ip cef with epoch** command:

```
Router# show ip cef with epoch 0
Prefix                Next Hop                Interface
```

```

0.0.0.0/0      no route
0.0.0.0/8      drop
0.0.0.0/32     receive
10.1.1.1/32    receive          Loopback0
127.0.0.0/8    drop
224.0.0.0/4    drop
224.0.0.0/24   receive
240.0.0.0/4    drop
255.255.255.255/32 receive

```

The table below describes significant fields shown in the display.

**Table 47: show ip cef with epoch Field Descriptions**

| Field     | Description                                                                                            |
|-----------|--------------------------------------------------------------------------------------------------------|
| Prefix    | IP addresses in the FIB associated with the specified epoch.                                           |
| Next Hop  | What happens to the packet at the next hop.                                                            |
| Interface | Either the egress interface for the forwarded packet or the interface on which the packet is received. |

The following is sample output from the **show ip cef with epoch detail** command:

```

Router# show ip cef with epoch 15 detail

IPv4 CEF is enabled and running
VRF Default:
  9 prefixes (9/0 fwd/non-fwd)
  Table id 0
  Database epoch:          0 (9 entries at this epoch)
The table below describes significant fields shown in the display.

```

**Table 48: show ip cef with epoch detail Field Descriptions**

| Field                                       | Description                                                                                    |
|---------------------------------------------|------------------------------------------------------------------------------------------------|
| IPv4 CEF is enabled and running             | States whether Cisco Express Forwarding is enabled and running.                                |
| VRF Default                                 | VRF table, in this instance, the default VRF.                                                  |
| 9 prefixes ((9/0 fwd/non-fwd)               | Number of prefixes in the VRF, how many of them are forwarded, and how many are not forwarded. |
| Table id 0                                  | Table identification number.                                                                   |
| Database epoch: 0 (9 entries at this epoch) | Value of the database epoch and number of entries in the epoch.                                |

The following is sample output from the **show ip cef with epoch checksum** command:

```
Router# show ip cef with epoch 0 checksum
0.0.0.0/0
  FIB checksum: 0x353023B8
0.0.0.0/8
  FIB checksum: 0x6AAA2DEF
0.0.0.0/32
  FIB checksum: 0xC9136D79
10.1.1.1/32
  FIB checksum: 0x2DD79A12
127.0.0.0/8
  FIB checksum: 0x06E2709F
224.0.0.0/4
  FIB checksum: 0xC59D5F03
224.0.0.0/24
  FIB checksum: 0x9A64B149
240.0.0.0/4
  FIB checksum: 0x891B2D02
255.255.255.255/32
  FIB checksum: 0x72C832F4
```

The table below describes significant fields shown in the display.

**Table 49: show ip cef with epoch checksum Field Descriptions**

| Field                    | Description                                    |
|--------------------------|------------------------------------------------|
| 10.1.1.1/32              | Prefix in epoch 0.                             |
| FIB checksum: 0x2DD79A12 | FIB checksum associated with the named prefix. |

The following is sample output from the **show ip cef with epoch platform** command:

```
Router# show ip cef with epoch 0 platform
0.0.0.0/0
0.0.0.0/8
0.0.0.0/32 receive
10.1.1.1/32 receive
127.0.0.0/8
224.0.0.0/4 multicast
224.0.0.0/24 multicast
240.0.0.0/4
255.255.255.255/32 receive
```

The table below describes significant fields shown in the display.

**Table 50: show ip cef with epoch platform Field Descriptions**

| Field                 | Description                                        |
|-----------------------|----------------------------------------------------|
| 10.1.1.1/32 receive   | Receive prefix in the specified database epoch.    |
| 224.0.0.0/4 multicast | Multicast address in the specified database epoch. |

**Related Commands**

| Command                         | Description                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------|
| <b>show ip cef</b>              | Displays entries in the FIB or displays a summary of the FIB.                         |
| <b>show ip cef epoch</b>        | Displays epoch information for the adjacency table and all FIB tables.                |
| <b>show ipv6 cef with epoch</b> | Displays Cisco Express Forwarding IPv6 FIB information filtered for a specific epoch. |

## show ip cef with source

To display Cisco Express Forwarding Information Base (FIB) information filtered for a specific source, use the **show ip cef with source** command in privileged EXEC mode.

```
show ip cef with source source-type [checksum|detail|epoch|internal [checksum]|platform [checksum|detail|internal [checksum]]
```

Syntax Description

|                    |  |
|--------------------|--|
| <i>source-type</i> |  |
|--------------------|--|



The *source-type* argument must be replaced by one of the following keywords that are supported for your release.

Keywords for all supported Cisco IOS Releases:

- **alias** --Displays alias address prefix sources in the Cisco Express Forwarding FIB.
- **broadband** --Displays broadband receive prefix sources in the Cisco Express Forwarding FIB.
- **fallback** --Displays fallback lookup prefix sources in the Cisco Express Forwarding FIB.
- **interface** --Displays interface configuration prefix sources in the Cisco Express Forwarding FIB.
- **NAT** --Displays Network Address Translation (NAT) prefix sources in the Cisco Express Forwarding FIB.
- **rib** --Displays Routing Information Base (RIB) prefix sources in the Cisco Express Forwarding FIB.
- **special** --Displays special prefix sources in the Cisco Express Forwarding FIB.
- **test** --Displays test command prefix sources in the Cisco Express Forwarding FIB.
- **virtual** --Displays virtual address prefix sources in the Cisco Express Forwarding FIB, for example, Virtual Router Redundancy Protocol (VRRP) and Hot Standby Router Protocol (HSRP) addresses.

Additional keywords for Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, and later releases:

- **adjacency** --Displays adjacency prefix sources in the Cisco Express Forwarding FIB.
- **default-route** --Displays default route handler prefix sources in the Cisco Express Forwarding FIB.
- **inherited-path-list** --Displays inherited path list prefix source in the Cisco Express Forwarding FIB.

Additional keywords for Cisco IOS Releases 12.2(33)SXH, 12.4(20)T, and later SX and T releases:

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <ul style="list-style-type: none"> <li>• <b>adj</b> --Displays adjacency prefix sources in the Cisco Express forwarding FIB.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                 | <ul style="list-style-type: none"> <li>• <b>defnet</b> -- Displays default network prefix sources in the Cisco Express Forwarding FIB.</li> <li>• <b>defroutehandler</b> --Displays default route handler prefix sources in the Cisco Express Forwarding FIB.</li> <li>• <b>ipl</b> --Displays inherited path list prefix source in the Cisco Express Forwarding FIB.</li> <li>• <b>lte</b> --Displays Multiprotocol Label Switching (MPLS) label table entries.</li> <li>• <b>recursive-resolution</b> --Displays recursive resolution prefix sources in the Cisco Express Forwarding FIB.</li> </ul> |
| <b>checksum</b> | (Optional) Displays FIB entry checksums.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>detail</b>   | (Optional) Displays detailed information about FIB epochs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>epoch</b>    | (Optional) Displays information about epochs associated with the source prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>internal</b> | (Optional) Displays internal data structure information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>platform</b> | (Optional) Displays platform-specific data structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

## Usage Guidelines

Use this command to filter on a specified type of source prefix in the Cisco Express Forwarding FIB.

## Examples

The following is sample output from the **show ip cef with source rib** command:

```
Router# show ip cef with source rib
Prefix          Next Hop          Interface
10.1.1.1/32     receive           Loopback0
```

The table below describes the significant fields shown in the display.

**Table 51: show ip cef with source rib Field Descriptions**

| Field     | Description                                                                                              |
|-----------|----------------------------------------------------------------------------------------------------------|
| Prefix    | List of prefixes in the Cisco Express Forwarding FIB whose source is the Routing Information Base (RIB). |
| Next Hop  | Next-hop address, in general.                                                                            |
| Interface | Either an egress interface or receive interface.                                                         |

The following is sample output from the **show ip cef with source fib detail** command:

```
Router# show ip cef with source rib detail
IPv4 CEF is enabled and running
VRF Default:
  9 prefixes (9/0 fwd/non-fwd)
  Table id 0
  Database epoch: 0 (9 entries at this epoch)
10.1.1.1/32, epoch 0, flags attached, connected, receive
  Interface source: Loopback0
  receive for Loopback0
```

The table below describes the significant fields shown in the display.

**Table 52: show ip cef with source rib detail Field Descriptions**

| Field                                       | Description                                                                                   |
|---------------------------------------------|-----------------------------------------------------------------------------------------------|
| VRF Default                                 | Default VRF table.                                                                            |
| 9 prefixes (9/0 Fwd/non-fwd)                | Number of prefixes in the VRF, how many of them are forwarded, and how many or not forwarded. |
| Table id 0                                  | Table identification number.                                                                  |
| Database epoch: 0 (9 entries at this epoch) | Number of the epoch (0) and number of entries in the epoch.                                   |

| Field                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.1.1.1/32, epoch 0, flags attached, connected, receive | <p>Details about the prefix: the epoch in which it is found, and the flags that are set for the prefix:</p> <ul style="list-style-type: none"> <li>• attached--Prefix is connected to a network</li> <li>• connected--Prefix includes an address that is bound to an interface on the device</li> <li>• receive--Prefix is punted to and handled by the Process code rather than Cisco Express Forwarding</li> </ul> |
| Interface source: Loopback0                              | Indicates that the source interface for the prefix was an interface, specifically Interface Loopback0.                                                                                                                                                                                                                                                                                                               |
| receive for Loopback0                                    | Indicates that the prefix is a receive type for the Loopback interface. Traffic matching this prefix will be punted to the process level and handled by the process code.                                                                                                                                                                                                                                            |

**Related Commands**

| Command                          | Description                                                                            |
|----------------------------------|----------------------------------------------------------------------------------------|
| <b>show ip cef</b>               | Displays entries in the FIB or displays a summary of the FIB.                          |
| <b>show ip cef with epoch</b>    | Displays Cisco Express Forwarding FIB information filtered for a specific epoch.       |
| <b>show ipv6 cef with epoch</b>  | Displays Cisco Express Forwarding IPv6 FIB information filtered for a specific epoch.  |
| <b>show ipv6 cef with source</b> | Displays Cisco Express Forwarding IPv6 FIB information filtered for a specific source. |



## show ip mds forwarding through show monitor event-trace merged-list

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# show ip mds forwarding

To display the Multicast Forwarding Information Base (MFIB) table and forwarding information for multicast distributed switching (MDS) on a line card, use the **show ip mds forwarding** command in user EXEC or privileged EXEC mode.

**show ip mds forwarding** [ *group-address* ] [ *source-address* ]

## Syntax Description

|                       |                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------|
| <i>group-address</i>  | (Optional) Address of the IP multicast group for which to display the MFIB table.             |
| <i>source-address</i> | (Optional) Address of the source of IP multicast packets for which to display the MFIB table. |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2(11)GS  | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

Use this command on the line card. This command displays the MFIB table, forwarding information, and related flags and counts.



### Note

To reach the console for a line card, enter **attach slot#**(slot number where the line card resides).

On a Gigabit Switched Router (GSR) only, line card commands can be executed from the Route Processor (RP) using the following syntax: **execute [slot slot-number | all] command**.

The *command* argument is any of the line card **show** commands, such as **show ip mds summary** and **show ip mds forward**.

## Examples

The following is sample output from the **show ip mds forwarding** command:

```
Router# show ip mds forwarding
IP multicast MDFS forwarding information and statistics:
```

Flags: N - Not MDFS switchable, F - Not all MDFS switchable, O - OIF Null  
 R - In-ratelimit, A - In-access, M - MTU mismatch, P - Register set  
 Interface state: Interface, Next-Hop, Mac header  
 (\*, 224.2.170.73),  
 Incoming interface: Null  
 Pkts: 0, last used: never, Kbps: 0, fast-flags: N  
 Outgoing interface list: Null  
 (172.17.62.86, 224.2.170.73) [31]  
 Incoming interface: Fddi3/0/0  
 Pkts: 3034, last used: 00:00:00, Kbps: 0, fast-flags: M  
 Outgoing interface list:

The table below describes the significant fields shown in the display.

**Table 53: show ip mds forwarding Field Descriptions**

| Field                              | Description                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| (172.17.62.86, 224.2.170.73) [31]) | Source and group addresses. The number in brackets is the hash bucket for the route.                                         |
| Incoming interface                 | Expected interface for a multicast packet from the source. If the packet is not received on this interface, it is discarded. |
| Pkts                               | Total number of packets switched by the entry in the table.                                                                  |
| last used:                         | Time when this MFIB entry was used to switch a packet.                                                                       |
| Kbps:                              | Kilobits per second of the switched traffic.                                                                                 |
| Outgoing interface list            | Interfaces through which packets will be forwarded.                                                                          |



## show ip mds interface

To display Multicast Distributed Switching (MDS) information for all the interfaces on the line card, use the **show ip mds interface** command in user EXEC or privileged EXEC mode.

**show ip mds interface** [*vrf vrf-name*]

### Syntax Description

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| <b>vrf</b>      | (Optional) Supports the Multicast Virtual Private Network (VPN) routing and forwarding instance (VRF). |
| <i>vrf-name</i> | (Optional) Name assigned to the VRF.                                                                   |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                               |
|-------------|----------------------------------------------------------------------------|
| 11.0        | This command was introduced.                                               |
| 11.2(11)GS  | This command was integrated into Cisco IOS Release 11.2(11)GS.             |
| 12.0(23)S   | The <b>vrf</b> keyword and <i>vrf-name</i> argument were added.            |
| 12.2(13)T   | This command was integrated into Cisco IOS Release 12.2(13)T.              |
| 12.2(14)S   | This command was integrated into Cisco IOS Release 12.2(14)S.              |
| 12.2(18)SXE | Support for this command was introduced on the Supervisor Engine 720 only. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.            |

### Examples

The following is sample output from the **show ip mds interface** command:

```
Router# show ip mds interface
Interface          SW-Index  HW-Index  HW IDB      FS Vector  VRF
Ethernet1/0/0      2          1         0x60C2DB40  0x602FB7A4 default
Ethernet1/0/1      3          2         0x60C32280  0x603D52B8 default
Ethernet1/0/2      4          3         0x60C35E40  0x602FB7A4 default
Ethernet1/0/3      5          4         0x60C39E60  0x603D52B8 default
Ethernet1/0/4      6          5         0x60C3D780  0x602FB7A4 default
Ethernet1/0/5      7          6         0x60C41140  0x602FB7A4 default
Ethernet1/0/6      8          7         0x60C453A0  0x602FB7A4 default
Ethernet1/0/7      9          8         0x60C48DC0  0x602FB7A4 default
POS2/0/0           10         9          0x0         default
POS3/0/0           11        10          0x0         default
```

```

Virtual-Access1      13      11      0x0      default
Loopback0            14      12      0x0      default
Tunnel0              15      23      0x61C2E480 0x603D52B8 vrf1
Tunnel1              16      24      0x61C267E0 0x603D52B8 vrf2
Ethernet1/0/3.1      17      4       0x60C39E60 0x603D52B8 vrf1
Ethernet1/0/3.2      18      4       0x60C39E60 0x603D52B8 vrf2

```

The table below describes the significant fields shown in the display.

**Table 54: show ip mds interface Field Descriptions**

| Field     | Description                           |
|-----------|---------------------------------------|
| Interface | The specified interface.              |
| SW-Index  | Software index.                       |
| HW-Index  | Hardware index.                       |
| HW IDB    | Hardware interface description block. |
| FS Vector | Fast Switching Vector.                |
| VRF       | VPN routing/forwarding instance.      |

## show ip mds stats

To display multicast distributed switching (MDS) statistics, use the **show ip mds stats** command in user EXEC or privileged EXEC mode.

**show ip mds stats** {switching| linecard| ipc-msg}

### Syntax Description

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| <b>switching</b> | Displays switching statistics.                                |
| <b>linecard</b>  | Displays line card statistics.                                |
| <b>ipc-msg</b>   | Displays Interprocess Communication (IPC) message statistics. |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2(11)GS  | This command was introduced.                                                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.0(33)S   | This command was modified. The <b>ipc-msg</b> keyword was added.                                                                                                                  |

### Usage Guidelines

The **switching** and **linecard** keywords are available only on the Route Processor (RP). The **ipc-msg** keyword is available on both the RP and line card (LC).

### Examples

The following is sample output from the **show ip mds stats** command with the **switching** keyword:

```
Router# show ip mds stats switching
Slot Total      Switched      Drops      RPF      Punts      Failures
              (switch/clone)
  1      0          0          0          0          4          0/0
  3  20260925  18014717    253        93      2247454    1/0
```

The table below describes the fields in the display.

**Table 55: show ip mds stats switching Field Descriptions**

| Field                   | Description                                                                                                                        |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Slot                    | Slot number for the line card.                                                                                                     |
| Total                   | Total number of packets received.                                                                                                  |
| Switched                | Total number of packets switched.                                                                                                  |
| Drops                   | Total number of packets dropped.                                                                                                   |
| RPF                     | Total number of packets that failed reverse path forwarding (RPF) lookup.                                                          |
| Punts                   | Total number of packets sent to the RP because the line card could not switch them.                                                |
| Failures (switch/clone) | Times that the RP tried to switch but failed because of lack of resources or clone for the RSP only; failed to get a packet clone. |

The following is sample output from the **show ip mds stats** command with the **linecard** keyword:

```
Router# show ip mds stats linecard
Slot      Status      IPC(seq/max)  Q(high/route)  Reloads
1         active      10560/10596   0/0            9
3         active      11055/11091   0/0            9
```

The table below describes the fields in the display.

**Table 56: show ip mds stats linecard Field Descriptions**

| Field         | Description                                                                   |
|---------------|-------------------------------------------------------------------------------|
| Slot          | Slot number for the line card.                                                |
| Status        | MDS line card status.                                                         |
| IPC(seq/max)  | MDS IPC message sequence number and maximum sequence number for the linecard. |
| Q(high/route) | Length of the high and normal priority MDS IPC queue.                         |
| Reloads       | The number of MDS downloads that happened in the line card.                   |

The following is sample output from a line card using the **show ip mds stats** command with the **ipc-msg** keyword:

```
Router# show ip mds stats ipc-msg
MDFS IPC stats information
=====
MDFS Reload stats
-----
Full reload request: 1          Partial reload request: 0
LC disable request : 0
MDFS ipc messages sent
-----
line card stats      : 494394      mdb stats           : 38421
hwidb stats         : 4775        swidb stats         : 4805
flow control msg    : 6981        clear mroute msg    : 0
MDFS alert messages received
-----
mdfs enable alert   : 306          table2 size alert   : 0
clear all alert     : 206          clear stats alert   : 0
spd alert           : 714          svd alert           : 303
route limit alert   : 4            source limit alert   : 5
punt limit alert    : 707
MDFS ipc messages received
-----
gdb msg : 431          mdb msg      : 11866        midb msg      : 749592
hwidb msg: 4915        oir hwidb msg: 51        hwidb erase msg : 51
swidb msg: 5456        oir swidb msg: 51        swidb erase msg : 51
mdt msg : 263          rpdf msg     : 0          fwd table erase msg: 0
mdt mgid ext slotmask msg: 6      mvrf ext slotmask msg: 719
```

The table below describes the fields in the display.

**Table 57: show ip mds stats ipc-msg switching Field Descriptions**

| Field                         | Description                                                                     |
|-------------------------------|---------------------------------------------------------------------------------|
| <b>MDFS Reload stats</b>      |                                                                                 |
| Full reload request           | Number of full multicast distributed switching (MDS) download requests sent.    |
| Partial reload request        | Number of partial MDS download requests sent.                                   |
| LC disable request            | Number of requests sent to disable MDS on the line card.                        |
| <b>MDFS ipc messages sent</b> |                                                                                 |
| line card stats               | Number of line card statistic messages sent.                                    |
| mdb stats                     | Number of Multicast Descriptor Block (MDB) statistics messages sent.            |
| hwidb stats                   | Number of hardware Interface Descriptor Block (HWIDB) statistics messages sent. |
| swidb stats                   | Number of software Interface Descriptor Block (SWIDB) statistics messages sent. |
| flow control msg              | Number of flow control messages sent.                                           |

| Field                               | Description                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------|
| clear mroute msg                    | Number of clear multicast route (mroute) messages sent.                               |
| <b>MDFS alert messages received</b> |                                                                                       |
| mdfs enable alert                   | Number of multicast distributed fast switching (MDFS) enable alert messages received. |
| table2 size alert                   | Number of table2 size alert messages received.                                        |
| clear all alert                     | Number of clear all alert messages received.                                          |
| clear stats alert                   | Number of clear statistics alert messages received                                    |
| spd alert                           | Number of selective packet discard (SPD) alert messages received.                     |
| svd alert                           | Number of singular value decomposition (SVD) alert messages received.                 |
| route limit alert                   | Number of mroute limit alert messages received.                                       |
| source limit alert                  | Number of sources per group limit alert messages received.                            |
| punt limit alert                    | Number of MDFS punt limit alert messages received.                                    |
| <b>MDFS ipc messages received</b>   |                                                                                       |
| gdb msg                             | Number of GDB messages received.                                                      |
| mdb msg                             | Number of MDB messages received.                                                      |
| midb msg                            | Number of multicast interface data block (MIDB) messages received.                    |
| hwidb msg                           | Number of HWIDB messages received.                                                    |
| oir hwidb msg                       | Number of HWIDB online insertion and removal (OIR) messages received.                 |
| hwidb erase msg                     | Number of HWIDB erase messages received.                                              |
| swidb msg                           | Number of SWIDB messages received.                                                    |
| oir swidb msg                       | Number of SWIDB OIR messages received.                                                |
| swidb erase msg                     | Number of SWIDB erase messages received.                                              |

| Field                     | Description                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------|
| mdt msg                   | Number of Multicast Distribution Tree (MDT) messages received.                                      |
| rpdf msg                  | Number of rendezvous point designated forwarder (RPDF) messages received.                           |
| fwd table erase msg       | Number of MDFS forwarding table erase messages received.                                            |
| mdt mgid ext slotmask msg | Number of MDFS MDT multicast global identifier (MGID) extended slotmask messages received.          |
| mvrf ext slotmask msg     | Number of MDFS Multicast Virtual Routing and Forwarding (MVRF) extended slotmask messages received. |

# show ip mds summary

To display a summary of the Multicast Forwarding Information Base (MFIB) table for multicast distributed switching (MDS), use the **show ip mds summary** command in user EXEC or privileged EXEC mode.

**show ip mds summary**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** User EXEC (>) Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                      |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 11.2(11)GS  | This command was introduced.                                                                                                                                                      |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
|                 | 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

**Usage Guidelines** Use this command on a line card. On a Gigabit Switched Router (GSR) only, line card commands can be executed from the Route Processor (RP) using the following syntax:

**execute** [*slot slot-number* | **all**] *command*

The *command* argument is any of the line card **show** commands, such as **show ip mds summary** or **show ip mds forward**.

**Examples** The following is sample output from the **show ip mds summary** command:

```
Router# show ip mds summary
IP multicast MDFS forwarding information and statistics:
Flags: N - Not MDFS switchable, F - Not all MDFS switchable, O - OIF Null
      R - In-ratelimit, A - In-access, M - MTU mismatch, P - Register set
Interface state: Interface, Next-Hop, Mac header
(*, 224.2.170.73),
  Incoming interface: Null
  Pkts: 0, last used: never, Kbps: 0, fast-flags: N
(172.17.62.86, 224.2.170.73) [31]
  Incoming interface: Fddi3/0/0
  Pkts: 3045, last used: 00:00:03, Kbps: 0, fast-flags: M
(172.22.3.7, 224.2.170.73) [334]
  Incoming interface: Fddi3/0/0
  Pkts: 0, last used: never, Kbps: 0, fast-flags: M
The table below describes the significant fields in the display.
```



**Table 58: show ip mds summary Field Descriptions**

| Field                             | Description                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| (172.17.62.86, 224.2.170.73) [31] | Source and group addresses. The number in brackets is the hash bucket for the route.                                         |
| Incoming interface                | Expected interface for a multicast packet from the source. If the packet is not received on this interface, it is discarded. |
| Pkts                              | Total number of packets switched by that entry.                                                                              |
| last used                         | Time when this MFIB entry was used to switch a packet.                                                                       |
| Kbps                              | Kilobits per second of the switched traffic.                                                                                 |

# show ip traffic

To display the global or system-wide IP traffic statistics for one or more interfaces, use the **show ip traffic** command in user EXEC or privileged EXEC mode.

**show ip traffic** [*interface type number*]

## Syntax Description

|                                     |                                                                                                                                                                                                  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>interface</b> <i>type number</i> | (Optional) Displays the global or system-wide IP traffic statistics for a specific interface. If the <b>interface</b> keyword is used, the <i>type</i> and <i>number</i> arguments are required. |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Command Default

Using the **show ip traffic** command with no keywords or arguments displays the global or system-wide IP traffic statistics for all interfaces.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release                   | Modification                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.0                      | This command was introduced.                                                                                                                                                                                                                                                                                                                                    |
| 12.2                      | The output was enhanced to display the number of keepalive, open, update, route-refresh request, and notification messages received and sent by a Border Gateway Protocol (BGP) routing process.                                                                                                                                                                |
| 12.2(25)S                 | The command output was modified.                                                                                                                                                                                                                                                                                                                                |
| 12.2(28)SB                | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                                                                                                                                                                                                                                                |
| 12.2(33)SRA               | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                                                                                                 |
| 12.2(33)SXH               | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                                                                                                                                                                                                 |
| 12.4(20)T                 | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                                                                                                                                                                                                   |
| 12.2(33)SXH5              | This command was modified. The output was changed to display the ARP (proxy) reply counter as the number of ARP replies for real proxies only.                                                                                                                                                                                                                  |
| Cisco IOS XE Release 3.1S | This command was integrated into Cisco IOS XE Release 3.1S. This command was modified to include the optional <b>interface</b> keyword and associated <i>type</i> and <i>number</i> arguments. These modifications were made to provide support for the IPv4 MIBs as described in RFC 4293: <i>Management Information Base for the Internet Protocol (IP)</i> . |

| Release  | Modification                                                                                                                                                                                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15.1(4)M | This command was modified. The optional <b>interface</b> keyword and associated <i>type</i> and <i>number</i> arguments were added. These modifications were made to provide support for the IPv4 MIBs as described in RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i> . |

## Usage Guidelines

Using the **show ip traffic** command with the optional **interface** keyword displays the ipIfStatsTable counters for the specified interface if IPv4 addressing is enabled.

## Examples

The following is sample output from the **show ip traffic** command:

```
Router# show ip traffic
IP statistics:
  Rcvd: 27 total, 27 local destination
        0 format errors, 0 checksum errors, 0 bad hop count
        0 unknown protocol, 0 not a gateway
        0 security failures, 0 bad options, 0 with options
  Opts: 0 end, 0 nop, 0 basic security, 0 loose source route
        0 timestamp, 0 extended security, 0 record route
        0 stream ID, 0 strict source route, 0 alert, 0 cipso, 0 ump
        0 other
  Frags: 0 reassembled, 0 timeouts, 0 couldn't reassemble
        0 fragmented, 0 couldn't fragment
  Bcast: 27 received, 0 sent
  Mcast: 0 received, 0 sent
  Sent: 0 generated, 0 forwarded
  Drop: 0 encapsulation failed, 0 unresolved, 0 no adjacency
        0 no route, 0 unicast RPF, 0 forced drop
  Drop: 0 packets with source IP address zero
ICMP statistics:
  Rcvd: 0 format errors, 0 checksum errors, 0 redirects, 0 unreachable
        0 echo, 0 echo reply, 0 mask requests, 0 mask replies, 0 quench
        0 parameter, 0 timestamp, 0 info request, 0 other
        0 irdp solicitations, 0 irdp advertisements
        0 time exceeded, 0 timestamp replies, 0 info replies
  Sent: 0 redirects, 0 unreachable, 0 echo, 0 echo reply
        0 mask requests, 0 mask replies, 0 quench, 0 timestamp
        0 info reply, 0 time exceeded, 0 parameter problem
        0 irdp solicitations, 0 irdp advertisements
BGP statistics:
  Rcvd: 0 total, 0 opens, 0 notifications, 0 updates
        0 keepalives, 0 route-refresh, 0 unrecognized
  Sent: 0 total, 0 opens, 0 notifications, 0 updates
        0 keepalives, 0 route-refresh
EIGRP-IPv4 statistics:
  Rcvd: 0 total
  Sent: 0 total
TCP statistics:
  Rcvd: 0 total, 0 checksum errors, 0 no port
  Sent: 0 total
PIMv2 statistics: Sent/Received
  Total: 0/0, 0 checksum errors, 0 format errors
  Registers: 0/0 (0 non-rp, 0 non-sm-group), Register Stops: 0/0, Hellos: 0/0
  Join/Prunes: 0/0, Asserts: 0/0, grafts: 0/0
  Bootstraps: 0/0, Candidate_RP_Advertisements: 0/0
  State-Refresh: 0/0
IGMP statistics: Sent/Received
  Total: 0/0, Format errors: 0/0, Checksum errors: 0/0
  Host Queries: 0/0, Host Reports: 0/0, Host Leaves: 0/0
  DVMRP: 0/0, PIM: 0/0
UDP statistics:
  Rcvd: 185515 total, 0 checksum errors, 185515 no port
```

```

    Sent: 0 total, 0 forwarded broadcasts
OSPF statistics:
  Rcvd: 0 total, 0 checksum errors
        0 hello, 0 database desc, 0 link state req
        0 link state updates, 0 link state acks
  Sent: 0 total
        0 hello, 0 database desc, 0 link state req
        0 link state updates, 0 link state acks
Probe statistics:
  Rcvd: 0 address requests, 0 address replies
        0 proxy name requests, 0 where-is requests, 0 other
  Sent: 0 address requests, 0 address replies (0 proxy)
        0 proxy name replies, 0 where-is replies
ARP statistics:
  Rcvd: 1477 requests, 8841 replies, 396 reverse, 0 other
  Sent: 1 requests, 20 replies (0 proxy), 0 reverse
  Drop due to input queue full: 0

```

The following is sample output from the **show ip traffic** command for Ethernet interface 0/0:

```

Router# show ip traffic interface ethernet 0/0
Ethernet0/0 IP-IF statistics :
  Rcvd: 99 total, 9900 total_bytes
        0 format errors, 0 hop count exceeded
        0 bad header, 0 no route
        0 bad destination, 0 not a router
        0 no protocol, 0 truncated
        0 forwarded
        0 fragments, 0 total reassembled
        0 reassembly timeouts, 0 reassembly failures
        0 discards, 99 delivers
  Sent: 99 total, 9900 total_bytes 0 discards
        99 generated, 0 forwarded
        0 fragmented into, 0 fragments, 0 failed
  Mcast: 0 received, 0 received bytes
        0 sent, 0 sent bytes
  Bcast: 0 received, 0 sent

```

## Examples

The following is sample output from the **show ip traffic** command when used on a Cisco 10000 series router:

```

Router# show ip traffic
IP statistics:
  Rcvd: 27 total, 27 local destination
        0 format errors, 0 checksum errors, 0 bad hop count
        0 unknown protocol, 0 not a gateway
        0 security failures, 0 bad options, 0 with options
  Opts: 0 end, 0 nop, 0 basic security, 0 loose source route
        0 timestamp, 0 extended security, 0 record route
        0 stream ID, 0 strict source route, 0 alert, 0 cipso, 0 ump
        0 other
  Frags: 0 reassembled, 0 timeouts, 0 couldn't reassemble
        0 fragmented, 0 couldn't fragment
  Bcast: 27 received, 0 sent
  Mcast: 0 received, 0 sent
  Sent: 0 generated, 0 forwarded
  Drop: 0 encapsulation failed, 0 unresolved, 0 no adjacency
        0 no route, 0 unicast RPF, 0 forced drop
        0 options denied, 0 source IP address zero

```

The table below describes the significant fields shown in the display.

**Table 59: show ip traffic Field Descriptions**

| Field         | Description                                                                                 |
|---------------|---------------------------------------------------------------------------------------------|
| format errors | Indicates a gross error in the packet format, such as an impossible Internet header length. |

| Field                | Description                                                                                       |
|----------------------|---------------------------------------------------------------------------------------------------|
| bad hop count        | Occurs when a packet is discarded because its time-to-live (TTL) field was decremented to zero.   |
| encapsulation failed | Usually indicates that the router had no ARP request entry and therefore did not send a datagram. |
| no route             | Counted when the Cisco IOS software discards a datagram that it did not know how to route.        |

**Related Commands**

| Command                 | Description                                                                        |
|-------------------------|------------------------------------------------------------------------------------|
| <b>clear ip traffic</b> | Clears the global or system-wide IP traffic statistics for one or more interfaces. |

## show ipv6 cef with epoch

To display Cisco Express Forwarding IPv6 Forwarding Information Base (FIB) information filtered for a specific epoch, use the **show ipv6 cef with epoch** command in privileged EXEC mode.

**show ipv6 cef with epoch** *epoch-number* [**checksum**| **detail**| **internal** [**checksum**]| **platform** [**checksum**| **detail**| **internal** [**checksum**]]]

### Syntax Description

|                     |                                                            |
|---------------------|------------------------------------------------------------|
| <i>epoch-number</i> | Number of the epoch, from 0 to 255.                        |
| <b>checksum</b>     | (Optional) Displays FIB entry checksums.                   |
| <b>detail</b>       | (Optional) Displays detailed information about FIB epochs. |
| <b>internal</b>     | (Optional) Displays internal data structure information.   |
| <b>platform</b>     | (Optional) Displays platform-specific data structures.     |

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

### Usage Guidelines

Use this command to display information about prefix properties for a specified epoch in the Cisco Express Forwarding IPv6 FIB. This command is similar to the **show ip cef with epoch** command, except that it is IPv6 specific. Use the **show ipv6 cef epoch** command to display entries filtered by epoch number.

### Examples

The following is sample output from the **show ipv6 cef with epoch** command:

```
Router# show ipv6 cef with epoch 0
::/0
```

```

no route
::/127
discard
2000::1/128
  receive for Loopback0
2000::2/128
  nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0
2000::3/128
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2000::4/128
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2001::/64
  attached to Ethernet2/0
2001::1/128
  receive for Ethernet2/0
2001::3/128
  attached to Ethernet2/0
2001:1::/64
  attached to Ethernet0/0
2001:1::1/128
  receive for Ethernet0/0
2001:2::/64
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2002::/64
  attached to Tunnel0
2002::1/128
  receive for Tunnel0
FE80::/10
  receive for Null0
FF00::/8
  receive for Null0

```

The table below describes significant fields shown in the display.

**Table 60: show ipv6 cef with epoch Field Descriptions**

| Field                                                     | Description                                                                                                        |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| no route                                                  | No route is associated with the IPv6 prefix.                                                                       |
| discard                                                   | Traffic for this prefix is discarded.                                                                              |
| 2000::1/128 receive for Loopback0                         | A receive prefix for interface Loopback0.                                                                          |
| 2000::2/128 nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0 | An IPv6 prefix that is forwarded to a next-hop address (FE80::A8BB:CCFF:FE00:2500) through interface Ethernet 0/0. |
| 2001::/64 attached for Ethernet2/0                        | This prefix is a connected network on interface Ethernet 0/0.                                                      |
| 2001::1/128 receive for Ethernet2/0                       | A receive prefix for interface Ethernet 0/0.                                                                       |

The following is sample output from the **show ipv6 cef with epoch detail** command:

```

Router# show ipv6 cef with epoch 0 detail

IPv6 CEF is enabled and running centrally.
VRF base:
  16 prefixes (16/0 fwd/non-fwd)
  Table id 0
  Database epoch:          0 (16 entries at this epoch)

```

```

::/0, epoch 0, flags default route handler
  no route
::/127, epoch 0, flags attached, discard
  discard
2000::1/128, epoch 0, flags attached, connected, receive, local
  receive for Loopback0
2000::2/128, epoch 0
  nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0
2000::3/128, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2000::4/128, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2001::/64, epoch 0, flags attached, connected, cover dependents
  Covered dependent prefixes: 1
    notify cover updated: 1
  attached to Ethernet2/0
2001::1/128, epoch 0, flags attached, receive, local
  receive for Ethernet2/0
2001::3/128, epoch 0, flags attached
  Adj source: IPV6 adj out of Ethernet2/0, addr 2001::3 02513FD8
  Dependent covered prefix type adjfib cover 2001::/64
  attached to Ethernet2/0
2001:1::/64, epoch 0, flags attached, connected
  attached to Ethernet0/0
2001:1::1/128, epoch 0, flags attached, receive, local
  receive for Ethernet0/0
2001:2::/64, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2002::/64, epoch 0, flags attached, connected
  attached to Tunnel0
2002::1/128, epoch 0, flags attached, receive, local
  receive for Tunnel0
FE80::/10, epoch 0, flags attached, receive, local
  receive for Null0
FF00::/8, epoch 0, flags attached, receive, local
  receive for Null0

```

The table below describes significant fields shown in the display.

**Table 61: show ipv6 cef with epoch detail Field Descriptions**

| Field                                       | Description                                                                                    |
|---------------------------------------------|------------------------------------------------------------------------------------------------|
| IPv6 CEF is enabled and running centrally   | Indicates that IPv6 CEF is enabled and running on the RP.                                      |
| VRF base 16 prefixes (16/0 fwd/non-fwd)     | Number of prefixes in the VRF, how many of them are forwarded, and how many are not forwarded. |
| Table id 0                                  | Table identification number.                                                                   |
| Database epoch 0 (16 entries at this epoch) | Value of the database epoch and number of entries in the epoch.                                |



| Field                                                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2000::1/128, epoch 0, flags attached, connected, receive, local receive for Loopback0 | <p>Provides detail for the table entries. In this example, 2000:1/128 is an IPv6 prefix at epoch 0. The flags set for this prefix are:</p> <ul style="list-style-type: none"> <li>• attached--Prefix is a connected network</li> <li>• connected--Prefix includes an address that is bound to an interface on the device</li> <li>• receive--Prefix is punt to and handled by the process level</li> <li>• local--Prefix is a subset of receive and marks prefixes that are received by on interface on the device</li> </ul> |

The following is sample output from the **show ipv6 cef with epoch checksum** command:

```
Router# show ipv6 cef with epoch 0 checksum
::/0
  FIB checksum: 0x64E25610
::/127
  FIB checksum: 0xE0B3DE11
2000::1/128
  FIB checksum: 0xD04E36EC
2000::2/128
  FIB checksum: 0x84892BA5
2000::3/128
  FIB checksum: 0x912BA720
2000::4/128
  FIB checksum: 0xC6D89ADA
.
.
.
```

The table below describes significant fields shown in the display.

**Table 62: show ipv6 cef with epoch checksum Field Descriptions**

| Field                    | Description                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------|
| ::/0                     | Default route handler. ::/0 prefix matches all addresses. ( ::/128 prefix is an exact match for all zero addresses only.) |
| FIB checksum: 0x64E25610 | FIB checksum associated with the named prefix.                                                                            |

#### Related Commands

| Command                       | Description                                                                      |
|-------------------------------|----------------------------------------------------------------------------------|
| <b>show ip cef with epoch</b> | Displays Cisco Express Forwarding FIB information filtered for a specific epoch. |

| Command             | Description                                       |
|---------------------|---------------------------------------------------|
| show ipv6 cef       | Displays entries in the IPv6 FIB.                 |
| show ipv6 cef epoch | Displays a summary of IPv6 FIB epoch information. |

## show ipv6 cef with source

To display Cisco Express Forwarding IPv6 Forwarding Information Base (FIB) filtered for a specific source, use the **show ipv6 cef with source** command in privileged EXEC mode.

```
show ipv6 cef with source source-type [checksum|detail|epoch|internal [checksum]]|platform [checksum|detail|internal [checksum]]
```

**Syntax Description**

|                    |  |
|--------------------|--|
| <i>source-type</i> |  |
|--------------------|--|

The *source-type* argument must be replaced by one of the following keywords that are supported for your release.

Keywords for all supported Cisco IOS releases:

- **alias** --Displays alias address prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **broadband** --Displays broadband receive prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **fallback** --Displays fallback lookup prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **interface** --Displays interface configuration prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **nat** --Displays Network Address Translation (NAT) prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **rib** --Displays Routing Information Base (RIB) prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **special** --Displays special prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **test** --Displays test command prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **virtual** --Displays virtual address prefix sources in the Cisco Express Forwarding IPv6 FIB, for example, Virtual Router Redundancy Protocol (VRRP) and Hot Standby Router Protocol (HSRP) addresses.

Additional keywords for Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA, and later SB and SR releases:

- **adjacency** --Displays adjacency prefix sources in the Cisco Express Forwarding IPv6 FIB.
- **default-route** --Displays default route handler prefix sources in the Cisco Express Forwarding FIB.
- **inherited-path-list** --Displays inherited path list prefix source in the Cisco Express Forwarding FIB.

Additional keywords for Cisco IOS Releases

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.2(33)SXH, 12.4(20)T, and later SX and T releases: <ul style="list-style-type: none"> <li>• <b>adj</b> --Displays adjacency prefix sources in the Cisco Express Forwarding FIB.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| -               | <ul style="list-style-type: none"> <li>• <b>defnet</b>-- Displays default network prefix sources in the Cisco Express Forwarding IPv6 FIB.</li> <li>• <b>defroutehandler</b> --Displays default route handler prefix sources in the Cisco Express Forwarding IPv6 FIB.</li> <li>• <b>ipl</b> --Displays inherited path list prefix source in the Cisco Express ForwardingIPv6 FIB.</li> <li>• <b>recursive-resolution</b> --Displays recursive resolution prefix sources in the Cisco Express Forwarding IPv6 FIB.</li> </ul> <p>Additional keyword for Cisco IOS Release 12.2(33)SXH and later SX releases:</p> <ul style="list-style-type: none"> <li>• <b>lte</b> --Displays Multiprotocol Label Switching (MPLS) label table entries.</li> </ul> |
| <b>checksum</b> | (Optional) Displays IPv6 FIB entry checksums.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>detail</b>   | (Optional) Displays detailed information about IPv6 FIB epochs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>epoch</b>    | (Optional) Displays information about epochs associated with the source prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>internal</b> | (Optional) Displays internal data structure information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>platform</b> | (Optional) Displays platform-specific data structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                    |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.  |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |

### Usage Guidelines

Use this command to filter on prefixes in the Cisco Express Forwarding FIB that are added by a specified source.

### Examples

#### Examples

The following is sample output from the **show ipv6 cef with source rib** command:

```
Router# show ipv6 cef with source rib
::/127
  discard
2000::1/128
  receive for Loopback0
2000::2/128
  nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0
2000::3/128
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2000::4/128
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2001::/64
  attached to Ethernet2/0
2001::1/128
  receive for Ethernet2/0
2001:1::/64
  attached to Ethernet0/0
2001:1::1/128
  receive for Ethernet0/0
2001:2::/64
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
2002::/64
  attached to Tunnel0
2002::1/128
  receive for Tunnel0
FE80::/10
  receive for Null0
FF00::/8
  receive for Null0
```

The table below describes the significant fields shown in the display.

**Table 63: show ipv6 cef with source rib Field Descriptions**

| Field                             | Description                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| ::/127                            | IPv6 prefix.                                                                                                                           |
| discard                           | Indicates that traffic destined for this prefix should be discarded.                                                                   |
| 2000::1/128 receive for Loopback0 | An IPv6 prefix that is a receive prefix for interface Loopback0. Traffic destined for this prefix will be punted to the process level. |

| Field                                                     | Description                                                                                                                                             |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2000::2/128 nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0 | An IPv6 prefix that is forwarded to a next-hop address (FE80::A8BB:CCFF:FE00:2500) through interface Ethernet 0/0.                                      |
| 2001::/64 attached for Ethernet2/0                        | An IPv6 prefix that is a connected network on interface Ethernet 0/0. That is, the destination can be reached directly through the specified interface. |

The following is sample output from the **show ipv6 cef with source fib detail** command:

```
Router# show ipv6 cef with source rib detail
IPv6 CEF is enabled and running centrally.
VRF base:
  16 prefixes (16/0 fwd/non-fwd)
  Table id 0
  Database epoch:          0 (16 entries at this epoch)
  ::/127, epoch 0, flags attached, discard
  discard
  2000::1/128, epoch 0, flags attached, connected, receive, local
  receive for Loopback0
  2000::2/128, epoch 0
  nexthop FE80::A8BB:CCFF:FE00:2500 Ethernet0/0
  2000::3/128, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
  2000::4/128, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
  2001::/64, epoch 0, flags attached, connected, cover dependents
  Covered dependent prefixes: 1
  notify cover updated: 1
  attached to Ethernet2/0
  2001::1/128, epoch 0, flags attached, receive, local
  receive for Ethernet2/0
  2001:1::/64, epoch 0, flags attached, connected
  attached to Ethernet0/0
  2001:1::1/128, epoch 0, flags attached, receive, local
  receive for Ethernet0/0
  2001:2::/64, epoch 0, flags rib only nolabel, rib defined all labels
  nexthop FE80::A8BB:CCFF:FE00:2602 Ethernet2/0
  2002::/64, epoch 0, flags attached, connected
  attached to Tunnel0
  2002::1/128, epoch 0, flags attached, receive, local
  receive for Tunnel0
  FE80::/10, epoch 0, flags attached, receive, local
  receive for Null0
  FF00::/8, epoch 0, flags attached, receive, local
  receive for Null0
```

The table below describes the significant fields shown in the display.

**Table 64: show ipv6 cef with source rib detail Field Descriptions**

| Field                                      | Description                                                          |
|--------------------------------------------|----------------------------------------------------------------------|
| IPv6 CEF is enabled and running centrally. | Verifies that Cisco Express Forwarding for IPV6 is enabled globally. |
| VRF base                                   | Base VRF table.                                                      |



| Field                                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16 prefixes (16/0 Fwd/non-fwd)                                  | Number of prefixes in the VRF, how many prefixes are forwarded, and how many are not forwarded.                                                                                                                                                                                                                                                                                                                                                                                   |
| Table id 0                                                      | Identifies the table by number.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Database epoch:                                                 | Specifies the type of epoch.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0 (16 entries at this epoch)                                    | Number of the epoch (0) and number of entries in the epoch.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2000::1/128, epoch 0, flags attached, connected, receive, local | <p>Details about the prefix: the epoch in which it is found, the flags set for the prefix:</p> <ul style="list-style-type: none"> <li>• attached--Prefix is a connected network</li> <li>• connected--Prefix includes an address that is bound to an interface on the device</li> <li>• receive--Prefix is punt to and handled by the process level</li> <li>• local--Prefix is a subset of receive and marks prefixes that are received by on interface on the device</li> </ul> |

## Examples

The following is sample output from the **show ipv6 cef with source adjacency** command:

```
Router# show ipv6 cef with source adjacency
2001::3/128
  attached to Ethernet2/0
```

The table below describes the significant fields shown in the display.

**Table 65: show ipv6 cef with source adjacency Field Descriptions**

| Field                   | Description                                                                      |
|-------------------------|----------------------------------------------------------------------------------|
| 2001::3/128             | IPv6 prefix whose source is an adjacency.                                        |
| attached to Ethernet2/0 | Indicates that the prefix is a connected network through Interface Ethernet 2/0. |

The following is sample output from the **show ipv6 cef with source adjacency detail** command:

```
Router# show ipv6 cef with source adjacency detail
#
IPv6 CEF is enabled and running centrally.
VRF Default
  16 prefixes (16/0 fwd/non-fwd)
  Table id 0x1E000000
```

```

Database epoch:          0 (16 entries at this epoch)
2001::3/128, epoch 0, flags attached
Adj source: IPV6 adj out of Ethernet2/0, addr 2001::3 050878F0
Dependent covered prefix type adjfib cover 2001::/64
attached to Ethernet2/0

```

The table below describes the significant fields shown in the display.

**Table 66: show ipv6 cef with source adjacency detail Field Descriptions**

| Field                                                          | Description                                                                                                                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPv6 CEF is enabled and running centrally.                     | Verifies that Cisco Express Forwarding for IPV6 is enabled and running on the RP.                                                                                                                            |
| VRF Default                                                    | Default VRF table.                                                                                                                                                                                           |
| 16 prefixes (16/0 Fwd/non-fwd)                                 | Number of prefixes in the VRF, how many prefixes are forwarded and how many are not forwarded.                                                                                                               |
| Table id 0x1E000000                                            | Identifies the table by hexadecimal number.                                                                                                                                                                  |
| 2001::3/128, epoch 0, flags attached                           | Lists a prefix, its epoch number, and flags. Attached flag indicates a connected network.                                                                                                                    |
| Adj source: IPv6 adj out of Ethernet2/0, addr 2000::3 050878F0 | Indicates that the prefix was sourced by an adjacency and specifies the address family, interface, and address in memory of the adjacency.                                                                   |
| Dependent covered prefix type adjfib cover 2001::/64           | A prefix sourced by an adjacency is dependent on another less specific prefix (2001::/64) for forwarding information. If this less specific prefix changes, the dependent prefix will need to be recomputed. |
| attached to Ethernet2/0                                        | Indicates the prefix is a connect network through interface Ethernet 2/0.                                                                                                                                    |

The following is sample output from the **show ipv6 cef with source adjacency checksum** command:

```

Router# show ipv6 cef with source adjacency checksum
2001::3/128
FIB checksum: 0x4AE0F5DC

```

The table below describes the significant fields shown in the display.

**Table 67: show ipv6 cef with source adjacency checksum Field Descriptions**

| Field                    | Description                               |
|--------------------------|-------------------------------------------|
| 2001::3/128              | IPv6 prefix whose source is an adjacency. |
| FIB checksum: 0x4AE0F5DC | FIB checksum.                             |

## Examples

The following is sample output from the **show ipv6 cef with source adjacency** command:

```
Router# show ipv6 cef with source adj
2001::3/128
    attached to Ethernet2/0
```

The table below describes the significant fields shown in the display.

**Table 68: show ipv6 cef with source adj Field Descriptions**

| Field                   | Description                                                                      |
|-------------------------|----------------------------------------------------------------------------------|
| 2001::3/128             | IPv6 prefix whose source is an adjacency.                                        |
| attached to Ethernet2/0 | Indicates that the prefix is a network connected through interface Ethernet 2/0. |

The following is sample output from the **show ipv6 cef with source adj detail** command:

```
Router# show ipv6 cef with source adj detail
IPv6 CEF is enabled and running centrally.
VRF base:
  16 prefixes (16/0 fwd/non-fwd)
  Table id 0
  Database epoch:      0 (16 entries at this epoch)
2001::3/128, epoch 0, flags attached
  Adj source: IPV6 adj out of Ethernet2/0, addr 2001::3 02513FD8
  Dependent covered prefix type adjfib cover 2001::/64
  attached to Ethernet2/0
```

The table below describes the significant fields shown in the display.

**Table 69: show ipv6 cef with source adj detail Field Descriptions**

| Field                                                          | Description                                                                                                                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPv6 CEF is enabled and running centrally.                     | Verifies that Cisco Express Forwarding for IPV6 is enabled and running on the RP.                                                                                                                            |
| VRF base                                                       | Base VRF table.                                                                                                                                                                                              |
| 16 prefixes (16/0 Fwd/non-fwd)                                 | Number of prefixes, and how many prefixes are forwarded and how many are not forwarded.                                                                                                                      |
| 2001::3/128, epoch 0, flags attached                           | Provides more detail about the adjacency source, such as epoch number and flags.                                                                                                                             |
| Adj source: IPV6 adj out of Ethernet2/0, addr 2000::3 050878F0 | Lists a prefix, its epoch number, and flags. Attached flag indicates a connected network.                                                                                                                    |
| Dependent covered prefix type adjfib cover 2001::/64           | A prefix sourced by an adjacency is dependent on another less specific prefix (2001::/64) for forwarding information. If this less specific prefix changes, the dependent prefix will need to be recomputed. |

| Field                   | Description                                                               |
|-------------------------|---------------------------------------------------------------------------|
| attached to Ethernet2/0 | Indicates the prefix is a connect network through interface Ethernet 2/0. |

The following is sample output from the **show ipv6 cef with source adj checksum** command:

```
Router# show ipv6 cef with source adj checksum
2001::3/128
  FIB checksum: 0x4AE0F5DC
```

The table below describes the significant fields shown in the display.

**Table 70: show ipv6 cef with source adj checksum Field Descriptions**

| Field                    | Description                               |
|--------------------------|-------------------------------------------|
| 2001::3/128              | IPv6 prefix whose source is an adjacency. |
| FIB checksum: 0x4AE0F5DC | FIB checksum.                             |

## Related Commands

| Command                          | Description                                                                         |
|----------------------------------|-------------------------------------------------------------------------------------|
| <b>show ip cef</b>               | Displays entries in the FIB or displays a summary of the FIB.                       |
| <b>show ip cef with epoch</b>    | Displays information about an epoch in the Cisco Express Forwarding FIB.            |
| <b>show ipv6 cef with epoch</b>  | Displays information about an epoch in the Cisco Express Forwarding IPv6 FIB.       |
| <b>show ipv6 cef with source</b> | Displays information about prefix sources in the Cisco Express Forwarding IPv6 FIB. |

## show mls cef

To display the Multilayer Switching (MLS)-hardware Layer 3-switching table entries, use the **show mls cef** command in user EXEC and privileged EXEC mode.

**show mls cef** [**ip**] [*prefix* [*mask-length*] **load-info**] [**detail**] [**module** *number*]

**show mls cef** [**ip**] [**lookup** ...] **multicast** ... **rpf** ... **vpn** ... **vrf** ...]

**show mls cef** [**adjacency** ...] **block** *block-number* [**entries**] **config-register** *reg-address* **diags** [**detail**] **entry** *index* [**detail**] **exact-route** ... **hardware** [**module** *number*] **inconsistency** ... **lookup** ... **masks** [*type*] [**module** *number*] **rpf** ... **statistics** ... **summary** [**module** *number*] **tunnel fragment** **used-blocks** [*type*] [**module** *number*] **vpn** ... **vrf** ...]

**show mls cef** [**eom** ...] **ip** ... **ipv6** ... **mpls** ...]

### Syntax Description

|                             |                                                                                                                                                                                            |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ip</b>                   | (Optional) Displays IPv6 unicast entries in the MLS-hardware Layer 3-switching table; see the "Usage Guidelines" section for additional information.                                       |
| <i>prefix</i>               | (Optional) Entry prefix in the format A.B.C.D.                                                                                                                                             |
| <i>mask-length</i>          | (Optional) Mask length; valid values are from 0 to 32.                                                                                                                                     |
| <b>load-info</b>            | (Optional) Displays output with a hash value next to each adjacency.                                                                                                                       |
| <b>detail</b>               | (Optional) Displays detailed hardware information. See the "Usage Guidelines" section for important information.                                                                           |
| <b>module</b> <i>number</i> | (Optional) Displays information about the entries for a specific module.                                                                                                                   |
| <b>lookup</b> ...           | (Optional) Displays IP entries in the MLS-hardware Layer 3-switching table for the specified destination IP address. See the <b>show mls cef lookup</b> command.                           |
| <b>multicast</b> ...        | (Optional) Displays IP entries in the MLS-hardware Layer 3-switching table in the compact Cisco Express Forwarding table display format; see the <b>show mls cef ip multicast</b> command. |
| <b>rpf</b> ...              | (Optional) Displays information about the Reverse Path Forwarding (RPF) hardware in the MLS-hardware Layer 3-switching table; see the <b>show mls cef rpf</b> command.                     |

|                                           |                                                                                                                                                                                             |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>vpn</b> ...                            | (Optional) Displays information about the Virtual Private Network (VPN) ID Cisco Express Forwarding table. See the "Usage Guidelines" section for important information.                    |
| <b>vrf</b> ...                            | (Optional) Displays information about the Cisco Express Forwarding table for the specified VRF name.                                                                                        |
| <b>adjacency</b> ...                      | (Optional) Displays information about the MLS-hardware Layer 3-switching adjacency node; see the <b>show mls cef adjacency</b> command.                                                     |
| <b>block</b> <i>block-number</i>          | (Optional) Displays information about the mask-block utilization for a specific block; valid values are from 0 to 4294967295. See the "Usage Guidelines" section for important information. |
| <b>entries</b>                            | (Optional) Displays the mask-block utilization entries. See the "Usage Guidelines" section for important information.                                                                       |
| <b>config-register</b> <i>reg-address</i> | (Optional) Displays information about the hardware configuration register for a specific register. See the "Usage Guidelines" section for important information.                            |
| <b>diags</b>                              | (Optional) Displays information about the diagnostic entry. See the "Usage Guidelines" section for important information.                                                                   |
| <b>entry</b> <i>index</i>                 | (Optional) Specifies the specified prefix entry index to display; valid values are from 0 to 4294967295. See the "Usage Guidelines" section for important information.                      |
| <b>exact-route</b> ...                    | (Optional) Displays information about hardware load sharing; see the <b>show mls cef exact-route</b> command.                                                                               |
| <b>hardware</b>                           | (Optional) Displays a summary of the hardware information. See the "Usage Guidelines" section for important information.                                                                    |
| <b>inconsistency</b> ...                  | (Optional) Displays information about the consistency checker; see the <b>show mls cef inconsistency</b> command.                                                                           |
| <b>masks</b> ...                          | (Optional) Displays information about the mask. See the "Usage Guidelines" section for important information.                                                                               |

|                        |                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>statistics</b> ...  | (Optional) Displays the number of switched packets and bytes; see the <b>show mls cef statistics</b> command.          |
| <b>tunnel fragment</b> | (Optional) Displays the operational status of tunnel fragmentation.                                                    |
| <b>summary</b> ...     | (Optional) Displays a summary of rates in the hardware for each protocol; see the <b>show mls cef summary</b> command. |
| <b>used-blocks</b>     | (Optional) Displays a list of used blocks; see the "Usage Guidelines" section for important information.               |
| <b>eom</b> ...         | Displays information about the EoM protocol; this keyword is not supported.                                            |
| <b>ip</b> ...          | Displays information about the IP protocol; see the "Usage Guidelines" section for additional information.             |
| <b>ipv6</b> ...        | Displays information about the IPv6 protocol.                                                                          |
| <b>mpls</b> ...        | Displays information about the MPLS protocol; see the <b>show mls cef mpls</b> command.                                |

**Command Default**

If you do not specify a protocol, the default display is for IP and the global Cisco Express Forwarding table.

**Command Modes**

User EXEC (>) Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                                                                                                                              |
| 12.2(17a)SX  | This command was changed to support the <b>mpls</b> keyword.                                                                                                                                                       |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to the 12.2SX release. This command was changed to include the <b>load-info</b> keyword on the Supervisor Engine 720 and the Supervisor Engine 2. |
| 12.2(18)SXF  | This command was modified. This command was changed to support the <b>tunnel fragment</b> keywords in all PFC3 modes.                                                                                              |
| 12.2(33)SXH  | This command was modified. Support for the command was added for PCF3BXL, PFC3C, and PFC3CXL modes only.                                                                                                           |
| 12.2(33)SXI  | This command was modified. Support for the command was added for PCF3BXL, PFC3C, and PFC3CXL modes only.                                                                                                           |

| Release      | Modification                                                     |
|--------------|------------------------------------------------------------------|
| 12.2(33)SX12 | This command was modified. Support was added for all PFC3 modes. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.  |

### Usage Guidelines

The ... indicates that there is additional information.

The following options are for expert users only and are not documented:

- **load-info**
- **detail**
- **block** *block-number* [**entries**]
- **config-register** *reg-address* }
- **diags** [**detail**]
- **entry** *index* [**detail**]
- **hardware** [**module** *number*]
- **masks** [*type*]
- **used-blocks** [*type*]
- **vpn**

The MLS-hardware Layer 3 switching applies to IP traffic only.

Use the **show mls cef[ip] vrf** command to display the VRF Cisco Express Forwarding table entries.

You can enter this command on the supervisor engine or switch consoles. Enter the **remote login** command to session into the supervisor engine to enter the commands.

The **show mls cef** command offers three levels of options as follows:

- Protocol-independent options--The following keywords are not protocol specific:
  - **adjacency**
  - **exact-route**
  - **inconsistency**
  - **module**
  - **rpf**
  - **statistics**
  - **summary**
  - **used-blocks**
  - **vpn**
  - **vrf**



- Protocol-dependent keywords--The following keywords specify a protocol:
  - **eom**
  - **ip**
  - **ipv6**
  - **mpls**
- Default keywords--The following keywords display identical output for both the **show mls cef** and **show mls cef ip** commands:
  - *prefix*
  - **lookup**
  - **multicast**--This keyword is not supported on systems configured with a Supervisor Engine 720.
  - **module**
  - **rpf**
  - **vpn**
  - **vrf**

## Examples

This example shows how the **show mls cef** and **show mls cef ip** commands are identical:

```
Router#
show mls cef
Codes: decap - Decapsulation, + - Push Label
Index Prefix Adjacency
66 127.0.0.1/32 punt
67 10.1.1.100/32 punt
68 10.1.1.0/32 punt
69 10.1.1.255/32 punt
70 10.2.2.100/32 punt
71 10.2.2.0/32 punt
72 10.2.2.255/32 punt
73 10.2.2.5/32 Gi5/2, 0000.c005.0205
74 0.0.0.0/32 punt
75 10.255.255.255/32 punt
76 172.16.22.22/32 punt
77 172.20.0.0/32 punt
78 173.32.255.255/32 punt
79 172.16.1.153/32 V130, 0050.808b.8200
81 172.16.1.91/32 V130, 0004.4eef.8800
82 172.16.1.100/32 V130, 00d0.bb02.0400
83 172.17.223.3/32 V130, 00d0.061b.7000
84 172.22.5.3/32 V130, 00d0.061d.200a
85 172.16.1.101/32 V130, 0007.ecfc.e40a
86 172.20.100.1/32 V130, 0050.2a8d.700a
87 172.16.1.104/32 V130, 0050.0f2d.ac00
88 172.32.254.226/32 V130, 0050.2a8d.700a
89 10.2.2.7/32 Gi5/2, 0000.c005.0207
90 10.1.1.5/32 Gi5/1, 0000.0101.0105
3200 224.0.0.0/8 punt
3201 10.1.1.0/24 punt
3202 10.2.2.0/24 punt
134400 172,20.0.0/8 punt
134432 0.0.0.0/0 drop
524256 0.0.0.0/0 drop
Router#
```

This example shows how to display all the MLS-hardware Layer 3-switching table IP entries:

```
Router#
show mls cef ip
Codes: decap - Decapsulation, + - Push Label
Index  Prefix                Adjacency
66     127.0.0.1/32          punt
67     10.1.1.100/32        punt
68     10.1.1.0/32          punt
69     10.1.1.255/32        punt
70     10.2.2.100/32        punt
71     10.2.2.0/32          punt
72     10.2.2.255/32        punt
73     10.2.2.5/32          Gi5/2,          0000.c005.0205
74     0.0.0.0/32           punt
75     10.255.255.255/32    punt
76     172.16.22.22/32      punt
77     172.20.0.0/32        punt
78     173.32.255.255/32    punt
79     172.16.1.153/32      Vl30,          0050.808b.8200
81     172.16.1.91/32       Vl30,          0004.4eef.8800
82     172.16.1.100/32      Vl30,          00d0.bb02.0400
83     172.17.223.3/32      Vl30,          00d0.061b.7000
84     172.22.5.3/32        Vl30,          00d0.061d.200a
85     172.16.1.101/32      Vl30,          0007.ecfc.e40a
86     172.20.100.1/32      Vl30,          0050.2a8d.700a
87     172.16.1.104/32      Vl30,          0050.0f2d.ac00
88     172.32.254.226/32    Vl30,          0050.2a8d.700a
89     10.2.2.7/32          Gi5/2,          0000.c005.0207
90     10.1.1.5/32           Gi5/1,          0000.0101.0105
3200   224.0.0.0/8          punt
3201   10.1.1.0/24          punt
3202   10.2.2.0/24          punt
134400 172,20.0.0/8           punt
134432 0.0.0.0/0             drop
524256 0.0.0.0/0             drop
Router#
```

The table below describes the fields in the examples.

**Table 71: show mls cef Command Output Fields**

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Index     | MLS-hardware Layer 3-switching table entry index; the maximum is 256,000 entries.                                                                                                                                                                                                                                                                                           |
| Prefix    | Entry prefix address/mask.                                                                                                                                                                                                                                                                                                                                                  |
| Adjacency | Adjacency types are as follows: <ul style="list-style-type: none"> <li>• drop--Packets matching the prefix entry are dropped.</li> <li>• punt--Packets are redirected to an MSFC for further processing.</li> <li>• <b>mac-address</b> --Packets matching the prefix are forwarded to this specific next hop or the final destination host if directly attached.</li> </ul> |

This example shows how to display the operational status of tunnel fragmentation:

```
Router# show mls cef tunnel fragment
Tunnel Fragmentation:      Enabled
Router#
```

#### Related Commands

| Command                     | Description                                                                                      |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| <b>show mls cef summary</b> | Displays the number of routes in the MLS-hardware Layer 3-switching table for all the protocols. |

## show mls cef adjacency

To display information about the Multilayer Switching (MLS)-hardware Layer 3-switching adjacency node, use the **show mls cef adjacency** command in user EXEC or privileged EXEC mode.

**show mls cef adjacency** [**all**] **decap-tunnel** **encap-tunnel** *ip-src-addr* **entry index** [**to end-range**] **flags** *lower-flag upper-flag* **mac-address** *number* **mac-rewrite** **macv4** **mpls** [*label*] **multicast** **nat** **recirculation** **special** **tcp** **usage** [**detail**] [*module number*]

### Syntax Description

|                                        |                                                                                                                                        |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>                             | (Optional) Displays all application-allocated entries.                                                                                 |
| <b>decap-tunnel</b>                    | (Optional) Displays the decapsulated tunneled-packet information.                                                                      |
| <b>encap-tunnel</b> <i>ip-src-addr</i> | (Optional) Displays the encapsulated tunnel-adjacency entry that matches the specified address.                                        |
| <b>entry index</b>                     | (Optional) Displays the adjacency-entry information for the specified index; valid values are from 0 to 1048575.                       |
| <b>to end-range</b>                    | (Optional) Specifies the index range to display adjacency-entry information; valid values are from 0 to 1048575.                       |
| <b>flags</b>                           | (Optional) Displays information about the specified bit flags. See the "Usage Guidelines" section for additional information.          |
| <i>lower-flag</i>                      | Lower 32-bits flag values to display; valid values are 0 to FFFFFFFF.                                                                  |
| <i>upper-flag</i>                      | Upper 32-bits flag values to display; valid values are 0 to FFFFFFFF.                                                                  |
| <b>mac-address</b> <i>number</i>       | (Optional) Displays information about the matched MAC-address adjacency for the specified 48-bit hardware address in the H.H.H format. |
| <b>mac-rewrite</b>                     | (Optional) Displays information about the MAC-rewrite adjacency.                                                                       |
| <b>macv4</b>                           | (Optional) Displays information about the MACv4 adjacency.                                                                             |
| <b>mpls</b>                            | (Optional) Displays information about the Multiprotocol Label Switching (MPLS) adjacency.                                              |

|                             |                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------|
| <i>label</i>                | (Optional) MPLS label to display adjacency-entry information; valid values are from 0 to 1048575. |
| <b>multicast</b>            | (Optional) Displays information about the multicast adjacency.                                    |
| <b>nat</b>                  | (Optional) Displays information about the Network Address Translation (NAT) adjacency.            |
| <b>recirculation</b>        | (Optional) Displays information about the recirculated-adjacency entry.                           |
| <b>special</b>              | (Optional) Displays information about the special adjacencies.                                    |
| <b>tcp</b>                  | (Optional) Displays information about the TCP-application adjacency.                              |
| <b>usage</b>                | (Optional) Displays information about the adjacency usage.                                        |
| <b>detail</b>               | (Optional) Displays hardware-entry details.                                                       |
| <b>module</b> <i>number</i> | (Optional) Displays information about the adjacency node for a specific module.                   |

**Command Modes**

User EXEC (>) Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                             |
|--------------|------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                    |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to the 12.2 SX release. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                          |

**Usage Guidelines**

The **decap-tunnel** and **endcap-tunnel** keywords are used to display the tunnel nodes. The encapsulator node is considered the tunnel-entry point and the decapsulator node is considered the tunnel-exit point. There may be multiple source-destination pairs using the same tunnel between the encapsulator and decapsulator.

The **decap-tunnel** and **endcap-tunnel** keywords are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720.

The **flags** keyword applies to all adjacency formats (for example, mac-rewrite, mpls, and multicast) and indicates the bits that are set in the adjacency for the specific adjacency.

The **module number** keyword and argument designate the module and port number. Valid values depend on the chassis and module used. For example, if you have a 48-port 10/100BASE-T Ethernet module installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

MLS-hardware Layer 3 switching applies to IP traffic only.

MLS-hardware Layer 3-switching adjacency statistics are updated every 60 seconds.

You can display hardware-switched IP-directed broadcast information by entering the **show mls cef adjacency mac-address number detail** command.

For each MLS-hardware Layer 3-switching Forwarding Information Base (FIB) entry, MLS-hardware Layer 3 switching stores Layer 2 information from the MSFC2 for adjacent nodes in the MLS-hardware Layer 3-switching adjacency table. Adjacent nodes are directly connected at Layer 2. To forward traffic, MLS-hardware Layer 3 switching selects a route from a MLS-hardware Layer 3-switching FIB entry, which points to a MLS-hardware Layer 3-switching adjacency entry, and uses the Layer 2 header for the adjacent node in the adjacency table entry to rewrite the packet during Layer 3 switching. MLS-hardware Layer 3 switching supports one million adjacency-table entries.

## Examples

### Examples

These examples show the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how to display information for all adjacency nodes:

```
Router# show mls cef adjacency all
Index: 5      smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
Index: 32773  smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
<Output is truncated>
```

This example shows how to display the adjacency-entry information for a specific index:

```
Router# show mls cef adjacency entry 132
Index: 132    smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
```

This example shows how to display the adjacency-entry information for a range of indexes:

```
Router# show mls cef adjacency entry 132 to 134
Index: 132    smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
Index: 133    smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
Index: 134    smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
              packets: 0, bytes: 0
```

Router#

This example shows how to display recirculation-adjacency information:

```
Router# show mls cef adjacency recirculation detail
Index: 6      smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 65535, vlan: 0, dindex: 0x0, ccc = 110,
              format: RECIR, l3rw_vld: 1
Router#
```

This example shows how to display specific bit flags:

```
Router# show mls cef adjacency flags 8408 0
```

```
STAT_REQUIRED NO_STAT CAP1 IQO UTTL UTOS
Router#
```

This example shows how to display adjacency-node information for a specific MAC address:

```
Router# show mls cef adjacency mac-address 00e0.f74c.842d
Index: 133138 smac: 00d0.061d.200a, dmac: 00e0.f74c.842d
             mtu: 1518, vlan: 45, dindex: 0x0, l3rw_vld: 1
             packets: 0, bytes: 0
Index: 133144 smac: 00d0.061d.200a, dmac: 00e0.f74c.842d
             mtu: 1518, vlan: 45, dindex: 0x0, l3rw_vld: 1
             packets: 0, bytes: 0
Router#
```

This example shows how to display the MAC-rewrite adjacency information:

```
Router# show mls cef adjacency mac-rewrite
Index: 133132 smac: 0000.0000.0000, dmac: 0000.0000.0000
             mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
             packets: 0, bytes: 0
Index: 133133 smac: 000a.421f.3000, dmac: 0050.2a8d.700a
             mtu: 1518, vlan: 1, dindex: 0x0, l3rw_vld: 1
             packets: 0, bytes: 0
Index: 133134 smac: 000a.421f.3000, dmac: 0000.7201.0001
             mtu: 1518, vlan: 72, dindex: 0x0, l3rw_vld: 1
             packets: 0, bytes: 0
Index: 133135 smac: 000a.421f.3000, dmac: 0000.7301.0001
             mtu: 1518, vlan: 73, dindex: 0x0, l3rw_vld: 1
             packets: 0, bytes: 0
<Output is truncated>
```

This example shows how to display information about the MPLS adjacency:

```
Router# show mls cef adjacency mpls detail
Index: 32768 smac: 0000.0000.0000, dmac: 0000.0000.0000
mtu: 1514, vlan: 0, dindex: 0x7FFA, l3rw_vld: 1
format: MPLS, flags: 0x1000408600
label0: 0, exp: 0, ovr: 0
label1: 0, exp: 0, ovr: 0
label2: 0, exp: 0, ovr: 0
op: POP
packets: 0, bytes: 0
Router#
```

This example shows how to display information about the multicast adjacency:

```
Router# show mls cef adjacency
      multicast detail
Index: 22 smac: 0000.0000.0000, dmac: 0000.0000.0000
mtu: 0, vlan: 0, dindex: 0x0, l3rw_vld: 0
format: MULTICAST, flags: 0x800
met2: 0, met3: 0
packets: 2232, bytes: 180684
Router#
```

This example shows how to display information about the NAT adjacency:

```
Router# show mls cef adjacency
      nat detail
Index: 200 mtu: 1522, vlan: 1063, dindex: 0x7FFA, l3rw_vld: 1
format: NAT, flags: 0x8600
ip_sa: 10.2.2.2, src_port: 100
ip_da: 10.3.3.3, dst_port: 300
delta_seq: 0, delta_ack: 0
packets: 0, bytes: 0
Router#
```

This example shows how to display information about the special adjacency:

```
Router# show mls cef adjacency special
Index: 0      smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 9234, vlan: 0, dindex: 0x0, l3rw_vld: 0
              format: MULTICAST, flags: 0x800 (mcast_fib_fail)
              met2: 0, met3: 0
              packets: 0, bytes: 0
Index: 1      smac: 0000.0000.0000, dmac: 0000.0000.0000
              mtu: 9234, vlan: 0, dindex: 0x0, l3rw_vld: 0
              format: MULTICAST, flags: 0x800 (mcast_fib_rf_cr)
              met2: 0, met3: 0
              packets: 0, bytes: 0
<Output is truncated>
```

This example shows how to display information about the TCP adjacency:

```
Router# show mls cef adjacency tcp detail
Index: 200 smac: abcd.abcd.abcd, dmac: 0000.1000.2000
mtu: 1518, vlan: 1063, dindex: 0x0, l3rw_vld: 1
format: MAC TCP, flags: 0x8408
delta_seq: 10, delta_ack: 0
packets: 0, bytes: 0
Router#
```

This example shows how to display information about the adjacency usage:

```
Router# show mls cef adjacency usage
Adjacency Table Size: 1048576
ACL region usage: 2
Non-stats region usage: 128
Stats region usage: 31
Total adjacency usage: 161
Router#
```

## Examples

These examples show the output from Cisco 7600 series routers that are configured with a Supervisor Engine 2.

This example shows how to display information for all adjacency nodes:

```
Router# show mls cef adjacency
Index 17414 : mac-sa:00d0.061d.200a, mac-da:0000.0000.0b0b
              interface:Gi4/11, mtu:1514
              packets:0000000000000000, bytes:0000000000000000
Index 17415 : mac-sa:00d0.061d.200a, mac-da:00e0.f74c.842e
              interface:Vl46, mtu:1514
              packets:0000000000000000, bytes:0000000000000000
Router#
```

This example shows how to display adjacency-node information for a specific MAC address:

```
Router# show mls cef adjacency mac-address 00e0.f74c.842e
Index 17415 : mac-sa:00d0.061d.200a, mac-da:00e0.f74c.842e
              interface:Vl46, mtu:1514
              packets:0000000000000000, bytes:0000000000000000
Router#
```

This example shows how to display the adjacency node information for a specific MAC address for a specific module:

```
Router# show mls cef adjacency mac-address 00e0.f74c.842e module 4
Module 4#
Index 17415 : mac-sa:00d0.061d.200a, mac-da:00e0.f74c.842e
              interface:Vl46, mtu:1514
              packets:0000000000000000, bytes:0000000000000000
Router#
```



## show mls cef exact-route

To display information about the hardware load sharing, use the **show mls cef exact-route** command in user EXEC or privileged EXEC mode.

**show mls cef exact-route** *{vrf instance-name src-ip| src-ip} {dest-ip| src-l4port} [dest-l4port| module num]*

### Syntax Description

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>vrf</b> <i>instance-name</i> | Displays the numeric Virtual Private Network (VPN) routing and forwarding (VRF) ID for the specified VRF instance name. |
| <i>src-ip</i>                   | Source IP address.                                                                                                      |
| <i>dest-ip</i>                  | Destination IP address.                                                                                                 |
| <i>src-l4port</i>               | Layer 4-source port number; valid values are from 0 to 65535.                                                           |
| <i>dest-l4port</i>              | (Optional) Layer 4-destination port number; valid values are from 0 to 65535.                                           |
| <b>module</b> <i>num</i>        | (Optional) Module number.                                                                                               |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17a)SX  | This command was changed to include the <b>vrf instance-name</b> keyword and argument.    |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Usage Guidelines

The **vrf instance-name** keyword and argument are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

## Examples

This example shows how to display the hardware load-sharing information. The fields shown in the display are self-explanatory.

```
Router# show mls cef exact-route 172.20.52.16 172.20.52.31
Interface: Gi2/1, Next Hop: 255.255.255.255, Vlan: 4073, Destination Mac: 00d0.061d.200a
Router#
```

## Related Commands

| Command                        | Description                                                        |
|--------------------------------|--------------------------------------------------------------------|
| <b>show ip cef exact-route</b> | Displays the exact route for a source-destination IP address pair. |

# show mls cef exception

To display information about the Cisco Express Forwarding exception, use the **show mls cef exception** command in user EXEC or privileged EXEC mode.

**Note**

The **show mls cef exception** command is not available in Cisco IOS Release 12.2(33)SXJ and later Cisco IOS 12.2SX releases.

**show mls cef exception** {status [detail]| priorities}

**Syntax Description**

|                   |                                                                                                             |
|-------------------|-------------------------------------------------------------------------------------------------------------|
| <b>status</b>     | Displays information about the Cisco Express Forwarding exception status.                                   |
| <b>detail</b>     | (Optional) Displays detailed hardware information; see the "Usage Guidelines" section for more information. |
| <b>priorities</b> | Displays information about the Cisco Express Forwarding exception priority.                                 |

**Command Modes**

User EXEC (>) Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                        |
|--------------|---------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                               |
| 12.2(17a)SX1 | The output was changed to display IPv6 information.                                                                 |
| 12.2(17b)SXA | The output was changed to display Multiprotocol Label Switching (MPLS) information.                                 |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                     |
| 12.2(33)SXJ  | This command was removed. It is not available in Cisco IOS Release 12.2(33)SXJ and later Cisco IOS 12.2SX releases. |

**Usage Guidelines**

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. The **detail** keyword is for expert users only and is not documented.

In the output of the **show mls cef exception status** command, the following definitions apply:

- FALSE--Indicates that the protocol is not under the exception.
- TRUE--Indicates that the protocol is under the exception.

## Examples

This example shows how to display detailed information about the Cisco Express Forwarding exception status. The fields shown in the display are self-explanatory.

```
Router
# show mls cef exception status
Current IPv4 FIB exception state = FALSE
Current IPv6 FIB exception state = FALSE
Current MPLS FIB exception state = FALSE
Router
#
```

This example shows how to display the Forwarding Information Base (FIB) Error Rate Monitor (ERM) exception priority. The fields shown in the display are self-explanatory.

```
Router
# show mls cef exception priorities
Priority Protocol
=====
1 IPv4
2 IPv6
3 MPLS
Router
#
```

## Related Commands

| Command                 | Description                                                                                                |
|-------------------------|------------------------------------------------------------------------------------------------------------|
| <b>mls erm priority</b> | Assigns the priorities to define an order in which protocols attempt to recover from the exception status. |

## show mls cef hardware

To display the Multilayer Switching (MLS)-hardware Layer 3-switching table entries, use the **show mls cef hardware** command in user EXEC or privileged EXEC mode.

**show mls cef hardware** [*module number*]

### Syntax Description

|                             |                                                                           |
|-----------------------------|---------------------------------------------------------------------------|
| <b>module</b> <i>number</i> | (Optional) Displays the adjacency-node information for a specific module. |
|-----------------------------|---------------------------------------------------------------------------|

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                             |
|--------------|------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                    |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to the 12.2 SX release. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                          |

### Usage Guidelines

In Cisco 7600 series routers that are configured with a Supervisor Engine 2 with a Policy Feature Card (PFC) and an Multilayer Switching Feature Card 2 (MSFC2), MLS-hardware Layer 3 switching provides IP unicast and IP multicast Layer 3 switching for a Supervisor Engine 2, a PFC2, an MSFC2, and fabric-enabled switching modules that have a Distributed Feature Card (DFC).

MLS-hardware Layer 3 switching applies to IP traffic only.

### Examples

#### Examples

This example shows the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how to display all the MLS-hardware Layer 3-switching table entries:

```
Router# show mls cef hardware
CEF TCAM v2:
Size:
  65536 rows/device, 2 device(s), 131072 total rows
  32 entries/mask-block
  8192 total blocks (32b wide)
  0 - 4095 upper blocks, 4096 - 8191 lower blocks
  1179648 s/w table memory
Used blocks:
  Upper bank:
    63 IP ucast
```

```

    0 IPX
    0 IP mcast
  Lower bank:
    0 IP ucast
    0 IPX
    0 IP mcast
Free blocks (non-contiguous range):
  27 - 4095 upper blocks, 4096 - 8191 lower blocks
Options:
  sanity check: off
  sanity interval: 301 seconds
  consistency check: on
    consistency check interval: 61 seconds
  redistribution: off
    redistribution interval: 120 seconds
    redistribution threshold: 10
  compression: on
    compression interval: 30 seconds
  bank balancing: off
    bank differential limit: 5
  rpf mode: off
  tcam shadowing: on
Background Task statistics:
  sanity check count: 0000000000000169
  Consistency check count: 0000000000000834
  Consistency check errors: 0000000000000002
  block redistribute count: 0000000000000000
  block compress count: 0000000000000011
    IP ucast [29]: 0000000000000001
    IP ucast [28]: 0000000000000001
Hardware switching status:
  ip switching: on
  ipx switching: off
Router#

```

## Examples

This example shows the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how to display all the MLS-hardware Layer 3-switching table entries:

```

Router# show mls cef hardware
CEF TCAM v2:
Size:
  65536 rows/device, 4 device(s), 262144 total rows
  32 entries/mask-block
  8192 total blocks (32b wide)
  1212416 s/w table memory
Options:
  sanity check: on
  sanity interval: 301 seconds
  consistency check: on
    consistency interval: 61 seconds
  redistribution: off
    redistribution interval: 120 seconds
    redistribution threshold: 10
  compression: on
    compression interval: 31 seconds
  tcam/ssram shadowing: on
Operation Statistics:
  Entries inserted: 0000000000000024
  Entries deleted: 0000000000000005
  Entries compressed: 0000000000000000
  Blocks inserted: 0000000000000018
  Blocks deleted: 0000000000000004
  Blocks compressed: 0000000000000000
  Blocks shuffled: 0000000000000002
  Blocks deleted for exception: 0000000000000000
  Direct h/w modifications: 0000000000000000
Background Task Statistics:
  Consistency Check count: 0000000000014066

```

```
Consistency Errors:                0000000000000000
SSRAM Consistency Errors:          0000000000000000
Sanity Check count:                0000000000002855
Sanity Check Errors:               0000000000000000
Compression count:                 0000000000004621
Exception Handling status          : on
L3 Hardware switching status       : on
Fatal Error Handling Status        : Reset
Fatal Errors:                      0000000000000000
Fatal Error Recovery Count:        0000000000000000
SSRAM ECC error summary:
  Uncorrectable ecc entries        : 0
  Correctable ecc entries          : 0
  Packets dropped                  : 0
  Packets software switched        : 0
FIB SSRAM Entry status
-----
Key: UC - Uncorrectable error, C - Correctable error
     SSRAM banks : Bank0      Bank1
No ECC errors reported in FIB SSRAM.
```

# show mls cef inconsistency

To display consistency-checker information, use the **show mls cef inconsistency** command in user EXEC or privileged EXEC mode.

**show mls cef inconsistency** [**module** *num*] **now** [**records**] [**detail**] [**module** *num*]

## Syntax Description

|                          |                                                                           |
|--------------------------|---------------------------------------------------------------------------|
| <b>module</b> <i>num</i> | (Optional) Displays inconsistency information for the specified module.   |
| <b>now</b>               | (Optional) Runs a consistency check and displays any issues.              |
| <b>records</b>           | (Optional) Displays the inconsistency records.                            |
| <b>detail</b>            | (Optional) Displays hardware-entry details.                               |
| <b>module</b> <i>num</i> | (Optional) Displays the adjacency-node information for a specific module. |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                            |
|--------------|---------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                   |
| 12.2(17d)SXB | Support for this command was implemented on the Supervisor Engine 2 for Cisco IOS Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                         |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. If you enter the **show mls cef inconsistency** command with no arguments, this information is displayed:

- Consistency check count
- Ternary Content Addressable Memory (TCAM)-consistency check errors
- Synchronous static random access memory (SSRAM)-consistency check errors

## Examples

This sections contains examples from the **show mls cef inconsistency** command. The fields shown in the displays are self-explanatory.



This example shows how to display information about the consistency checker:

```
Router# show mls cef inconsistency
Consistency Check Count      : 81
TCAM Consistency Check Errors : 0
SSRAM Consistency Check Errors : 0
Router#
```

This example shows how to display information about the consistency checker for a specific module:

```
Router# show mls cef inconsistency module 7
Consistency Check Count      : 11033
TCAM Consistency Check Errors : 0
SSRAM Consistency Check Errors : 0
Router#
```

This example shows how to run a consistency check and display any issues:

```
Router# show mls cef inconsistency now
Performing TCAM check now ...done
No. of FIB TCAM Consistency Check Errors : 0
Performing SSRAM check now ...done
No. of FIB SSRAM Consistency Check Errors : 0
Router#
```

This example shows how to display the consistency records:

```
Router# show mls cef inconsistency records
Consistency Check Count      : 11044
TCAM Consistency Check Errors : 0
SSRAM Consistency Check Errors : 0
Router#
```

## show mls cef ip

To display the IP entries in the Multilayer Switching (MLS)-hardware Layer 3-switching table, use the **show mls cef ip** command in user EXEC or privileged EXEC mode.

**show mls cef ip** [*prefix* [ *mask-length* ]] [**detail**] [*module number*]

**show mls cef ip accounting per-prefix**

**show mls cef ip** {{**lookup** ...}| {**multicast tcam** ...}| {**rpf** ...}| {**vpn** ...}| {**vrf** ...}}

### Syntax Description

|                              |                                                                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>prefix</i>                | (Optional) Entry prefix in the format A.B.C.D.                                                                                                                                                   |
| <i>mask-length</i>           | (Optional) Mask length; valid values are from 0 to 32.                                                                                                                                           |
| <b>detail</b>                | (Optional) Displays hardware-entry details.                                                                                                                                                      |
| <b>module</b> <i>number</i>  | (Optional) Displays the entries for a specific module.                                                                                                                                           |
| <b>accounting per-prefix</b> | Displays all the prefixes that are configured for the statistic collection.                                                                                                                      |
| <b>lookup</b> ...            | Displays the Ternary Content Addressable Memory (TCAM)-entry index for the specified destination IP unicast address; see the <b>show mls cef lookup</b> command.                                 |
| <b>multicast tcam</b> ...    | Displays the IP entries in the MLS-hardware Layer 3-switching table in the compact Cisco Express Forwarding table-display format; see the "Usage Guidelines" section for additional information. |
| <b>rpf</b> ...               | Displays the Reverse Path Forwarding (RPF)--hardware information in the MLS-hardware Layer 3-switching table; see the <b>show mls cef rpf</b> command.                                           |
| <b>vpn</b> ...               | (Optional) Displays information about the Virtual Private Network (VPN) ID Cisco Express Forwarding table; see the "Usage Guidelines" section for more information.                              |
| <b>vrf</b> ...               | Displays information about the VPN-instance Cisco Express Forwarding table.                                                                                                                      |

**Command Modes**

User EXEC (&gt;) Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                             |
|--------------|------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                    |
| 12.2(17a)SX  | This command was changed to include the <b>rpf</b> <i>prefix</i> form of this command.   |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to the 12.2 SX release. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                          |

**Usage Guidelines**

For Cisco 7600 series routers that are configured with a Supervisor Engine 720, see the **show mls cef ip multicast tcam** command for information about this command.

For Cisco 7600 series routers that are configured with a Supervisor Engine 2, the supported syntax for the **show mls cef ip multicast tcam** command is **show mls cef ip {multicast tcam [*prefix* [*mask*]} [*module num*]}**.

The following keywords are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2:

- **detail**
- **rpf**
- **vpn**
- **vrf**

The ... indicates that there is additional information.

The **vpn** keyword is for expert users only and is not documented.

Information in the output of the **show mls cef ip** command is also displayed in the **show mls cef** commands.

The lookup is performed as a "longest prefix match" and displays the TCAM-entry index that applies to the specified destination IP address.

The information output is in this format: Index, Prefix, Mask, and Adjacency.

**Examples****Supervisor Engine 2 Examples**

These examples show the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how to display IP entries in the MLS-hardware Layer 3-switching table:

```
Router# show mls cef ip
Index      Prefix      Mask      Adjacency
```

```

0          0.0.0.0          255.255.255.255      punt
1          255.255.255.255  255.255.255.255      punt
2          127.0.0.12       255.255.255.255      punt
3          127.0.0.0         255.255.255.255      punt
4          127.255.255.255   255.255.255.255      punt
5          172.20.52.18      255.255.255.255      punt
6          172.20.52.0       255.255.255.255      punt
7          172.20.52.31      255.255.255.255      punt
8          172.20.52.1       255.255.255.255      0010.0d59.b8c0
160        172.20.52.0       255.255.255.224      punt
6400       224.0.0.0         255.255.255.0        punt
115200     0.0.0.0          0.0.0.0              0010.0d59.b8c0

```

This example shows how to display the longest-prefix match lookup:

```

Router# show mls cef ip lookup 172.20.52.19
160          172.20.52.0       255.255.255.224      punt

```

### Supervisor Engine 720 Examples

These examples show the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how the **show mls cef** and **show mls cef ip** commands are identical:

```

Router#
show mls cef
Codes: decap - Decapsulation, + - Push Label
Index  Prefix                Adjacency
64     127.0.0.51/32          punt
65     127.0.0.0/32           punt
66     127.255.255.255/32     punt
67     1.1.1.100/32          punt
68     1.1.1.0/32             punt
69     1.1.1.255/32          punt
70     2.2.2.100/32          punt
71     2.2.2.0/32            punt
72     2.2.2.255/32          punt
73     2.2.2.5/32            Gi5/2,          0000.c005.0205
74     0.0.0.0/32            punt
75     255.255.255.255/32     punt
76     200.1.22.22/32        punt
77     200.0.0.0/32          punt
78     200.255.255.255/32     punt
79     200.1.1.153/32        V130,          0050.808b.8200
81     200.1.1.91/32         V130,          0004.4eef.8800
82     200.1.1.100/32        V130,          00d0.bb02.0400
83     200.12.223.3/32       V130,          00d0.061b.7000
84     200.2.5.3/32          V130,          00d0.061d.200a
85     200.1.1.101/32        V130,          0007.ecfc.e40a
86     200.0.100.1/32        V130,          0050.2a8d.700a
87     200.1.1.104/32        V130,          0050.0f2d.ac00
88     223.255.254.226/32    V130,          0050.2a8d.700a
89     2.2.2.7/32            Gi5/2,          0000.c005.0207
90     1.1.1.5/32            Gi5/1,          0000.0101.0105
3200   224.0.0.0/24          punt
3201   1.1.1.0/24            punt
3202   2.2.2.0/24            punt
134400 200.0.0.0/8           punt
134432 0.0.0.0/0            drop
524256 0.0.0.0/0            drop
Router#

```

This example shows how to display all the MLS-hardware Layer 3-switching table IP entries:

```

Router#
show mls cef ip
Codes: decap - Decapsulation, + - Push Label
Index  Prefix                Adjacency
66     127.0.0.1/32          punt
67     10.1.1.100/32         punt
68     10.1.1.0/32           punt

```

```

69      10.1.1.255/32      punt
70      10.2.2.100/32     punt
71      10.2.2.0/32       punt
72      10.2.2.255/32     punt
73      10.2.2.5/32       Gi5/2,      0000.c005.0205
74      0.0.0.0/32        punt
75      10.255.255.255/32 punt
76      172.16.22.22/32   punt
77      172.20.0.0/32     punt
78      173.32.255.255/32 punt
79      172.16.1.153/32   V130,      0050.808b.8200
81      172.16.1.91/32    V130,      0004.4eef.8800
82      172.16.1.100/32   V130,      00d0.bb02.0400
83      172.17.223.3/32   V130,      00d0.061b.7000
84      172.22.5.3/32     V130,      00d0.061d.200a
85      172.16.1.101/32   V130,      0007.ecfc.e40a
86      172.20.100.1/32   V130,      0050.2a8d.700a
87      172.16.1.104/32   V130,      0050.0f2d.ac00
88      172.32.254.226/32 V130,      0050.2a8d.700a
89      10.2.2.7/32       Gi5/2,      0000.c005.0207
90      10.1.1.5/32        Gi5/1,      0000.0101.0105
3200    224.0.0.0/8       punt
3201    10.1.1.0/24       punt
3202    10.2.2.0/24       punt
134400  200.20.0.0/8      punt
134432  0.0.0.0/0        drop
524256  0.0.0.0/0        drop
Router#

```

The table below describes the fields shown in the examples.

**Table 72: show mls cef ip Command Output Fields**

| Field     | Description                                                                       |
|-----------|-----------------------------------------------------------------------------------|
| Index     | MLS-hardware Layer 3-switching table entry index; the maximum is 256,000 entries. |
| Prefix    | Entry prefix address/mask.                                                        |
| Adjacency | Adjacency information.                                                            |

This example shows how to display the detailed MLS-hardware Layer 3-switching table entries:

```

Router#
show mls cef ip 127.0.0.1 detail
Codes: M - mask entry, V - value entry, A - adjacency index, P - priority bit
       D - full don't switch, m - load balancing modnumber, B - BGP Bucket sel
       V0 - Vlan 0, C0 - don't comp bit 0, V1 - Vlan 1, C1 - don't comp bit 1
       RVTEN - RPF Vlan table enable, RVTSEL - RPF Vlan table select
Format: IPV4_DA - (8 | xtag vpn pi cr recirc tos prefix)
Format: IPV4_SA - (9 | xtag vpn pi cr recirc prefix)
M(194   ): E | 1 FFF  0 0 0 0   255.255.255.255
V(194   ): 8 | 1 0    0 0 0 0   127.0.0.1 (A:133120 ,P:1,D:0,m:0 ,B:0)
Router#

```

This example shows how to display all the prefixes that are configured for the statistic collection:

```

Router# show mls cef ip accounting per-prefix
      VRF      Prefix/Mask      Packets      Bytes
A - Active, I - Inactive
Router#

```

**Related Commands**

| Command      | Description                                                |
|--------------|------------------------------------------------------------|
| show mls cef | Displays the MLS-hardware Layer 3-switching table entries. |

## show mls cef ip multicast

To display the IP entries in the Multilayer Switching (MLS)-hardware Layer 3-switching table on the switch processor, use the **show mls cef ip multicast** command in user EXEC or privileged EXEC mode.

**show mls cef ip multicast** {*bidir*| **grp-only**| **source** *source-ip*} [**detail**| **group** *group-id*| **vlan** *rpf-vlanid*]

**show mls cef ip multicast control** [**detail**| **prefix** *prefix*| **vlan** *rpf-vlanid*]

**show mls cef ip multicast group** *group-id* [**detail**| **vlan** *rpf-vlanid*]

**show mls cef ip multicast src-grp** [**detail**| **group** *group-ip*| **source**| **vlan** *rpf-vlanid*]

**show mls cef ip multicast subnet** [**detail**| **prefix** *prefix*| **vlan** *rpf-vlanid*]

**show mls cef ip multicast summary** [ *vpn-num* ]

**show mls cef ip multicast team** [*prefix* [*mask*]] [**detail**] [**module** *num*] [**vrf** *src-ip* {*src-port*| *dst-ip*} [*dst-port* *module num*]]

**show mls cef ip multicast** {*grp-mask*| **vlan** *rpf-vlanid*| **vpn** *vpn-id*} [**detail**]

### Syntax Description

|                                |                                                                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>bidir</b>                   | Displays bidirectional (Bidir) information.                                                                                                     |
| <b>grp-only</b>                | Displays hardware-entry information that is based on (*,G) shortcuts; see the "Usage Guidelines" section for additional information.            |
| <b>source</b> <i>source-ip</i> | Displays hardware-entry information based on the specified source IP address.                                                                   |
| <b>detail</b>                  | (Optional) Displays hardware-entry details.                                                                                                     |
| <b>group</b> <i>group-id</i>   | (Optional) Displays hardware-entry information that is based on the specified group IP address.                                                 |
| <b>vlan</b> <i>rpf-vlanid</i>  | (Optional) Displays information for a specific Reverse Path Forwarding (RPF) VLAN ID; valid values are from 0 to 4095.                          |
| <b>control</b>                 | (Optional) Displays hardware-entry information that is based on (*,G/m) entries; see the "Usage Guidelines" section for additional information. |
| <b>prefix</b> <i>prefix</i>    | (Optional) Displays hardware-entry information that is based on an IP subnet prefix.                                                            |
| <b>src-grp</b>                 | Displays hardware-entry information that is based on (S,G) shortcuts; see the "Usage Guidelines" section for additional information.            |

|                          |                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>subnet</b>            | Displays hardware-entry information that is based on (S/m,*) shortcuts; see the "Usage Guidelines" section for additional information.  |
| <b>summary</b>           | Displays a summary of installed-hardware shortcuts.                                                                                     |
| <b>tcam</b>              | Displays Cisco Express Forwarding table information in a compact format; see the "Usage Guidelines" section for additional information. |
| <b>mask</b>              | (Optional) Displays hardware-entry information that is based on the specified subnet mask.                                              |
| <b>vrf</b> <i>src-ip</i> | (Optional) Displays the numeric Virtual Private Network (VPN) routing and forwarding (VRF) ID for the specified source IP address.      |
| <i>src-port</i>          | (Optional) Layer 4 source port; valid values are from 0 to 65535.                                                                       |
| <i>dst-ip</i>            | (Optional) Destination IP address.                                                                                                      |
| <i>dst-port</i>          | (Optional) Layer 4 destination port; valid values are from 0 to 65535.                                                                  |
| <b>grp-mask</b>          | Displays hardware-entry information that is based on Bidir (*,G/m) shortcuts.                                                           |
| <b>vpn</b> <i>vpn-id</i> | Displays hardware-entry information that is based on the specified VPN ID; valid values are from 0 to 4095.                             |

**Command Modes**

User EXEC (&gt;) Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                        |
|--------------|-----------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                               |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                     |

**Usage Guidelines**

For Cisco 7600 series routers that are configured with a Supervisor Engine 2, the only supported syntax for the **show mls cef ip multicast** command is **show mls cef ip {multicast tcam[*prefix* [*mask*]]} [*module num*]]**.



There are two Multicast Multilayer Switching (MMLS) modes, ingress and egress. The output displayed differs for each mode.

The hardware-entry types are as follows:

- {S/m,\*}--Interface/mask (or subnet) entries that are used to catch a directly connected source.
- {\*,G/m}--Groups that are served by the route processors as group/mask.
- {G,C}--G indicates a destination MAC address, which is derived from an IP-multicast address, and C indicates the ingress VLAN.
- {S,G,C}--S indicates the source IP address, G indicates the destination IP address, which is a multicast address, and C indicates the ingress VLAN, which is usually the RPF VLAN of the flow.
- {S,G}--Multicast-routing table entry that is maintained by the software or a multicast-forwarding table entry that is created in the Forwarding Information Base (FIB) table.
- {\*,G}--Same as {S,G}, except that the source address is a wildcard.

The designated forwarder (DF) index field ranges from 1 to 4 and is an index into the acceptance (Protocol Independent Multicast [PIM] Route Processors (RPs) multiplied by the DF) table. The acceptance table is used with DF forwarding and is used to identify the set of DF interfaces for each of the four RPs in a VPN.

## Examples

This example shows how to display ingress hardware-entry information that is based on Bidir (\*,G/m) shortcuts:

```
Router# show mls cef ip multicast grp-mask
Multicast CEF Entries for VPN#0
Flags: R - Control, S - Subnet, B - Bidir, C - Complete, P - Partial,
       c - Central Rewrite, p - Primary Input, r - Recirculation
Source/mask      Destination/mask      RPF/DF  Flags #packets  #bytes  rwindex  Output
Vlans/Info
+-----+-----+-----+-----+-----+-----+-----+-----+
*          226.2.2.0/24      Df0     BCp    0          0        -        V150 [1 oifs]
*          225.2.2.0/24      Df1     BCp    0          0        -        V151 [1 oifs]
*          227.2.2.0/24      Df1     BCp    0          0        -        V151 [1 oifs]
Found 3 entries. 3 are mfd entries
Router#
```

This example shows how to display detailed ingress hardware-entry information that is based on Bidir (\*,G/m) shortcuts:

```
Router# show mls cef ip multicast grp-mask detail
(*, 226.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:0 AdjPtr:7,32775,65543,98311 FibRpfNf:0 FibRpfDf:0 FibAddr:0x100
  rwlans:0 rwindex:0x0 adjmac:0006.d606.e240 rdt:0 E:0 CAP1:0
  fmt:mcast l3rwvld:1 DM:0 mtu:1518 rwtype:L3 met2:0x0 met3:0x5
  packets:00000000000000 bytes:000000000000000000
  Starting Offset: 0x0005
  V E C: 50 I:0x00449
(*, 225.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:1 AdjPtr:8,32776,65544,98312 FibRpfNf:0 FibRpfDf:0 FibAddr:0x102
  rwlans:0 rwindex:0x0 adjmac:0006.d606.e240 rdt:0 E:0 CAP1:0
  fmt:mcast l3rwvld:1 DM:0 mtu:1518 rwtype:L3 met2:0x0 met3:0x6
  packets:00000000000000 bytes:000000000000000000
  Starting Offset: 0x0006
  V E C: 51 I:0x0044B
(*, 227.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:1 AdjPtr:19,32787,65555,98323 FibRpfNf:0 FibRpfDf:0 FibAddr:0x104
  rwlans:0 rwindex:0x0 adjmac:0006.d606.e240 rdt:0 E:0 CAP1:0
  fmt:mcast l3rwvld:1 DM:0 mtu:1518 rwtype:L3 met2:0x0 met3:0x7
  packets:00000000000000 bytes:000000000000000000
```

```

Starting Offset: 0x0007
V E C: 51 I:0x0044B
Found 3 entries. 3 are mfd entries
Router#

```

This example shows how to display ingress-Bidir information:

```
Router# show mls cef ip multicast bidir
```

```

Multicast CEF Entries for VPN#0
Flags: R - Control, S - Subnet, B - Bidir, C - Complete, P - Partial,
       c - Central Rewrite, p - Primary Input, r - Recirculation
Source/mask      Destination/mask  RPF/DF  Flags #packets  #bytes
rwindeX  Output Vlans/Info
+-----+-----+-----+-----+-----+-----+-----+
*          225.2.2.2/32      Df1    BCp    0          0          -
          V151,V130 [2 oifs]
*          225.2.2.1/32      Df1    BCp    0          0          -
          V151,V130 [2 oifs]
Found 2 entries. 2 are mfd entries
Router#

```

This example shows how to display detailed ingress-Bidir information:

```
Router# show mls cef ip multicast bidir detail
```

```

(*, 225.2.2.2)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:1 AdjPtr:10,32778,65546,98314 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE2
  rrwvls:0 rwindeX:0x0 adjmac:0006.d606.e240 rdt:0 E:0 CAP1:0
  fmt:mcast l3rwvld:1 DM:0 mtu:1518 rwtype:L3 met2:0x0 met3:0xA
  packets:00000000000000 bytes:000000000000000000
  Starting Offset: 0x000A
    V C: 51 I:0x004B5 P->19A0
  - V
    V E C: 30 I:0x0049B
(*, 225.2.2.1)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:1 AdjPtr:9,32777,65545,98313 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE0
  rrwvls:0 rwindeX:0x0 adjmac:0006.d606.e240 rdt:0 E:0 CAP1:0
  fmt:mcast l3rwvld:1 DM:0 mtu:1518 rwtype:L3 met2:0x0 met3:0x8
  packets:00000000000000 bytes:000000000000000000
  Starting Offset: 0x0008
    V C: 51 I:0x004B1 P->199C
  - V
    V E C: 30 I:0x00499
Found 2 entries. 2 are mfd entries
Router#

```

This example shows how to display egress hardware-entry information that is based on Bidir (\*,G/m) shortcuts:

```
Router# show mls cef ip multicast grp-mask
```

```

Multicast CEF Entries for VPN#0
Flags: R - Control, S - Subnet, B - Bidir, C - Complete, P - Partial,
       c - Central Rewrite, p - Primary Input, r - Recirculation
Source/mask      Destination/mask  RPF/DF  Flags #packets  #bytes
rwindeX  Output Vlans/Info
+-----+-----+-----+-----+-----+-----+-----+
*          225.2.2.0/24      Df0    BCp    0          0          -
*          225.2.2.0/24      -      Bpr    0          0          0x4AE
*   V151 [1 oifs]  225.2.2.0/24      -      Br     0          0          0x40E
*   V151 [1 oifs]  226.2.2.0/24      Df1    BCp    0          0          -
*          226.2.2.0/24      -      Bpr    0          0          0x4AE
*   V150 [1 oifs]  226.2.2.0/24      -      Br     0          0          0x40E
*   V150 [1 oifs]  227.2.2.0/24      Df0    BCp    0          0          -

```

```

*          227.2.2.0/24          -      Bpr    0          0          0x4AE
  V151 [1 oifs]
*          227.2.2.0/24          -      Br     0          0          0x40E
  V151 [1 oifs]
Found 3 entries. 3 are mfd entries
Router#

```

This example shows how to display detailed egress hardware-entry information that is based on Bidir (\*,G/m) shortcuts:

Router# **show mls cef ip multicast grp-mask detail**

```

(*, 225.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:0 AdjPtr:7,32775,65543,98311 FibRpfNf:0 FibRpfDf:0 FibAddr:0x120
  rrvlans:0 rwinde:0x0 rdt:0 E:0 CAP1:0
  fmt:recir l3rvld:1 DM:0 mtu:1522 rwtype:RECIR
  packets:0000000000000 bytes:000000000000000000
  PI:1 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:8,32776,65544,98312 FibRpfNf:0 FibRpfDf:0 FibAddr:0x122
  rrvlans:0 rwinde:0x4AE adjmac:0006.d606.e240 rdt:1 E:1 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x5
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x0005
  V E C: 51 I:0x0044C
  PI:0 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:9,32777,65545,98313 FibRpfNf:0 FibRpfDf:0 FibAddr:0x124
  rrvlans:0 rwinde:0x40E adjmac:0006.d606.e240 rdt:1 E:0 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x5
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x0005
  V E C: 51 I:0x0044C
(*, 226.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:1 AdjPtr:10,32778,65546,98314 FibRpfNf:0 FibRpfDf:0 FibAddr:0x126
  rrvlans:0 rwinde:0x0 rdt:0 E:0 CAP1:0
  fmt:recir l3rvld:1 DM:0 mtu:1522 rwtype:RECIR
  packets:0000000000000 bytes:000000000000000000
  PI:1 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:11,32779,65547,98315 FibRpfNf:0 FibRpfDf:0 FibAddr:0x128
  rrvlans:0 rwinde:0x4AE adjmac:0006.d606.e240 rdt:1 E:1 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1C
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x001C
  V E C: 50 I:0x00447
  PI:0 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:12,32780,65548,98316 FibRpfNf:0 FibRpfDf:0 FibAddr:0x12A
  rrvlans:0 rwinde:0x40E adjmac:0006.d606.e240 rdt:1 E:0 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1C
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x001C
  V E C: 50 I:0x00447
(*, 227.2.2.0/24)
  PI:1 (1) CR:0 (0) Recirc:0 (1)
  DFidx:0 AdjPtr:13,32781,65549,98317 FibRpfNf:0 FibRpfDf:0 FibAddr:0x12C
  rrvlans:0 rwinde:0x0 rdt:0 E:0 CAP1:0
  fmt:recir l3rvld:1 DM:0 mtu:1522 rwtype:RECIR
  packets:0000000000000 bytes:000000000000000000
  PI:1 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:14,32782,65550,98318 FibRpfNf:0 FibRpfDf:0 FibAddr:0x12E
  rrvlans:0 rwinde:0x4AE adjmac:0006.d606.e240 rdt:1 E:1 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1D
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x001D
  V E C: 51 I:0x0044C
  PI:0 (1) CR:0 (0) Recirc:1 (1)
  AdjPtr:15,32783,65551,98319 FibRpfNf:0 FibRpfDf:0 FibAddr:0x130
  rrvlans:0 rwinde:0x40E adjmac:0006.d606.e240 rdt:1 E:0 CAP1:0
  fmt:mcast l3rvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1D
  packets:0000000000000 bytes:000000000000000000
  Starting Offset: 0x001D
  V E C: 51 I:0x0044C

```

Found 3 entries. 3 are mfd entries

Router#

This example shows how to display egress-Bidir information:

Router# **show mls cef ip multicast bidir**

Multicast CEF Entries for VPN#0

Flags: R - Control, S - Subnet, B - Bidir, C - Complete, P - Partial,  
c - Central Rewrite, p - Primary Input, r - Recirculation

| Source/mask | Destination/mask | RPF/DF | Flags | #packets | #bytes |
|-------------|------------------|--------|-------|----------|--------|
| rwinde      | Output Vlan      | Info   |       |          |        |

|   |                    |              |     |     |   |   |       |
|---|--------------------|--------------|-----|-----|---|---|-------|
| * |                    | 225.2.2.2/32 | Df0 | BCp | 0 | 0 | -     |
| * | V151,V130 [2 oifs] | 225.2.2.2/32 | -   | Bpr | 0 | 0 | 0x4AE |
| * | V151,V130 [2 oifs] | 225.2.2.2/32 | -   | Br  | 0 | 0 | 0x40E |
| * |                    | 225.2.2.1/32 | Df0 | BCp | 0 | 0 | -     |
| * | V151,V130 [2 oifs] | 225.2.2.1/32 | -   | Bpr | 0 | 0 | 0x4AE |
| * | V151,V130 [2 oifs] | 225.2.2.1/32 | -   | Br  | 0 | 0 | 0x40E |

Found 2 entries. 2 are mfd entries

Router#

This example shows how to display detailed egress-Bidir information:

Router# **show mls cef ip multicast bidir detail**

(\* , 225.2.2.2)

PI:1 (1) CR:0 (0) Recirc:0 (1)  
DFidx:0 AdjPtr:19,32787,65555,98323 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE6  
rwvlans:0 rwinde:0x0 rdt:0 E:0 CAP1:0  
fmt:recir l3rwvld:1 DM:0 mtu:1522 rwtype:RECIR  
packets:00000000000000 bytes:000000000000000000

PI:1 (1) CR:0 (0) Recirc:1 (1)  
AdjPtr:20,32788,65556,98324 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE8  
rwvlans:0 rwinde:0x4AE adjmac:0006.d606.e240 rdt:1 E:1 CAP1:0  
fmt:mcast l3rwvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x22  
packets:00000000000000 bytes:000000000000000000

Starting Offset: 0x0022

V C: 51 I:0x004B3 P->24

V E C: 30 I:0x004B6

PI:0 (1) CR:0 (0) Recirc:1 (1)  
AdjPtr:21,32789,65557,98325 FibRpfNf:0 FibRpfDf:0 FibAddr:0xEA  
rwvlans:0 rwinde:0x40E adjmac:0006.d606.e240 rdt:1 E:0 CAP1:0  
fmt:mcast l3rwvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x22  
packets:00000000000000 bytes:000000000000000000

Starting Offset: 0x0022

V C: 51 I:0x004B3 P->24

V E C: 30 I:0x004B6

(\* , 225.2.2.1)

PI:1 (1) CR:0 (0) Recirc:0 (1)  
DFidx:0 AdjPtr:16,32784,65552,98320 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE0  
rwvlans:0 rwinde:0x0 rdt:0 E:0 CAP1:0  
fmt:recir l3rwvld:1 DM:0 mtu:1522 rwtype:RECIR  
packets:00000000000000 bytes:000000000000000000

PI:1 (1) CR:0 (0) Recirc:1 (1)  
AdjPtr:17,32785,65553,98321 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE2  
rwvlans:0 rwinde:0x4AE adjmac:0006.d606.e240 rdt:1 E:1 CAP1:0  
fmt:mcast l3rwvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1E  
packets:00000000000000 bytes:000000000000000000

Starting Offset: 0x001E

V C: 51 I:0x004AF P->20

V E C: 30 I:0x004B2

PI:0 (1) CR:0 (0) Recirc:1 (1)  
AdjPtr:18,32786,65554,98322 FibRpfNf:0 FibRpfDf:0 FibAddr:0xE4  
rwvlans:0 rwinde:0x40E adjmac:0006.d606.e240 rdt:1 E:0 CAP1:0  
fmt:mcast l3rwvld:1 DM:0 mtu:1522 rwtype:L3 met2:0x0 met3:0x1E  
packets:00000000000000 bytes:000000000000000000

```
Starting Offset: 0x001E
V C: 51 I:0x004AF P->20
V E C: 30 I:0x004B2
Found 2 entries. 2 are mfd entries
Router#
```

This example shows how to display TCAM information:

```
Router# show mls cef ip multicast tcam
```

| Index | Group      | Source  | RPF/DF | Interface |
|-------|------------|---------|--------|-----------|
| 64    | 224.0.1.39 | 0.0.0.0 | NULL   |           |
| 66    | 224.0.1.40 | 0.0.0.0 | NULL   |           |
| 96    | 224.0.0.0  | 0.0.0.0 | NULL   |           |

```
Router#
```

## show mls cef ipv6

To display the hardware IPv6-switching table entries, use the **show mls cef ipv6** command in privileged EXEC mode.

**show mls cef ipv6** [*vrf vrf-name*] [*ip-address/mask*] [**accounting per-prefix**] [**module number**]

**show mls cef ipv6 exact-route** *src-addr* [*L4-src-port*] *dst-addr* [*L4-dst-port*]

**show mls cef ipv6 multicast tcam** [*v6mcast-address*] [**detail**] [**internal**]

### Syntax Description

|                              |                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>vrf</b>                   | (Optional) IPv6 Virtual Private Network (VPN) routing and forwarding (VRF) instance.                             |
| <i>vrf-name</i>              | (Optional) VRF name.                                                                                             |
| <i>ip-address / mask</i>     | (Optional) Entry IPv6 address and prefix mask. Valid values for the <i>mask</i> argument are from 0 through 128. |
| <b>accounting per-prefix</b> | (Optional) Displays per-prefix accounting statistics.                                                            |
| <b>module number</b>         | (Optional) Displays the entries for a specific module.                                                           |
| <b>exact-route</b>           | Provides the exact route of IPv6-switching table entries.                                                        |
| <i>src-addr</i>              | Source IP address.                                                                                               |
| <i>L4-src-port</i>           | (Optional) Layer 4-source port number; valid values are from 0 to 65535.                                         |
| <i>dst-addr</i>              | Destination IP address.                                                                                          |
| <i>L4-dst-port</i>           | (Optional) Layer 4-destination port number; valid values are from 0 to 65535.                                    |
| <b>multicast tcam</b>        | Displays IPv6-multicast entries.                                                                                 |
| <i>v6mcast-address</i>       | (Optional) IPv6-multicast address.                                                                               |
| <b>detail</b>                | (Optional) Displays detailed hardware information.                                                               |
| <b>internal</b>              | (Optional) <i>Displays internal hardware information.</i>                                                        |

### Command Modes

Privileged EXEC (#)

**Command History**

| Release      | Modification                                                                                                      |
|--------------|-------------------------------------------------------------------------------------------------------------------|
| 12.2(17a)SX  | This command was introduced on the Supervisor Engine 720.                                                         |
| 12.2(17b)SXA | The output was changed to display multicast protocol information in the Forwarding Information Base (FIB) driver. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                   |
| 12.2(33)SRB1 | This command was integrated into Cisco IOS Release 12.2(33)SRB1.                                                  |

**Usage Guidelines**

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

You can enter this command on the supervisor engine and Multilayer Switching (MLS)-hardware Layer 3-switching module consoles only. Enter the **remote login** command to enter a session into the supervisor engine and distributed forwarding card (DFC)-equipped module to enter the commands.

When entering the *ip-address / mask* argument, use this format, X:X:X:X::X/*mask*, where valid values for *mask* are from 0 to 128.

Up to 64 IPv6 prefixes are supported.

You must enter the *L4-src-port* and *L4-dst-port* arguments when the load-sharing mode is set to full, for example, when Layer 4 ports are included in the load-sharing hashing algorithm.

**Examples**

This example shows how to display the hardware IPv6-switching table entries:

```
Router# show mls cef ipv6
Codes:M-MPLS encap, + - Push label
Index Prefix Adjacency
524384 BEEF:6::6/128 punt
524386 5200::6/128 punt
524388 2929::6/128 punt
524390 6363::30/128 Fa1/48 , 0000.0001.0002
524392 3FFE:1B00:1:1:0:5EFE:1B00:1/128 punt
524394 2002:2929:6:2::6/128 punt
524396 2002:2929:6:1::6/128 punt
524398 6363::6/128 punt
524416 BEEF:6::/64 drop
524418 5200::/64 punt
524420 2929::/64 punt
524422 2002:2929:6:2::/64 punt
524424 2002:2929:6:1::/64 punt
524426 6363::/64 punt
524428 3FFE:1B00:1:1::/64 Tu4 , V6 auto-tunnel
524448 FEE0::/11 punt
524480 FE80::/10 punt
524512 FF00::/8 punt
524544 ::/0 drop
```

This example shows how to display the IPv6 entries for a specific IPv6 address and mask:

```
Router# show mls cef ipv6 2001:4747::/64

Codes:R - Recirculation, I-IP encap
M-MPLS encap, + - Push label
```

```
Index Prefix Out i/f Out Label
160 2001:4747::/64 punt
```

This example shows how to display all the IPv6-FIB entries that have per-prefix statistics available:

```
Router#
show mls cef ipv6 accounting per-prefix
(I) BEEF:2::/64: 0 packets, 0 bytes
A - Active, I - Inactive
```

This example shows how to display detailed hardware information:

```
Router# show mls cef ipv6 detail

Codes: M - mask entry, V - value entry, A - adjacency index, P - FIB Priority
D - FIB Don't short-cut, m - mod-num
Format: IPv6_DA - (C | xtag vpn uvo prefix)
M(128 ): F | 1 FF 1 FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF
V(128 ): C | 1 0 1 2001:4747::1253 (A:12 ,P:1,D:0,m:0 )
M(160 ): F | 1 FF 1 FFFF:FFFF:FFFF:FFFF:FFFF::
V(160 ): C | 1 0 1 2001:4747:: (A:11 ,P:1,D:0,m:0 )
M(224 ): F | 1 FF 1 FFE0::
V(224 ): C | 1 0 1 FFE0:: (A:11 ,P:1,D:0,m:0 )
M(256 ): F | 1 FF 1 FFC0::
V(256 ): C | 1 0 1 FFC0:: (A:12 ,P:1,D:0,m:0 )
M(352 ): F | 1 FF 1 FF00::
V(352 ): C | 1 0 1 FF00:: (A:12 ,P:1,D:0,m:0 )
M(480 ): F | 1 FF 1 ::
V(480 ): C | 1 0 1 :: (A:14 ,P:1,D:0,m:0 )
```

## Related Commands

| Command                                      | Description                                                         |
|----------------------------------------------|---------------------------------------------------------------------|
| <b>mls ipv6 acl compress address unicast</b> | Turns on the compression of IPv6 addresses.                         |
| <b>remote login</b>                          | Accesses the Cisco 7600 series router console or a specific module. |



## show mls cef ipx

To display Internetwork Packet Exchange (IPX) entries in the Multilayer Switching (MLS)-hardware Layer 3 switching table, use the **show mls cef ipx** command in user EXEC or privileged EXEC mode.

**show mls cef ipx** [*prefix* [*mask*] *module number*][*module number*]

### Syntax Description

|                             |                                                        |
|-----------------------------|--------------------------------------------------------|
| <i>prefix</i>               | (Optional) Entry prefix in the format A.B.C.D.         |
| <i>mask</i>                 | (Optional) Entry prefix mask in the format A.B.C.D.    |
| <b>module</b> <i>number</i> | (Optional) Displays the entries for a specific module. |

### Command Modes

User EXEC(>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                                        |
|--------------|-----------------------------------------------------------------------------------------------------|
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                     |

### Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2 only. Information in the output of the **show mls cef ipx** command is also displayed in the **show mls ipx** command.

### Examples

This example shows how to display the IPX entries in the MLS-hardware Layer 3-switching table. The fields shown in the display are self-explanatory.

```
Router# show mls cef ipx
Router#
Index      Prefix          Mask              Adjacency
.
```

### Related Commands

| Command             | Description                                                        |
|---------------------|--------------------------------------------------------------------|
| <b>show mls ipx</b> | Displays IPX-related MLS-hardware Layer 3 switching table entries. |

## show mls cef logging

To display the contents of the ternary content addressable memory (TCAM)-inconsistency buffer, use the **show mls cef logging** command in user EXEC or privileged EXEC mode.

**show mls cef logging** [*module number*]

### Syntax Description

|                             |                                                        |
|-----------------------------|--------------------------------------------------------|
| <b>module</b> <i>number</i> | (Optional) Displays the entries for a specific module. |
|-----------------------------|--------------------------------------------------------|

### Command Default

This command has no default settings.

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2 only. In Cisco 7600 series routers that are configured with a Supervisor Engine 2 with a Policy Feature Card (PFC) and a Multilayer Switch Feature Card 2 (MSFC2), multilayer switching (MLS)-hardware Layer 3 switching provides IP unicast and IP multicast Layer 3 switching for a Supervisor Engine 2, a Policy Feature Card 2 (PFC2), an MSFC2, and fabric-enabled switching modules that have a Distributed Forwarding Card (DFC). The TCAM-inconsistency buffer records any inconsistency that is found in the TCAM. MLS-hardware Layer 3 switching applies to IP traffic only.

### Examples

This example shows how to display the contents of the TCAM inconsistency buffer. The significant fields shown in the display are self-explanatory.

```
Router# show mls cef logging

PFIB_ERR:TCAM_SHADOW_CONSISTENCY_ERR:value : Index: 100
Expected: 0 -0 -0
Hardware: 5 -1020304 -0
PFIB_ERR:TCAM_SHADOW_CONSISTENCY_ERR:Mask : Index: 3
Expected: 4 -0 -0
Hardware: 6 -FFF00000-0
```

# show mls cef lookup

To display the IP entries in the multilayer switching (MLS)-hardware Layer 3 switching table for the specified destination IP address, use the **show mls cef lookup** command in user EXEC or privileged EXEC mode.

**show mls cef** [**ip**] **lookup** *address* [**detail**] [**module** *number*]

## Syntax Description

|                             |                                                                                                                                            |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ip</b>                   | (Optional) Displays IP entries in the MLS-hardware Layer 3-switching table; see the "Usage Guidelines" section for additional information. |
| <i>address</i>              | IP address in the format A.B.C.D.                                                                                                          |
| <b>detail</b>               | (Optional) Displays hardware-entry details.                                                                                                |
| <b>module</b> <i>number</i> | (Optional) Displays the entries for a specific module.                                                                                     |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

The lookup is performed as a "longest-prefix match" and displays the ternary content addressable memory (TCAM)-entry index that applies to the specified destination IP address.

The information output is in this format: Index, Prefix, Mask, and Adjacency.

The output of the **show mls cef lookup ip** and the **show mls cef lookup** commands is identical.

## Examples

This example shows how to display the longest prefix match that applies to a specific IPv4-unicast address. The fields shown in the display are self-explanatory.

```
Router# show mls cef lookup 224.0.0.0
Codes: decap - Decapsulation, + - Push Label
Index  Prefix                Adjacency
3200   224.0.0.0/24             punt
```

## show mls cef mac

To display the multilayer switching (MLS)-hardware Layer 3-switching MAC-address information for the MSFC, use the **show mls cef mac** command in user EXEC or privileged EXEC mode.

**show mls cef mac** [**module** *num*]

### Syntax Description

|                          |                                                        |
|--------------------------|--------------------------------------------------------|
| <b>module</b> <i>num</i> | (Optional) Displays the entries for a specific module. |
|--------------------------|--------------------------------------------------------|

### Command Default

This command has no default settings.

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2 only. In Cisco 7600 series routers that are configured with a Supervisor Engine 2 with a Policy Feature Card (PFC) and a Multilayer Switch Feature Card 2 (MSFC2), multilayer switching (MLS)-hardware Layer 3 switching provides IP unicast and IP multicast Layer 3 switching for a Supervisor Engine 2, a Policy Feature Card 2 (PFC2), an MSFC2, and fabric-enabled switching modules that have a Distributed Forwarding Card (DFC).

### Examples

This example shows how to display the MLS-hardware Layer 3-switching MAC-address information for the MSFC. The fields shown in the display are self-explanatory.

```
Router#
show mls cef mac
Router MAC address:00d0.061d.200a
```

### Related Commands

| Command             | Description                                                |
|---------------------|------------------------------------------------------------|
| <b>show mls cef</b> | Displays the MLS-hardware Layer 3-switching table entries. |

| Command              | Description                                                                                      |
|----------------------|--------------------------------------------------------------------------------------------------|
| show mls cef summary | Displays the number of routes in the MLS-hardware Layer 3-switching table for all the protocols. |

# show mls cef maximum-routes

To display the current maximum-route system configuration, use the **show mls cef maximum-routes** command in user EXEC or privileged EXEC mode.

**show mls cef maximum-routes**

**Syntax Description** This command has no arguments or keywords.

**Command Default** This command has no default settings.

**Command Modes** User EXEC (>) Privileged EXEC (#)

| Command History | Release      | Modification                                                          |
|-----------------|--------------|-----------------------------------------------------------------------|
|                 | 12.2(17b)SXA | Support for this command was introduced on the Supervisor Engine 720. |
|                 | 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

**Usage Guidelines** This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. When you enter the **mls cef maximum-routes** command to change the configuration, the following additional fields appear in the output of the **show mls cef maximum-routes** command:

- User configured--Shows configuration changes that you have made.
- Upon reboot--Shows the configuration after a system reboot.

These fields appear if you have not saved the change (using the **copy system:running-config nvram: startup-config** command) after entering the **mls cef maximum-routes** command. See the "Examples" section for additional information.

**Examples** This section contains example of the **mls cef maximum-routes** command. The fields shown in the display are self-explanatory.

This example shows the display after you have entered the **mls cef maximum-routes** command, saved the change (**copy system:running-config nvram: startup-config** command), and rebooted the system:

```
Router# show mls cef maximum-routes
FIB TCAM maximum routes :
=====
Current :-
-----
IPv4 - 1k (default)
```

```
MPLS - 239k
IPv6 + IP Multicast - 8k (default)
```

This example shows the display if you entered the **mls cef maximum-routes** command and did not save the change:

```
Router# show mls cef maximum-routes
FIB TCAM maximum routes :
=====
Current :-
-----
IPv4 - 1k (default)
MPLS - 239k
IPv6 + IP Multicast - 8k (default)
User configured :-
-----
IPv4 + MPLS - 192k (default)
IPv6 + IP multicast - 32k (default)
Upon reboot :-
```

```
-----
IPv4 - 1k (default)
MPLS - 239k
IPv6 + IP multicast - 8k (default)
```

This example shows the output if you have made a configuration change and saved the change (**copy system:running-config nvram: startup-config** command):

```
Router# show mls cef maximum-routes
FIB TCAM maximum routes :
=====
Current :-
-----
IPv4 - 1k (default)
MPLS - 239k
IPv6 + IP Multicast - 8k (default)
User configured :-
-----
IPv4 + MPLS - 192k (default)
IPv6 + IP multicast - 32k (default)
```

## Related Commands

| Command                                                 | Description                                                                                          |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>copy system:running-config nvram: startup-config</b> | Saves the configuration to NVRAM.                                                                    |
| <b>mls cef maximum-routes</b>                           | Limits the maximum number of the routes that can be programmed in the hardware allowed per protocol. |

# show mls cef mpls

To display the Multiprotocol Label Switching (MPLS) entries in the Multilayer Switching (MLS)-hardware Layer 3 switching table, use the **show mls cef mpls** command in user EXEC or privileged EXEC mode.

**show mls cef mpls** [**detail**] [**internal**] [**labels** *value*] [**module** *number*] [**vpn** *instance*] [**vrf** *instance*]

## Syntax Description

|                             |                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>detail</b>               | (Optional) Displays hardware-entry details.                                                                                               |
| <b>internal</b>             | (Optional) Displays internal Cisco Express Forwarding entries.                                                                            |
| <b>labels</b> <i>value</i>  | (Optional) Displays the entries for a specific label; valid values are from 0 to 1048575.                                                 |
| <b>module</b> <i>number</i> | (Optional) Displays the entries for a specific module.                                                                                    |
| <b>vpn</b> <i>instance</i>  | (Optional) Displays the Virtual Private Network (VPN) ID MPLS table entries for a specific VPN instance; valid values are from 0 to 4095. |
| <b>vrf</b> <i>instance</i>  | (Optional) Displays the MPLS Cisco Express Forwarding table entries for a specific VPN routing and forwarding (VRF) instance.             |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

|             |                                                                       |
|-------------|-----------------------------------------------------------------------|
| 12.2(17a)SX | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

## Examples

This examples shows how to display MPLS entries. The fields shown in the display are self-explanatory.

```
Router# show mls cef mpls
```

```
Codes: + - Push label, - - Pop Label          * - Swap Label
Index  Local      Label                      Out i/f
      Label      Op
      
```



## show mls cef rpf

To display the information about the Reverse Path Forwarding (RPF) hardware in the Multilayer Switching (MLS)-hardware Layer 3-switching table, use the **show mls cef rpf** command in user EXEC or privileged EXEC mode.

**show mls cef** [**ip**] **rpf** [ *ip-address* ] [ **module num** ]

### Syntax Description

|                   |                                                                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ip</b>         | (Optional) Displays IP entries in the MLS-hardware Layer 3-switching table; see the "Usage Guidelines" section for additional information. |
| <i>ip-address</i> | (Optional) IP address.                                                                                                                     |
| <b>module num</b> | (Optional) Displays the entries for a specific module.                                                                                     |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

### Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. If you enter the **show mls cef ip rpf** command without arguments, the RPF global mode status is displayed. The output of the **show mls cef ip rpf** and the **show mls cef rpf** commands is identical.

### Examples

This example shows how to display the status of the RPF global mode. The fields shown in the display are self-explanatory.

```
Router# show mls cef rpf
RPF global mode:          not enabled
Router#
```

This example shows how to display the RPF information for a specific IP address. The fields shown in the display are self-explanatory.

```
Router# show mls cef rpf 10.100.0.0
RPF information for prefix 10.100.0.0/24
uRPF check performed in the hardware for interfaces :
GigabitEthernet1/1
Router#
```

**Related Commands**

| Command                  | Description               |
|--------------------------|---------------------------|
| mls ip cef rpf multipath | Configures the RPF modes. |

## show mls cef statistics

To display the number of switched packets and bytes, use the **show mls cef statistics** command in user EXEC or privileged EXEC mode.

**show mls cef statistics** [*module number*]

### Syntax Description

|                             |                                                            |
|-----------------------------|------------------------------------------------------------|
| <b>module</b> <i>number</i> | (Optional) Displays the information for a specific module. |
|-----------------------------|------------------------------------------------------------|

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                              |
|--------------|-------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                     |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB. |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                           |

### Usage Guidelines

In Cisco 7600 series routers that are configured with a Supervisor Engine 2 with a Policy Feature Card (PFC) and a Multilayer Switching Feature Card 2 (MSFC2), Multilayer Switching (MLS)-hardware Layer 3 switching provides IP unicast and IP multicast Layer 3 switching for a Supervisor Engine 2, a PFC2, an MSFC2, and fabric-enabled switching modules that have a Distributed Forwarding Card (DFC).

### Examples

This example shows how to display the MLS-hardware Layer 3-switching statistics. The fields shown in the display are self-explanatory.

```
Router# show mls cef statistics
Total CEF switched packets: 0000000000000000
Total CEF switched bytes:   0000000000000000
Router#
```

# show mls cef summary

To display the number of routes in the Multilayer Switching (MLS)-hardware Layer 3-switching table for all the protocols, use the **show mls cef summary** command in user EXEC or privileged EXEC mode.

**show mls cef summary** [*module number*]

## Syntax Description

|                             |                                                            |
|-----------------------------|------------------------------------------------------------|
| <b>module</b> <i>number</i> | (Optional) Displays the information for a specific module. |
|-----------------------------|------------------------------------------------------------|

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                                                 |
|--------------|--------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                        |
| 12.2(17a)SX  | The output was changed and no longer displays the Cisco Express Forwarding switched packets and bytes total. |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.                    |
| 12.2(33)SRA  | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                              |
| 12.2(33)SXI  | The output was changed for display of VRF and non-VRF routes for both IPv4 and IPv6 routes.                  |

## Usage Guidelines

The number of prefixes in the MLS-hardware Layer 3-switching table indicates the individual numbers for IPv4 and IPv6 unicast, IPv4 multicast, Multiprotocol Label Switching (MPLS), and EoM routes.

For Cisco 7600 series routers that are configured with a Supervisor Engine 2, the output displays the CEF-switched packets and total bytes.

When IPv6 is not configured, the command output from a Cisco Catalyst 6500 series switch running Cisco IOS Release 12.2(33)SXI or a later release will show 255 IPv6 VRF routes.

## Examples

### Examples

This example shows the output from Cisco 7600 series routers that are configured with a Supervisor Engine 720.

This example shows how to display a summary of MLS-hardware Layer 3-switching information:

```
Router#
show mls cef summary
Total routes: 80385
  IPv4 unicast routes: 42
  IPv4 Multicast routes: 5
  MPLS routes: 0
  IPv6 unicast routes: 2
  EoM routes: 0
Router#
```

## Examples

This example shows the output from Cisco 7600 series routers that are configured with a Supervisor Engine 2.

This example shows how to display a summary of MLS-hardware Layer 3-switching information:

```
Router#
show mls cef summary
Total CEF switched packets: 0000000000098681
Total CEF switched bytes: 0000000004539326
Total routes: 80385
  IP unicast routes: 80383
  IPX routes: 0
  IP multicast routes: 2
Router#
```

## Examples

This example shows the output from a Cisco Catalyst 6500 series switch running Cisco IOS Release 12.2(33)SXI or a later release:

```
Router# show mls cef summary
Total routes: 280
  IPv4 unicast routes: 20
    IPv4 non-vrf routes : 9
    IPv4 vrf routes : 11
  IPv4 Multicast routes: 3
  MPLS routes: 0
  IPv6 unicast routes: 257
    IPv6 non-vrf routes: 2
    IPv6 vrf routes: 255
  IPv6 multicast routes: 3
  EoM routes: 0
```

The table below describes the fields in the **show mls cef summary** command output.

**Table 73: show mls cef summary Command Output Fields**

| Field                                                 | Description                                                                                              |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Total MLS-hardware Layer 3-switching switched packets | Number of MLS-hardware Layer 3-switching packets forwarded by the MLS-hardware Layer 3-switching engine. |
| Total MLS-hardware Layer 3-switching switched bytes   | Number of bytes forwarded by the MLS-hardware Layer 3-switching engine.                                  |
| Total routes                                          | Number of route entries.                                                                                 |
| IP unicast routes                                     | Number of IP-unicast route entries.                                                                      |

| Field               | Description                                                   |
|---------------------|---------------------------------------------------------------|
| IP VRF routes       | Number of virtual routing and forwarding (VRF) route entries. |
| IPX routes          | Number of Internetwork Packet Exchange (IPX) route entries.   |
| IP multicast routes | Number of IP-multicast route entries.                         |

**Related Commands**

| Command             | Description                                                |
|---------------------|------------------------------------------------------------|
| <b>show mls cef</b> | Displays the MLS-hardware Layer 3-switching table entries. |

## show mls cef vrf

To display information about the Virtual Private Network (VPN) routing and forwarding instance (VRF) Cisco Express Forwarding table for a specific VRF name, use the **show mls cef vrf** command in user EXEC or privileged EXEC mode.

**show mls cef vrf** *instance-name* [ *prefix* ] [ **detail** ] [ **lookup** *ip-address* ] [ **module** *num* ] [ **rpf** [ *ip-address* ] ]

### Syntax Description

|                                 |                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <i>instance-name</i>            | VPN routing/forwarding instance name; valid values are from 0 to 4095.                                                    |
| <i>prefix</i>                   | (Optional) Prefix of the entry to display.                                                                                |
| <b>detail</b>                   | (Optional) Displays the hardware-entry details.                                                                           |
| <b>lookup</b> <i>ip-address</i> | (Optional) Displays the longest prefix-match lookup entry for the specified address.                                      |
| <b>module</b> <i>num</i>        | (Optional) Displays the entries for a specific module.                                                                    |
| <b>rpf</b> <i>ip-address</i>    | (Optional) Displays the unicast Reverse Path Forwarding (uRPF) check information for the (optional) specified IP address. |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                          |
|-------------|-----------------------------------------------------------------------|
| 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.       |

### Usage Guidelines

This command is **not** supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. The **show mls cef ip** command displays the Cisco Express Forwarding entries in the default VRF. To display specific (non-default) VRF entries, use the **show mls cef [ip] vrf vrf-name** command.

### Examples

This example shows how to display information about the VPN routing and forwarding instance Cisco Express Forwarding table for a specific VRF name. The fields shown in the display are self-explanatory.

```
Router#
show mls cef vrf vpn-1
```

```
Codes: decap - Decapsulation, + - Push Label
Index Prefix Adjacency
64 0.0.0.0/32 receive
65 255.255.255.255/32 receive
280 10.50.27.1/32 receive
281 10.50.27.0/32 receive
282 10.50.27.255/32 receive
298 10.1.1.1/32 receive
299 10.1.1.0/32 receive
300 10.1.1.255/32 receive
656 10.1.99.1/32 receive
Router#
```

**Related Commands**

| Command                | Description                                                          |
|------------------------|----------------------------------------------------------------------|
| <b>show mls cef ip</b> | Displays the IP entries in the MLS-hardware Layer 3-switching table. |



## show mls ip cef rpf-table

To display the configuration of the Reverse Path Forwarding (RPF) Cisco Express Forwarding table, use the **show mls ip cef rpf-table** command in privileged EXEC mode.

**show mls ip cef rpf-table**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                             |
|-----------------|-------------|--------------------------------------------------------------------------|
|                 | 12.2(14)SX  | Support for this command was introduced on the Supervisor Engine 720.    |
|                 | 12.2(17a)SX | This command is supported on releases prior to Release 12.2(17a)SX only. |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.          |

**Usage Guidelines** This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

**Examples** This example shows how to display the RPF Cisco Express Forwarding table entries. The fields shown in the display are self-explanatory.

```
Router#
show mls ip cef rpf-table
-----
172.16.10.0/24      [0] Fa2/1, Fa2/2, Fa2/3, Fa2/4
172.16.20.0/24
172.16.30.0/24
10.10.0.0/16       [1] Gi1/1, Gi1/2
10.20.0.0/16
```

| Related Commands | Command                               | Description                                       |
|------------------|---------------------------------------|---------------------------------------------------|
|                  | <b>mls ip cef rpf interface-group</b> | Defines an interface group in the RPF-VLAN table. |

# show mls ip non-static

To display information for the software-installed nonstatic entries, use the **show mls ip non-static** command in user EXEC or privileged in the EXEC mode.

**show mls ip non-static** [**count** [*module number*]] [**detail** [*module number*]] [*module number*]

## Syntax Description

|                             |                                                            |
|-----------------------------|------------------------------------------------------------|
| <b>count</b>                | (Optional) Displays the total number of nonstatic entries. |
| <b>module</b> <i>number</i> | (Optional) Designates the module number.                   |
| <b>detail</b>               | (Optional) Specifies a detailed per-flow output.           |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                             |
|--------------|--------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.    |
| 12.2(17a)SX  | This command is supported on releases prior to Release 12.2(17a)SX only. |
| 12.2(17b)SXA | This command is replaced by the <b>show mls netflow ip</b> command.      |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

## Examples

This sections contains examples from the **show mls ip non-static** command. The fields shown in the display are self-explanatory.

This example shows how to display the software-installed nonstatic entries:

```
Router> show mls ip non-static
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts           Bytes           Age    LastSeen  Attributes
-----
Router>
```

This example shows how to display detailed information for the software-installed nonstatic entries:

```
Router> show mls ip non-static detail
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
```

```

Pkts          Bytes          Age    LastSeen  Attributes
-----
QoS      Police Count Threshold    Leak      Drop Bucket  Use-Tbl Use-Enable
-----+-----+-----+-----+-----+-----+-----+
Router>

```

This example shows how to display the total number of software-installed nonstatic entries:

```

Router> show mls ip non-static count
Displaying Netflow entries in Supervisor Earl
  Number of shortcuts = 0
Router>

```

# show mls ip routes

To display the NetFlow routing entries, use the **show mls ip routes** command in user EXEC or privileged EXEC mode.

**show mls ip routes** [**non-static**|**static**] [**count** [*module number*]] [**detail** [*module number*]] [*module number*]

## Syntax Description

|                             |                                                                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>non-static</b>           | (Optional) Displays the software-installed nonstatic entries.                                                                     |
| <b>static</b>               | (Optional) Displays the software-installed static entries.                                                                        |
| <b>count</b>                | (Optional) Displays the total number of NetFlow routing entries.                                                                  |
| <b>module</b> <i>number</i> | (Optional) Displays the entries that are downloaded on the specified module; see the "Usage Guidelines" section for valid values. |
| <b>detail</b>               | (Optional) Specifies a detailed per-flow output.                                                                                  |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                    |
|--------------|---------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.           |
| 12.2(17a)SX  | This command is supported on releases prior to Release 12.2(17a)SX only.        |
| 12.2(17b)SXA | This command is replaced by the <b>show mls netflow ip sw-installed</b> command |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

## Examples

This section contains examples of the **show mls ip routes non-static** command. The fields shown in the display are self-explanatory.

This example shows how to display the software-installed nonstatic routing entries:

```
Router> show mls ip routes non-static
```

```

Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts           Bytes          Age    LastSeen  Attributes
-----
Router>

```

This example shows how to display detailed information for the software-installed nonstatic routing entries:

```

Router> show mls ip routes non-static detail
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts           Bytes          Age    LastSeen  Attributes
-----
      QoS      Police Count Threshold    Leak    Drop Bucket  Use-Tbl Use-Enable
-----+-----+-----+-----+-----+-----+-----+
Router>

```

This example shows how to display the total number of software-installed routing entries:

```

Router> show mls ip routes count
Displaying Netflow entries in Supervisor Earl
  Number of shortcuts = 0
Router>

```

## Related Commands

| Command                                 | Description                                                 |
|-----------------------------------------|-------------------------------------------------------------|
| <b>show mls netflow ip sw-installed</b> | Displays information for the software-installed IP entries. |

# show mls ip static

To display the information for the software-installed static IP entries, use the **show mls ip static** command in user EXEC or privileged EXEC mode.

**show mls ip static** [**count** [**module number**]] [**detail** [**module number**]] **module number**

## Syntax Description

|                             |                                                         |
|-----------------------------|---------------------------------------------------------|
| <b>count</b>                | (Optional) Displays the total number of static entries. |
| <b>module</b> <i>number</i> | (Optional) Designates the module number.                |
| <b>detail</b>               | (Optional) Specifies a detailed per-flow output.        |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release      | Modification                                                                     |
|--------------|----------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.            |
| 12.2(17a)SX  | This command is supported on releases prior to Release 12.2(17a)SX only.         |
| 12.2(17b)SXA | This command is replaced by the <b>show mls netflow ip sw-installed</b> command. |

## Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

## Examples

This section contains examples from the **show mls ip static** command. The fields shown in the display are self-explanatory.

This example shows how to display the software-installed static entries:

```
Router> show mls ip static
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts           Bytes           Age    LastSeen  Attributes
-----
Router>
```

This example shows how to display detailed information for the software-installed static entries:

```
Router> show mls ip static detail
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
```

```

Pkts          Bytes          Age    LastSeen  Attributes
-----
  QoS      Police Count Threshold    Leak      Drop Bucket  Use-Tbl Use-Enable
-----+-----+-----+-----+-----+-----+-----+
Router>

```

This example shows how to display the total number of software-installed static entries:

```

Router> show mls ip static count
Displaying Netflow entries in Supervisor Earl
Number of shortcuts = 0
Router>

```

## show mls ip statistics

To display the statistical information for the NetFlow IP entries, use the **show mls ip statistics** command in the user EXEC or privileged EXEC mode.

**show mls ip statistics** [**count** [*module number*]] [**detail** [*module number*]] *module number*

### Syntax Description

|                             |                                                                              |
|-----------------------------|------------------------------------------------------------------------------|
| <b>count</b>                | (Optional) Displays the total number of NetFlow entries.                     |
| <b>module</b> <i>number</i> | (Optional) Displays the entries that are downloaded on the specified module. |
| <b>detail</b>               | (Optional) Specifies a detailed per-flow output.                             |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                                                                                       |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                                                              |
| 12.2(17a)SX  | This command is supported on releases prior to Release 12.2(17a)SX only.                                                                           |
| 12.2(17b)SXA | On Cisco 7600 series routers that are configured with a Supervisor Engine 720, this command is replaced by the <b>show mls netflow ip</b> command. |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.                                                          |

### Examples

This section contains examples from the **show mls ip statistics** command. The fields shown in the display are self-explanatory.

This example shows how to display statistical information for the NetFlow IP entries:

```
Router> show mls ip statistics
Displaying Netflow entries in Supervisor Earl
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts          Bytes          Age    LastSeen  Attributes
-----
Router>
```

This example shows how to display detailed statistical information for the NetFlow IP entries:

```
Router> show mls ip statistics detail
Displaying Netflow entries in Supervisor Earl
```



```
DstIP          SrcIP          Prot:SrcPort:DstPort  Src i/f:AdjPtr
-----
Pkts          Bytes          Age    LastSeen  Attributes
-----
QoS          Police Count Threshold    Leak      Drop Bucket  Use-Tbl Use-Enable
-----+-----+-----+-----+-----+-----+-----+
Router>
```

## show mls table-contention

To display table contention level (TCL) information, use the **show mls table-contention** command in the user EXEC or privileged EXEC mode.

**show mls table-contention** {**detailed**|**summary**|**aggregate**}

### Syntax Description

|                  |                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>detailed</b>  | Displays the detailed TCL information.                                                                                        |
| <b>summary</b>   | Displays the TCL level.                                                                                                       |
| <b>aggregate</b> | Displays the aggregate count of all missed flows in the Supervisor Engine 720 and page hits or misses in Supervisor Engine 2. |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release      | Modification                                                                                                                                                                                                                                   |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(14)SX   | Support for this command was introduced on the Supervisor Engine 720.                                                                                                                                                                          |
| 12.2(17a)SX  | This command was changed to include the following: <ul style="list-style-type: none"><li>• The <b>aggregate</b> keyword</li><li>• The last reading of the corresponding registers in the <b>summary</b> and <b>detailed</b> keywords</li></ul> |
| 12.2(17d)SXB | Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.                                                                                                                                                      |

### Usage Guidelines

You can enter the **aggregate** keyword to display the statistics for the NetFlow-creation failures and NetFlow-hash aliases in the Supervisor Engine 720.

You can enter the **aggregate** keyword to display the page hits and misses in the Supervisor Engine 2.

The last reading of the corresponding registers are displayed in the **summary** and **detailed** keywords for the Supervisor Engine 720.

### Examples

This section contains examples from the **show mls table-contention** command. The fields shown in the display are self-explanatory.

This example shows how to display a detailed list of TCL information:

```
Router#
show mls table-contention detailed
Detailed Table Contention Level Information
=====
Layer 3
-----
L3 Contention Level:      0
Page Hits Requiring 1 Lookup   =      31
Page Hits Requiring 2 Lookups  =       0
Page Hits Requiring 3 Lookups  =       0
Page Hits Requiring 4 Lookups  =       0
Page Hits Requiring 5 Lookups  =       0
Page Hits Requiring 6 Lookups  =       0
Page Hits Requiring 7 Lookups  =       0
Page Hits Requiring 8 Lookups  =       0
Page Misses                  =       0
Router#
```

This example shows how to display a summary of TCL information:

```
Router# show mls table-contention summary
Summary of Table Contention Levels (on a scale of 0 (lowest) to 3 (highest))
=====
L3 Contention Level: 0
```

This example shows how to display an aggregate count of all missed flows in the Supervisor Engine 720 and page hits/misses in Supervisor Engine 2:

```
Router# show mls table-contention aggregate
Earl in Module 1
Detailed Table Contention Level Information
=====
Layer 3
-----
L3 Contention Level:      0
Page Hits Requiring 1 Lookup   =    24000
Page Hits Requiring 2 Lookups  =     480
Page Hits Requiring 3 Lookups  =       0
Page Hits Requiring 4 Lookups  =       0
Page Hits Requiring 5 Lookups  =       0
Page Hits Requiring 6 Lookups  =       0
Page Hits Requiring 7 Lookups  =       0
Page Hits Requiring 8 Lookups  =       0
Page Misses                  =       0
```

## show monitor event-trace

To display event trace messages for Cisco IOS software subsystem components, use the **show monitor event-trace** command in privileged EXEC mode.

**show monitor event-trace** {**all-traces** [**merged**] [**all**] **back** {*mmm* | *hh:mm*} [**clock** *hh:mm* [*date month month date*]] [**from-boot** *seconds*] **latest**} [*component* {**all**] **back** {*mmm* | *hh:mm*] [*date month month date*]]] [**clock** *hh:mm* [*date month month date*]] [**from-boot** *seconds*] **latest**] **parameters**} } [**detail**]

### Syntax Description

|                                           |                                                                                                                                                                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all-traces</b>                         | (Optional) Displays all event trace messages in memory to the console.                                                                                                                                                                 |
| <b>merged</b>                             | (Optional) Displays all event traces entries sorted by time.                                                                                                                                                                           |
| <b>all</b>                                | Displays all event trace messages currently in memory.                                                                                                                                                                                 |
| <b>back</b> { <i>mmm</i>   <i>hh:mm</i> } | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes. The time argument is specified either in minutes or in hours and minutes format (mmm or hh:mm). |
| <b>clock</b> <i>hh:mm</i>                 | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                                                                                 |
| <i>date</i>                               | (Optional) Day of the month.                                                                                                                                                                                                           |
| <i>month</i>                              | (Optional) Displays the month of the year.                                                                                                                                                                                             |
| <b>from-boot</b> <i>seconds</i>           | Displays event trace messages starting from a specified number of seconds after booting (uptime). To display the uptime, in seconds, enter the <b>show monitor event-trace component from-boot ?</b> command.                          |
| <b>latest</b>                             | Displays only the event trace messages since the last <b>show monitor event-trace</b> command was entered.                                                                                                                             |
| <i>component</i>                          | (Optional) Name of the Cisco IOS software subsystem component that is the object of the event trace. To get a list of components that support event tracing in this release, use the <b>monitor event-trace ?</b> command.             |
| <b>parameters</b>                         | Displays the trace parameters. The only parameter displayed is the size (number of trace messages) of the trace file.                                                                                                                  |

|               |                                                 |
|---------------|-------------------------------------------------|
| <b>detail</b> | (Optional) Displays detailed trace information. |
|---------------|-------------------------------------------------|

**Command Modes**

Privileged EXEC (#)

**Command History**

| <b>Release</b> | <b>Modification</b>                                                                                                                                                                                                                                                                                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(18)S      | This command was introduced.                                                                                                                                                                                                                                                                                                                                                          |
| 12.2(8)T       | This command was integrated into Cisco IOS Release 12.2(8)T.                                                                                                                                                                                                                                                                                                                          |
| 12.2(25)S      | This command was integrated into Cisco IOS Release 12.2(25)S. The <b>show monitor event-trace cef</b> command replaced the <b>show cef events</b> and <b>show ip cef events</b> commands.                                                                                                                                                                                             |
| 12.2(50)SY     | This command was integrated into Cisco IOS Release 12.2(50)SY.                                                                                                                                                                                                                                                                                                                        |
| 12.2(18)SXE    | This command was integrated into Cisco IOS Release 12.2(18)SXE.<br><br>The <b>spa</b> component keyword was added to support online insertion and removal (OIR) event messages for shared port adapters (SPAs).<br><br>The <b>bfd</b> keyword was added for the <i>component</i> argument to display trace messages relating to the Bidirectional Forwarding Detection (BFD) feature. |
| 12.4(4)T       | Support for the <b>bfd</b> keyword was added for Cisco IOS Release 12.4(4)T.                                                                                                                                                                                                                                                                                                          |
| 12.0(31)S      | Support for the <b>bfd</b> keyword was added for Cisco IOS Release 12.0(31)S.                                                                                                                                                                                                                                                                                                         |
| 12.2(28)SB     | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.                                                                                                                                                                                                                                                                      |
| 12.4(9)T       | The <b>bfd</b> keyword was added as an entry for the <i>component</i> argument to display trace messages relating to crypto fault detection.                                                                                                                                                                                                                                          |
| 12.2(33)SRA    | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                                                                                                                                                                                       |
| 12.2(33)SXH    | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                                                                                                                                                                                                                       |
| 12.2(33)SB     | This command was integrated into Cisco IOS Release 12.2(33)SB.                                                                                                                                                                                                                                                                                                                        |
| 12.4(20)T      | This command was integrated into Cisco IOS Release 12.4(20)T.                                                                                                                                                                                                                                                                                                                         |

**Usage Guidelines**

Use the **show monitor event-trace** command to display trace message information.

The trace function is not locked while information is being displayed to the console, which means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace** command will generate a message

indicating that some messages might be lost; however, messages will continue to display on the console. If the number of lost messages is excessive, the **show monitor event-trace** command will stop displaying messages.

Use the **bfd** keyword for the *component* argument to display trace messages relating to the BFD feature.

Use the **cfp** keyword for the *component* argument to display trace messages relating to the crypto fault detection feature. This keyword displays the contents of the error trace buffers in an encryption data path.

## Examples

### Examples

The following is sample output from the **show monitor event-trace component** command for the interprocess communication (IPC) component. Notice that each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```
Router# show monitor event-trace ipc

3667: 6840.016:Message type:3 Data=0123456789
3668: 6840.016:Message type:4 Data=0123456789
3669: 6841.016:Message type:5 Data=0123456789
3670: 6841.016:Message type:6 Data=0123456
```

### Examples

Use the **show monitor event-trace bfd all** command to display logged messages for important BFD events in the recent past. The following trace messages show BFD session state changes:

```
Router# show monitor event-trace bfd all
3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], event Session
      create, state Unknown -> Fail
3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Fail -> Down
      (from LC)
3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Down -> Init
      (from LC)
3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Init -> Up
      (from LC)
3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], event Session
      create, state Unknown -> Fail
3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], state Fail -> Down
      (from LC)
3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], state Down -> Up
      (from LC)
```

To display trace information for all components configured for event tracing on the networking device, enter the **show monitor event-trace all-traces** command. In this example, separate output is provided for each event, and message numbers are interleaved between the events.

```
Router# show monitor event-trace all-traces

Test1 event trace:
3667: 6840.016:Message type:3 Data=0123456789
3669: 6841.016:Message type:4 Data=0123456789
3671: 6842.016:Message type:5 Data=0123456789
3673: 6843.016:Message type:6 Data=0123456789
Test2 event trace:
3668: 6840.016:Message type:3 Data=0123456789
3670: 6841.016:Message type:4 Data=0123456789
3672: 6842.016:Message type:5 Data=0123456789
3674: 6843.016:Message type:6 Data=0123456789
```

## Examples

The following is sample output from the **show monitor event-trace component latest** command for the **spa** component:

```
Router# show monitor event-trace spa latest
00:01:15.364: subslot 2/3: 4xOC3 POS SPA, TSM Event:inserted New state:wait_psm
_ready
    spa type 0x440
00:02:02.308: subslot 2/0: not present, TSM Event:empty New state:remove
    spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/0: not present, TSM Event:remove_complete New state:idle
00:02:02.308: subslot 2/1: not present, TSM Event:empty New state:remove
    spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/1: not present, TSM Event:remove_complete New state:idle
00:02:02.308: subslot 2/2: not present, TSM Event:empty New state:remove
    spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/2: not present, TSM Event:remove_complete New state:idle
00:02:02.312: subslot 2/3: not present(plugin 4xOC3 POS SPA), TSM Event:empty New
state:remove
    spa type 0x0, fail code 0x0(none)
00:02:02.312: subslot 2/3: not present, TSM Event:remove_complete New state:idle
```

## Examples

If you select Cisco Express Forwarding as the component for which to display event messages, you can use the following additional arguments and keywords: **show monitor event-trace cef [events | interface | ipv6 | ipv4][all]**.

The following example shows the IPv6 or IPv4 events related to the Cisco Express Forwarding component. Each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```
Router# show monitor event-trace cef ipv6 all
00:00:24.612: [Default] *::/*'00 New FIB table [OK]
Router# show monitor event-trace cef ipv4 all
00:00:24.244: [Default] 127.0.0.81/32'01 FIB insert [OK]
```

In the following example, all event trace messages for the Cisco Express Forwarding component are displayed:

```
Router# show monitor event-trace cef events all
00:00:18.884: SubSys fib_ios_chain init
00:00:18.884: Inst unknown-> RP
00:00:24.584: SubSys fib init
00:00:24.592: SubSys fib_ios init
00:00:24.592: SubSys fib_ios_if init
00:00:24.596: SubSys ipv4fib init
00:00:24.608: SubSys ipv4fib_ios init
00:00:24.612: SubSys ipv6fib_ios init
00:00:24.620: Flag IPv4 CEF enabled set to yes
00:00:24.620: Flag 0x7BF6B62C set to yes
00:00:24.620: Flag IPv4 CEF switching enabled set to yes
00:00:24.624: GState CEF enabled
00:00:24.628: SubSys ipv4fib_les init
00:00:24.628: SubSys ipv4fib_pas init
00:00:24.632: SubSys ipv4fib_util init
00:00:25.304: Process Background created
00:00:25.304: Flag IPv4 CEF running set to yes
00:00:25.304: Process Background event loop enter
00:00:25.308: Flag IPv4 CEF switching running set to yes
```

The following example shows Cisco Express Forwarding interface events:

```
Router# show monitor event-trace cef interface all
00:00:24.624: <empty> (sw 4) Create new
00:00:24.624: <empty> (sw 4) SWIDBLnk FastEthernet0/0(4)
00:00:24.624: Fa0/0 (sw 4) NameSet
00:00:24.624: <empty> (hw 1) Create new
```

```

00:00:24.624: <empty>      (hw  1) HWIDBLnk FastEthernet0/0(1)
00:00:24.624: Fa0/0        (hw  1) NameSet
00:00:24.624: <empty>      (sw  3) Create    new
00:00:24.624: <empty>      (sw  3) SWIDBLnk FastEthernet0/1(3)
00:00:24.624: Fa0/1        (sw  3) NameSet
00:00:24.624: <empty>      (hw  2) Create    new

```

## Examples

The following example shows the IPv4 events related to the Cisco Express Forwarding component. Each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```

Router# show monitor event-trace cef ipv4 all
00:00:48.244: [Default] 127.0.0.81/32'01      FIB insert      [OK]

```

In the following example, all event trace message for the Cisco Express Forwarding component are displayed:

```

Router# show monitor event-trace cef events all
00:00:18.884: SubSys    fib_ios_chain init
00:00:18.884: Inst      unknown -> RP
00:00:24.584: SubSys    fib init
00:00:24.592: SubSys    fib_ios init
00:00:24.592: SubSys    fib_ios_if init
00:00:24.596: SubSys    ipv4fib_init
00:00:24.608: SubSys    ipv4fib_ios init
00:00:24.620: Flag      IPv4 CEF enabled set to yes
00:00:24.620: Flag      0x7BF6B62C set to yes
00:00:24.620: Flag      IPv4 CEF switching enabled set to yes
00:00:24.624: GState    CEF enabled
00:00:24.628: SubSys    ipv4fib_les init
00:00:24.628: SubSys    ipv4fib_pas init
00:00:24.632: SubSys    ipv4fib_util init
00:00:25.304: Process  Background created
00:00:25.304: Flag      IPv4 CEF running set to yes
00:00:25.304: Process  Background event loop enter
00:00:25.308: Flag      IPv4 CEF switching running set to yes

```

The following examples show Cisco Express Forwarding interface events:

```

Router# show monitor event-trace cef interface all

00:00:24.624: <empty>      (sw  4) Create    new
00:00:24.624: <empty>      (sw  4) SWIDBLnk FastEthernet1/0/0(4)
00:00:24.624: Fa0/0        (sw  4) NameSet
00:00:24.624: <empty>      (hw  1) Create    new
00:00:24.624: <empty>      (hw  1) HWIDBLnk FastEthernet1/0/0(1)
00:00:24.624: Fa0/0        (hw  1) NameSet
00:00:24.624: <empty>      (sw  3) Create    new
00:00:24.624: <empty>      (sw  3) SWIDBLnk FastEthernet1/1/0(3)
00:00:24.624: Fa0/1        (sw  3) NameSet
00:00:24.624: <empty>      (hw  2) Create    new

```

## Examples

To troubleshoot errors in an encryption datapath, enter the **show monitor event-trace cfd all** command. In this example, events are shown separately, each beginning with a time stamp, followed by data from the error trace buffer. Cisco Technical Assistance Center (TAC) engineers can use this information to diagnose the cause of the errors.



### Note

If no packets have been dropped, this command does not display any output.

```

Router# show monitor event-trace cfd all
00:00:42.452: 450000B4 00060000 FF33B306 02020203 02020204 32040000 F672999C
00000001 7A7690C2 A0A4F8BC E732985C D6FFDCC8 00000001 C0902BD0
A99127AE 8EAA22D4

```



```

00:00:44.452: 450000B4 00070000 FF33B305 02020203 02020204 32040000 F672999C
00000002 93C01218 2325B697 3C384CF1 D6FFDCC8 00000002 BFA13E8A
D21053ED 0F62AB0E
00:00:46.452: 450000B4 00080000 FF33B304 02020203 02020204 32040000 F672999C
00000003 7D2E11B7 A0BA4110 CC62F91E D6FFDCC8 00000003 7236B930
3240CA8C 9EBB44FF
00:00:48.452: 450000B4 00090000 FF33B303 02020203 02020204 32040000 F672999C
00000004 FB6C80D9 1AADF938 CDE57ABA D6FFDCC8 00000004 E10D8028
6BBD748F 87F5E253
00:00:50.452: 450000B4 000A0000 FF33B302 02020203 02020204 32040000 F672999C
00000005 697C8D9D 35A8799A 2A67E97B D6FFDCC8 00000005 BC21669D
98B29FFF F32670F6
00:00:52.452: 450000B4 000B0000 FF33B301 02020203 02020204 32040000 F672999C
00000006 CA18CBC4 0F387FE0 9095C27C D6FFDCC8 00000006 87A54811
AE3A0517 F8AC4E64

```

## Related Commands

| Command                                | Description                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------|
| <b>monitor event-trace (EXEC)</b>      | Controls event trace functions for a specified Cisco IOS software subsystem component. |
| <b>monitor event-trace (global)</b>    | Configures event tracing for a specified Cisco IOS software subsystem component.       |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device.  |

## show monitor event-trace adjacency

To display adjacency trace events, use the **show monitor event-trace adjacency** command in privileged EXEC mode.

**show monitor event-trace adjacency** { **all** | **back** *trace-duration* | **clock** *hh : mm* [ *date* ] [ *month* ] | **from-boot** [ *seconds* ] | **latest** } [ **detail** ] | **parameters** }

### Syntax Description

|                             |                                                                                                                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>                  | Displays all event trace messages in the current buffer.                                                                                                        |
| <b>back</b>                 | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                          |
| <i>trace-duration</i>       | The time duration in hours and minutes format (mmm or hhh:mm).                                                                                                  |
| <b>clock</b> <i>hh : mm</i> | Displays event trace messages starting from a specified time in hours and minutes format (hh:mm).                                                               |
| <i>date</i>                 | (Optional) Day of the month from 1 to 31.                                                                                                                       |
| <i>month</i>                | (Optional) Month of the year.                                                                                                                                   |
| <b>from-boot</b>            | Displays event trace messages starting after booting up (uptime).                                                                                               |
| <i>seconds</i>              | (Optional) The specified number of seconds following bootup (uptime) after which event trace messages should start being displayed. The range is from 0 to 785. |
| <b>latest</b>               | Displays the latest trace events since last display.                                                                                                            |
| <b>detail</b>               | (Optional) Displays detailed trace information.                                                                                                                 |
| <b>parameters</b>           | Displays the parameters configured for the trace.                                                                                                               |

### Command Modes

Privileged EXEC (#)

### Command History

| Release   | Modification                 |
|-----------|------------------------------|
| 12.2(25)S | This command was introduced. |

| Release                  | Modification                                                                        |
|--------------------------|-------------------------------------------------------------------------------------|
| 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB.                      |
| 12.4(18)T                | This command was integrated into Cisco IOS Release 12.4(18)T.                       |
| 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                     |
| 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                     |
| Cisco IOS XE Release 2.1 | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |

## Examples

The following is sample output from the **show monitor event-trace adjacency all** command. The fields are self-explanatory.

Router# **show monitor event-trace adjacency all**

```
*Aug 7 05:13:56.408: GLOBAL: adj system chunk pool created (element size 276) [OK]
*Aug 7 05:13:56.408: GLOBAL: adj system state change to adjacency system up [OK]
*Aug 7 05:13:56.408: GLOBAL: adj manager background process started [OK]
*Aug 7 05:13:56.408: GLOBAL: adj ios manager up [OK]
*Aug 7 05:13:56.408: GLOBAL: adj ios manager add enable [OK]
*Aug 7 05:13:56.924: GLOBAL: adj ipv4 bundle changed to IPv4 no fixup, no
redirect adj oce [OK]
*Aug 7 05:14:07.928: GLOBAL: adj mgr notified of fibidb state change int
SSLVPN-VIF0 to up [OK]
*Aug 7 05:14:11.320: GLOBAL: adj mgr notified of fibidb state change int
FastEthernet0/0 to up [OK]
*Aug 7 05:14:11.320: GLOBAL: adj mgr notified of fibidb state change int
FastEthernet0/1 to up [OK]
*Aug 7 05:14:11.324: GLOBAL: adj mgr notified of fibidb state change int
*Aug 7 05:14:11.324: GLOBAL: adj mgr notified of fibidb state change int
Serial3/1 to up [OK]
*Aug 7 05:14:12.064: GLOBAL: adj mgr notified of fibidb state change int
Serial3/0 to down [OK]
*Aug 7 05:14:12.080: GLOBAL: adj mgr notified of fibidb state change int
Serial3/1 to down [OK]
*Aug 7 05:14:17.292: GLOBAL: adj ipv4 bundle changed to IPv4 no fixup adj oce [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: update oce bundle, IPv4
incomplete adj oce [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: allocate [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: request resolution [OK]
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: request to add ARP [OK]
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: allocate [Ignr]
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: add source ARP [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: request to update [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: update oce bundle, IPv4
no fixup adj oce [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: update [OK] IPv4 no
fixup adj oce [OK]
*Aug 7 05:14:11.324: GLOBAL: adj mgr notified of fibidb state change int
Serial3/1 to up [OK]
*Aug 7 05:14:12.064: GLOBAL: adj mgr notified of fibidb state change int
Serial3/0 to down [OK]
*Aug 7 05:14:12.080: GLOBAL: adj mgr notified of fibidb state change int
Serial3/1 to down [OK]
*Aug 7 05:14:17.292: GLOBAL: adj ipv4 bundle changed to IPv4 no fixup adj oce [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: update oce bundle, IPv4
incomplete adj oce [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: allocate [OK]
*Aug 7 05:14:17.292: ADJ: IP 10.4.9.1 FastEthernet0/0: request resolution [OK]
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: request to add ARP [OK]
```

```
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: allocate [Ignr]
*Aug 7 09:10:25.576: ADJ: IP 10.4.9.1 FastEthernet0/0: add source ARP [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: request to update [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: update oce bundle, IPv4
no fixup adj oce [OK]
*Aug 7 09:10:25.580: ADJ: IP 10.4.9.1 FastEthernet0/0: update [OK]
```

**Related Commands**

| Command                                | Description                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------|
| <b>monitor event-trace (EXEC)</b>      | Controls event trace functions for a specified Cisco IOS software subsystem component. |
| <b>monitor event-trace (global)</b>    | Configures event tracing for a specified Cisco IOS software subsystem component.       |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device.  |

## show monitor event-trace cef

To display event trace messages for Cisco Express Forwarding, use the **show monitor event-trace cef** command in privileged EXEC mode.

**show monitor event-trace cef** {**all** [**detail**]| **back** {*minutes*| *hours : minutes*} [**detail**]| **clock** *hours : minutes* [*day month*] [**detail**]| **from-boot** [*seconds*] [**detail**]| **latest** [**detail**]| **merged** {**all** [**detail**]| **back** {*minutes*| *hours : minutes*} [**detail**]| **clock** *hours : minutes* [*day month*] [**detail**]| **from-boot** [*seconds*] [**detail**]| **latest** [**detail**]}}

### Syntax Description

|                        |                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>             | Displays all event trace messages currently in memory for Cisco Express Forwarding.                                                                                     |
| <b>detail</b>          | (Optional) Displays detailed trace information.                                                                                                                         |
| <b>back</b>            | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                                  |
| <i>minutes</i>         | Specifies the time argument in minutes. The time argument is specified in minutes format (mmm).                                                                         |
| <i>hours : minutes</i> | Specifies the time argument in hours and minutes. The time argument is specified in hours and minutes format (hh:mm).                                                   |
| <b>clock</b>           | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                  |
| <i>day month</i>       | (Optional) The day of the month from 1 to 31 and the month of the year.                                                                                                 |
| <b>from-boot</b>       | Displays event trace messages starting after booting (uptime).<br>To display the uptime, in seconds, enter the <b>show monitor event-trace cef from-boot ?</b> command. |
| <i>seconds</i>         | (Optional) Displays event trace messages starting from a specified number of seconds after booting (uptime). Range: 0 to 3369.                                          |
| <b>latest</b>          | Displays only the event trace messages since the last <b>show monitor event-trace cef</b> command was entered.                                                          |
| <b>merged</b>          | Displays entries in all event traces sorted by time.                                                                                                                    |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

Use the **show monitor event-trace cef** command to display trace message information for Cisco Express Forwarding.

The trace function is not locked while information is displayed to the console, which means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace cef** command generates a message indicating that some messages might be lost; however, messages continue to display on the console. If the number of lost messages is excessive, the **show monitor event-trace cef** command stops displaying messages.

**Examples**

The following is sample output from the **show monitor event-trace cef all** command:

```
Router# show monitor event-trace cef all
cef_events:
*Aug 22 20:14:58.999: SubSys  ipv4fib_ios_def_cap init
*Aug 22 20:14:58.999: SubSys  ipv6fib_ios_def_cap init
*Aug 22 20:14:58.999: Inst    unknown -> RP
*Aug 22 20:14:58.999: SubSys  fib_ios_chain init
*Aug 22 20:14:59.075: SubSys  fib_init
*Aug 22 20:14:59.075: SubSys  ipv4fib init
*Aug 22 20:14:59.075: SubSys  fib_ios init
*Aug 22 20:14:59.075: SubSys  fib_ios_if init
*Aug 22 20:14:59.075: SubSys  ipv4fib_ios init
*Aug 22 20:14:59.075: Flag    Common CEF enabled set to yes
*Aug 22 20:14:59.075: Flag    IPv4 CEF enabled set to yes
*Aug 22 20:14:59.075: Flag    IPv4 CEF switching enabled set to yes
*Aug 22 20:14:59.075: GState  CEF enabled
*Aug 22 20:14:59.075: SubSys  ipv6fib_ios init
*Aug 22 20:14:59.075: SubSys  ipv4fib_util init
*Aug 22 20:14:59.075: SubSys  ipv4fib_les init
*Aug 22 20:15:02.907: Process Background created
*Aug 22 20:15:02.907: Flag    IPv4 CEF running set to yes
*Aug 22 20:15:02.907: Process Background event loop enter
*Aug 22 20:15:02.927: Flag    IPv4 CEF switching running set to yes

cef_interface:
*Aug 22 20:14:58.999: Et0/0      (hw  3) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/1      (hw  4) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/2      (hw  5) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/3      (hw  6) SWvecLES <unknown> (0x01096A3C)
```

```

*Aug 22 20:14:58.999: Et1/0      (hw  7) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et1/1      (hw  8) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et1/2      (hw  9) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et1/3      (hw 10) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Se2/0      (hw 11) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Se2/1      (hw 12) SWvecLES <unknown> (0x01096A3C)
.
.
.

```

The output is in table format where the first column contains a timestamp, the second column lists the type of event, and the third column lists the detail for the event.

The table below describes the significant fields shown in the display.

**Table 74: show monitor event -trace cef all Field Descriptions**

| Field                 | Description                                                                                                                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *Aug 22 20:14:58.999: | A timestamp that indicates the month, day, and time when the event was captured.                                                                                                                                       |
| cef_events            | Indicates that messages about Cisco Express Forwarding events will follow.                                                                                                                                             |
| SubSys                | The event type that is related to the initialization of a subset of functionality. For example, "ipv4fib_ios_def_cap init" is the initialization of IPv4 Cisco Express Forwarding IOS default capabilities.            |
| Inst                  | The event type that records changes to an instance, such as changes to a Route Processor (RP) or line card. For example, a change from unknown to RP occurs at startup when the software detects what the instance is. |
| Flag                  | The event type that records changes to Cisco Express Forwarding control flags that handle what is running, for example, "Common CEF enabled set to yes".                                                               |
| GState                | The event type that notes changes to the Cisco Express Forwarding global state: "CEF enabled" or "CEF disabled".                                                                                                       |
| Process               | The event type that records when Cisco Express Forwarding processes are created, begin, or complete normal operations,                                                                                                 |
| cef_interface         | Indicates that messages about Cisco Express Forwarding interface events will follow.                                                                                                                                   |
| Et0/0                 | Indicates that the following recorded event affects interface Ethernet 0/0.                                                                                                                                            |

| Field                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (hw 3) SWvecLES <unknown> (0x01096A3C) | <p>The detail for this event is as follows:</p> <ul style="list-style-type: none"> <li>• (hw3)--The hardware interface descriptor block (idb) number for the interface</li> <li>• SWvecLES--The switching vector for this interface is changed to the LES path</li> <li>• &lt;unknown&gt;--The switching vector name is unknown</li> <li>• (0x01096A3C)--The address in memory of the switching vector</li> </ul> |

The following is sample output from the **show monitor event-trace cef latest** command:

```
Router# show monitor event-trace cef latest
cef_events:
cef_interface:
*Aug 22 20:14:59.075: Se3/0          (sw 15) FlagCha  0x60C1 add puntLC
*Aug 22 20:14:59.075: <empty>      (hw 16) State    down -> up
*Aug 22 20:14:59.075: <empty>      (hw 16) Create   new
*Aug 22 20:14:59.075: Se3/1        (hw 16) NameSet
*Aug 22 20:14:59.075: Se3/1        (hw 16) HWIDBLnk Serial3/1(16)
*Aug 22 20:14:59.075: Se3/1        (hw 16) RCFlags  None -> Fast
*Aug 22 20:14:59.075: <empty>      (sw 16) VRFLink  IPv4:id0 - success
*Aug 22 20:14:59.075: <empty>      (sw 16) State    deleted -> down
*Aug 22 20:14:59.075: <empty>      (sw 16) Create   new
*Aug 22 20:14:59.075: Se3/1        (sw 16) NameSet
*Aug 22 20:14:59.075: Se3/1        (sw 16) FIBHWLnk Serial3/1(16)
*Aug 22 20:14:59.075: Se3/1        (sw 16) SWIDBLnk Serial3/1(16)
*Aug 22 20:14:59.075: Se3/1        (sw 16) FlagCha  0x6001 add p2p|input|first
*Aug 22 20:14:59.075: Se3/1        (sw 16) FlagCha  0x6041 add auto_adj
*Aug 22 20:14:59.075: Se3/1        (sw 16) Impared  lc rea Queueing configuration
*Aug 22 20:14:59.075: Se3/1        (sw 16) FlagCha  0x60C1 add puntLC
*Aug 22 20:14:59.075: <empty>      (hw 17) State    down -> up
*Aug 22 20:14:59.075: <empty>      (hw 17) Create   new
*Aug 22 20:14:59.075: Se3/2        (hw 17) NameSet
```

The table below describes the significant fields shown in the display.



**Table 75: show monitor event-trace cef latest Field Descriptions**

| Field                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (sw15)<br>FlagCha 0x60C1 add puntLC | <p>The detail for this event is as follows:</p> <ul style="list-style-type: none"> <li>• (sw 15)--The software idb number for the interface.</li> <li>• FlagCha--Indicates a Forwarding Information Base interface descriptor block (fibidb) flag change for the interface.</li> <li>• 0x60C1--The flag field in hexadecimals after the change.</li> <li>• add--Flags are added.</li> <li>• puntLC--Changed flag or flags--puntLC is one flag that indicates packets that are switched to this interface on the linecard are handled by the next slower path (not switched by Cisco Express Forwarding).</li> </ul> |
| State                               | Indicates a change in state, for example when an interface goes from an up state to a down state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Create                              | Indicates that an interface was created.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Nameset                             | Indicates that the name of the interface changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RCFlags                             | Indicates that a route cache change occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Related Commands**

| Command                                      | Description                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>        | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>      | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef events</b>   | Displays event trace messages for Cisco Express Forwarding events.           |

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## show monitor event-trace cef events

To display event trace messages for Cisco Express Forwarding events, use the **show monitor event-trace cef events** command in privileged EXEC mode.

**show monitor event-trace cef events** {**all** [**detail**] | **back** {*minutes* | *hours : minutes*} [**detail**] | **clock** *hours : minutes* [*day month*] [**detail**] | **from-boot** [*seconds*] [**detail**] | **latest** [**detail**] | **parameters**}

### Syntax Description

|                        |                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>             | Displays all event trace messages currently in memory for Cisco Express Forwarding.                                                                                     |
| <b>detail</b>          | (Optional) Displays detailed trace information.                                                                                                                         |
| <b>back</b>            | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                                  |
| <i>minutes</i>         | Time argument (mmm) in minutes.                                                                                                                                         |
| <i>hours : minutes</i> | Time argument (hh:mm) in hours and minutes. You must enter the colon (:) in the argument.                                                                               |
| <b>clock</b>           | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                  |
| <i>day month</i>       | (Optional) The day of the month from 1 to 31 and the name of the month of the year.                                                                                     |
| <b>from-boot</b>       | Displays event trace messages starting after booting (uptime).<br>To display the uptime, in seconds, enter the <b>show monitor event-trace cef from-boot ?</b> command. |
| <i>seconds</i>         | (Optional) Displays event trace messages starting from a specified number of seconds after booting (uptime). Range: 0 to 3279.                                          |
| <b>latest</b>          | Displays only the event trace messages generated since the last <b>show monitor event-trace cef</b> command was entered.                                                |
| <b>parameters</b>      | Displays parameters configured for the trace. The only parameter displayed is the size (number of trace messages) of the trace file.                                    |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

Use the **show monitor event-trace cef events** command to display trace message information about events associated with Cisco Express Forwarding.

The trace function is not locked while information is being displayed to the console. This means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace cef events** command generates a message indicating that some messages might be lost; however, messages continue to be displayed on the console. If the number of lost message is excessive, the **show monitor event-trace cef events** command stops displaying messages.

**Examples**

The following is sample output from the **show monitor event-trace cef events all** command:

```
Router# show monitor event-trace cef events all
*Aug 13 17:38:27.999: SubSys  ipv4fib_ios_def_cap init
*Aug 13 17:38:27.999: SubSys  ipv6fib_ios_def_cap init
*Aug 13 17:38:27.999: Inst    unknown -> RP
*Aug 13 17:38:27.999: SubSys  fib_ios_chain init
*Aug 13 17:38:28.199: SubSys  fib init
*Aug 13 17:38:28.199: SubSys  ipv4fib init
*Aug 13 17:38:28.199: SubSys  fib_ios init
*Aug 13 17:38:28.199: SubSys  fib_ios_if init
*Aug 13 17:38:28.199: SubSys  ipv4fib_ios init
*Aug 13 17:38:28.199: Flag    Common CEF enabled set to yes
*Aug 13 17:38:28.199: Flag    IPv4 CEF enabled set to yes
*Aug 13 17:38:28.199: Flag    IPv4 CEF switching enabled set to yes
*Aug 13 17:38:28.199: GState  CEF enabled
*Aug 13 17:38:28.199: SubSys  ipv6fib_ios init
*Aug 13 17:38:28.199: SubSys  ipv4fib_util init
*Aug 13 17:38:28.199: SubSys  ipv4fib_les init
*Aug 13 17:38:34.059: Process Background created
*Aug 13 17:38:34.059: Flag    IPv4 CEF running set to yes
*Aug 13 17:38:34.059: Process Background event loop enter
*Aug 13 17:38:34.079: Flag    IPv4 CEF switching running set to yes
```

The table below describes the significant fields shown in the display.

**Table 76: show monitor event-trace cef events all Field Descriptions**

| Field                 | Description                                                                                                                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *Aug 13 17:38:27.999: | A time stamp that indicates the month, day, and time when the event was captured.                                                                                                                                      |
| SubSys                | The event type that is related to the initialization of a subset of functionality. For example, "ipv4fib_ios_def_cap init" is the initialization of IPv4 Cisco Express Forwarding IOS default capabilities.            |
| Inst                  | The event type that records changes to an instance, such as changes to a Route Processor (RP) or line card. For example, a change from unknown to RP occurs at startup when the software detects what the instance is. |
| Flag                  | The event type that records changes to Cisco Express Forwarding control flags that handle what is running, for example, "Common CEF enabled set to yes".                                                               |
| GState                | The event type that notes changes to the Cisco Express Forwarding global state: "CEF enabled" or "CEF disabled".                                                                                                       |
| Process               | The event type that records when Cisco Express Forwarding processes are created, begin, or complete normal operations,                                                                                                 |

**Related Commands**

| Command                                      | Description                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>        | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>      | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>          | Displays event trace messages for Cisco Express Forwarding.                  |

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv4</b>      | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## show monitor event-trace cef interface

To display event trace messages for Cisco Express Forwarding interface events, use the **show monitor event-trace cef interface** command in privileged EXEC mode

```
show monitor event-trace cef interface {all [detail]| back {minutes| hours : minutes} [detail]| clock hours : minutes [day month] [detail]| from-boot [ seconds ] [detail]| latest [detail]| parameters| {hw| sw} interface-index {all [detail]| back {minutes| hours : minutes} [detail]| clock hours : minutes [day month] [detail]| from-boot [ seconds ] [detail]| latest [detail]}}
```

### Syntax Description

|                               |                                                                                                                                                                             |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>all</b>                    | Displays all event trace messages currently in memory for Cisco Express Forwarding.                                                                                         |
| <b>detail</b>                 | (Optional) Displays detailed trace information for Cisco Express Forwarding interface events.                                                                               |
| <b>back</b>                   | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                                      |
| <i>minutes</i>                | Time argument (mmm) in minutes.                                                                                                                                             |
| <i>hours</i> : <i>minutes</i> | Time argument (hh:mm) in hours and minutes. You must enter the colon (:) in the argument.                                                                                   |
| <b>clock</b>                  | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                      |
| <i>day month</i>              | (Optional) The day of the month from 1 to 31 and the name of the month of the year.                                                                                         |
| <b>from-boot</b>              | Displays event trace messages starting after booting (uptime).<br><br>To display the uptime, in seconds, enter the <b>show monitor event-trace cef from-boot ?</b> command. |
| <i>seconds</i>                | (Optional) Displays event trace messages starting from a specified number of seconds after booting (uptime). Range: 0 to 4429.                                              |
| <b>latest</b>                 | Displays only the event trace messages generated since the last <b>show monitor event-trace cef</b> command was entered.                                                    |
| <b>parameter</b>              | Displays parameters configured for the trace.                                                                                                                               |

|                        |                                                                   |
|------------------------|-------------------------------------------------------------------|
| <b>hw</b>              | Displays trace events for the specified hardware interface index. |
| <b>sw</b>              | Displays trace events for the specified hardware interface index  |
| <i>interface-index</i> | Specifies the interface index. Range: 0 to 10000.                 |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

Use the **show monitor event-trace cef interface** to display trace message information about interface events associated with Cisco Express Forwarding.

The trace function is not locked while information is displayed to the console. This means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace cef interface** command generates a message indicating that some messages might be lost; however, messages continue to be displayed on the console. If the number of lost messages is excessive, the **show monitor event-trace cef interface** command stops displaying messages.

**Examples**

The following is sample output from the **show monitor event-trace cef interface latest** command:

```
Router# show monitor event-trace cef interface latest
*Aug 22 20:14:58.999: Et0/0      (hw  3) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/1      (hw  4) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/2      (hw  5) SWvecLES <unknown> (0x01096A3C)
*Aug 22 20:14:58.999: Et0/3      (hw  6) SWvecLES <unknown> (0x01096A3C)
.
.
.
*Aug 22 20:14:59.075: <empty>    (hw  3) State      down -> up
*Aug 22 20:14:59.075: <empty>    (hw  3) Create     new
*Aug 22 20:14:59.075: Et0/0      (hw  3) NameSet
*Aug 22 20:14:59.075: Et0/0      (hw  3) HWIDBLnk   Ethernet0/0(3)
*Aug 22 20:14:59.075: Et0/0      (hw  3) RCFlags    None -> Fast
*Aug 22 20:14:59.075: <empty>    (sw  3) VRFLink    IPv4:id0 - success
```



```

*Aug 22 20:14:59.075: <empty>          (sw 3) State      deleted -> down
*Aug 22 20:14:59.075: <empty>          (sw 3) Create     new
*Aug 22 20:14:59.075: Et0/0           (sw 3) NameSet
*Aug 22 20:14:59.075: Et0/0           (sw 3) FIBHWLnk   Ethernet0/0(3)
*Aug 22 20:14:59.075: Et0/0           (sw 3) SWIDBLnk   Ethernet0/0(3)
*Aug 22 20:14:59.075: Et0/0           (sw 3) FlagCha    0x6000 add input|first
*Aug 22 20:14:59.075: Et0/0           (sw 3) State      down -> up
*Aug 22 20:14:59.075: <empty>          (hw 4) State      down -> up
*Aug 22 20:14:59.075: <empty>          (hw 4) Create     new
*Aug 22 20:14:59.075: Et0/1           (hw 4) NameSet
*Aug 22 20:14:59.075: Et0/1           (hw 4) HWIDBLnk   Ethernet0/1(4)
*Aug 22 20:14:59.075: Et0/1           (hw 4) RCFlags    None -> Fast
*Aug 22 20:14:59.075: <empty>          (sw 4) VRFLnk    IPv4:id0 - success
*Aug 22 20:14:59.075: <empty>          (sw 4) State      deleted -> down
*Aug 22 20:14:59.075: <empty>          (sw 4) Create     new
*Aug 22 20:14:59.075: Et0/1           (sw 4) NameSet
*Aug 22 20:14:59.075: Et0/1           (sw 4) FIBHWLnk   Ethernet0/1(4)
*Aug 22 20:14:59.075: Et0/1           (sw 4) SWIDBLnk   Ethernet0/1(4)
*Aug 22 20:14:59.075: Et0/1           (sw 4) FlagCha    0x6000 add input|first
*Aug 22 20:14:59.075: Et0/1           (sw 4) State      down -> up
.
.
.

```

The table below describes the significant fields shown in the display.

**Table 77: show monitor event-trace cef interface latest Field Descriptions**

| Field                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Et0/0                                 | Indicates that the following recorded event affects interface Ethernet 0/0.                                                                                                                                                                                                                                                                                                                                       |
| (hw3) SWvecLES <unknown> (0x01096A3C) | <p>The detail for this event is as follows:</p> <ul style="list-style-type: none"> <li>• (hw3)--The hardware interface descriptor block (idb) number for the interface</li> <li>• SWvecLES--The switching vector for this interface is changed to the LES path</li> <li>• &lt;unknown&gt;--The switching vector name is unknown</li> <li>• (0x01096A3C)--The address in memory of the switching vector</li> </ul> |
| State                                 | Indicates a change in state, for example, when an interface goes from the up state to the down state.                                                                                                                                                                                                                                                                                                             |
| Create                                | Indicates that an interface was created.                                                                                                                                                                                                                                                                                                                                                                          |
| Nameset                               | Indicates that the name of the interface changed.                                                                                                                                                                                                                                                                                                                                                                 |
| RCFlags                               | Indicates that a route cache change occurred.                                                                                                                                                                                                                                                                                                                                                                     |
| FlagCha                               | Indicates that a Forwarding Information Base interface descriptor block (fibidb) flag changed for the interface.                                                                                                                                                                                                                                                                                                  |

**Related Commands**

| <b>Command</b>                               | <b>Description</b>                                                           |
|----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>        | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>      | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>          | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>   | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef ipv4</b>     | Displays event trace messages for Cisco Express Forwarding IPv4 events.      |
| <b>show monitor event-trace cef ipv6</b>     | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## show monitor event-trace cef ipv4

To display event trace messages for Cisco Express Forwarding IPv4 events, use the **show monitor event-trace cef ipv4** command in privileged EXEC mode.

**show monitor event-trace cef ipv4** *{ {ip-address| vrf vrf-name ip-address} {all [detail]| back {minutes| hours : minutes} [detail]| clock hours : minutes [day month] [detail]| from-boot seconds [detail]| latest [detail]} | all [detail]| back {minutes| hours : minutes} [detail]| clock hours : minutes [day month] [detail]| from-boot seconds [detail]| latest [detail]| parameters}*

### Syntax Description

|                            |                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ip-address</i>          | Specifies an IP address of interest in A.B.C.D format.                                                                                                                              |
| <b>vrf</b> <i>vrf-name</i> | Specifies a Cisco Express Forwarding IPv4 Virtual Private Network (VPN) routing and Forwarding (VRF) table. The <i>vrf-name</i> argument specifies the name of the VRF of interest. |
| <b>all</b>                 | Displays all event trace messages currently in memory for Cisco Express Forwarding IPv4 events.                                                                                     |
| <b>detail</b>              | (Optional) Displays detailed trace information for Cisco Express Forwarding IPv4 events.                                                                                            |
| <b>back</b>                | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                                              |
| <i>minutes</i>             | Time argument (mmm) in minutes.                                                                                                                                                     |
| <i>hours : minutes</i>     | Time argument (hh:mm) in hours and minutes. You must enter the colon (:) in the argument.                                                                                           |
| <b>clock</b>               | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                              |
| <i>day month</i>           | (Optional) The day of the month from 1 to 31 and the name of the month of the year.                                                                                                 |
| <b>from-boot</b>           | Displays event trace messages starting after booting (uptime).<br><br>To display the uptime, in seconds, enter the <b>show monitor event-trace cef from-boot ?</b> command.         |
| <i>seconds</i>             | (Optional) Displays event trace messages starting from a specified number of seconds after booting (uptime). Range: 0 to 3279.                                                      |

|                   |                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>latest</b>     | Displays only the event trace messages generated since the last <b>show monitor event-trace cef ipv4</b> command was entered. |
| <b>parameters</b> | Displays parameters configured for the trace.                                                                                 |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

Use the **show monitor event-trace cef ipv4** command to display trace message information for Cisco Express Forwarding IPv4 events.

The trace function is not locked while information is displayed to the console. This means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace cef ipv4** command generates a message indicating that some messages might be lost; however, messages continue to be displayed on the console. If the number of lost messages is excessive, the **show monitor event-trace cef ipv4** command stops displaying messages.

**Examples**

The following is sample output from the **show monitor event-trace cef ipv4 all** command:

```
Router# show monitor event-trace cef ipv4 all
*Aug 22 20:14:59.075: [Default] *.*.*/*          Allocated FIB table
                        [OK]
*Aug 22 20:14:59.075: [Default] *.*.*/*'00      Add source Default table
                        [OK]
*Aug 22 20:14:59.075: [Default] 0.0.0.0/0'00    FIB add src DRH (ins)
                        [OK]
*Aug 22 20:14:59.075: [Default] *.*.*/*'00      New FIB table
                        [OK]
*Aug 22 20:15:02.927: [Default] *.*.*/*'00      FIB refresh start
                        [OK]
.
.
.
```

The table below describes the significant fields shown in the display.

**Table 78: show monitor event-trace cef ipv4 all Field Descriptions**

| Field                    | Description                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| *Aug 22 20:14:59.075:    | Time stamp that indicates the month, day, and time when the event was captured.                                                           |
| [Default] *.*.*.*/*      | Identifies the default VRF.                                                                                                               |
| Allocated FIB table [OK] | Provides the event detail and indicates if the event happened or if it was ignored ([Ignr]). In this instance, a FIB table was allocated. |
| Add source Default table | Indicates that a source for the Default table was added.                                                                                  |

Following is sample output from the **show monitor event-trace cef ipv4 parameters** command:

```
Router# show monitor event-trace cef ipv4 parameters
Trace has 1000 entries
Stacktrace is disabled by default
Matching all events
The table below describes the significant fields shown in the display.
```

**Table 79: show monitor event-trace cef ipv4 parameters Field Descriptions**

| Field                             | Description                                           |
|-----------------------------------|-------------------------------------------------------|
| Trace has 1000 entries            | The size of the event logging buffer is 1000 entries. |
| Stacktrace is disabled by default | Stack trace at tracepoints is disabled.               |
| Matching all events               | Event tracing for all events is matched.              |

## Related Commands

| Command                                      | Description                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>        | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>      | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b> | Configures event tracing for Cisco Express Forwarding IPv6 events.           |

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>    | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |
| <b>show monitor event-trace cef ipv6</b>      | Displays event trace messages for Cisco Express Forwarding IPv6 events.      |

## show monitor event-trace cef ipv6

To display event trace messages for Cisco Express Forwarding IPv6 events, use the **show monitor event-trace cef ipv6** command in privileged EXEC mode.

**show monitor event-trace cef ipv6** {*ipv6-address* {**all** [**detail**] | **back** {*minutes* | *hours : minutes*} [**detail**] | **clock** *hours : minutes* [*day month*] [**detail**] | **from-boot** *seconds* [**detail**] | **latest** [**detail**] } | **all** [**detail**] | **back** {*minutes* | *hours : minutes*} [**detail**] | **clock** *hours : minutes* [*day month*] [**detail**] | **from-boot** *seconds* [**detail**] | **latest** [**detail**] | **parameters**}

### Syntax Description

|                        |                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ipv6-address</i>    | Specifies an IPv6 address. This address must be specified in hexadecimal using 16-bit values between colons, as specified in RFC 2373.                                  |
| <b>all</b>             | Displays all event trace messages currently in memory for Cisco Express Forwarding IPv6 events.                                                                         |
| <b>detail</b>          | (Optional) Displays detailed trace information for Cisco Express Forwarding IPv6 events.                                                                                |
| <b>back</b>            | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes.                                  |
| <i>minutes</i>         | Time argument (mmm) in minutes.                                                                                                                                         |
| <i>hours : minutes</i> | Time argument (hh:mm) in hours and minutes. You must enter the colon (:) in the argument.                                                                               |
| <b>clock</b>           | Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).                                                                  |
| <i>day month</i>       | (Optional) The day of the month from 1 to 31 and the name of the month of the year.                                                                                     |
| <b>from-boot</b>       | Displays event trace messages starting after booting (uptime).<br>To display the uptime, in seconds, enter the <b>show monitor event-trace cef from-boot ?</b> command. |
| <i>seconds</i>         | (Optional) Displays event trace messages starting from a specified number of seconds after booting (uptime). Range: 0 to 3279.                                          |
| <b>latest</b>          | Displays only the event trace messages generated since the last <b>show monitor event-trace cef ipv6</b> command was entered.                                           |

|                   |                                               |
|-------------------|-----------------------------------------------|
| <b>parameters</b> | Displays parameters configured for the trace. |
|-------------------|-----------------------------------------------|

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

Use the **show monitor event-trace cef ipv6** command to display trace message information for Cisco Express Forwarding IPv6 events.

The trace function is not locked while information is displayed to the console. This means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace cef ipv6** command generates a message indicating that some messages might be lost; however, messages continue to be displayed on the console. If the number of lost messages is excessive, the **show monitor event-trace cef ipv6** command stops displaying messages.

**Examples**

The following is a sample of the **show monitor event-trace cef ipv6 all** command:

```
Router# show monitor event-trace cef ipv6 all
*Aug 22 20:14:59.075: [Default] *::*/*           Allocated FIB table
                        [OK]
*Aug 22 20:14:59.075: [Default] *::*/'00        Add source Default table
                        [OK]
*Aug 22 20:14:59.075: [Default] ::/0'00        FIB add src DRH (ins)
                        [OK]
*Aug 22 20:14:59.075: [Default] *::*/'00        New FIB table
                        [OK]
```

The table below describes the significant fields shown in the display.

**Table 80: show monitor event-trace cef ipv6 all Field Descriptions**

| Field                 | Description                                                                     |
|-----------------------|---------------------------------------------------------------------------------|
| *Aug 22 20:14:59.075: | Time stamp that indicates the month, day, and time when the event was captured. |



| Field                    | Description                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------|
| [Default] *::*/*         | Identifies the default VRF.                                                                                 |
| Allocated FIB table [OK] | Provides the event detail and indicates if the event happened. In this instance, a FIB table was allocated. |

The following is sample output from the **show monitor event-trace cef ipv6 parameters** command:

```
Router# show monitor event-trace cef ipv6 parameters
Trace has 1000 entries
Stacktrace is disabled by default
Matching all events
The table below describes the significant fields shown in the display.
```

**Table 81: show monitor event-trace cef ipv6 parameters Field Descriptions**

| Field                             | Description                                           |
|-----------------------------------|-------------------------------------------------------|
| Trace has 1000 entries            | The size of the event logging buffer is 1000 entries. |
| Stacktrace is disabled by default | Stack trace at tracepoints is disabled.               |
| Matching all events               | Event tracing for all events is matched.              |

## Related Commands

| Command                                       | Description                                                                  |
|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>monitor event-trace cef (EXEC)</b>         | Monitors and controls the event trace function for Cisco Express Forwarding. |
| <b>monitor event-trace cef (global)</b>       | Configures event tracing for Cisco Express Forwarding.                       |
| <b>monitor event-trace cef ipv4 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv4 events.           |
| <b>monitor event-trace cef ipv6 (global)</b>  | Configures event tracing for Cisco Express Forwarding IPv6 events.           |
| <b>show monitor event-trace cef</b>           | Displays event trace messages for Cisco Express Forwarding.                  |
| <b>show monitor event-trace cef events</b>    | Displays event trace messages for Cisco Express Forwarding events.           |
| <b>show monitor event-trace cef interface</b> | Displays event trace messages for Cisco Express Forwarding interface events. |

| Command                           | Description                                                             |
|-----------------------------------|-------------------------------------------------------------------------|
| show monitor event-trace cef ipv4 | Displays event trace messages for Cisco Express Forwarding IPv4 events. |

## show monitor event-trace continuous

To display event trace messages of components that have enabled continuous display, use the **show monitor event-trace continuous** command in privileged EXEC mode.

**show monitor event-trace continuous**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release                  | Modification                                                                        |
|-----------------|--------------------------|-------------------------------------------------------------------------------------|
|                 | 12.2(25)S                | This command was introduced.                                                        |
|                 | 12.4(2)T                 | This command was integrated into Cisco IOS Release 12.3(2)T.                        |
|                 | 12.2(28)SB               | This command was integrated into Cisco IOS Release 12.2(28)SB.                      |
|                 | 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                     |
|                 | 12.2(33)SXH              | This command was integrated into Cisco IOS Release 12.2(33)SXH.                     |
|                 | Cisco IOS XE Release 2.1 | This command was implemented on Cisco ASR 1000 Series Aggregation Services Routers. |

**Examples** The following is sample output from the **show monitor event-trace continuous** command. The fields are self-explanatory.

```
Router# show monitor event-trace continuous

Event trace continuous display enabled for:
datainteg
tunnel
adjacency
```

| Related Commands | Command                             | Description                                                                            |
|------------------|-------------------------------------|----------------------------------------------------------------------------------------|
|                  | <b>monitor event-trace (EXEC)</b>   | Controls event trace functions for a specified Cisco IOS software subsystem component. |
|                  | <b>monitor event-trace (global)</b> | Configures event tracing for a specified Cisco IOS software subsystem component.       |

| Command                                | Description                                                                           |
|----------------------------------------|---------------------------------------------------------------------------------------|
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device. |

## show monitor event-trace cpu-report

To display event trace messages for the CPU, use the **show monitor event-trace cpu-report** command in user EXEC or privileged EXEC mode.

**show monitor event-trace cpu-report** {**brief** | **all** | **back** {*mmm* | *hhh : mm*} | **clock** *hh : mm* [*date month* | *month date*] | **from-boot** [*seconds*] | **latest** | **detail** | **handle** *handle-number*}

### Syntax Description

|                                  |                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>brief</b>                     | Displays a brief CPU report.                                                                                                           |
| <b>all</b>                       | Displays all event trace messages currently in memory for the CPU.                                                                     |
| <b>back</b>                      | Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes. |
| { <i>mmm</i>   <i>hhh : mm</i> } | Duration of the trace. The format is mmm or hhh:mm.                                                                                    |
| <b>clock</b>                     | Displays event trace messages starting from a specific clock time.                                                                     |
| <i>hh : mm</i>                   | Integer value that is the length of time, in hours and minutes. The format is hh:mm.                                                   |
| <i>date</i>                      | (Optional) Day of the month (from 1 to 31).                                                                                            |
| <i>month</i>                     | (Optional) Displays the month of the year.                                                                                             |
| <b>from-boot</b>                 | Displays event trace messages starting from a specified number of seconds after booting.                                               |
| <i>seconds</i>                   | (Optional) Number of seconds since the networking device was last booted (uptime).                                                     |
| <b>latest</b>                    | Displays only the event trace messages since the last <b>show monitor event-trace</b> command was entered.                             |
| <b>detail</b>                    | (Optional) Displays detailed event trace information.                                                                                  |
| <b>handle</b>                    | Displays a detailed CPU report for a specified handle number.                                                                          |
| <i>handle-number</i>             | Handle number. Valid values are from 1 to 255.                                                                                         |

**Command Modes**

User EXEC (&gt;) Privileged EXEC (#)

**Command History**

| Release                  | Modification                                                    |
|--------------------------|-----------------------------------------------------------------|
| 12.3(14)T                | This command was introduced.                                    |
| 12.2(33)SRB              | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB               | This command was integrated into Cisco IOS Release 12.2(33)SB.  |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1.      |

**Usage Guidelines**

Use the **show monitor event-trace cpu-report** command with the **brief** keyword to display the CPU report details. To display individual snapshots, use the **show monitor event-trace cpu-report handle *handle-number*** command.

To display the uptime, in seconds, enter the **show monitor event-trace cpu-report from-boot ?** command.

**Examples**

To display CPU report details for event tracing on a networking device, enter the **show monitor event-trace cpu-report brief all** command. The field descriptions are self-explanatory.

```
Router# show monitor event-trace cpu-report brief all
Timestamp      : Handle Name      Description
00:01:07.320:  1      CPU          None
```

To display CPU report details for event tracing on a networking device for the handle number 1, enter the **show monitor event-trace cpu-report handle 1** command. The field descriptions are self-explanatory.

```
Router# show monitor event-trace cpu-report handle 1
00:01:07.320:  1      CPU          None
#####
Global Statistics
-----
5 sec CPU util 0%/0% Timestamp 21:03:56
Queue Statistics
-----

```

|          | Exec Count | Total CPU | Response Time<br>(avg/max) | Queue Length<br>(avg/max) |
|----------|------------|-----------|----------------------------|---------------------------|
| Critical | 1          | 0         | 0/0                        | 1/1                       |
| High     | 5          | 0         | 0/0                        | 1/1                       |
| Normal   | 178        | 0         | 0/0                        | 2/9                       |
| Low      | 15         | 0         | 0/0                        | 2/3                       |

```
Common Process Information
-----
PID Name          Prio Style
-----
10 AAA high-capacit M New
133 RADIUS TEST CMD M New
47 VNM DSPRM MAIN  H New
58 TurboACL       M New
97 IP Background  M New
99 CEF: IPv4 proces L New
112 X.25 Background M New
117 LFDp Input Proc M New
3 Init           M Old
```

```

CPU Intensive processes
-----
  PID Total      Exec   Quant      Burst  Burst size  Schedcall  Schedcall
    Count CPUs    Count  avg/max    Count  avg/max(ms)  Count Per  avg/max
-----
    3   820         6  136/236      1    24/24         18  887/15172
Priority Suspends
-----
  PID Exec Count Prio-Susps
-----
    3         6         1
Latencies
-----
  PID Exec Count  Latency
                   avg/max
-----
    10         1 15192/15192
   133         1 15192/15192
    58         1 15192/15192
   112         1 15192/15192
   117         1 15192/15192
    99         1 15172/15172
    47         1 15172/15172
    97         1 15172/15172
#####
Global Statistics
-----
5 sec CPU util 0%/0% Timestamp 00:00:00
Queue Statistics
-----
      Exec Count  Total CPU      Response Time      Queue Length
      (avg/max)      (avg/max)
Critical         0         0         0/0         0/0
High             0         0         0/0         0/0
Normal          0         0         0/0         0/0
Low             0         0         0/0         0/0

Common Process Information
-----
  PID Name          Prio Style
-----
CPU Intensive processes
-----
  PID Total      Exec   Quant      Burst  Burst size  Schedcall  Schedcall
    Count CPUs    Count  avg/max    Count  avg/max(ms)  Count Per  avg/max
-----
Priority Suspends
-----
  PID Exec Count Prio-Susps
-----
Latencies
-----
  PID Exec Count  Latency
                   avg/max
-----
#####

```

## Related Commands

| Command                                        | Description                                                                           |
|------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>monitor event-trace cpu-report (EXEC)</b>   | Monitors event tracing of the CPU reports.                                            |
| <b>monitor event-trace cpu-report (global)</b> | Monitors the collection of CPU report traces.                                         |
| <b>monitor event-trace dump-traces</b>         | Saves trace messages for all event traces currently enabled on the networking device. |

## show monitor event-trace hw-api

To display event trace information about the HW-API events, use the **show monitor event-trace hw-api** command in privileged EXEC mode.

**show monitor event-trace hw-api** { **all** | **back** *time* | **clock** *time day month* | **from-boot** [ *time* ] | **latest** } [**detail**] [**parameters**]

### Syntax Description

|                   |                                                                    |
|-------------------|--------------------------------------------------------------------|
| <b>all</b>        | Displays all event traces in the current buffer.                   |
| <b>back</b>       | Displays trace from a specific time far back in the past.          |
| <i>time</i>       | Duration of trace in the format mmm or hhh:mm.                     |
| <b>clock</b>      | Displays trace from a specific clock time and date.                |
| <i>time</i>       | Time in the format hh:mm.                                          |
| <i>day</i>        | Day of the month.                                                  |
| <i>month</i>      | Month of the year.                                                 |
| <b>from-boot</b>  | Displays trace from specified seconds after booting.               |
| <i>time</i>       | (Optional) Time after boot in seconds. Valid range is 0 to 217696. |
| <b>latest</b>     | Displays latest trace events since last display.                   |
| <b>detail</b>     | (Optional) Displays detailed trace information.                    |
| <b>parameters</b> | Displays the parameters of the trace.                              |

### Command Modes

Privileged EXEC (#)

### Command History

| Release   | Modification                                                                                                                                                                      |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.4(17)T | This command was introduced.                                                                                                                                                      |
| 12.2SX    | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |



| Release                  | Modification                                                       |
|--------------------------|--------------------------------------------------------------------|
| 12.2(33)SRC              | This command was integrated into Cisco IOS Release 12.2(33)SRC.    |
| Cisco IOS XE Release 2.1 | This command was implemented on the Cisco ASR 1000 series routers. |

## Examples

The following is sample output from the **show monitor event-trace hw-api all** command. The fields are self-explanatory.

```
Router# show monitor event-trace hw-api all
*Jan 14 17:42:25.207: bwalk at 000756FC adj Et0/0 IP 192.168.1.1 0
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 adj Et0/0 IP 192.168.1.1 0
0.000
*Jan 14 17:42:25.207: bwalk at 000756FC adj Et0/0 IP 192.168.1.1 0
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 rpflst 014B1450
0.000
*Jan 14 17:42:25.207: bwalk at 000756FC rpflst 014B1450
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 fibidb Ethernet0/0
0.000
*Jan 14 17:42:25.207: bwalk at 000756FC fibidb Ethernet0/0
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 adj Et0/0 IP 192.168.1.1 0
0.000
*Jan 14 17:42:25.207: bwalk at 000756FC adj Et0/0 IP 192.168.1.1 0
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 rpflst 014B1450
0.000
*Jan 14 17:42:25.207: bwalk at 000756FC rpflst 014B1450
0.000
*Jan 14 17:42:25.207: bwalk as 00075600 adj Et0/0 IP 192.168.1.1 0
```

## Related Commands

| Command                                | Description                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------|
| <b>monitor event-trace (EXEC)</b>      | Controls event trace functions for a specified Cisco IOS software subsystem component. |
| <b>monitor event-trace (global)</b>    | Configures event tracing for a specified Cisco IOS software subsystem component.       |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device.  |
| <b>monitor event-trace hw-api</b>      | Monitors control even tracing of HW-API events.                                        |

# show monitor event-trace merged-list

To display event trace information for a list of trace buffers sorted by time, use the **show monitor event-trace merged-list** command in privileged EXEC mode.

**show monitor event-trace merged-list** *trace-buffer-name1* [...] [*trace-buffer-name4* ]]

## Syntax Description

|                          |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| <i>trace-buffer-name</i> | Name of the trace buffer. You can specify up to four trace buffers. |
|--------------------------|---------------------------------------------------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release                  | Modification                                                                                                                                                                      |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.0(26)S                | This command was introduced.                                                                                                                                                      |
| 12.3(2)T                 | This command was integrated into Cisco IOS Release 12.3(2)T.                                                                                                                      |
| 12.2(33)SRA              | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX                   | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| Cisco IOS XE Release 2.1 | This command was implemented on the Cisco ASR 1000 Series Aggregation Services Routers.                                                                                           |

## Examples

The following is sample output from the **show monitor event-trace merged-list** command. The output displays event trace information for the lists `cef_interface` and `licnvram`, sorted by time. The fields are self-explanatory.

```
Router# show monitor event-trace merged-list list1 cef_interface licnvram
*Dec 7 14:02:21.019: licnvram: **NVRAM: Original config magic is good
*Dec 7 14:02:21.019: licnvram: **NVRAM: Backup config magic is good
*Dec 7 14:02:21.019: licnvram: **NVRAM: Second Backup Magic is not good
*Dec 7 14:02:42.767: cef_interface: Gi0/0 (hw 2) SWvecLES Null
(0x622026C8)
*Dec 7 14:02:42.767: cef_interface: Gi0/1 (hw 3) SWvecLES Null
(0x622026C8)
*Dec 7 14:02:42.767: cef_interface: Ao1/0 (hw 5) SWvecLES Null
(0x622026C8)
*Dec 7 14:02:42.767: cef_interface: In2/0 (hw 6) SWvecLES Null
(0x622026C8)
*Dec 7 14:02:42.767: cef_interface: Vo0 (hw 4) SWvecLES Null
(0x622026C8)
*Dec 7 14:02:42.851: cef_interface: <empty> (hw 2) Create new ['0]
*Dec 7 14:02:42.851: cef_interface: <empty> (hw 2) State down -> up
```

```
*Dec  7 14:02:42.851: cef_interface: Gi0/0      (hw  2) NameSet
*Dec  7 14:02:42.851: cef_interface: Gi0/0      (hw  2) HWIDBLnk GigabitEthernet
```

**Related Commands**

| Command                                | Description                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------|
| <b>monitor event-trace (EXEC)</b>      | Controls event trace functions for a specified Cisco IOS software subsystem component. |
| <b>monitor event-trace (global)</b>    | Configures event tracing for a specified Cisco IOS software subsystem component.       |
| <b>monitor event-trace dump-traces</b> | Saves trace messages for all event traces currently enabled on the networking device.  |





## show pxf accounting through test cef table consistency

---

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- [show pxf statistics, page 505](#)
- [show pxf xcm, page 508](#)
- [show route-map ipc, page 512](#)
- [show xdr, page 515](#)
- [snmp mib cef throttling-interval, page 520](#)
- [snmp-server enable traps cef, page 522](#)
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- [test cef table consistency, page 540](#)

# show pxf accounting

To show Parallel eXpress Forwarding (PXF) switching statistics for individual interfaces, use the **show pxf accounting** command in user EXEC or privileged EXEC mode.

**show pxf accounting** *interface* [*slot/port*]

## Syntax Description

|                  |                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------|
| <i>interface</i> | Specifies the type of interface to display.                                                                  |
| <i>slot /</i>    | (Optional) Backplane slot number. On the Cisco 7200 VXR series routers, the value can be from 0 to 6.        |
| <i>port</i>      | (Optional) Port number of the interface. On the Cisco 7200 VXR series routers, the value can be from 0 to 5. |

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(1)E    | This command was introduced.                                                                                                                                                      |
| 12.1(5)T    | This command was integrated into Cisco IOS Release 12.1(5)T.'                                                                                                                     |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

You can display information about the interface types shown in the table below using the **show pxf accounting** command:

**Table 82: show pxf accounting Interface Types**

| Keyword             | Interface Type         |
|---------------------|------------------------|
| <b>atm</b>          | ATM interface          |
| <b>ethernet</b>     | Ethernet interface     |
| <b>fastethernet</b> | FastEthernet interface |

| Keyword        | Interface Type               |
|----------------|------------------------------|
| <b>hssi</b>    | High Speed Serial interface  |
| <b>null</b>    | Null interface               |
| <b>pos</b>     | Packet-over-SONET interface  |
| <b>serial</b>  | Synchronous serial interface |
| <b>summary</b> | PXF summary statistics       |

## Examples

The following is sample output from the **show pxf accounting ?** command:

```
Router# show pxf accounting ?
  ATM          ATM interface
  Ethernet      IEEE 802.3
  FastEthernet  FastEthernet IEEE 802.3
  Hssi          High Speed Serial Interface
  Null          Null interface
  POS           Packet over Sonet
  Serial        Serial
  summary       PXF summary statistics
```

The following is sample output from the **show pxf accounting ethernet** command with an Ethernet interface in slot 4 on a Cisco 7200 VXR series router:

```
Router# show pxf accounting ethernet 4/0
Interface  Pkts In   Chars In   Pkts Out   Chars Out   Punted   Dropped
Ethernet4/0  0         0         122        11490       4         0
```

The following is sample output from the **show pxf accounting null** command with a null interface in slot 0 on a Cisco 7200 VXR series router:

```
Router# show pxf accounting null 0/0
Interface  Pkts In   Chars In   Pkts Out   Chars Out   Punted   Dropped
nu0/0      0         0         0          0          4932     0
```

The following is sample output from the **show pxf accounting pos** command with a Packet-over-SONET interface in slot 4 on a Cisco 7200 VXR series router:

```
Router# show pxf accounting pos
Interface  Pkts In   Chars In   Pkts Out   Chars Out   Punted   Dropped
POS4/0     19        1064       0          0          44       0
```

The following is sample output from the **show pxf accounting serial** command with a serial interface in slot 5 on a Cisco 7200 VXR series router:

```
Router# show pxf accounting serial 5/0
Interface  Pkts In   Chars In   Pkts Out   Chars Out   Punted   Dropped
Serial5/0  0         0         0          0          0        0
```

The following is sample output from the **show pxf accounting summary** command:

```
Router# show pxf accounting summary
      Pkts      Dropped  RP Processed      Ignored
      Total          0      48360          0
PXF Statistic:
Packets RP -> PXF:
  switch ip:          0
  switch raw:    30048360
```



```

      qos fastsend:          0
      qos enqueue:         1938
Total:                    30050298
Packets PXF -> RP:
      qos pkts:             1938
      fast pkts:           30000000
      drops:total           0
      punts:total          48360
      "      not IP      :    40572
      "      CEF no adjacency :    7788
Total:                    30050298
Packets ignored:          0 | ring space:
      shadow ring full:    0 | shadow ring:          16384
      in ring full:       0 | inring:              968
      PXF inactive:       0
tx credits:               16230330 | delayed credits:      0
holdq enqueues:           0 | requeue drops:        0
interrupts:               40538 | interrupt misses:     1947
interrupt packets:        53326
pending read bytes:       0
Interface  Pkts In   Chars In   Pkts Out  Chars Out   Punted   Dropped
Fa0/0      0        0        0  30000000  1740000000  970      0
Et1/0      0        0        0        0        0  21309    0
Et1/1      0        0        0        0        0    0        0
Et1/2      0        0        0        0        0    0        0
Et1/3      0        0        0        0        0    0        0
Se2/0      0        0        0        0        0   963      0
Se2/1      0        0        0        0        0    0        0
Se2/2      0        0        0        0        0    0        0
Se2/3      0        0        0        0        0    0        0
Fa3/0      0        0        0        0        0   963      0
PO4/0     30000000  144000000  0        0        0   963      0
AT5/0      0        0        0        0        0  23192    0
Vi1        0        0        0        0        0    0        0
Vt1        0        0        0        0        0    0        0
Vi2        0        0        0        0        0    0        0

```

**Related Commands**

| Command                   | Description                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>show pxf crash</b>     | Displays PXF crash information.                                                                                      |
| <b>show pxf feature</b>   | Displays the PXF routing feature tables for enabled PXF features.                                                    |
| <b>show pxf interface</b> | Displays a summary of the interfaces in the router and the PXF features or capabilities enabled on these interfaces. |

# show pxf cpu access-lists

To display Parallel eXpress Forwarding (PXF) memory information for access control lists (ACLs), use the **show pxf cpu access-lists** command in privileged EXEC mode.

**show pxf cpu access-lists** [**security**| **qos**| **pbr**| **compiled**]

## Cisco 10000 Series Router

**show pxf cpu access-lists** [**security** [[**tcam** *acl-name* [**detail**]]] **flex-sum**| **children**]| **qos**| **pbr**| **compiled**]

### Syntax Description

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>security</b>             | (Optional) Displays information about the security ACLs defined in Cisco IOS and compiled to the PXF. Also displays information about split ACLs, such as how much memory has been used.                                                                                                                                                                                                                                                                               |
| <b>tcam</b> <i>acl-name</i> | (Optional) Displays information about the specified security ACL stored in ternary content addressable memory (TCAM).<br><br>This option is only available on the PRE3 for the Cisco 10000 series router.                                                                                                                                                                                                                                                              |
| <b>detail</b>               | (Optional) Displays decoded information about the packet fields used for matching in the TCAM.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>flex-sum</b>             | (Optional) Displays summary information describing the amount of memory allocated in the parallel express forwarding (PXF) engine for use by the flexible key construction microcode. This information is useful for design teams.<br><br>This option is only available on the PRE3 for the Cisco 10000 series router.                                                                                                                                                 |
| <b>children</b>             | (Optional) Displays information for child policies. If an ACL is a template child, the output typically does not display the child information. Specifying the <b>children</b> keyword displays data for child policies, too, and shows the children and the parent policy of each child.<br><br>Use caution when using the <b>children</b> keyword as there might be thousands of child policies configured, which could have negative effects on the command output. |
| <b>qos</b>                  | (Optional) Displays information about the QoS ACLs defined in Cisco IOS and compiled to the PXF.                                                                                                                                                                                                                                                                                                                                                                       |

|                 |                                                                                                                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>pbr</b>      | (Optional) Displays information about ACLs for policy-based routing (PBR).                                                                                                                                                   |
| <b>compiled</b> | <p>(Optional) Displays information for all compiled Turbo-ACLs.</p> <p>The PRE2 supports Turbo-ACLs and the <b>compiled</b> option. The PRE3 accepts the PRE2 <b>compiled</b> option, but does not implement Turbo-ACLs.</p> |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                               |
|-------------|----------------------------------------------------------------------------|
| 12.2S       | This command was introduced.                                               |
| 12.3(7)XI1  | This command was introduced on the PRE2 for the Cisco 10000 series router. |
| 12.2(31)SB2 | This command was introduced on the PRE3 for the Cisco 10000 series router. |

**Usage Guidelines****Cisco 10000 Series Router (PRE2)**

Because memory is shared between TurboACLs and MiniACLs, they can interfere with each other's capacities. The Mini-ACL is automatically set up with space for 8191 Mini-ACLs at router start. If more than 8191 Mini-ACLs are created, another block of MiniACLs (4096) is allocated. This process is repeated as necessary until the router is out of External Column Memory (XCM) in any one bank that the Mini-ACLs need.

**Cisco 10000 Series router (PRE3)**

The PRE3 implements only TCAM ACLs. Turbo-ACLs and Mini-ACLs are not supported.

**Examples**

The sample output from the **show pxf cpu access-lists security** command (see Sample Output) is based on the configuration of the access control list (ACL) called test\_list (see ACL Configuration). The sample output is divided into several sections with a description of the type of information displayed in each.

**ACL Configuration**

```
Router# show pxf cpu access-lists test_list
Extended IP access list test_list (Compiled)
 10 permit ip any host 10.1.1.1
 20 permit ip any host 10.1.1.2
 30 permit ip any host 10.1.1.3
 40 permit ip any host 10.1.1.4
 50 permit ip any host 10.1.1.5
 60 permit ip any host 10.1.1.6
 70 permit ip any host 10.1.1.7
 80 permit ip any host 10.1.1.8
 90 permit ip any host 10.1.1.9
```

```

100 permit ip any host 10.1.1.11
110 permit ip any host 10.1.1.12

```

### Sample Output

The following sample output describes the information displayed in the first section of the command output from the **show pxf cpu access-lists security** command:

```
Router# show pxf cpu access-lists security
```

```
PXF Security ACL statistics:
```

| ACL        | State       | Tables | Entries | Config | Fragment | Redundant | Memory | ACL_index |
|------------|-------------|--------|---------|--------|----------|-----------|--------|-----------|
| 1          | Operational | 1      | -       | -      | -        | -         | 0Kb    | 1         |
| sl_def_acl | Operational | 2      | -       | -      | -        | -         | 0Kb    | 2         |
| test       | Operational | 3      | -       | -      | -        | -         | 0Kb    | 3         |
| test_list  | Operational | 1      | 12      | 11     | 0        | 0         | 7Kb    | 1         |

The table below describes the significant fields shown in the display.

**Table 83: show pxf cpu access-lists security Field Descriptions**

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACL      | Identifies the ACL by name or number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| State    | Displays the current state of the ACL: <ul style="list-style-type: none"> <li>• Copying--ACL is in the process of being created or compiled.</li> <li>• Operational--ACL is active and filtering packets.</li> <li>• Out of acl private mem--ACL has run out of the private memory that was allocated exclusively to it.</li> <li>• Out of shared mem--ACL has run out of the memory that it shares with other ACLs.</li> <li>• Unknown Failure--ACL has failed because of an uncategorized reason.</li> <li>• Unneeded--ACL was allocated but is not currently in use.</li> </ul> |
| Tables   | An indicator of whether the ACL has been split into more than one PXF pass. The first three ACLs in the output are MiniACLs, and have the ACL_index duplicated in the Tables column.                                                                                                                                                                                                                                                                                                                                                                                               |
| Entries  | The count of ACL rules as seen by the Turbo compiler. This is the sum of the Config, Fragment, and Redundant columns plus 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Config   | The count of rules for this ACL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Fragment | The count of extra rules added to handle fragment handling, where Layer 4 information is needed but not available in a packet fragment.                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Field     | Description                                                                       |
|-----------|-----------------------------------------------------------------------------------|
| Redundant | The count of rules that are not needed because they are covered by earlier rules. |
| Memory    | The amount of PXF XCM in use for the ACL.                                         |
| ACL_index | The index of the ACL in XCM.                                                      |

The following sample output describes the information displayed in the next section of the command output from the **show pxf cpu access-lists security** command:

First level lookup tables:

| Block | Use                | Rows   | Columns | Memory used |
|-------|--------------------|--------|---------|-------------|
| 0     | TOS/Protocol       | 1/128  | 1/32    | 16384       |
| 1     | IP Source (MS)     | 1/128  | 1/32    | 16384       |
| 2     | IP Source (LS)     | 1/128  | 1/32    | 16384       |
| 3     | IP Dest (MS)       | 2/128  | 1/32    | 16384       |
| 4     | IP Dest (LS)       | 12/128 | 1/32    | 16384       |
| 5     | TCP/UDP Src Port   | 1/128  | 1/32    | 16384       |
| 6     | TCP/UDP Dest Port  | 1/128  | 1/32    | 16384       |
| 7     | TCP Flags/Fragment | 1/128  | 1/32    | 16384       |

The table below describes the significant fields shown in the display.

**Table 84: show pxf cpu access-lists security Field Descriptions**

| Field       | Description                                                                                                                                                                                                                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Block       | Indicates the block number.                                                                                                                                                                                                                                                                                         |
| Use         | Describes the IP packet field that is being matched.                                                                                                                                                                                                                                                                |
| Rows        | An indication of where the largest variety of values are in use in the ACLs that are being applied. In the output, 12/128 means that there are 12 different values of significance in the field. If there are other rules added and the value exceeds 128, more memory will be needed to accommodate the new rules. |
| Columns     | An indication of the number of TurboACLs in PXF memory. In the output, 1/32 means there is only one TurboACL in PXF memory. If there are more than 31 added, another chunk of memory is needed to accommodate the new ACLs.                                                                                         |
| Memory used | Displays the total amount of memory used for this particular lookup table.                                                                                                                                                                                                                                          |

The following sample output describes the information displayed in the next section of the command output from the **show pxf cpu access-lists security** command. There are 16 banks of XCM in each PXF column. This output section shows the usage level of each bank.

| Banknum | Heapsize | Freesize | %Free |
|---------|----------|----------|-------|
| 0       | 4718592  | 4702208  | 99    |
| 1       | 8126464  | 6012928  | 73    |
| 2       | 8388608  | 6290432  | 74    |
| 3       | 8388608  | 6290432  | 74    |
| 4       | 5898240  | 5881856  | 99    |
| 5       | 8126464  | 6012928  | 73    |
| 6       | 8388608  | 6290432  | 74    |
| 7       | 8126464  | 6012928  | 73    |
| 8       | 4456448  | 4440064  | 99    |
| 9       | 8126464  | 6012928  | 73    |

The table below describes the significant fields shown in the display.

**Table 85: show pxf cpu access-lists security Field Descriptions**

| Field    | Description                                                                                                                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Banknum  | The block of memory used for this particular lookup table.                                                                                                                                                  |
| Heapsize | The total amount of memory, in bytes, allocated for this block.                                                                                                                                             |
| Freesize | The amount of memory, in bytes, that is currently available for use by this block of memory.                                                                                                                |
| %Free    | The percentage of memory that is free and available for use for this block of memory. When the %Free drops to 0, the router cannot hold any more ACLs in PXF memory, and any new ACL will not pass traffic. |

This section of the sample command output indicates the memory usage of the MiniACLs in the router. All of the rows state about the same thing. To determine the actual number of MiniACLs in play, divide the memory used in any of blocks 1 to 10 by 256, or blocks 11 to 14 by 16.

```

MiniACL XCM Tables:
Block  Use                Memory Used  %Free
0     IP Src 1                768         99
1     IP Src 2                768         99
2     IP Src 3                768         99
3     IP Src 4                768         99
4     IP Dest 1               768         99
5     IP Dest 2               768         99
6     IP Dest 3               768         99
7     IP Dest 4               768         99
8     ToS                    768         99
9     Protocol                768         99
10    TCP Flags/Fragment      768         99
11    Source Port 1           48          99
12    Source Port 2           48          99
13    Destination Port 2      48          99
14    Destination Port 2      48          99

```

The following describes the information displayed in the last section of the sample output from the **show pxf cpu access-lists security** command:

```
Available MiniACL count = 8191
Usable ranges(inclusive):
1->8191
```

The table below describes the significant fields shown in the display.

**Table 86: show pxf cpu access-lists security Field Descriptions**

| Field             | Description                                                   |
|-------------------|---------------------------------------------------------------|
| Available MiniACL | The number of ACLs currently available for allocation in XCM. |
| Usable ranges     | The ACL indexes that will be assigned to MiniACLs.            |

### PRE2 and PRE3 Security ACLs Examples (Cisco 10000 Series Router)

This section compares the output from the **show pxf cpu access-lists security** command when issued on the PRE2 and PRE3.

For the PRE2, the following sample output displays VMR (value, plus a mask and result) data for the ACL named ICMP\_IGMP\_MATCH:

```
Router# show pxf cpu access-lists security tcam ICMP_IGMP_MATCH detail
```

```
-----
VMR Format - handle: 524607B4
Format has 5 fields, refcount = 1
Field: Format, FIXED, start_bit = 69, end_bit = 71
Field: ACL index, FIXED, start_bit = 54, end_bit = 68
Field: Flags, FIXED, start_bit = 43, end_bit = 53
Field: L4 proto, FIXED CNV, start_bit = 16, end_bit = 23
Field: L4 source port, FIXED CNV, start_bit = 0, end_bit = 15 Total bits = 53, format = 72
  GMR used: 5 Col 2 LKBP Vector: 544
-----

VMRs
----- VMR 0 -----
V: 001B0000 0000010B 00
M: FFFFC000 0000FFFF FF
R: 00010001
Format: 00000000/00000007
ACL index: 0000006C/00007FFF
L4 source port: 00000B00/0000FFFF
L4 proto: 00000001/000000FF
Flags: 00000000/00000000
----- VMR 1 -----
V: 001B0000 00000103 01
M: FFFFC000 0000FFFF FF
R: 00010002
Format: 00000000/00000007
ACL index: 0000006C/00007FFF
L4 source port: 00000301/0000FFFF
L4 proto: 00000001/000000FF
Flags: 00000000/00000000
----- VMR 2 -----
V: 001B0000 00000213 00
M: FFFFC000 0000FFFF 00
R: 00010003
Format: 00000000/00000007
ACL index: 0000006C/00007FFF
L4 source port: 00001300/0000FF00
```

```

L4 proto: 00000002/000000FF
Flags: 00000000/00000000
----- VMR 3 -----
V: 001B0000 00000214 00
M: FFFFC000 0000FFFF 00
R: 00010004
Format: 00000000/00000007
ACL index: 0000006C/00007FFF
L4 source port: 00001400/0000FF00
L4 proto: 00000002/000000FF
Flags: 00000000/00000000

```

For the PRE3, the following sample output displays for the **show pxf cpu access-lists security** command. Notice that the output does not include the columns shown above that are relevant to only the PRE2 and the output no longer displays first-level lookup tables.

```
Router# show pxf cpu access-lists security
```

```

PXF Security ACL statistics:
  ACL                               State          ACL_index
STANDARD_MATCH_PERMIT             Operational    116
SRC_IP_MATCH144                   Operational    102
DST_IP_MATCH                       Operational    113
DST_IP_MATCH144                   Operational    112
PROTOCOL_MATCH                    Operational    104
PROTOCOL_MATCH144                 Operational    103
FRAG_MATCH                         Operational    109
PRECEDENCE_TOS_MATCH              Operational    106
PRECEDENCE_TOS_MATCH144           Operational    105

```

#### Related Commands

| Command                        | Description                                        |
|--------------------------------|----------------------------------------------------|
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.                       |
| <b>show pxf statistics</b>     | Displays a chassis-wide summary of PXF statistics. |



## show pxf cpu atom

To display Parallel eXpress Forwarding (PXF) CPU Any Transport over MPLS (AToM) forwarding information for an interface or Virtually Cool Common Index (VCCI), use the **show pxf cpu atom** command in privileged EXEC mode.

**show pxf cpu atom** [*interface-name*] *vcci*

### Syntax Description

|                       |                                   |
|-----------------------|-----------------------------------|
| <i>interface-name</i> | (Optional) Name of the interface. |
| <i>vcci</i>           | (Optional) VCCI entry identifier. |

### Command Modes

Privileged EXEC (#)

### Command History

| Release    | Modification                                                  |
|------------|---------------------------------------------------------------|
| 12.2(31)SB | This command was introduced on the Cisco 10000 series router. |

### Examples

The following example shows AToM forwarding information for Gigabit Ethernet interface 6/0/0. The fields shown in the display are self-explanatory.

```
Router#: show pxf cpu atom gigabitethernet 6/0/0
Imposition Information for VCCI 0x9E2:
  Output VCCI: 0x0
  Mac rewrite index: 0x0 extension: 0x0
  Ingress Flags: 0x0
  PTI Action Table: 0x0
```

### Related Commands

| Command                         | Description                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------|
| <b>show mpls l2transport vc</b> | Displays information about AToM VCs that are enabled to route Layer 2 packets on a router. |
| <b>show pxf cpu mpls</b>        | Displays PXF MPLS FIB entry information.                                                   |
| <b>show pxf cpu subblocks</b>   | Displays subblocks information that includes column 0 of AToM.                             |

## show pxf cpu bba

To display information on Parallel eXpress Forwarding (PXF) CPU Broadband Aggregation (BBA) groups, use the **show pxf cpu bba** command in privileged EXEC mode.

**show pxf cpu bba**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                    |
|-----------------|-------------|-----------------------------------------------------------------|
|                 | 12.2S       | This command was introduced.                                    |
|                 | 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |

**Examples** The following example shows BBA groups information in the PXF CPU:

```
Router# show pxf cpu bba
6w3d: show pxf bba
6w3d: %IPCOIR-4-REPEATMSG: IPC handle already exists for 1/0
6w3d: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/0 is down. Notifying 4oc3atm-1 dr.
6w3d: %C10K_ALARM-6-INFO: ASSERT CRITICAL slot 1 Card Stopped Responding OIR Al
6w3d: %IPCOIR-5-CARD_DETECTED: Card type 4oc3atm-1 (0x2D8) in slot 1/0
6w3d: %IPCOIR-5-CARD_LOADING: Loading card in slot 1/0 sw version 1.1 code MD5 C
6w3d: %C10K-5-LC_NOTICE: Slot[1/0] 4oc3atm-1 Image Downloaded...Booting...
6w3d: %IPCOIR-5-CARD_DETECTED: Card type 4oc3atm-1 (0x2D8) in slot 1/0
6w3d: %C10K_ALARM-6-INFO: CLEAR CRITICAL slot 1 Card Stopped Responding OIR Ala
6w3d: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/0 is up. Notifying 4oc3atm-1 driv.
```

### Related Commands

| Command                | Description                                         |
|------------------------|-----------------------------------------------------|
| <b>bba-group pppoe</b> | Configures a BBA group to establish PPPoE sessions. |

## show pxf cpu buffers

To display packet buffer memory for temporary packet storage in the Cisco Internetwork Performance Monitor (IPM) of the Parallel eXpress Forwarding (PXF), use the **show pxf cpu buffers** command in privileged EXEC mode.

**show pxf cpu buffers**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                   |
|-----------------|------------|----------------------------------------------------------------|
|                 | 12.2S      | This command was introduced on the Cisco 10000 series router.  |
|                 | 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB. |

**Usage Guidelines** This command provides information about the number of handles that are used and available. Handles are outstanding packets in the virtual time management system (VTMS).

**Examples** The following example shows the number of handles that are used and available:

```
Router# show pxf cpu buffers
Cobalt2 ttc running.
Calculations could be off by (+/-) cache sizes.
      cache size
small    512
large    128
pool     # handles    available
-----
small      524288      523808
large      32768       32624
```

The table below describes the fields shown in the display.

**Table 87: show pxf cpu buffers Field Descriptions**

| Field     | Description                                         |
|-----------|-----------------------------------------------------|
| pool      | Identifies the buffer pool.                         |
| # handles | The number of handles that are currently used.      |
| available | The number of handles that are currently available. |

**Related Commands**

| Command                    | Description                                    |
|----------------------------|------------------------------------------------|
| <b>clear pxf</b>           | Clears PXF counters and statistics.            |
| <b>show pxf statistics</b> | Displays chassis-wide, summary PXF statistics. |

## show pxf cpu cef

The **show pxf cpu cef** command is replaced by the **show ip cef platform** command on the Cisco 10000 series router. See the **show ip cef platform** command for more information.

# show pxf cpu context

To display the current and historical loads on the Parallel eXpress Forwarding (PXF), use the **show pxf cpu context** command in privileged EXEC mode.

**show pxf cpu context**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                   |
|-----------------|------------|----------------------------------------------------------------|
|                 | 12.2S      | This command was introduced on the Cisco 10000 series router.  |
|                 | 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1. |
|                 | 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB. |

## Examples

The **show pxf cpu context** command shows how busy the PXF forwarding process (FP) is with the current traffic load. The first section displays the number of contexts of each type that have entered the PXF engine since it was last reloaded. If counters are idle, the PXF pipeline is not operating properly.

```
Router# show pxf cpu context
FP context statistics      count      rate (since last time command was run)
-----
  feed_back               168635      0
  new_work_from_lc        7474477     13
  new_work_from_rp        964679      1
  new_work_from_replay    0           0
  null_context            3797097495884 6312156
-----
                             6312170
FP average context/sec    1min        5min        60min
-----
  feed_back               0           0           0      cps
  new_work_from_lc        8           8           8      cps
  new_work                 1           1           1      cps
  new_work_from_replay    0           0           0      cps
  null_context            6312260     6312261     6312250   cps
-----
  Total                   6312270     6312271     6312260   cps
FP context utilization    1min        5min        60min
-----
  Actual                   0 %         0 %         0 %
  Theoretical              0 %         0 %         0 %
  Maximum                  98 %        98 %        98 %
```

The table below describes the significant fields shown in the display.

**Table 88: show pxf cpu context Field Descriptions**

| Field                  | Description                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FP context statistics  |                                                                                                                                                                                                                                                                                                                                                                                                      |
| feed_back              | Packets requiring additional passes through the pipeline. This counter is incremented once for each additional pass.                                                                                                                                                                                                                                                                                 |
| new_work               | New packets input to the PXF pipeline. This counter represents a snapshot of the amount of incoming traffic being processed by the processor.                                                                                                                                                                                                                                                        |
| null_context           | An indication of unused forwarding bandwidth (idle time). This counter is incremented for every context during which the PXF pipeline is not processing traffic. This counter represents the processor's potential to handle additional traffic. As the processor becomes more busy, the value for null decreases until it becomes zero, at which point the processor has reached its maximum usage. |
| FP average context/sec |                                                                                                                                                                                                                                                                                                                                                                                                      |
| feed_back              | Displays the rate, in terms of the number of contexts per second (cps) for the feed_back counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                                                                                        |
| new_work               | Displays the rate, in terms of the number of contexts per second (cps) for the new_work counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                                                                                         |
| null_context           | Displays the rate, in terms of the number of contexts per second (cps) for the null_counter for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                                                                                             |
| FP context utilization |                                                                                                                                                                                                                                                                                                                                                                                                      |
| Actual                 | Displays the actual percentage of processor usage per second, compared to the theoretical maximum, for the last 1-minute, 5-minute, and 60-minute time periods.                                                                                                                                                                                                                                      |
| Theoretical            | Displays the percentage of processor usage compared to the ideal theoretical capacities for the last 1-minute, 5-minute, and 60-minute time periods. The theoretical maximum for the PXF processors is 3,125,000 contexts per second (cps).                                                                                                                                                          |

| Field   | Description                                                                                                                              |
|---------|------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum | Displays the actual maximum percentage of processor usage that has occurred for the last 1-minute, 5-minute, and 60-minute time periods. |

**Related Commands**

| Command                    | Description                                    |
|----------------------------|------------------------------------------------|
| <b>clear pxf</b>           | Clears PXF counters and statistics.            |
| <b>show pxf statistics</b> | Displays chassis-wide, summary PXF statistics. |



## show pxf cpu feedback

To display the total number of feedbacks through the Parallel eXpress Forwarding (PXF) by all packets, use the **show pxf cpu feedback** command in privileged EXEC mode.

**show pxf cpu feedback**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                   |
|-----------------|------------|----------------------------------------------------------------|
|                 | 12.2S      | This command was introduced on the Cisco 10000 series router.  |
|                 | 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB. |

**Examples** The following example shows feedback counters information:

```
Router# show pxf cpu feedback
Load for five secs: 5%/0%; one minute: 6%; five minutes: 2%
Time source is hardware calendar, *21:13:02.615 UTC Tue Nov 29 2005
FP column 0 feedback counts
Global packet handle retry counter = 0
```

| Name                | Current | Difference (since last show) |
|---------------------|---------|------------------------------|
| bypass              | = 0     | 0                            |
| schedule retry      | = 0     | 0                            |
| WRED sample         | = 0     | 0                            |
| MLPPP linkq update  | = 0     | 0                            |
| IP frag             | = 0     | 0                            |
| ICMP                | = 0     | 0                            |
| layer2 divert       | = 0     | 0                            |
| tunnel lookup       | = 0     | 0                            |
| tunnel RX           | = 0     | 0                            |
| tunnel TX           | = 0     | 0                            |
| output qos          | = 0     | 0                            |
| tag not ip          | = 0     | 0                            |
| netflow accumulate  | = 0     | 0                            |
| netflow age         | = 0     | 0                            |
| netflow swap        | = 0     | 0                            |
| netflow export      | = 0     | 0                            |
| PBR                 | = 0     | 0                            |
| input secACL log    | = 0     | 0                            |
| input secACL split  | = 0     | 0                            |
| output secACL log   | = 0     | 0                            |
| output secACL split | = 0     | 0                            |
| IPC response        | = 0     | 0                            |
| IPC MLPPP flush     | = 0     | 0                            |
| input qos split     | = 0     | 0                            |
| output qos split    | = 0     | 0                            |
| MLPPP fwd packet    | = 0     | 0                            |
| MLPPP background    | = 0     | 0                            |
| MLPPP flush         | = 0     | 0                            |
| drop                | = 0     | 0                            |

```

QPPB = 0 0
mcast lookup = 0 0
mcast replicate = 0 0
mcast rpf failed = 0 0
mcast bypass = 0 0
PBR split = 0 0
MLPPP lock retry = 0 0
output secACL = 0 0
qos divert split = 0 0
qos inject split = 0 0
secACL divert split = 0 0
MLPPP frag = 0 0
mpls deaggregation = 0 0
tunnel in secACL log = 0 0
tunnel out secACL log = 0 0
no packet handle = 0 0
PBR to FIB = 0 0
MLPPP flush lock retry = 0 0
MLPPP flush setup = 0 0
MLPPP sync flush req = 0 0
tail drop IP frag = 0 0
RP inject = 0 0
feedback retry = 0 0
MLPPP discard feedback = 0 0
MLPPP stats copy IPC = 0 0
IPM replay = 0 0
IPM replay drop = 0 0
IP reasm lock retry = 0 0
IP reasm recover punt = 0 0
IP reasm forward = 0 0
IP reasm insertion = 0 0
LAC switch = 0 0
L2TP decap = 0 0
IP reasm fb divert qos = 0 0
keepalive = 0 0
drop stats redirect = 0 0
AToM multiplexed = 0 0
LFI reassembly = 0 0
LFI remove entry = 0 0
iEdge translation = 0 0
iEdge divert = 0 0
multiple input qos = 0 0
multiple output qos = 0 0
iEdge PBHK DS trans = 0 0
LAC switch qos = 0 0
WRED sample init = 0 0
replay egress = 0 0
IPV6 FIB = 0 0
ICMPV6 = 0 0
IPV6 ACL = 0 0
IPV6 DIVERT ACL = 0 0
Total = 0 0

```

**Related Commands**

| Command              | Description                                           |
|----------------------|-------------------------------------------------------|
| show pxf cpu context | Displays the current and historical loads on the PXF. |

## show pxf cpu iedge

To display Parallel eXpress Forwarding (PXF) policy and template information, use the **show pxf cpu iedge** command in privileged EXEC mode.

**show pxf cpu iedge** [ **detail** | **policy** *policy-name* | **template** ]

### Syntax Description

|                                  |                                                                        |
|----------------------------------|------------------------------------------------------------------------|
| <b>detail</b>                    | (Optional) Displays detailed information about policies and templates. |
| <b>policy</b> <i>policy-name</i> | (Optional) Displays summary policy information.                        |
| <b>template</b>                  | (Optional) Displays summary template information.                      |

### Command Modes

Privileged EXEC (#)

### Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.2S   | This command was introduced. |

### Examples

The following example shows PXF template information. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu iedge template
Super ACL name      OrigCRC   Class Count   CalcCRC
lsacl_2             4EA94046    2             00000000
if_info 71BA3F20
```

### Related Commands

| Command                    | Description                           |
|----------------------------|---------------------------------------|
| <b>show pxf statistics</b> | Displays a summary of PXF statistics. |

## show pxf cpu ipv6

To display Parallel eXpress Forwarding (PXF) IPv6 statistics, use the **show pxf cpu ipv6** command in privileged EXEC mode.

**show pxf cpu ipv6** [*ipv6:address* [*prefix*]] **acl-prefixes** **hash** **summary**

### Cisco 10000 Series Router

**show pxf cpu ipv6** [**acl-prefixes**] **address** **hash** **summary** [**table**] **vrf**

### Syntax Description

|                                        |                                                                                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| <i>ipv6: address</i> [ <i>prefix</i> ] | (Optional) Specifies the IPv6 address and optional IPv6 prefix for the information you want to display. |
| <b>acl-prefixes</b>                    | (Optional) Displays access control list (ACL) prefixes mapping information.                             |
| <b>address</b>                         | (Optional) Displays PXF IPv6 address-specific information.                                              |
| <b>hash</b>                            | (Optional) Displays hash table summary information.                                                     |
| <b>summary</b>                         | (Optional) Displays a summary of the PXF IPv6 statistics.                                               |
| <b>table</b>                           | (Optional) Displays detailed information about the PXF IPv6 forwarding table.                           |
| <b>vrf</b>                             | (Optional) Displays PXF IPv6 VRF information.                                                           |

### Command Modes

Privileged EXEC (#)

### Command History

| Release    | Modification                                                                                                                                                             |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2S      | This command was introduced.                                                                                                                                             |
| 12.2(31)SB | This command was integrated in Cisco IOS Release 12.2(31)SB.                                                                                                             |
| 12.2(33)SB | This command was enhanced to provide the <b>address</b> , <b>table</b> , and <b>vrf</b> options, and implemented on the Cisco 10000 series router for the PRE3 and PRE4. |

### Usage Guidelines

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In Cisco IOS Release 12.2(33)SB, the **show pxf cpu ipv6 table** command displays the global table, but does not display the leafs that correspond to the IPv6 prefixes ::1/128 (Loopback) and ::/128 (All Zero). The microcode checks for these prefixes.

The **show pxf cpu ipv6 table** command replaces the **show pxf cpu ipv6** command in Cisco IOS Release 12.2(31)SB.

## Examples

The following example shows the PXF IPv6 statistics:

```
Router# show pxf cpu ipv6
Mtrie Leaf Data: Prefix/Length
  Leaf prefix ::/0,ACL Index = 0
    Leaf elt_addr: 0x70D20001 SW_OBJ_FIB_ENTRY: 0x20A6E404 acl_index: 0
    Refcount: 514 Flags: 0x2 Parent: None
    First Covered: None
    Right Peer: None
=====
0 routes in Mtrie with less specific overlapping parent route
Hash Table Leaf Data: Prefix/Length
  Leaf prefix ::1/128,ACL Index = 0
    Leaf elt_addr: 0x70D20011 SW_OBJ_FIB_ENTRY: 0x0 acl_index: 0
    128-bit Table Hash Value: 0xC7F7
    Refcount: 3 Flags: 0x2 Parent: None
    First Covered: None
    Right Peer: None
  Leaf prefix ::/128,ACL Index = 0
    Leaf elt_addr: 0x70D20009 SW_OBJ_FIB_ENTRY: 0x0 acl_index: 0
    128-bit Table Hash Value: 0xC2719
    Refcount: 3 Flags: 0x2 Parent: None
    First Covered: None
    Right Peer: None
=====
0 routes in Hash Table with less specific overlapping parent route
```

## Related Commands

| Command                        | Description                  |
|--------------------------------|------------------------------|
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics. |

# show pxf cpu mpls

To display Parallel eXpress Forwarding (PXF) Multiprotocol Label Switching (MPLS) Forwarding Information Base (FIB) information, use the **show pxf cpu mpls** command in privileged EXEC mode.

**show pxf cpu mpls**[*labels label-value*] **vrf** ]

## Syntax Description

|                           |                                                                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>labels label-value</i> | (Optional) Displays the transport type and output features associated with the specified label value or label range. The <i>label-value</i> range is 0 to 524288. |
| <b>vrf</b>                | (Optional) Displays virtual routing and forwarding (VRF) root information.                                                                                        |

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.2S   | This command was introduced. |

## Examples

The following example shows VRF root information. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu mpls vrf
VRF_ID 0      FIB_ROOT(RP) 0x72400000
```

## Related Commands

| Command                        | Description                                                                            |
|--------------------------------|----------------------------------------------------------------------------------------|
| <b>ping mpls</b>               | Checks MPLS LSP connectivity.                                                          |
| <b>show mpls interfaces</b>    | Displays information about the interfaces configured for label switching.              |
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.                                                           |
| <b>trace mpls</b>              | Discovers MPLS LSP routes that packets will take when traveling to their destinations. |

## show pxf cpu mroute

To display Parallel eXpress Forwarding (PXF) multicast route (mroute) information, use the **show pxf cpu mroute** command in privileged EXEC mode.

**show pxf cpu mroute** [ *ipaddress1* ] [ *ipaddress2* ]

### Syntax Description

|                              |                                                                                       |
|------------------------------|---------------------------------------------------------------------------------------|
| <i>ipaddress1 ipaddress2</i> | (Optional) Displays PXF mroute information for a particular group or range of groups. |
|------------------------------|---------------------------------------------------------------------------------------|

### Command Modes

Privileged EXEC (#)

### Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.2S   | This command was introduced. |

### Examples

The following example shows PXF mroute information:

```
Router# show pxf cpu mroute
Shadow G/SG[5624]: s: 0.0.0.0 g: 224.0.1.40 uses: 0 bytes 0 flags: [D ] LNJ
Interface          vcci  offset  rw_index mac_header
In :                0      0x000004
Shadow G/SG[3195]: s: 0.0.0.0 g: 234.5.6.7 uses: 0 bytes 0 flags: [5 ] NJ
Interface          vcci  offset  rw_index mac_header
In :                0      0x000008
Out: Cable5/1/0     5      0x00002C 1B      00000026800001005E05060700010
Out: Cable6/1/1     9      0x000028 1A      00000026800001005E05060700010
Out: Cable6/0/0     6      0x000024 19      00000026800001005E05060700010
Out: Cable5/0/0     3      0x000020 18      00000026800001005E05060700010
Out: Cable7/0/0     A      0x00001C 17      00000026800001005E05060700010
Out: Cable7/1/1     C      0x000018 16      00000026800001005E05060700010
Out: Cable7/1/0     B      0x000014 15      00000026800001005E05060700010
Out: Cable6/1/0     8      0x000010 14      00000026800001005E05060700010
Out: Cable6/0/1     7      0x00000C 13      00000026800001005E05060700010
Out: Cable5/0/1     4      0x000008 12      00000026800001005E05060700010
```

The table below describes the fields shown in the display.

**Table 89: show pxf cpu mroute Field Descriptions**

| Field     | Description                                                           |
|-----------|-----------------------------------------------------------------------|
| Interface | Interface or subinterface.                                            |
| vcci      | Virtually Cool Common Index (VCCI) for the interface or subinterface. |

| Field      | Description                                                           |
|------------|-----------------------------------------------------------------------|
| rw_index   | Index used to read and write into the multicast table for this entry. |
| mac_header | MAC header that is used when rewriting the packet for output.         |

**Related Commands**

| Command                    | Description                                                        |
|----------------------------|--------------------------------------------------------------------|
| show ip mroute             | Displays the Cisco IOS version of a multicast routing table entry. |
| <b>show pxf statistics</b> | Displays chassis-wide, summary PXF statistics.                     |



## show pxf cpu pbr action

To display policy-based routing (PBR) actions configured in the Parallel eXpress Forwarding (PXF), use the **show pxf cpu pbr action** command in privileged EXEC mode.

**show pxf cpu pbr action** *map-name*

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**show pxf cpu pbr** [**action** *map-name*| **tcam** *map-name*| **flex-sum**]

#### Syntax Description

|                               |                                                                                                                                                                                                                                                                                                      |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>action</b> <i>map-name</i> | (Optional) Displays PBR action information and redirects the command output to the route map you specify.                                                                                                                                                                                            |
| <b>tcam</b> <i>map-name</i>   | (Optional) Displays VMR (value, plus a mask and result) information stored in ternary content addressable memory (TCAM) and redirects the command output to the route map you specify.<br><br><b>Note</b> This option is only available on the PRE3 for the Cisco 10000 series router.               |
| <b>flex-sum</b>               | (Optional) Displays summary information describing the amount of memory allocated in the PXF engine for use by the flexible key construction microcode. This information is useful for design teams.<br><br><b>Note</b> This option is only available on the PRE3 for the Cisco 10000 series router. |

#### Command Modes

Privileged EXEC (#)

#### Command History

| Release     | Modification                                                               |
|-------------|----------------------------------------------------------------------------|
| 12.2S       | This command was introduced.                                               |
| 12.3(7)X11  | This command was introduced on the Cisco 10000 series router for the PRE2. |
| 12.2(31)SB2 | This command was introduced on the Cisco 10000 series router for the PRE3. |

**Usage Guidelines**

This command is useful to determine if an adjacency has been found for a **set ip next-hop *ip-address*** route map configuration command.

**Examples**

The following example shows the PBR route maps configured in the PXF:

```
Router# show pxf cpu pbr action foo
Show PBR Action:
-----
Policy number: 1
route-map foo, permit, sequence 10
  map number      = 0
  action index    = 0
    primary action : SET_ROUTE
    secondary action : - none -
  mac-rewr index = 0x0000 0015
  vcci = 0x09D4, qos group = 0, tos prec = 0
  tt_pkt_count = 0          tt_byte_count = 0
Adjacency data 0x20D29968
XCM adjacency from 0x70000120 (RP)
0xA0000120 (FP) index 0x24:
```

**Examples**

The following configuration example shows a PBR configuration in which traffic classification is based on the IP access list named **pbr\_length**. The route map permits traffic based on the specified matching criteria and sets the next hop address of each packet.

```
ip access-list extended pbr_length
  permit tcp any any
!
route-map pbr_length permit 10
  match ip address pbr_length
  match length 100 200
  set ip next-hop 2.0.95.5      !
route-map pbr_length permit 20
  match ip address pbr_length
  match length 200 300
  set ip next-hop 2.0.95.5      !
route-map pbr_length permit 30
  match length 300 400
  set ip next-hop 2.0.95.5      !
```

The following sample output from the **show pxf cpu pbr** command shows the type of information that displays based on the above PBR configuration:

```
Router# show pxf cpu pbr action pbr_length
Show PBR Action:
-----
Policy number: 3
route-map pbr_length, permit, sequence 10
  map number      = 0
  action index    = 64
  map vcci out    = 0x0
  tt_pkt_count   = 0          tt_byte_count = 0
    primary action : NULL_ACTION
    secondary action : - none -
  mac-rewr index = 0x0000 0000
  vcci = 0x0000, qos group = 0, tos prec = 0
.....
route-map pbr_length, permit, sequence 20
  map number      = 1
  action index    = 65
  map vcci out    = 0x0
  tt_pkt_count   = 0          tt_byte_count = 0
```

```

primary action : NULL_ACTION
secondary action : - none -
mac-rewr index = 0x0000 0000
vcci = 0x0000, qos group = 0, tos prec = 0
.....
route-map pbr_length, permit, sequence 30
  map number = 2
  action index = 66
  map vcci out = 0x0
  tt_pkt_count = 0          tt_byte_count = 0
  primary action : NULL_ACTION
  secondary action : - none -
  mac-rewr index = 0x0000 0000
  vcci = 0x0000, qos group = 0, tos prec = 0

```

The following sample output from the **show pxf cpu pbr tcam** command shows the type of detailed VMR (value, plus a mask and result) information that displays:

Router# **show pxf cpu pbr tcam pbr\_length detail**

```

VMR data for Route-map pbr_length
-----
VMR Format - handle: 5050BC90
Format has 5 fields, refcount = 1
Field: Format, FIXED, start_bit = 69, end_bit = 71
Field: ACL index, FIXED, start_bit = 54, end_bit = 68
Field: Flags, FIXED, start_bit = 43, end_bit = 53
Field: L4 proto, FIXED CNV, start_bit = 16, end_bit = 23
Field: Unknown, FLEX, start_bit = 0, end_bit = 15 Total bits = 53, format = 72 GMR used: 0
  Col 3 LKBP Vector: 96C
Status: Running
-----
VMRs
----- VMR 0 -----
V: 7000C000 00000600 70
M: FFFFD800 0000FFFF F0
R: 80000104
Format: 00000003/00000007
ACL index: 00004003/00007FFF
L4 proto: 00000006/000000FF
Flags: 00000000/00000300
Packet Length: 00000070/0000FFFF
----- VMR 1 -----
V: 7000C000 00000600 68
M: FFFFD800 0000FFFF F8
R: 80000104
Format: 00000003/00000007
ACL index: 00004003/00007FFF
L4 proto: 00000006/000000FF
Flags: 00000000/00000300
Packet Length: 00000068/0000FFFF
----- VMR 2 -----
V: 7000C000 00000600 64
M: FFFFD800 0000FFFF FC
R: 80000104
Format: 00000003/00000007
ACL index: 00004003/00007FFF
L4 proto: 00000006/000000FF
Flags: 00000000/00000300
Packet Length: 00000064/0000FFFC
.
.
.
----- VMR 18 -----
V: 7000C000 00000000 00
M: FFFFC000 00000000 00
R: 80000110
Format: 00000003/00000007
ACL index: 00004003/00007FFF
L4 proto: 00000000/00000000

```

Flags: 00000000/00000000  
Packet Length: 00000000/00000000

**Related Commands**

| Command                         | Description                                      |
|---------------------------------|--------------------------------------------------|
| <b>show pxf cpu policy-data</b> | Displays QoS policy data index usage statistics. |
| <b>show pxf cpu vcci</b>        | Displays VCCI to interface mapping information.  |

## show pxf cpu police

To display all active policer policies in the Parallel eXpress Forwarding (PXF), including active interface and policing parameters, use the **show pxf cpu police** command in privileged EXEC mode.

**show pxf cpu police** [*policy-map-name* ]

### Syntax Description

|                        |                                                                          |
|------------------------|--------------------------------------------------------------------------|
| <i>policy-map-name</i> | (Optional) Policy for which you want to display PXF policing statistics. |
|------------------------|--------------------------------------------------------------------------|

### Command Modes

Privileged EXEC (#)

### Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.2S      | This command was introduced.                                   |
| 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1. |

### Usage Guidelines

If a policy name is not specified, the command displays policing statistics for all policy maps.

### Examples

The following example shows the PXF policing statistics for a policy called policetest. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu police policetest
Policy policetest:
  Class: police_class
  Interface VCCI 0x9DD Output Policy:
    police 8000 8000 15000 conform-action transmit exceed-action drop violate-action drop
  Class: class-default
  *** No police action ***
```

### Related Commands

| Command                    | Description                                     |
|----------------------------|-------------------------------------------------|
| <b>show pxf cpu vcci</b>   | Displays VCCI to interface mapping information. |
| <b>show pxf statistics</b> | Displays chassis-wide, summary PXF statistics.  |

# show pxf cpu policy-data

To display Parallel eXpress Forwarding (PXF) policy data index usage statistics, use the **show pxf cpu policy-data** command in privileged EXEC mode.

**show pxf cpu policy-data**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                   |
|-----------------|------------|----------------------------------------------------------------|
|                 | 12.2S      | This command was introduced.                                   |
|                 | 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1. |

**Examples** The following example shows PXF policy data which is information related to the number of classes in a policy and the reservation of unique indexes to support match statistics and token buckets. Policy data index statistics are related to free match statistics indexes. Exhaustion of these indexes means no more policies can be created in the router. Secondary policy data indexes are related to free token bucket indexes. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu policy-data
Service policy data index usage statistics:
Total groups = 9, pool_defragmented = TRUE.
  Group size    Chunk count
    1           0
    2           1
    4           1
    8           0
   16           1
   32           1
   64           1
  128           1
  256          1023
Total free count = 262134.
Total chunk count = 262144.
Secondary policy data index usage statistics:
Total groups = 9, pool_defragmented = TRUE.
  Group size    Chunk count
    2           1
    4           1
    8           0
   16           1
   32           1
   64           1
  128           1
  256           1
  512          2047
Total free count = 1048566.
Total chunk count = 1048576.
```

The Group size field is the number of policy classes. The Chunk count field is the number of blocks the group holds.

**Related Commands**

| Command                        | Description                                                        |
|--------------------------------|--------------------------------------------------------------------|
| <b>show pxf cpu pbr action</b> | Displays PBR actions configured in the PXF for all PBR route maps. |
| <b>show pxf cpu vcci</b>       | Displays VCCI to interface mapping information.                    |

# show pxf cpu qos

To display Parallel eXpress Forwarding (PXF) External Column Memory (XCM) contents related to a particular policy, use the **show pxf cpu qos** command in privileged EXEC mode.

**show pxf cpu qos** [**policy-map** *policy-name*] **vcci-maps**

## Cisco 10000 Series Router

**show pxf cpu qos** [**vcci**] **classifiers** | **flex-sum** | **policy-map** *policy-name* | **vcci-maps**

### Syntax Description

|                                      |                                                                                                                                                                                                                                                         |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>vcci</i>                          | (Optional) Virtual Channel Circuit Identifier (VCCI). Information about this specified VCCI will be displayed.                                                                                                                                          |
| <b>classifiers</b>                   | (Optional) Displays information about the criteria used to classify traffic.                                                                                                                                                                            |
| <b>flex-sum</b>                      | (Optional) Displays summary information describing the amount of memory allocated in the PXF engine for use by the flexible key construction microcode.<br><br><b>Note</b> This option is only available on the Cisco 10000 series router for the PRE3. |
| <b>policy-map</b> <i>policy-name</i> | (Optional) Displays per-policy map information.                                                                                                                                                                                                         |
| <b>vcci-maps</b>                     | (Optional) Displays VCCI map values.                                                                                                                                                                                                                    |

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                               |
|-------------|----------------------------------------------------------------------------|
| 12.2S       | This command was introduced.                                               |
| 12.3(7)XI1  | This command was introduced on the Cisco 10000 series router for the PRE2. |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.             |
| 12.2(31)SB2 | This command was introduced on the PRE3 for the Cisco 10000 series router. |



**Usage Guidelines**

This command is useful in verifying the presence of a policy on interfaces and indexes programmed in the PXF.

**Examples**

The following example shows XCM contents related to a policy called police\_test, which is defined as follows:

```
policy-map police_test
  class high-priority
    priority
  class low-priority
    set atm-clp
  class class-default
    queue-limit 512
Router# show pxf cpu qos police_test
Output Policymap: police_test
Vcci: A05  Flags: 4  Policymap_index: 6  Policymap_data_index: 12
OUT AT1/0/0.111 (0x71764660) ref_count 1
Output Action Table Contents for vcci 0xA05 - Policymap index: 6
  class-name: high-priority  class_index: 0  action_flags: 0x00
    srp_class_id: 0x01  prec/dscp: 0x00  cos: 0
    discard_class: 0x00  exp_value: 0
  class-name: low-priority  class_index: 1  action_flags: 0x10
    srp_class_id: 0x00  prec/dscp: 0x00  cos: 0
    discard_class: 0x00  exp_value: 0
  class-name: class-default  class_index: 2  action_flags: 0x00
    srp_class_id: 0x00  prec/dscp: 0x00  cos: 0
    discard_class: 0x00  exp_value: 0
```

**Related Commands**

| Command                            | Description                                                     |
|------------------------------------|-----------------------------------------------------------------|
| <b>show pxf cpu statistics qos</b> | Displays match statistics for a service policy on an interface. |

# show pxf cpu queue

To display parallel express forwarding (PXF) queueing and link queue statistics, use the **show pxf cpu queue** command in privileged EXEC mode.

**show pxf cpu queue** [*interface*] *QID* [**summary**]

## Cisco uBR10012 Universal Broadband Router

**show pxf cpu queue** [*interface*] *QID*

### Syntax Description

|                  |                                                                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>interface</i> | (Optional) The interface for which you want to display PXF queueing statistics. This displays PXF queueing statistics for the main interface and all subinterfaces and permanent virtual circuits (PVCs). It also displays packets intentionally dropped due to queue lengths.           |
| <i>QID</i>       | (Optional) The queue identifier.                                                                                                                                                                                                                                                         |
| <b>summary</b>   | (Optional) Displays queue scaling information such as: <ul style="list-style-type: none"> <li>• Number of queues and recycled queues.</li> <li>• Number of available queue IDs (QIDs).</li> <li>• Number of packet buffers, recycled packet buffers, and free packet buffers.</li> </ul> |

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2S       | This command was introduced.                                                                                                                                                 |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                               |
| 12.3(7)XI1  | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                                                               |
| 12.3(23)BC1 | The "Link Queues" output field for dynamic bandwidth sharing-enabled modular cable and wideband cable interfaces was added on the Cisco uBR10012 universal broadband router. |

| Release     | Modification                                                                                                                                                                                      |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SB  | This command was modified for virtual access interfaces (VAIs) and the output was modified for the <b>summary</b> option, and implemented on the Cisco 10000 series router for the PRE3 and PRE4. |
| 12.2(33)SCB | The output of this command has been updated or re-arranged (compared to the VTMS version) for DOCSIS Weighted Fair Queuing (WFQ) Scheduler feature and implemented on the Cisco uBR10012 router.  |

## Usage Guidelines

When neither the interface or QID is specified, the command displays queuing statistics for the route processors (RPs).

### Cisco 10000 Series Router

The Cisco 10000 series router high-speed interfaces work efficiently to spread traffic flows equally over the queues. However, using single traffic streams in a laboratory environment might result in less-than-expected performance. To ensure accurate test results, test the throughput of the Gigabit Ethernet, OC-48 POS, or ATM uplink with multiple source or destination addresses. To determine if traffic is being properly distributed, use the **show pxf cpu queue** command.

In Cisco IOS Release 12.2(33)SB and later releases, the router no longer allows you to specify a virtual access interface (VAI) as **viX.Y** in the **show pxf cpu queue** command. Instead, you must spell out the VAI as **virtual-access**.

For example, the router accepts the following command:

```
Router# show pxf cpu queue virtual-access2.1
```

In releases prior to Cisco IOS Release 12.2(33)SB, the router accepts the abbreviated form of the VAI. For example, the router accepts the following command:

```
Router# show pxf cpu queue vi2.1
```

In Cisco IOS Release 12.2(33)SB and later releases, the output from the **show pxf cpu queue interface summary** command displays only the physical interface and the number of logical links. The output does not display the number of priority queues, class queues, and so on. This modification applies to the PRE3 and PRE4.

### Cisco uBR10012 Universal Broadband Router

If dynamic bandwidth sharing (DBS) is enabled, the link queue information that is displayed refers to the specific type of interface that is configured--modular cable or wideband cable. The **summary** keyword option is not supported for the Cisco uBR10012 universal broadband router for wideband cable or modular cable interfaces. The **ATM** interface output is not available for this router.

See the table below for descriptions of the **interface** keyword fields.

**Table 90: show pxf cpu queue Interface Option Field Descriptions**

| Field      | Description            |
|------------|------------------------|
| <0-131071> | QID (queue identifier) |

| Field             | Description                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ATM               | Asynchronous transfer mode interface<br><b>Note</b> The ATM interface output is not available for the Cisco uBR10012 universal broadband router. |
| BVI               | Bridge-group virtual interface                                                                                                                   |
| Bundle            | Cable virtual bundle interface                                                                                                                   |
| CTunnel           | CTunnel interface                                                                                                                                |
| Cable             | Cable modem termination service (CMTS) interface                                                                                                 |
| DTI               | Digital trunk interface                                                                                                                          |
| Dialer            | Dialer interface                                                                                                                                 |
| Ethernet          | IEEE 802.3                                                                                                                                       |
| FastEthernet      | FastEthernet IEEE 802.3                                                                                                                          |
| GigabitEthernet   | GigabitEthernet IEEE 802.3z                                                                                                                      |
| Group-Async       | Async group interface                                                                                                                            |
| Loopback          | Loopback interface                                                                                                                               |
| MFR               | Multilink frame relay bundle interface                                                                                                           |
| Modular-Cable     | Modular cable interface                                                                                                                          |
| Multilink         | Multilink group interface                                                                                                                        |
| Null              | Null interface                                                                                                                                   |
| Port-channel      | Ethernet channel of interfaces                                                                                                                   |
| RP                | Forwarding path (FP) to route processing (RP) queues                                                                                             |
| Tunnel            | Tunnel interface                                                                                                                                 |
| Vif               | Pragmatic general multicast (PGM) host interface                                                                                                 |
| Virtual-Template  | Virtual template interface                                                                                                                       |
| Virtual-TokenRing | Virtual token ring                                                                                                                               |
| WB-SPA            | line card to line card (LC-LC) queues                                                                                                            |

| Field          | Description             |
|----------------|-------------------------|
| Wideband-Cable | Wideband CMTS interface |

## Examples

The following example shows PXF queueing statistics for an ATM interface when a QID is not specified. The sample output includes the dropped and dequeued packets for the VCs, and for classes associated with sessions that inherit queues from VCs.

```
Router# show pxf cpu queue atm 5/0/2
VCCI 2517: ATM non-aggregated VC 1/229, VCD 1, Handle 1, Rate 500 kbps
  VCCI/ClassID  ClassName      QID    Length/Max  Res  Dequeues  Drops
    0 2517/0      class-default  269    0/4096      11      3        0
    0 2517/31     pak-priority  268    0/32        11      4        0
  Queues Owned but Unused by VC (inheritable by sessions)
    ClassID      ClassName      QID    Length/Max  Res  Dequeues  Drops
      0          class-default  275    0/32        11     100        0
      31         pak-priority  268    0/32        11      4        0
VCCI 2517: ATM non-aggregated VC 1/233, VCD 4, Handle 4, Rate 50 kbps
  VCCI/ClassID  ClassName      QID    Length/Max  Res  Dequeues  Drops
    0 2517/0      class-default  269    0/4096      11      3        0
    0 2517/31     pak-priority  268    0/32        11      4        0
  Queues Owned but Unused by VC (inheritable by sessions)
    ClassID      ClassName      QID    Length/Max  Res  Dequeues  Drops
      0          class-default  274    0/32        11      0        0
      31         pak-priority  268    0/32        11      4        0
VCCI 2520: ATM non-aggregated VC 1/232, VCD 3, Handle 3, Rate 500 kbps
  VCCI/ClassID  ClassName      QID    Length/Max  Res  Dequeues  Drops
    0 2520/0      class-default  273    0/32        11      0        0
    0 2520/31     pak-priority  268    0/32        11      4        0
VCCI 2519: ATM non-aggregated VC 1/231, VCD 2, Handle 2, Rate 500 kbps
  VCCI/ClassID  ClassName      QID    Length/Max  Res  Dequeues  Drops
    0 2519/0      class-default  272    0/32        11      0        0
    0 2519/31     pak-priority  268    0/32        11      4        0
```

The following example displays PXF queueing statistics for QID 267:

```
Router# show pxf cpu queue 267
ID : 267
Priority : Lo
CIR (in-use/configured) : 0/65535
EIR (in-use/configured) : 0/0
MIR (in-use/configured) : 0/65535
Maximum Utilization configured : no
Link : 2
Flowbit (period/offset) : 32768/32768
Burst Size : 1024 bytes
Bandwidth : 133920 Kbps
Channel : 0
Packet Descriptor Base : 0x00000100
ML Index : 0
Length/Average/Alloc : 0/0/32
Enqueues (packets/octets) : 293352/9280610
Dequeues (packets/octets) : 293352/9280610
Drops (tail/random/max_threshold) : 0/0/0
Drops (no_pkt_handle/buffer_low) : 0/0
WRED (weight/avg_smaller) : 0/0
WRED (next qid/drop factor) : 0/0
WRED (min_threshold/max_threshold/scale/slope) :
precedence 0 : 0/0/0/0
precedence 1 : 0/0/0/0
precedence 2 : 0/0/0/0
precedence 3 : 0/0/0/0
precedence 4 : 0/0/0/0
precedence 5 : 0/0/0/0
```

```
precedence 6 : 0/0/0/0
precedence 7 : 0/0/0/0
```

## Examples

The following examples show link queue information for specific wideband cable and modular cable interfaces when dynamic bandwidth sharing is enabled.

## Examples

```
Router(config)# interface modular-cable 1/0/0:1
.
.
.
Router(config-if)# cable dynamic-bw-sharing
.
.
.
Router# show pxf cpu queue modular-cable 1/0/0:1
Link Queues :
  QID   CIR(act/conf)      EIR           MIR           RF Chan.   Status
  420   19661/19661           1/1           65535/65535    0           Inactive
```

### Wideband Cable Interface

```
Router(config)# interface wideband-cable 1/0/0:0
.
.
.
Router(config-if)# cable dynamic-bw-sharing
.
.
.
Router# show pxf cpu queue wideband-cable 1/0/0:0
Link Queues :
  QID   CIR(act/conf)      EIR           MIR           RF Chan.   Status
  419   32768/32768          1/1           65535/65535    0           Inactive
  566   19661/19661          1/1           65535/65535    1           Inactive
```

The following example shows service flow queue information for modular cable interfaces.

```
Router# show pxf cpu queue modular-cable 1/2/0:0
Cable Interface Queues:
  QID   Len/Max  Dequeues  TailDrops  MinRt   Wt/Quantum  ShapeRt  FlowId
           (Kbps)
  131147 0/255    190       0           0       1/240       0        58
  131148 0/255    33820     0           0       1/10000     0       32824
Cable Service Flow Queues:
* Best Effort Queues
  QID   Len/Max  Dequeues  TailDrops  MinRt   Wt/Quantum  ShapeRt  FlowId
           (Kbps)
  131241 0/255    0         0           0       1/240       0       32881
* CIR Queues
  QID   Len/Max  Dequeues  TailDrops  MinRt   Wt/Quantum  ShapeRt  FlowId
           (Kbps)
  2049  254/255  131018    485751     99      1/1920      0       32880
* Low Latency Queues
  QID   Len/Max  Dequeues  TailDrops
```

## Related Commands

| Command                          | Description                                                           |
|----------------------------------|-----------------------------------------------------------------------|
| <b>cable dynamic-bw-sharing</b>  | Enables DBS on a specific modular cable or wideband cable interface.  |
| <b>show pxf cable controller</b> | Displays information about the RF channel VTMS links and link queues. |

| Command                       | Description                                            |
|-------------------------------|--------------------------------------------------------|
| show pxf cpu statistics queue | Displays PXF CPU queueing counters for all interfaces. |

## show pxf cpu reasm\_index

To display information about reassembly of IP fragmented packets in the Parallel eXpress Forwarding (PXF), use the **show pxf cpu reasm\_index** command in privileged EXEC mode.

**show pxf cpu reasm\_index [summary]**

### Syntax Description

|                |                                                                                         |
|----------------|-----------------------------------------------------------------------------------------|
| <b>summary</b> | (Optional) Displays summary reassembly information of IP fragmented packets in the PXF. |
|----------------|-----------------------------------------------------------------------------------------|

### Command Modes

Privileged EXEC (#)

### Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.2S   | This command was introduced. |

### Examples

The following example shows reassembly summary information. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu reasm_index summary
Multilink Reassembly Index usage summary
      Maximum   Used      Available
      1251      0         1251
```

### Related Commands

| Command                           | Description                                             |
|-----------------------------------|---------------------------------------------------------|
| <b>ip virtual-reassembly</b>      | Enables VFR information on an interface.                |
| <b>show ip virtual-reassembly</b> | Displays VFR configuration and statistical information. |



## show pxf cpu statistics

To display Parallel eXpress Forwarding (PXF) CPU statistics, use the **show pxf cpu statistics** command in privileged EXEC mode.

```
show pxf cpu statistics [atom| backwalk| clear| diversion| drop [interface| vcci]] ip| ipv6| l2tp| mlp| qos
[ interface ]| queue| rx [ vcci ]| security| arp-filter| drl [cable-wan-ip| wan-non-ip]]
```

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```
show pxf cpu statistics diversion [pxf [interface {interface| vcci}]] top number]
```

#### Syntax Description

|                                |                                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>atom</b>                    | (Optional) Displays Any Transport over MPLS (AToM) statistics.                                                                                                         |
| <b>backwalk</b>                | (Optional) Displays backwalk requests statistics.                                                                                                                      |
| <b>clear</b>                   | (Optional) Clears PXF CPU statistics.                                                                                                                                  |
| <b>diversion</b>               | (Optional) Displays packets that the PXF diverted to the Route Processor (RP) for special handling.                                                                    |
| <b>drop</b> [interface] [vcci] | (Optional) Displays packets dropped by the PXF for a particular interface or Virtual Circuit Connection Identifier (VCCI).                                             |
| <b>ip</b>                      | (Optional) Displays IP statistics.                                                                                                                                     |
| <b>ipv6</b>                    | (Optional) Displays IPv6 statistics.                                                                                                                                   |
| <b>l2tp</b>                    | (Optional) Displays packet statistics for an L2TP Access Concentrator (LAC) (Optional) and L2TP Network Server (LNS).                                                  |
| <b>mlp</b>                     | (Optional) Displays multilink PPP (MLP) statistics.                                                                                                                    |
| <b>pxf</b>                     | (Optional) Displays packets that the PXF diverted to the Route Processor (RP). Available on the Cisco 10000 series router only.                                        |
| <b>pxf interface</b> interface | (Optional) Displays per-interface PXF statistical information for the divert cause policer on a particular interface. Available on the Cisco 10000 series router only. |

|                                  |                                                                                                                                                                                                      |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>pxf interface</b> <i>vcci</i> | (Optional) Displays per-VCCI PXF statistical information for the divert cause policer on a particular Virtual Circuit Connection Identifier (VCCI). Available on the Cisco 10000 series router only. |
| <b>qos</b> [ <i>interface</i> ]  | (Optional) Displays match statistics for a service policy on an interface.                                                                                                                           |
| <b>queue</b>                     | (Optional) Displays queueing counters for all interfaces.                                                                                                                                            |
| <b>rx</b> [ <i>vcci</i> ]        | (Optional) Displays receive statistics for a VCCI.                                                                                                                                                   |
| <b>security</b>                  | (Optional) Displays ACL matching statistics.                                                                                                                                                         |
| <b>top</b> <i>number</i>         | (Optional) Displays PXF statistical information for the number of top punters you specify. Available on the Cisco 10000 series router only. Valid values are from 1 to 100.                          |
| <b>arp-filter</b>                | (Optional) Displays the ARP filter statistics.                                                                                                                                                       |
| <b>drl</b>                       | (Optional) Displays the divert rate limit.                                                                                                                                                           |
| <b>cable-wan-ip</b>              | (Optional) Displays cable / wan-ip statistics for dropped packets.                                                                                                                                   |
| <b>wan-non-ip</b>                | (Optional) Displays DRL wan-non-ip statistics for dropped packets.                                                                                                                                   |

**Command Modes**

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                                                                                                                                                                                                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(7)XI1  | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                                                                                                                                                                                                                                                             |
| 12.2(28)SB  | This command was introduced on the Cisco 10000 series router and integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                                                                                                                             |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2.                                                                                                                                                                                                                                                                                                            |
| 12.2(33)SB  | This command was enhanced to display per-interface or per-VCCI PXF statistical information for the divert cause policer on a particular interface or VCCI, to display the top punters on an interface, and to display the provisioned burst size for any divert causes. These enhancements were implemented on the Cisco 10000 series router for the PRE2, PRE3, and PRE4. |

| Release     | Modification                                                                                                                                                                                                                                                                                    |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(33)SCB | This command was integrated into Cisco IOS Release 12.2(33)SCB on the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers. Support for the Cisco uBR7225VXR router was added. The <b>arp-filter</b> , <b>drl</b> , <b>cable-wan-ip</b> , and <b>wan-non-ip</b> keywords were added. |
| 12.2(33)SCE | This command was modified in Cisco IOS Release 12.2(33)SCE. The <b>cable-wan-ip</b> keyword was removed.                                                                                                                                                                                        |

## Usage Guidelines

### Cisco 10000 Series Router Usage Guidelines

- The **show pxf cpu statistics diversion** command displays statistical information about diverted packets. Divert causes with the string "ipv6..." display as "v6..." in the output of all **show pxf cpu statistics diversion** commands.
- The output from the **show pxf cpu statistics diversion pxf** command was enhanced in Cisco IOS Release 12.2(33)SB to display the provisioned burst size for any divert causes.
- The **show pxf cpu statistics diversion pxf interface interface** command displays statistical information about the divert cause policer on a specific interface. The output of this command is similar to the output displayed at the aggregated level. This command enables you to see the traffic types being punted from an inbound interface, subinterface, and session.
- The **show pxf cpu statistics diversion pxf interface vcc** command displays statistical information about the divert cause policer on a specific VCCI. The output of this command is similar to the output displayed at the aggregated level. This command enables you to see the traffic types being punted from an inbound interface, subinterface, and session.
- The **show pxf cpu statistics diversion top number** command displays the interfaces, subinterfaces, and sessions with the highest number of punter packets.

## Examples



### Note

The following example shows PXF queueing counters information. These are aggregate counters for all interfaces. The Total column is the total for all columns.

```
Router# show pxf cpu statistics queue
Column 6 Enqueue/Dequeue Counters by Rows:
dbg Counters      0          1          2          3          4          5          6
              7      Total
=====
enq_pkt          0x0000FD9B 0x0000FC77 0x0000FE4A 0x0000FF81 0x0000FC53 0x0000FD2E 0x0000FF19
0x0000FDDE 0x0007EE55
tail_drop_pkt    0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
deq_pkt          0x0000FD47 0x0000FEF2 0x0000FCB3 0x0000FF65 0x0000FCE7 0x0000FC45 0x0000FEE7
```

```

0x0000FDF1 0x0007EE55
deq_vtp_req      0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
deq_flow_off     0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
deq_ocq_off      0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
engdeq_conflict 0x0000003A 0x00000043 0x0000004A 0x00000039 0x0000003A 0x0000004F 0x00000036
0x00000031 0x000001F0
bndl_pkt         0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
frag_pkt         0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg_frag_drop    0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg_bndl_sem     0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
context_inhibit 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
bfifo_eng_fail   0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg1             0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg2             0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg3             0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg4             0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg5             0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
dbg6             0x0000      0x0000      0x0000      0x0000      0x0000      0x0000      0x0000      0x0000
0x0000      0x0000
dbg7             0x00      0x00      0x00      0x00      0x00      0x00      0x00      0x00
0x00      0x00
Column 7 Rescheduling State Counters by Rows:
dbg Counters      0          1          2          3          4          5          6
=====
=====
=====
High Next Time    0x524E1100 0x524E1140 0x524E1140 0x524E1180 0x524E11C0 0x524E11C0 0x524E1200
0x524E1240      -
Low Next Time     0x524E1100 0x524E1140 0x524E1140 0x524E1180 0x524E11C0 0x524E1200 0x524E1200
0x524E1240      -
High Wheel Slot   0x00000844 0x00000845 0x00000846 0x00000846 0x00000847 0x00000848 0x00000848
0x00000849      -
Low Wheel Slot    0x00000844 0x00000845 0x00000846 0x00000846 0x00000847 0x00000848 0x00000848
0x00000849      -
DEQ_WHEEL         0x0001F5D0 0x0001F4BD 0x0001F56B 0x0001F6BF 0x0001F396 0x0001F3E8 0x0001F6BF
0x0001F4A7 0x000FA99B
DQ-lock Fails     0x0000039F 0x000003FD 0x000003B2 0x000003E1 0x000003CB 0x000003E2 0x000003FD
0x000003CD 0x00001EA6
TW_ENQ Fails      0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
Q_SCHED           0x0000FACD 0x0000FC6B 0x0000FA38 0x0000FCE4 0x0000FA66 0x0000F994 0x0000FC62
0x0000FB8B 0x0007DA3B
FAST_SCHED        0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
Q_DEACT           0x0000FB03 0x0000F852 0x0000FB33 0x0000F9DB 0x0000F930 0x0000FA54 0x0000FA5D
0x0000F91C 0x0007CF60
Q_ACTIVATE        0x0000F9B6 0x0000F8D4 0x0000FA6C 0x0000FBA9 0x0000F87E 0x0000F95B 0x0000FB0A
0x0000F9DE 0x0007CF60
Q_CHANGE          0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
DEBUG1            0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
DEBUG2            0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
DEBUG3            0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000
DEBUG4            0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000

```

```

DEBUG5          0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000

```

The table below describes the significant fields shown in the display.

**Table 91: show pxf cpu statistics queue Field Descriptions**

| Field                                         | Description                                                                                          |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------|
| Column 6 Enqueue/Dequeue Counters by Rows:    |                                                                                                      |
| enq_pkt                                       | Packets the PXF enqueued.                                                                            |
| tail_drop_pkt                                 | Packets the PXF tails dropped.                                                                       |
| deq_pkt                                       | Packets the PXF dequeued.                                                                            |
| deq_vtp_req                                   | Number of times a dequeue was inhibited due to the virtual traffic policer.                          |
| deq_flow_off                                  | Numbers of times a dequeue was inhibited due to a flowoff from the line card.                        |
| deq_ocq_off                                   | Number of times a dequeue was inhibited due to link level flow control.                              |
| enqdeq_conflict                               | Shows a dequeue failed due to an enqueue to the same queue in progress.                              |
| bndl_pkt                                      | Count of packets that were fragmented.                                                               |
| frag_pkt                                      | Count of fragments sent.                                                                             |
| dbg_frag_drop                                 | Count of invalid multilink PPP (MLP) fragment handles.                                               |
| dbg_bndl_sem                                  | Count of semaphore collision (used for MLP).                                                         |
| context_inhibit                               | Number of times multilink transmit fragment processing was inhibited due to a lack of DMA resources. |
| bfifo_enq_fail                                | Count of bundle FIFO (BFIFO) enqueue failures.                                                       |
| Column 7 Rescheduling State Counters by Rows: |                                                                                                      |
| High Next Time                                | Current next send time for the high priority wheel.                                                  |
| Low Next Time                                 | Current next send time for the low priority wheel.                                                   |
| High Wheel Slot                               | Current high priority slot number.                                                                   |
| Low Wheel Slot                                | Current low priority slot number.                                                                    |

| Field         | Description                                                                       |
|---------------|-----------------------------------------------------------------------------------|
| DEQ_WHEEL     | Count of successful dequeues from the timing wheel.                               |
| DQ-lock Fails | Count of timing wheel dequeue failures (both queue empty and race conditions).    |
| TW ENG Fails  | Timing wheel enqueue failures.                                                    |
| Q_SCHED       | Count of queues scheduled/rescheduled onto the timing wheel.                      |
| FAST_SCHED    | Count of queues fast scheduled/rescheduled onto the timing wheel.                 |
| Q_DEACT       | Count of queue deactivations.                                                     |
| Q_ACTIVATE    | Count of queue activations (activate state).                                      |
| Q_CHANGE      | Count of queue changes; for example, Route Processor (RP) inspired rates changes. |

The following example displays PXF L2TP packet statistics.



#### Note

For L2TP Access Concentrator (LAC) operation, all statistics are applicable. For L2TP Network Server (LNS) operation, only the PPP Control Packets, PPP Data Packets, and PPP Station Packets statistics are meaningful.

```
Router# show pxf cpu statistics l2tp
LAC Switching Global Debug Statistics:
  PPP Packets          51648
  PPP Control Packets  51647
  PPP Data Packets      1
  Not IPv4 Packets      1
  IP Short Hdr Packets  1
  IP Valid Packets      0
  IP Invalid Packets    1
  DF Cleared Packets    0
  Path MTU Packets      0
  No Path MTU Packets   0
  Within PMTU Packets   0
  Fraggable Packets     0
  PMTU Pass Packets     0
  PMTU Fail Packets     0
  Encapped Packets      51648
L2TP Classification Global Debug Statistics:
  LAC or Multihop Packets 151341
  Multihop Packets         0
  PPP Control Packets      51650
  PPP Data Packets        99691
  PPP Station Packets      151341
```

The following example displays match statistics for the police\_test policy on an ATM interface. The Classmap Index differentiates classes within a policy while the Match Number differentiates match statements within a class.

```
Router# show pxf cpu statistics qos atm 6/0/0.81801
      Classmap      Match      Pkts      Bytes
      Index      Number      Matched      Matched
-----
police_test (Output) service-policy :
  police_class      (0)      0      0
                   1      0      0
                   2      0      0
                   3      0      0
  class-default      (1)      0      0
```

## Examples

The following example displays the top 10 packet types diverted to the RP. The output displays the top punters by interface and by Layer 2 packet flow.

```
Router# show pxf cpu statistics diversion top 10
Top 10 punters by interface are:
Rate (pps)      Packets      (diverted/dropped)      vcci      Interface
1      10/0      2606 Virtual-Access2.1
Last diverted packet type is none.
Top 10 punters by Layer 2 flow are:
Rate (pps)      Packets      (diverted/dropped)      Interface      Layer 2 info
1      15/0      ATM2/0/3      vpi 128/vci 4096/vcci 2591
Last diverted packet type is oam_f4.
1      15/0      ATM2/0/3      vpi 128/vci 4096/vcci 2593
Last diverted packet type is oam_f4.
```

## Related Commands

| Command                              | Description                                               |
|--------------------------------------|-----------------------------------------------------------|
| <b>platform c10k divert- policer</b> | Configures the rate and burst size of the divert-policer. |
| <b>show pxf statistics</b>           | Displays a summary of statistics in the PXF.              |

# show pxf cpu subblocks

To display Parallel eXpress Forwarding (PXF) CPU statistics for a bridged subinterface (encapsulation type), use the **show pxf cpu subblocks** command in privileged EXEC mode.

**show pxf cpu subblocks interface-name**

## Syntax Description

|                       |                        |
|-----------------------|------------------------|
| <i>interface-name</i> | Name of the interface. |
|-----------------------|------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                             |
|------------|--------------------------------------------------------------------------|
| 12.2(28)SB | This command was introduced on the Cisco 10000 series router.            |
| 12.3(14)T  | This command was enhanced to display more information for all subblocks. |
| 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB.           |

## Examples

The following example shows subblocks information for Gigabit Ethernet interface 7/0/0:

```
Router# show pxf cpu subblocks g7/0/0
GigabitEthernet7/0/0 is up
  ICB = 1C000, LinkId = 6, interface PXF, enabled
    link next_send: 0x37022604 channel number: 0
    link bandwidth_mult: 33467 shift: 22
    link bandwidth mult: 33467 shift: 22
    link aggregate cir: 0x00000000 aggregate eir: 0x00000000
  IOS encapsulation type 1 ARPA
  Min mtu: 14 Max mtu: 1528
  VCCI mactable location = A3340000
  VCCI 9D3 (802.1Q VLAN 1)
    icmp ipaddress 0.0.0.0 timestamp 0
    fib_root 0x0, fib_root_rpf 0x0 cicc_flags 0x00, flags/netmask 0x02
  VCCI 9DB (802.1Q VLAN 1)
    icmp ipaddress 0.0.0.0 timestamp 0
    fib_root 0x0, fib_root_rpf 0x0 cicc_flags 0x00, flags/netmask 0x02
```

The following example shows subblocks information for all interfaces:

```
Router# show pxf cpu subblocks PXF
Interface      Status  ICB  WQB_ID  Fwding  Enc  VCCI-map  VCCI VC
Control Plane  up      0    1        PXF     0    A3000000  1
ATM1/0/0       initiali 6000  3        disabl  33  A3040000  9CF
ATM1/0/1       initiali 6001  4        disabl  33  A3060000  9D0
ATM1/0/2       initiali 6002  5        disabl  33  A3080000  9D1
ATM1/0/3       initiali 6003  6        disabl  33  A30A0000  9D2
Serial2/0/0    initiali A000  7        disabl  16  A3000004  9D3
Serial2/0/1    initiali A001  8        disabl  16  A3000008  9D4
Serial2/0/2    initiali A002  9        disabl  5   A300000C  9D5
```



```

Serial2/0/3          initiali A800 10    disabl 5    A3000010 9D6
Serial2/0/4          initiali A801 11    disabl 5    A3000014 9D7
Serial2/0/5          initiali A802 12    disabl 5    A3000018 9D8
Serial2/0/6          initiali B000 13    disabl 5    A300001C 9D9
Serial2/0/7          initiali B001 14    disabl 5    A3000020 9DA
POS3/0/0             up      E000 15    PXF      5    A3000024 9DB
Serial4/0/0.1/1/1:0  up      12000 27    PXF     16    A3000040 9E7
Serial4/0/0.1/1/1:1  up      12001 28    PXF     16    A3000044 9E8
POS5/0/0             down    16000 16    disabl 5    A3000028 9DC
POS5/0/1             down    16001 17    disabl 5    A300002C 9DD
POS5/0/2             down    16002 18    disabl 5    A3000030 9DE
POS5/0/3             down    16003 19    disabl 5    A3000034 9DF
POS5/0/4             down    16004 20    disabl 5    A3000038 9E0
POS5/0/5             down    16005 21    disabl 5    A300003C 9E1
GigabitEthernet6/0/0 down    1A000 22    disabl 1    A32C0000 9E2 1
GigabitEthernet6/0/0.100 down 1A000 22    disabl 1    A32C0000 9EB 100
ATM8/0/0             up      22000 23    PXF     33    A33C0000 9E3
ATM8/0/0.1           up      22000 23    PXF     33    A33C0000 0 0/33
ATM8/0/0.2           up      22000 23    PXF     33    A33C0000 0 0/34
ATM8/0/0.100        up      22000 23    PXF     33    A33C0000 9EC 30/32
ATM8/0/0.200        up      22000 23    PXF     33    A33C0000 9ED 0/32
ATM8/0/1             down    22001 24    disabl 33    A33E0000 9E4
ATM8/0/2             down    22002 25    disabl 33    A3400000 9E5
ATM8/0/3             down    22003 26    disabl 33    A3420000 9E6
Multilink1           up      0      29    PXF     16    A3000048 2
Multilink2           down    0      36    disabl 16    A300005C 4
Multilink20          up      0      30    PXF     16    A300004C 3
Multilink60230       down    0      31    disabl 16    A3000050 9E9
Multilink60130       down    0      32    disabl 16    A3000054 9EA

```

The table below describes the fields shown in the display.

**Table 92: show pxf cpu subblocks Field Descriptions**

| Field     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface | Identifies the interface or subinterface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Status    | <p>Displays the status of the interface:</p> <ul style="list-style-type: none"> <li>• Administ--The interface has been shut down and is in the administrative down state.</li> <li>• Deleted--The subinterface has been removed from the router's configuration.</li> <li>• Down--The interface is down because of a cable or other connectivity problem.</li> <li>• Initiali--The interface is in the process of initializing.</li> <li>• Reset--The interface is currently being reset.</li> <li>• Up--The interface is up and passing traffic.</li> </ul> |
| ICB       | Displays the Interface Control Block (ICB) that is mapped to this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| WQB_ID    | Displays the Work Queue Block (WQB) identifier for the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fwding   | Displays whether traffic is being forwarded (PXF) or not (disable).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Enc      | <p>Identifies the type of encapsulation used on the interface. The most common encapsulation types are:</p> <ul style="list-style-type: none"> <li>0 = None</li> <li>1 = Ethernet ARPA</li> <li>2 = Ethernet SAP</li> <li>3 = 802.2 SNAP</li> <li>5 = Serial, raw HDLC</li> <li>8 = Serial, LAPB</li> <li>9 = Serial, X.25</li> <li>20 = Frame Relay</li> <li>21 = SMDS</li> <li>22 = MAC-level packets</li> <li>27 = Logical Link Control (LLC) 2</li> <li>28 = Serial, SDLC (primary)</li> <li>30 = Async SLIP encapsulation</li> <li>33 = ATM interface</li> <li>35 = Frame Relay with IETF encapsulation</li> <li>42 = Dialer encapsulation</li> <li>46 = Loopback interface</li> <li>51 = ISDN Q.921</li> <li>59 = DOCSIS (previously known as MCNS)</li> <li>61 = Transparent Mode</li> <li>62 = TDM clear channel</li> <li>64 = PPP over Frame Relay</li> <li>65 = IEEE 802.1Q</li> <li>67 = LAPB terminal adapter</li> <li>68 = DOCSIS Cable Modem</li> </ul> |
| VCCI-map | Displays the memory address for the Virtually Cool Common Index (VCCI) map table for this particular VCCI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| VCCI     | Identifies the VCCI, in hexadecimal, assigned to the interface or subinterface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| VC       | Identifies the virtual circuit (VC).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Related Commands**

| Command                     | Description                                                                     |
|-----------------------------|---------------------------------------------------------------------------------|
| <b>clear pxf</b>            | Clears PXF counters and statistics.                                             |
| <b>debug pxf</b>            | Displays PXF debugging output.                                                  |
| <b>show ip mroute</b>       | Displays the contents of the IP multicast routing table.                        |
| <b>show pxf cpu tbridge</b> | Displays PXF CPU statistics for transparent bridging.                           |
| <b>show pxf microcode</b>   | Displays identifying information for the microcode currently loaded on the PXF. |

# show pxf cpu vcci

To display Virtually Cool Common Index (VCCI) to interface mapping information on the Parallel eXpress Forwarding (PXF), use the **show pxf cpu vcci** command in privileged EXEC mode.

**show pxf cpu vcci [summary]**

## Syntax Description

|                |                                                  |
|----------------|--------------------------------------------------|
| <b>summary</b> | (Optional) Displays VCCI allocation information. |
|----------------|--------------------------------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification                 |
|---------|------------------------------|
| 12.2S   | This command was introduced. |

## Usage Guidelines

The VCCI is an index that uniquely identifies each interface or subinterface in the PXF and it maps that interface to the appropriate set of services and features. This command is useful to verify the number of VCCIs that are used and available.

The Cisco 10000 series router has 65,536 VCCIs. A VCCI is assigned to each individual routed interface. A VCCI is not assigned to virtual template interfaces and loopbacks.

## Examples

The following example shows how to display the number of used and available VCCIs. The fields shown in the display are self-explanatory.

```
Router# show pxf cpu vcci summary
VCCI usage summary
      Maximum  Used   Available
Multilink VCCI    2500    0         2500
Other VCCI       63023   14       63009
```

## Related Commands

| Command                         | Description                                      |
|---------------------------------|--------------------------------------------------|
| <b>show pxf cpu policy-data</b> | Displays QoS policy data index usage statistics. |

# show pxf crash

To display Parallel eXpress Forwarding (PXF) crash information, use the **show pxf crash** command in privileged EXEC mode.

**show pxf crash**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release    | Modification                                                                                                                                                                      |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.1(1)E   | This command was introduced on the Cisco 10000 series router.                                                                                                                     |
|                 | 12.1(5)T   | This command was integrated into Cisco IOS Release 12.1(5)T.                                                                                                                      |
|                 | 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB.                                                                                                                    |
|                 | 12.2SX     | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

**Examples** The following example shows crash information as a result of a PXF direct memory access (DMA) error. The PXF crash information is typically stored in bootflash.

```
Router# show pxf crash
Summary of bootflash:pxf_crashinfo_20060117-152035
Time of crash was 15:20:35 UTC Tue Jan 17 2006
PXF DMA Error - End of Descriptor Before Cmd Byte Length Exhausted
Current microcode:
    file=system:pxf/c10k2-11-ucode.108.0.0.0,
    version=108.0.0.0,
    description=Nightly Build Software created Sat 19-Nov-05 00:12
```

The table below describes the significant fields shown in the display.

**Table 93: show pxf crash Field Descriptions**

| Field                 | Description                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary of bootflash: | Displays the filename in bootflash where the PXF crash information is stored. The filename format includes the date and time of the PXF crash. |
| Time of crash         | Displays the date of the PXF crash.                                                                                                            |

| Field             | Description                                                                      |
|-------------------|----------------------------------------------------------------------------------|
| UTC               | Displays the Universal Coordinated Time (UTC) of the PXF crash.                  |
| Current microcode | Displays identifying information for the microcode currently running on the PXF. |

**Related Commands**

| Command             | Description                           |
|---------------------|---------------------------------------|
| show pxf statistics | Displays a summary of PXF statistics. |

## show pxf dma

To display the current state of direct memory access (DMA) buffers, error counters, and registers on the Parallel eXpress Forwarding (PXF), use the **show pxf dma** command in privileged EXEC mode.

**show pxf dma** [buffers| counters| reassembly| registers]

### Cisco 10000 Series Router (PRE3 only)

**show pxf dma** [buffers| counters| reassembly| registers][brief| config| errors| status]

#### Syntax Description

|                   |                                                                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>buffers</b>    | (Optional) Displays PXF DMA buffers information.                                                                                                                                                     |
| <b>counters</b>   | (Optional) Displays packet and error counters for the PXF DMA engine.                                                                                                                                |
| <b>reassembly</b> | (Optional) Displays PXF reassembly table usage information.                                                                                                                                          |
| <b>registers</b>  | (Optional) Displays PXF DMA registers information.                                                                                                                                                   |
| <b>brief</b>      | (Optional) Displays PXF DMA information, including the initialization state of each block in the PXF API and any errors that occurred.<br><br><b>Note</b> This option is available on the PRE3 only. |
| <b>config</b>     | (Optional) Displays a configuration summary of the registers in each of the PXF DMA blocks.<br><br><b>Note</b> This option is available on the PRE3 only.                                            |
| <b>errors</b>     | (Optional) Displays the errors that occurred in each of the PXF DMA blocks.<br><br><b>Note</b> This option is available on the PRE3 only.                                                            |
| <b>status</b>     | (Optional) Displays the initialization state of each PXF DMA block. In normal operation, all blocks display the enabled state.<br><br><b>Note</b> This option is available on the PRE3 only.         |

#### Command Modes

Privileged EXEC (#)

**Command History**

| Release     | Modification                                                                                                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| 12.2S       | This command was introduced.                                                                                                  |
| 12.3(7)XI   | This command was integrated into Cisco IOS Release 12.3(7)XI and implemented on the Cisco 10000 series router for the PRE2.   |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2 and implemented on the Cisco 10000 series router for the PRE3. |

**Examples**

The following example shows PXF DMA buffers information:

```
Router# show pxf dma buffers
PXF To-RP DMA Ring Descriptors & Buffers:
  Descriptor  Buffer      Buffer      Descriptor
  Address    Address    Length (b)  Flags
0  0x0CA06340 0x0AC097C0  512         0x0002
1  0x0CA06350 0x0AC088C0  512         0x0002
2  0x0CA06360 0x0AC07C40  512         0x0002
3  0x0CA06370 0x0AC0B5C0  512         0x0002
4  0x0CA06380 0x0AC0CC40  512         0x0002
5  0x0CA06390 0x0AC08640  512         0x0002
6  0x0CA063A0 0x0AC0C240  512         0x0002
7  0x0CA063B0 0x0AC08B40  512         0x0002
8  0x0CA063C0 0x0AC0AE40  512         0x0002
9  0x0CA063D0 0x0AC0BAC0  512         0x0002
10 0x0CA063E0 0x0AC0C9C0  512         0x0002
11 0x0CA063F0 0x0AC09CC0  512         0x0002
12 0x0CA06400 0x0AC0C740  512         0x0002
13 0x0CA06410 0x0AC0A6C0  512         0x0002
14 0x0CA06420 0x0AC0B0C0  512         0x0002
15 0x0CA06430 0x0AC09040  512         0x0002
16 0x0CA06440 0x0AC0A440  512         0x0002
17 0x0CA06450 0x0AC065C0  512         0x0002
18 0x0CA06460 0x0AC06FC0  512         0x0002
19 0x0CA06470 0x0AC06340  512         0x0002
20 0x0CA06480 0x0AC07240  512         0x0002
21 0x0CA06490 0x0AC092C0  512         0x0002
22 0x0CA064A0 0x0AC0D140  512         0x0002
23 0x0CA064B0 0x0AC0C4C0  512         0x0002
24 0x0CA064C0 0x0AC07740  512         0x0002
25 0x0CA064D0 0x0AC09540  512         0x0002
26 0x0CA064E0 0x0AC0A940  512         0x0002
27 0x0CA064F0 0x0AC06840  512         0x0002
28 0x0CA06500 0x0AC08140  512         0x0002
29 0x0CA06510 0x0AC06D40  512         0x0002
30 0x0CA06520 0x0AC07EC0  512         0x0002
31 0x0CA06530 0x0AC0ABC0  512         0x0003
PXF From-RP DMA Ring Descriptors & Buffers:
  Descriptor  Buffer      Buffer      Descriptor  Context
  Address    Address    Length (b)  Flags      Bit
0  0x0CA06580 0x00000000  0           0x0000     Not set
1  0x0CA06590 0x00000000  0           0x0000     Not set
2  0x0CA065A0 0x00000000  0           0x0000     Not set
3  0x0CA065B0 0x00000000  0           0x0000     Not set
4  0x0CA065C0 0x00000000  0           0x0000     Not set
5  0x0CA065D0 0x00000000  0           0x0000     Not set
6  0x0CA065E0 0x00000000  0           0x0000     Not set
7  0x0CA065F0 0x00000000  0           0x0000     Not set
8  0x0CA06600 0x00000000  0           0x0000     Not set
9  0x0CA06610 0x00000000  0           0x0000     Not set
10 0x0CA06620 0x00000000  0           0x0000     Not set
```



|    |            |            |   |        |         |
|----|------------|------------|---|--------|---------|
| 11 | 0x0CA06630 | 0x00000000 | 0 | 0x0000 | Not set |
| 12 | 0x0CA06640 | 0x00000000 | 0 | 0x0000 | Not set |
| 13 | 0x0CA06650 | 0x00000000 | 0 | 0x0000 | Not set |
| 14 | 0x0CA06660 | 0x00000000 | 0 | 0x0000 | Not set |
| 15 | 0x0CA06670 | 0x00000000 | 0 | 0x0001 | Not set |

The table below describes the fields shown in the display.

**Table 94: show pxf dma Field Descriptions**

| Field              | Description                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Descriptor Address | Memory address pointing to the descriptor for this buffer.                                                                    |
| Buffer Address     | Address of this buffer in memory.                                                                                             |
| Buffer Length      | Length, in bytes, of this particular buffer.                                                                                  |
| Descriptor Flags   | Internal flags identifying this buffer's use and status.                                                                      |
| Context Bit        | State of the context bit which is set when the buffer is currently in use by a context (the basic unit of packet processing). |

#### Related Commands

| Command                   | Description                                        |
|---------------------------|----------------------------------------------------|
| <b>clear pxf</b>          | Clears PXF counters and statistics.                |
| <b>show pxf cpu</b>       | Displays PXF CPU statistics.                       |
| <b>show pxf microcode</b> | Displays the microcode version running on the PXF. |

# show pxf feature cef

To display Parallel eXpress Forwarding (PXF) routing feature tables for Cisco Express Forwarding, use the **show pxf feature cef** command in user EXEC or privileged EXEC mode.

**show pxf feature cef** *entry*

## Syntax Description

|              |                        |
|--------------|------------------------|
| <i>entry</i> | Display the PXF entry. |
|--------------|------------------------|

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(1)E    | This command was introduced.                                                                                                                                                      |
| 12.1(5)T    | This command was integrated into Cisco IOS Release 12.1(5)T.                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Examples

The following is sample output from the **show pxf feature cef** command. The fields shown in the display are self-explanatory.

```
Router# show pxf feature cef entry
Shadow 16-4-4-8 PXF Mtrie:
  41 leaves, 1968 leaf bytes, 15 nodes, 267000 node bytes
  5 invalidations
  46 prefix updates
  refcounts: 66746 leaf, 66720 node

Prefix/Length      Refcount   Parent
0.0.0.0/0          62282
0.0.0.0/32         3          0.0.0.0/0
171.22.12.128/27   34         0.0.0.0/0
171.22.12.128/32   3          171.22.12.128/27
171.22.12.129/32   3          171.22.12.128/27
171.22.12.130/32   3          171.22.12.128/27
171.22.12.131/32   3          171.22.12.128/27
171.22.12.147/32   3          171.22.12.128/27
```

## Related Commands

| Command                     | Description                                  |
|-----------------------------|----------------------------------------------|
| <b>show pxf feature nat</b> | Displays PXF routing feature tables for NAT. |



## show pxf feature cef vrf

To display the routing feature tables for Virtual Private Network (VPN) routing and forwarding instances (VRFs) on the Parallel eXpress Forwarding (PXF) path, use the **show pxf feature cef vrf** command in privileged EXEC mode.

**show pxf feature cef vrf** *vpn-name*

### Syntax Description

|                 |                             |
|-----------------|-----------------------------|
| <i>vpn-name</i> | Name of the VPN to display. |
|-----------------|-----------------------------|

### Command Modes

Privileged EXEC (#)

### Command History

| Release   | Modification                                                 |
|-----------|--------------------------------------------------------------|
| 12.2(15)B | This command was introduced.                                 |
| 12.3(4)T  | This command was integrated into Cisco IOS Release 12.3(4)T. |

### Usage Guidelines

Use this command to display VRF PXF routing feature tables for a specified VPN for Cisco Express Forwarding. This command also displays information about prefix and MTRIE resource usage.

### Examples

The following is sample output for the **show pxf feature cef vrf** command when it is used to display information about VRF vpn1:

```
Router# show pxf feature cef vrf vpn1
Shadow 8-8-4-4-8 PXF Mtrie:
  51 leaves, 2448 leaf bytes, 92 nodes, 56352 node bytes
  10 invalidations
  61 prefix updates
  refcounts: 3666 leaf, 3733 node
Prefix/Length      Refcount  Parent      Address      Shadow
0.0.0.0/32         3         0x00000000  0xC0047218  0x62CAF2E8
10.5.0.0/16        558       0x00000000  0xC0047278  0x62CAF108
10.5.0.0/32         3         10.5.0.0/16  0xC0047268  0x62CAEE08
10.5.0.1/32         3         10.5.0.0/16  0xC0047260  0x62CAEA18
10.5.0.2/32         3         10.5.0.0/16  0xC0047388  0x62CAEA48
10.5.0.255/32       3         10.5.0.0/16  0xC0047270  0x62CAF0D8
10.30.1.0/16       288       0x00000000  0xC0047360  0x62CAEB38
10.30.1.1/32        3         10.30.1.0/16  0xC0047350  0x62CAEB98
10.70.0.0/32        3         0x00000000  0xC00472C0  0x62CAEEF8
10.70.1.1/32        3         0x00000000  0xC0047358  0x62CAEB68
10.70.1.2/32        3         0x00000000  0xC0047368  0x62CAEB08
10.70.1.3/32        3         0x00000000  0xC0047370  0x62CAEAD8
10.70.1.4/32        3         0x00000000  0xC0047378  0x62CAEAA8
70.1.1.5/32         3         0x00000000  0xC0047380  0x62CAEA78
224.0.0.0/24        3         0x00000000  0xC0047228  0x62CAF288
255.255.255.255/32  3         0x00000000  0xC0047220  0x62CAF2B8
```

=====

5 routes with less specific overlapping parent route

The table below describes the significant fields shown in the display.

**Table 95: show pxf feature cef vrf Field Descriptions**

| Field                      | Description                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shadow 8-8-4-4-8 PXF Mtrie | MTRIE lookup table index structures.                                                                                                                                                                                                                                                                                    |
| 51 leaves                  | All created leaves for all MTRIEs.                                                                                                                                                                                                                                                                                      |
| 2448 leaf bytes            | Leaf byte counter. When a new leaf is created, the leaf byte counter is incremented by the size of the leaf structure.                                                                                                                                                                                                  |
| 92 nodes                   | All created nodes for all MTRIEs.                                                                                                                                                                                                                                                                                       |
| 56352 node bytes           | Node byte counter. When a new node is created, the node byte counter is incremented.                                                                                                                                                                                                                                    |
| 10 invalidations           | Invalidation counter. When a route (represented by a leaf) is deleted from an MTRIE, the invalidations counter is incremented. This counter includes all MTRIEs.                                                                                                                                                        |
| 61 prefix updates          | IP prefix counter. When an IP prefix (represented by a leaf) is added to the MTRIE, the IP prefix counter is incremented. This counter includes all MTRIEs.                                                                                                                                                             |
| refcounts                  | Counters associated with references between leaves.                                                                                                                                                                                                                                                                     |
| 3666 leaf                  | MTRIEs have a leaf lock and a leaf free function. The leaf lock function increments the leaf refcount. The leaf free function decrements the leaf refcount. The leaf lock and leaf free functions prevent a leaf from being freed (deleted) while the leaf is still being referenced. This counter includes all MTRIEs. |
| 3733 node                  | Node counter. When a child node is added to another node, the node to which the child node is added becomes a parent node. The node counter is decremented when a child node is deleted. This counter includes all MTRIEs.                                                                                              |
| Prefix/Length              | The IP address and subnet mask of a leaf.                                                                                                                                                                                                                                                                               |
| Refcount                   | The number of leaves that reference a specified leaf. The refcount counter is incremented when the leaf lock function is called and decremented when the leaf free function is called.                                                                                                                                  |

| Field   | Description                                                                                                                                     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Parent  | When you add a less specific route to a more specific route, the more specific route has a back pointer that points to the less specific route. |
| Address | The address of the memory for the specified leaf.                                                                                               |
| Shadow  | The shadow address in Route Processor memory for the specified leaf.                                                                            |

**Related Commands**

| Command                     | Description                                  |
|-----------------------------|----------------------------------------------|
| <b>show pxf feature cef</b> | Displays PXF routing feature tables for CEF. |
| <b>show pxf feature nat</b> | Displays PXF routing feature tables for NAT. |

## show pxf feature nat

To display Parallel eXpress Forwarding (PXF) routing tables for Network Address Translation (NAT), use the **show pxf feature nat** command in user EXEC or privileged EXEC mode.

**show pxf feature nat** [**entry**|**stat**|**tcp**]

### Syntax Description

|              |                                       |
|--------------|---------------------------------------|
| <b>entry</b> | Displays NAT information.             |
| <b>stat</b>  | Displays NAT processing information.  |
| <b>tcp</b>   | Displays NAT TCP logging information. |

### Command Modes

User EXEC (>) Privileged EXEC (#)

### Command History

| Release     | Modification                                                                                                                                                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(1)E    | This command was introduced.                                                                                                                                                      |
| 12.1(5)T    | This command was integrated into Cisco IOS Release 12.1(5)T.                                                                                                                      |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
| 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

### Examples

The following is sample output from the **show pxf feature nat** command. The fields shown in the display are self-explanatory.

```
Router# show pxf feature nat
--- 171.22.12.175      192.168.0.129      ---      ---
--- 171.22.12.163      192.168.0.7        ---      ---
--- 171.22.12.161      192.168.0.13       ---      ---
--- 171.22.12.162      192.168.0.3        ---      ---
--- 171.22.12.165      192.168.0.8        ---      ---
--- 171.22.12.168      192.168.0.14       ---      ---
--- 171.22.12.170      192.168.0.12       ---      ---
--- 171.22.12.166      192.168.0.15       ---      ---
--- 171.22.12.164      192.168.0.16       ---      ---
```

**Related Commands**

| Command              | Description                                                       |
|----------------------|-------------------------------------------------------------------|
| show pxf feature cef | Displays PXF routing feature tables for Cisco Express Forwarding. |



# show pxf interface

To display a summary of the interfaces on the router and the Parallel eXpress Forwarding (PXF) features and capabilities enabled on these interfaces, use the **show pxf interface** command in privileged EXEC mode.

**show pxf interface** *interface-name* [**detail**]

## Syntax Description

|                       |                                                                                |
|-----------------------|--------------------------------------------------------------------------------|
| <i>interface-name</i> | Name of the interface.                                                         |
| <b>detail</b>         | (Optional) Displays detailed information for all PXF interfaces on the router. |

## Command Modes

Privileged EXEC (#)

## Command History

| Release    | Modification                                                                                                                                                                      |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2S      | This command was introduced.                                                                                                                                                      |
| 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1.                                                                                                                    |
| 12.2SX     | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

If you do not specify an interface, the command displays a summary of the statistics for all PXF interfaces on the router.

## Examples

The following example shows PXF statistics for serial interface 1/0/0. The significant fields shown in the display are self-explanatory.

```
Router# show pxf interface s1/0/0
ed10#sho pxf interface s1/0/0
Serial1/0/0 is up, enabled, PXF enabled, IOS encap PPP      (16)
  Last clearing of Serial1/0/0 counters: 00:06:29
    91 packets input, (1934 bytes)
Total PXF input errors (pkts/bytes):           0/0
PXF output queues:
      Class      ID      Length/Max      Outputs (pkts/bytes)      Drops
    0 class-default  276      0/1024           0/0                0
    15 -             275      0/32           91/1953              0
Slot 1/0: FBB Rx:0x00000000 OCQ debug:0x00001040, qN_entry_cnt[5:0]: 0
          PXF DMA RE drops: 0/0, Null config drops: 0/0
          Last clearing of slot 1/0 counters: 00:06:29
```

**Related Commands**

| Command                    | Description                                    |
|----------------------------|------------------------------------------------|
| <b>clear pxf</b>           | Clears PXF counters and statistics.            |
| <b>show pxf statistics</b> | Displays chassis-wide, summary PXF statistics. |

## show pxf microcode

To display identifying information for the microcode currently loaded on the Parallel eXpress Forwarding (PXF), use the **show pxf microcode** command in privileged EXEC mode.

**show pxf microcode**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release   | Modification                                                  |
|-----------------|-----------|---------------------------------------------------------------|
|                 | 12.2S     | This command was introduced.                                  |
|                 | 12.3(7)XI | This command was integrated into Cisco IOS Release 12.3(7)XI. |

**Examples** The following example shows the microcode version that is currently loaded on the PXF:

```
Router# show pxf microcode
PXF complex: 4 Toasters 8 Columns total
PXF processor tmc0 is running.
PXF processor tmc1 is running.
PXF processor tmc2 is running.
PXF processor tmc3 is running.
Loaded microcode: system:pxf/c10k2-11-ucode.6.1.3
                  Version: 6.1.3
                  Release Software created Sun 20-Nov-05 14:06
                  Signature: 0d2b395c1083872793586f9cec47d7b3
                  Microcode load attempted 1 time(s), latest 2w6d ago
                  tmc0 FG_PC=0 BG_PC=6 WDog=1024 MinPhase=23 SecPreScalerTimer=11542680 MS
ecPreScalerTimer=153600
                  tmc1 FG_PC=0 BG_PC=6 WDog=1024 MinPhase=23 SecPreScalerTimer=11542680 MS
ecPreScalerTimer=153600
                  tmc2 FG_PC=0 BG_PC=6 WDog=1024 MinPhase=23 SecPreScalerTimer=11542680 MS
ecPreScalerTimer=153600
                  tmc3 FG_PC=0 BG_PC=6 WDog=1024 MinPhase=23 SecPreScalerTimer=11542680 MS
ecPreScalerTimer=154
```

The table below describes the fields shown in the display.

**Table 96: show pxf microcode Field Descriptions**

| Field            | Description                                                                              |
|------------------|------------------------------------------------------------------------------------------|
| PXF complex      | The number of PXF processors, their associate memory columns, and their current status.  |
| Loaded microcode | The source and filename for the microcode that is currently loaded on the PXF processor. |

| Field                    | Description                                                                                                                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Version                  | The microcode version.                                                                                                                                                                                        |
| Release Software created | The time and date the current microcode was compiled.                                                                                                                                                         |
| Signature                | The signature in the microcode version.                                                                                                                                                                       |
| Microcode load attempted | The number of times the PXF processor has loaded the microcode since the Cisco IOS image was loaded at system boot. Also, shows the time (in days and hours) since the last successful load of the microcode. |
| tmc#                     | The current program counters and configuration for the PXF processors.                                                                                                                                        |

**Related Commands**

| Command                        | Description                         |
|--------------------------------|-------------------------------------|
| <b>clear pxf</b>               | Clears PXF counters and statistics. |
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.        |
| <b>show pxf dma</b>            | Displays PXF DMA information.       |

# show pxf netflow

To display the NetFlow Parallel eXpress Forwarding (PXF) counters, use the **show pxf netflow** command in privileged EXEC mode.

**show pxf netflow**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC (#)

## Command History

| Release   | Modification                                                  |
|-----------|---------------------------------------------------------------|
| 12.2S     | This command was introduced.                                  |
| 12.3(7)XI | This command was integrated into Cisco IOS Release 12.3(7)XI. |

## Examples

The following example shows the NetFlow PXF statistics. The fields shown in the display are self-explanatory.

```
Router# show pxf netflow
NetFlow debug counters
  timeout activity: 0
  timeout inactivity: 9785
  forced age: 0
  export busy: 1
  export locked: 62
  export noswap: 2
  accumulate: 1296898
  new flow: 9808
(unreliable) ICM counters
  records pending : 0
  live flows : 0

NetFlow PXF Config Registers
  PXF Inactive Timeout: 90000
  PXF Active Timeout: 90000
```

## Related Commands

| Command                        | Description                                    |
|--------------------------------|------------------------------------------------|
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.                   |
| <b>show pxf statistics</b>     | Displays chassis-wide, summary PXF statistics. |

## show pxf stall-monitoring

To display the configuration and operating status details of the PXF stall monitor (PSM), use the **show pxf stall-monitoring** command in privileged EXEC mode. The **show pxf stall-monitoring** command also displays the number of stalls on the PSM after it was last enabled.

**show pxf stall-monitoring** [**counters**| **reset** {**active-status**| **cob-fib**| **cob-tib**| **pxf-drop**} **subslot** *sub-slot*]

### Syntax Description

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>counters</b> | Displays statistical information for all counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>reset</b>    | Displays the following counters: <ul style="list-style-type: none"> <li>• <b>active-status</b> --Displays the active status on the specified subslot.</li> <li>• <b>cob-fib</b> --Displays the Cobalt FIB counter on the specified subslot.</li> <li>• <b>cob-tib</b> --Displays the Cobalt TIB counter on the specified subslot.</li> <li>• <b>pxf-drop</b> --Displays the PXF per RSRC drop counter on the specified subslot.</li> <li>• <b>subslot</b> <i>sub slot</i> --Displays information about the specified subslot.</li> </ul> |

### Command Modes

Privileged EXEC (#)

### Command History

| Release     | Modification                 |
|-------------|------------------------------|
| 12.2(33)XNE | This command was introduced. |

### Examples

The following example displays a sample output of the **show pxf stall-monitoring** command:

```
Router# show pxf stall-monitoring
pxf stall-monitoring : Enabled
Stall History
=====
Stall Threshold Configuration
=====
Primary Action = LC-reset Threshold = 3 (default)
Primary Action = HT-reset Threshold = 3 (default)
Secondary action = SSO SwitchOverRouter#
The fields displayed are self-explanatory.
```

The following example displays a sample output of the **show pxf stall-monitoring counters** command:

```
Router# show pxf stall-monitoring counters
To RP Counters
=====
IOS To RP Counter = 20665
PXF To RP Drop Counter = 0
Current Counter Values
=====
Slot 0 Subslot 0 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 0 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 1 Subslot 0 Cob TIB = 2368 Cob FIB = 0 PXF Drop = 0
Slot 1 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 2 Subslot 0 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 2 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 3 Subslot 0 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 3 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 4 Subslot 0 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 4 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 5 Subslot 0 Cob TIB = 6162 Cob FIB = 6204 PXF Drop = 0
Slot 5 Subslot 1 Cob TIB = 6101 Cob FIB = 6065 PXF Drop = 0
Slot 5 Subslot 2 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 5 Subslot 3 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 7 Subslot 0 Cob TIB = 8402 Cob FIB = 8402 PXF Drop = 0
Slot 7 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 8 Subslot 0 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Slot 8 Subslot 1 Cob TIB = 0 Cob FIB = 0 PXF Drop = 0
Line Card Participant Status
=====
Slot 1 Subslot 0 = 1
Slot 1 Subslot 1 = 0
Slot 2 Subslot 0 = 0
Slot 2 Subslot 1 = 0
Slot 3 Subslot 0 = 0
Slot 3 Subslot 1 = 0
Slot 4 Subslot 0 = 0
Slot 4 Subslot 1 = 0
Slot 5 Subslot 0 = 0
Slot 5 Subslot 1 = 1
Slot 5 Subslot 2 = 0
Slot 5 Subslot 3 = 0
Slot 7 Subslot 0 = 1
Slot 7 Subslot 1 = 0
Slot 8 Subslot 0 = 1
Slot 8 Subslot 1 = 0
Line Card Active Status
=====
Slot 1 Subslot 0 = 0
Slot 1 Subslot 1 = 0
Slot 2 Subslot 0 = 0
Slot 2 Subslot 1 = 0
Slot 3 Subslot 0 = 0
Slot 3 Subslot 1 = 0
Slot 4 Subslot 0 = 0
Slot 4 Subslot 1 = 0
Slot 5 Subslot 0 = 0
Slot 5 Subslot 1 = 1
Slot 5 Subslot 2 = 0
Slot 5 Subslot 3 = 0
Slot 7 Subslot 0 = 0
Slot 7 Subslot 1 = 0
Slot 8 Subslot 0 = 0
Slot 8 Subslot 1 = 0
```

The fields displayed are self-explanatory.

The following example displays a sample output of the **show pxf stall-monitoring reset** command:

```
Router# show pxf stall-monitoring reset active-status subslot 1/0
pxf stall-monitoring : Enabled
0
```

**Related Commands**

| Command                               | Description                                                                                                                       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>hw-module pxf stall-monitoring</b> | Enables PXF stall monitor on the Cisco 10000 series router and configures default threshold values before the LC and HTDP resets. |



## show pxf statistics

To display summary Parallel eXpress Forwarding (PXF) statistics, use the **show pxf statistics** command in privileged EXEC mode.

**show pxf statistics** {context| diversion| drop [detail]| ip| ipv6}

### Syntax Description

|                      |                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------|
| <b>context</b>       | Displays context statistics.                                                                 |
| <b>diversion</b>     | Displays traffic diverted from the PXF.                                                      |
| <b>drop [detail]</b> | Displays packets dropped by the PXF. The <b>detail</b> option provides detailed information. |
| <b>ip</b>            | Displays IP and ICMP statistics.                                                             |
| <b>ipv6</b>          | Displays IPv6 statistics.                                                                    |

### Command Modes

Privileged EXEC (#)

### Command History

| Release    | Modification                                                   |
|------------|----------------------------------------------------------------|
| 12.0(22)S  | This command was introduced on the Cisco 10000 series router.  |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.3(7)XI1 | This command was integrated into Cisco IOS Release 12.3(7)XI1. |
| 12.2(31)SB | This command was integrated into Cisco IOS Release 12.2(31)SB. |

### Examples

The following example shows a summary of PXF IP statistics:

```
Router# show pxf statistics ip
Chassis-wide PXF forwarding counts
  IP inputs 0, forwarded 0, punted 0
  IP dropped 0, no adjacency 0, no route 0
  IP unicast RPF 0, unresolved 0
  ICMP created 0, Unreachable sent 0, TTL expired sent 0
  ICMP echo requests 0, replies sent 0
  ICMP checksum errors 0
  IP packets fragmented 0, total fragments 0, failed 0
  IP don't-fragment 0, multicast don't-fragment 0
  IP mcast total 0, switched 0, punted 0, failed 0
  IP mcast drops 0, RPF 0, input ACL 0, output ACL + taildrops 0
Last clearing of PXF forwarding counters:never
```

The following example shows a summary of PXF statistics for dropped packets:

```
Router# show pxf statistics drop
PXF input drops:
  Unassigned drops (pkts/bytes):                0/0
Last clearing of drop counters: never
```

The following example shows detailed PXF statistics for dropped packets:

```
Router# show pxf statistics drop detail
PXF input drops:
  Unassigned drops (pkts/bytes):                0/0
PXF Unassigned input drop details:
  (These input drops are not assigned to a particular PXF interface.)
```

|                      | packets | bytes |
|----------------------|---------|-------|
| generic              | 0       | 0     |
| mpls_no_eos          | 0       | 0     |
| fib_zero_dest        | 0       | 0     |
| fib_drop_null        | 0       | 0     |
| fib_icmp_no_adj      | 0       | 0     |
| fib_icmp_bcast_dst   | 0       | 0     |
| mfib_ttl_0           | 0       | 0     |
| mfib_disabled        | 0       | 0     |
| mfib_rpf_failed      | 0       | 0     |
| mfib_null_oif        | 0       | 0     |
| tfib_rp_flag         | 0       | 0     |
| tfib_eos_violation   | 0       | 0     |
| tfib_nonip_expose    | 0       | 0     |
| tfib_label_invalid   | 0       | 0     |
| tfib_path_unknown    | 0       | 0     |
| tfib_nonip_ttl_exp   | 0       | 0     |
| icmp_unrch_interval  | 0       | 0     |
| icmp_on_icmp         | 0       | 0     |
| icmp_bad_hdr         | 0       | 0     |
| icmp_multicast       | 0       | 0     |
| icmp_frag            | 0       | 0     |
| macr_bad_tag_num     | 0       | 0     |
| no_touch             | 0       | 0     |
| enq_id_0             | 0       | 0     |
| no_pkt_handles       | 0       | 0     |
| l2_unsupp_drop       | 0       | 0     |
| ipm_replay_full      | 0       | 0     |
| bad_atm_arp          | 0       | 0     |
| nested_fragmentation | 0       | 0     |
| l2less_drop_packets  | 0       | 0     |
| l2tp_payload_encap   | 0       | 0     |
| re_bit[00]           | 0       | 0     |
| [01]                 | 0       | 0     |
| [02]                 | 0       | 0     |
| [03]                 | 0       | 0     |
| [04]                 | 0       | 0     |
| [05]                 | 0       | 0     |
| [06]                 | 0       | 0     |
| [07]                 | 0       | 0     |
| [08]                 | 0       | 0     |
| [09]                 | 0       | 0     |
| [10]                 | 0       | 0     |
| .                    |         |       |
| .                    |         |       |
| .                    |         |       |

The following example shows summarized statistics for traffic diverted from the PXF:

```
Router# show pxf statistics diversion
Diversion Cause Stats:
  divert      = 0
  encap       = 0
  clns_isis   = 0
  clns        = 0
  cdp         = 0
  cgmp        = 0
  arp         = 1
```

```
rarp      = 0
mpls_ctl  = 0
keepalive = 0
ppp_cntrl = 449
fr_lmi    = 0
atm_ilm_i = 0
oam f4    = 0
oam f5 ete= 0
oam f5 seg= 0
mlfr lip  = 0
.
.
.
```

**Related Commands**

| Command                        | Description                         |
|--------------------------------|-------------------------------------|
| <b>clear pxf</b>               | Clears PXF counters and statistics. |
| <b>show pxf cpu statistics</b> | Displays PXF CPU statistics.        |

## show pxf xcm

To display Parallel eXpress Forwarding (PXF) External Column Memory (XCM) information, use the **show pxf xcm** command in privileged EXEC mode.

**show pxf xcm**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release   | Modification                                                  |
|-----------------|-----------|---------------------------------------------------------------|
|                 | 12.2S     | This command was introduced.                                  |
|                 | 12.3(7)XI | This command was integrated into Cisco IOS Release 12.3(7)XI. |
|                 |           |                                                               |

**Examples** The following example shows XCM information for each PXF processor:

```
Router# show pxf xcm
Toaster 0:
  Number of Columns: 2
  Proc ID: 0x00000004 = TMC_X72
  ASIC Revision: 0x00000001 = T3-ECC
  XCM0 type:FCRAM, size = 67108864
  ECC is enabled for column 0
    XCM AB Config Register: 0x024703B9
    XCM CD Config Register: 0x024703B9
    XCM Exception Type Register: 0x00000000
    FCRAM-A Counters
      Number of ECC single bit errors: 0
    FCRAM-B Counters
      Number of ECC single bit errors: 0
    FCRAM-C Counters
      Number of ECC single bit errors: 0
    FCRAM-D Counters
      Number of ECC single bit errors: 0
  XCM1 type:FCRAM, size = 67108864
  ECC is enabled for column 1
    XCM AB Config Register: 0x024703B9
    XCM CD Config Register: 0x024703B9
    XCM Exception Type Register: 0x00000000
    FCRAM-A Counters
      Number of ECC single bit errors: 0
    FCRAM-B Counters
      Number of ECC single bit errors: 0
    FCRAM-C Counters
      Number of ECC single bit errors: 0
    FCRAM-D Counters
      Number of ECC single bit errors: 0
Toaster 1:
  Number of Columns: 2
  Proc ID: 0x00000004 = TMC_X72
  ASIC Revision: 0x00000001 = T3-ECC
  XCM0 type:FCRAM, size = 67108864
```

```

ECC is enabled for column 0
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0
XCM1 type:FCRAM, size = 67108864
ECC is enabled for column 1
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0
Toaster 2:
Number of Columns: 2
Proc ID: 0x00000004 = TMC_X72
ASIC Revision: 0x00000001 = T3-ECC
XCM0 type:FCRAM, size = 67108864
ECC is enabled for column 0
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0
XCM1 type:FCRAM, size = 67108864
ECC is enabled for column 1
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0
Toaster 3:
Number of Columns: 2
Proc ID: 0x00000004 = TMC X72
ASIC Revision: 0x00000001 = T3-ECC
XCM0 type:FCRAM, size = 67108864
ECC is enabled for column 0
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0
XCM1 type:FCRAM, size = 67108864

```

```

ECC is enabled for column 1
XCM AB Config Register: 0x024703B9
XCM CD Config Register: 0x024703B9
XCM Exception Type Register: 0x00000000
FCRAM-A Counters
Number of ECC single bit errors: 0
FCRAM-B Counters
Number of ECC single bit errors: 0
FCRAM-C Counters
Number of ECC single bit errors: 0
FCRAM-D Counters
Number of ECC single bit errors: 0

```

The table below describes the fields shown in the display.

**Table 97: show pxf xcm Field Descriptions**

| Field                                                   | Description                                                                                          |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| The following fields appear for each PXF processor.     |                                                                                                      |
| Toaster #                                               | Identifies the PXF processor.                                                                        |
| Number of Columns                                       | Displays the number of memory columns on the PXF processor.                                          |
| Proc ID                                                 | Displays the processor type (TMC is Toaster Memory Column).                                          |
| ASIC Revision                                           | Displays the internal version number of the PXF processor.                                           |
| The following fields appear for each XCM memory column. |                                                                                                      |
| XCM type                                                | Displays the type and size, in bytes, of memory used in this particular column.                      |
| ECC is enabled for column                               | Displays whether Error Code Correction (ECC) checking is enabled or disabled for this memory column. |
| XCM Config Register and XCM Exception Type Register     | Displays the contents of these two registers for the memory column.                                  |
| Number of ECC single bit errors                         | Displays the number of single-bit errors detected in memory.                                         |

#### Related Commands

| Command      | Description                  |
|--------------|------------------------------|
| show pxf cpu | Displays PXF CPU statistics. |

| Command            | Description                                                 |
|--------------------|-------------------------------------------------------------|
| show pxf microcode | Displays the microcode version currently loaded on the PXF. |

# show route-map ipc

To display counts of the one-way route map interprocess communication (IPC) messages sent from the rendezvous point (RP) to the Versatile Interface Processor (VIP) when NetFlow policy routing is configured, use the **show route-map ipc** command in privileged EXEC mode.

**show route-map ipc**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

| Command History | Release     | Modification                                                                                                                                                                      |
|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | 12.0(3)T    | This command was introduced.                                                                                                                                                      |
|                 | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                   |
|                 | 12.2SX      | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

**Usage Guidelines** This command displays the counts of one-way route map IPC messages from the RP to the VIP when NetFlow policy routing is configured. If you execute this command on the RP, the messages are shown as "Sent." If you execute this command on the VIP console, the IPC messages are shown as "Received."

**Examples** The following is sample output of the **show route-map ipc** command when it is executed on the RP:

```
Router# show route-map ipc
Route-map RP IPC Config Updates Sent
Name: 4
Match access-list: 2
Match length: 0
Set precedence: 1
Set tos: 0
Set nexthop: 4
Set interface: 0
Set default nexthop: 0
Set default interface: 1
Clean all: 2
```

The following is sample output of the **show route-map ipc** command when it is executed on the VIP:

```
Router# show route-map ipc
Route-map LC IPC Config Updates Received
Name: 4
Match access-list: 2
Match length: 0
Set precedence: 1
Set tos: 0
```



```

Set nexthop: 4
Set interface: 0
Set default nexthop: 0
Set default interface: 1
Clean all: 2

```

The table below describes the significant fields shown in the display.

**Table 98: show route-map ipc Field Descriptions**

| Field                                | Description                                                                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Route-map RP IPC Config Updates Sent | Indicates that IPC messages are being sent from the RP to the VIP.                                                                                                                                                                                                                 |
| Name                                 | Number of IPC messages sent about the name of the route map.                                                                                                                                                                                                                       |
| Match access-list                    | Number of IPC messages sent about the access list.                                                                                                                                                                                                                                 |
| Match length                         | Number of IPC messages sent about the length to match.                                                                                                                                                                                                                             |
| Set precedence                       | Number of IPC messages sent about the precedence.                                                                                                                                                                                                                                  |
| Set tos                              | Number of IPC messages sent about the type of service (ToS).                                                                                                                                                                                                                       |
| Set nexthop                          | Number of IPC messages sent about the next hop.                                                                                                                                                                                                                                    |
| Set interface                        | Number of IPC messages sent about the interface.                                                                                                                                                                                                                                   |
| Set default nexthop                  | Number of IPC messages sent about the default next hop.                                                                                                                                                                                                                            |
| Set default interface                | Number of IPC messages sent about the default interface.                                                                                                                                                                                                                           |
| Clean all                            | Number of IPC messages sent about clearing the policy routing configuration from the VIP. When dCEF is disabled and reenabled, the configuration related to policy routing must be removed (cleaned) from the VIP before the new information is downloaded from the RP to the VIP. |

## Related Commands

| Command                                    | Description                                                                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>set ip next-hop verify-availability</b> | Configures policy routing to verify if the next hops of a route map are CDP neighbors before policy routing to that next hop. |



# show xdr

To display details about eXternal Data Representation (XDR), use the **show xdr** command in user EXEC or privileged EXEC mode.

**show xdr** {**client** {*client-name* | **all**} [**statistics**] | **linecard** [ *linecard-number* ] [**internal**] | **multicast-group** | **timers**}

## Syntax Description

|                                                   |                                                                                                                                                                                                                                  |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>client</b> { <i>client-name</i>   <b>all</b> } | Displays client basic information or statistics for a client or all clients.                                                                                                                                                     |
| <b>statistics</b>                                 | (Optional) Displays XDR statistics.                                                                                                                                                                                              |
| <b>linecard</b>                                   | (Line cards only) (Route/Switch Processor (RSP) on Cisco 7500 series and Route Processor (RP) on Cisco 10000 series) Displays XDR information for all XDR line card peer instances or the specified XDR line card peer instance. |
| <i>linecard-number</i>                            | (Optional) Specifies the line card slot number.                                                                                                                                                                                  |
| <b>internal</b>                                   | (Optional) (RSP only) Displays internal information.                                                                                                                                                                             |
| <b>multicast-group</b>                            | Displays XDR multicast groups.                                                                                                                                                                                                   |
| <b>timers</b>                                     | Displays XDR timers.                                                                                                                                                                                                             |

## Command Default

XDR details are not displayed.

## Command Modes

User EXEC (>) Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced.                                                                                     |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                  |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                                    |

**Usage Guidelines**

This command is available only on distributed platforms (such as the Cisco 7500 series) and on the Cisco 10000 series routers.

**Examples**

The following example shows how to display XDR information for all clients:

```
Router# show xdr client all
XDR Interrupt P(0) flag:1 decode:0x413B9804 pull:0x413B9AE8 context:8
XDR Process Pri(1) flag:1 decode:0x413B99A0 pull:0x413B9D3C context:6
FIBHWIDB broker(2) flag:1 decode:0x0 pull:0x413A7B7C context:2
FIBIDB broker (3) flag:1 decode:0x0 pull:0x413A844C context:2
FIBHWIDB Subblo(4) flag:1 decode:0x0 pull:0x413A8E20 context:2
FIBIDB Subblock(5) flag:1 decode:0x0 pull:0x413A97DC context:2
XDR High Queue (6) flag:3 decode:0x4031AFFC pull:0x4031B934 context:1
Adjacency updat(7) flag:1 decode:0x413B266C pull:0x413B261C context:2
XDR Medium Queu(8) flag:3 decode:0x4031B004 pull:0x4031B95C context:1
IPv4 table brok(9) flag:1 decode:0x0 pull:0x413B21F0 context:6
IPv6 table brok(10) flag:1 decode:0x0 pull:0x413ECA90 context:6
XDR Low Queue (11) flag:3 decode:0x4031B00C pull:0x4031B984 context:1
MFI RP Pull (12) flag:1 decode:0x0 pull:0x413E1174 context:1
Push Client One(13) flag:1 decode:0x413BA300 pull:0x0 context:4
CEF push (14) flag:1 decode:0x413A3D74 pull:0x0 context:124
MFI non-RP Push(15) flag:1 decode:0x413DFA34 pull:0x0 context:4
XDR ping (16) flag:1 decode:0x413BABB4 pull:0x0 context:1
```

The following example shows how to display XDR information for all XDR line card peer instances:

```
Router# show xdr linecard
XDR slot number 1, status PEER UP
  IPC messages sent 48
  Next sequence number to send 21
  Maximum sequence number expected 36
XDR slot number 2, status PEER UP
  IPC messages sent 52
  Next sequence number to send 31
  Maximum sequence number expected 46
XDR slot number 3, status PEER UP
  IPC messages sent 55
  Next sequence number to send 17
  Maximum sequence number expected 32
```

The following example shows how to display XDR information for the XDR line card peer instance in slot number 1:

```
Router# show xdr linecard 1
XDR slot number 1, status PEER UP
  IPC messages sent 48
  Next sequence number to send 21
  Maximum sequence number expected 36
```

The following example shows how to display internal XDR information for the XDR line card peer instance in slot number 1:

```
Router# show xdr linecard 1 internal
XDR slot number 1, status PEER UP
  IPC messages sent 48
  Next sequence number to send 21
  Maximum sequence number expected 36
  Tx bytes Rx bytes
XDR Interrupt Priori:
  0 0 2391 11955 Window Message
  21 336 0 0 Time Message
  2 8 0 0 Resequenece Message
  0 0 1 6 CEF LC state
XDR Process Priority:
```

|                       |    |       |    |     |                     |
|-----------------------|----|-------|----|-----|---------------------|
|                       | 0  | 0     | 1  | 3   | Registration Signal |
|                       | 2  | 10    | 0  | 0   | CEF running         |
| FIBHWIDB broker :     | 90 | 33570 | 0  | 0   | fibhwwidb update    |
| FIBIDB broker :       | 80 | 30960 | 0  | 0   | fibidb update       |
| FIBIDB Subblock brok: | 10 | 315   | 0  | 0   | fibswsb update      |
| Adjacency update :    | 2  | 6     | 0  | 0   | Adjacency update me |
|                       | 3  | 9     | 0  | 0   | Adjacency repopulat |
| IPv4 table broker :   | 16 | 558   | 0  | 0   | prefix              |
|                       | 4  | 24    | 0  | 0   | epoch               |
|                       | 2  | 36    | 0  | 0   | table               |
|                       | 4  | 44    | 0  | 0   | multicast prefix    |
| IPv6 table broker :   | 1  | 18    | 0  | 0   | table               |
| CEF push :            | 12 | 72    | 19 | 114 | repopulation req    |
|                       | 0  | 0     | 1  | 12  | isl table update rq |
|                       | 0  | 0     | 1  | 12  | dot1q table updateq |
|                       | 2  | 10    | 0  | 0   | state               |
|                       | 9  | 452   | 0  | 0   | control             |
|                       | 1  | 3     | 0  | 0   | flow features deace |
|                       | 1  | 22    | 0  | 0   | flow cache config   |
|                       | 1  | 40    | 0  | 0   | flow export config  |
|                       | 6  | 470   | 0  | 0   | access-list config  |
|                       | 2  | 10    | 0  | 0   | access-list delete  |
|                       | 1  | 12    | 0  | 0   | route-map           |
|                       | 1  | 16    | 0  | 0   | icmp limit          |
|                       | 1  | 8     | 0  | 0   | SSM RP to LC commas |
| XDR ping :            | 3  | 12    | 3  | 12  | ping message        |

The following is sample output from the **show xdr multicast-group** command:

```
Router# show xdr multicast-group
0x4300DC00 READY Window: 15 Linecards: 2
  XDR High Queue xdrs to push: 0
  XDR Medium Queu xdrs to push: 0
  XDR Low Queue xdrs to push: 0
0x4414BC60 READY Window: 15 Linecards: 1
  XDR High Queue xdrs to push: 0
  XDR Medium Queu xdrs to push: 0
  XDR Low Queue xdrs to push: 0
0x44159420 READY Window: 15 Linecards: 3
  XDR High Queue xdrs to push: 0
  XDR Medium Queu xdrs to push: 0
  XDR Low Queue xdrs to push: 0
```

The following is sample output from the **show xdr timers** command:

```
Router# show xdr timers
XDR multicast timers
  Expiration Type
  | 0.000 (parent)
XDR RP ping timers
  Expiration Type
  | 0.000 (parent)
XDR RP timers
  Expiration Type
  | 1:19.236 (parent)
  | 1:19.236 Sending Time
  | 4:59.236 Keepalive timer slot: 2
  | 4:59.236 Keepalive timer slot: 1
  | 4:59.248 Keepalive timer slot: 3
```

**Examples**

The following example shows how to display XDR information for all clients:

```
Router# show xdr client all
XDR Interrupt P(0) flag:RP|ISSU aware
  ISSU capable slot(s): 1
XDR Process Pri(1) flag:RP|ISSU aware
  ISSU capable slot(s): 1
FIBHWIDB broker(2) flag:RP|ISSU aware
  ISSU capable slot(s): 1
FIBIDB broker (3) flag:RP|ISSU aware
  ISSU capable slot(s): 1
FIBHWIDB Subblo(4) flag:RP|ISSU aware
  ISSU capable slot(s): 1
FIBIDB Subblock(5) flag:RP|ISSU aware
  ISSU capable slot(s): 1
XDR High Queue (6) flag:RP|LC
Adjacency updat(7) flag:RP|ISSU aware
  ISSU capable slot(s): 1
XDR Medium Queue(8) flag:RP|LC
IPv4 table brok(9) flag:RP|ISSU aware
  ISSU capable slot(s): 1
XDR Low Queue (11) flag:RP|LC
MFI Pull (12) flag:RP|ISSU aware
  ISSU capable slot(s): 1
Push Client One(13) flag:RP
CEF push (14) flag:RP|ISSU aware
  ISSU capable slot(s): 1
MFI Push (15) flag:RP|ISSU aware
  ISSU capable slot(s): 1
XDR ping (16) flag:RP
MPLS Embedded M(17) flag:RP
```

The following example shows how to display XDR information for all XDR line card peer instances:

```
Router# show xdr linecard
XDR slot number 1, status PEER UP
  IPC messages sent 569
  This is the secondary RP
  Next sequence number to send 116
  Maximum sequence number expected 160
  ISSU state: Nego done, version 2, mtu 7, sid 31
```

The following example shows how to display XDR information for the XDR line card peer instance in slot number 1:

```
Router# show xdr linecard 1
XDR slot number 1, status PEER UP
  IPC messages sent 570
  This is the secondary RP
  Next sequence number to send 116
  Maximum sequence number expected 160
  ISSU state: Nego done, version 2, mtu 7, sid 31
```

The following example shows how to display internal XDR information for the XDR line card peer instance in slot number 1:

```
Router# show xdr linecard 1 internal

XDR slot number 1, status PEER UP
  IPC maximum mtu 1478
  IPC messages sent 570
  This is the secondary RP
  Next sequence number to send 116
  Maximum sequence number expected 160
  ISSU state: Nego done, version 2, mtu 7, sid 31
  Tx bytes      Rx bytes
XDR Interrupt Priori:
                        0      0      10427 52135  Window Message
```

```

      87      1392      0      0      Time Message
      1        4      0      0      Resequence Message
      19      444      11     264     ISSU nego
XDR Process Priority:
      17      51      11     33      Reg Signal
      1        2      0      0      CEF running
      0        0      1      4      CEF reload request
      15      348      9     216     ISSU nego
FIBHWIDB broker      :
      32      3588      0      0      fibhwiwb update
      7        156      5     120     ISSU nego
FIBIDB broker        :
      49      6429      0      0      fibidb update
      7        156      5     120     ISSU nego
FIBHWIDB Subblock br:
      7        156      5     120     ISSU nego
FIBIDB Subblock brok:
      41      1533      0      0      fibswsb update
      13      300      8     192     ISSU nego
Adjacency update     :
      62      3089      0      0      adj update
      4        8        0      0      adj epoch
      17      396      10     240     ISSU nego
IPv4 table broker    :
      285     28557      0      0      prefix
      8        48        0      0      epoch
      5        78        0      0      table
      5        55        0      0      multicast prefix
      45     1068      24     576     ISSU nego
MFI Pull             :
      12      456      0      0      pull update
      75     1788      39     936     ISSU nego
CEF push             :
      8        48      14     84      repopulation req
      5        10        0      0      state
      12      816      0      0      control
      2         0        0      0      mpls_access-list delete
      2        32        0      0      icmp limit
      9       204        6     144     ISSU nego
MFI Push             :
      3       101        0      0      service reply
      2        34        0      0      client request
      0         0         4     106     service request
      2        16        0      0      enable/redis redistribution
client
XDR ping             :
      153     3660      78     1872     ISSU nego
      6        24        6      24      ping message

```

**Related Commands**

| Command                | Description                                                                        |
|------------------------|------------------------------------------------------------------------------------|
| <b>show cef broker</b> | Displays Cisco Express Forwarding information related to a selected update broker. |

## snmp mib cef throttling-interval

To set the throttling interval for the CEF-MIB inconsistency notifications, use the **snmp mib cef throttling-interval** command in global configuration mode. To remove the throttling interval, use the **no** form of this command.

**snmp mib cef throttling-interval** *seconds*

**no snmp mib cef throttling-interval** *seconds*

### Syntax Description

|                |                                                                                                                                                                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>seconds</i> | The time to allow before an inconsistency notification is sent during the process of updating forwarding information from the Routing Information Base (RIB) to the Route Processor (RP) and the line card databases. The valid values are from 0 to 3600 seconds. |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Command Default

Throttling is disabled by default (throttling interval is set to 0 seconds).

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(31)SB  | This command was introduced.                                    |
| 12.2(33)SRC | This command was integrated into Cisco IOS Release 12.2(33)SRC. |
| 12.2(33)SB  | This command was integrated into Cisco IOS Release 12.2(33)SB.  |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |
| 15.0(1)M    | This command was integrated into Cisco IOS Release 15.0(1)M.    |
| 12.2(33)SRE | This command was integrated into Cisco IOS Release 12.2(33)SRE. |
| 12.2(50)SY  | This command was integrated into Cisco IOS Release 12.2(50)SY.  |

### Usage Guidelines

Use this command in conjunction with the **snmp-server enable traps cef inconsistency** command to set the time that elapsed between the occurrence of a Cisco Express Forwarding database inconsistencies and the time when you want to receive an inconsistency notification.

If you set the throttling interval to 0 seconds, throttling is disabled.



## Examples

The following example shows how to set the throttling interval for CEF-MIB inconsistency notification to 300 seconds:

```
configure terminal
!  
snmp-server enable traps cef inconsistency  
snmp mib cef throttling-interval 300
```

## Related Commands

| Command                             | Description                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------|
| <b>snmp-server enable traps cef</b> | Enables CEF-MIB notifications that correspond to Cisco Express Forwarding events. |
| <b>snmp-server host</b>             | Specifies the recipient of an SNMP notification operation.                        |

## snmp-server enable traps cef

To enable Cisco Express Forwarding support of Simple Network Management Protocol (SNMP) notifications on a network management system (NMS), use the **snmp-server enable traps cef** command in global configuration mode. To disable Cisco Express Forwarding support of SNMP notifications, use the **no** form of this command.

**snmp-server enable traps cef** [peer-state-change] [resource-failure] [inconsistency] [peer-fib-state-change]

**no snmp-server enable traps cef** [peer-state-change] [resource-failure] [inconsistency] [peer-fib-state-change]

### Syntax Description

|                              |                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>peer-state-change</b>     | (Optional) Enables the sending of CEF-MIB SNMP notifications for changes in the operational state of Cisco Express Forwarding peers.                                                                                                                                                                                             |
| <b>resource-failure</b>      | (Optional) Enables the sending of CEF-MIB SNMP notifications for resource failures that affect Cisco Express Forwarding operations.                                                                                                                                                                                              |
| <b>inconsistency</b>         | (Optional) Enables the sending of CEF-MIB SNMP notifications for inconsistencies that occur when routing information is updated from the Routing Information Base (RIB) to the Cisco Express Forwarding Forwarding Information Base (FIB) on the Route Processor (RP) and to the Cisco Express Forwarding FIB on the line cards. |
| <b>peer-fib-state-change</b> | (Optional) Enables the sending of CEF-MIB SNMP notifications for changes in the operational state of the Cisco Express Forwarding peer FIB.                                                                                                                                                                                      |

### Command Default

All CEF-MIB notifications are disabled by default.

### Command Modes

Global configuration (config)

### Command History

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.2(31)SB2 | This command was introduced.                                    |
| 12.2(33)SRC | This command was integrated into Cisco IOS Release 12.2(33)SRC. |
| 12.2(33)SB  | This command was integrated into Cisco IOS Release 12.2(33)SB.  |

| Release     | Modification                                                    |
|-------------|-----------------------------------------------------------------|
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.   |
| 15.0(1)M    | This command was integrated into Cisco IOS Release 15.0(1)M.    |
| 12.2(33)SRE | This command was integrated into Cisco IOS Release 12.2(33)SRE. |
| 12.2(50)SY  | This command was integrated into Cisco IOS Release 12.2(50)SY.  |

### Usage Guidelines

You can use this command to enable CEF-MIB SNMP notifications that correspond to specific Cisco Express Forwarding events. To send the notifications to an NMS or host system, you must configure the **snmp-server host** command with the **cef** keyword.

You can enable all CEF-MIB SNMP notifications if you enter the **snmp-server enable traps cef** command without entering an optional keyword.

### Examples

The following example shows how to enable a router to send Cisco Express Forwarding peer state changes and forwarding inconsistencies as informs to the NMS with IP address 10.56.125.47 and to use the community string defined as public:

```
configure terminal
!
snmp-server enable traps cef peer-state-change inconsistency
snmp-server host 10.56.125.47 informs version 2c public
```

### Related Commands

| Command                      | Description                                                                                                        |
|------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>snmp-server community</b> | Configures a community access string to permit SNMP access to the local router by the remote SNMP software client. |
| <b>snmp-server host</b>      | Specifies the recipient of an SNMP notification operation.                                                         |

## snmp-server host

To specify the recipient of a Simple Network Management Protocol (SNMP) notification operation, use the **snmp-server host** command in global configuration mode. To remove the specified host from the configuration, use the **no** form of this command.

```
snmp-server host {hostname| ip-address} [vrf vrf-name| informs| traps| version {1| 2c| 3} [auth| noauth| priv]] community-string [udp-port port [ notification-type ] notification-type]
```

```
no snmp-server host {hostname| ip-address} [vrf vrf-name| informs| traps| version {1| 2c| 3} [auth| noauth| priv]] community-string [udp-port port [ notification-type ] notification-type]
```

### Command Syntax on Cisco ME 3400, ME 3400E, and Catalyst 3750 Metro Switches

```
snmp-server host ip-address {community-string| informs| traps} {community-string| version {1| 2c| 3} {auth| noauth}} {community-string| vrf vrf-name {informs| traps}} [notification-type]
```

```
no snmp-server host ip-address {community-string| informs| traps} {community-string| version {1| 2c| 3} {auth| noauth}} {community-string| vrf vrf-name {informs| traps}} [notification-type]
```

### Command Syntax on Cisco 7600 Series Router

```
snmp-server host ip-address {community-string| {informs| traps} {community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string| vrf vrf-name {informs| traps} {community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string}} [notification-type ]
```

```
no snmp-server host ip-address {community-string| {informs| traps} {community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string| vrf vrf-name {informs| traps} {community-string| version {1| 2c| 3} {auth| noauth| priv}} community-string}} [notification-type ]
```

### Syntax Description

|                   |                                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>hostname</i>   | Name of the host. The SNMP notification host is typically a network management station (NMS) or SNMP manager. This host is the recipient of the SNMP traps or informs.                                                                  |
| <i>ip-address</i> | IPv4 address or IPv6 address of the SNMP notification host.                                                                                                                                                                             |
| <b>vrf</b>        | (Optional) Specifies that a VPN routing and forwarding (VRF) instance should be used to send SNMP notifications. <ul style="list-style-type: none"> <li>In Cisco IOS Release 12.2(54)SE, the <b>vrf</b> keyword is required.</li> </ul> |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>vrf-name</i> | <p>(Optional) VPN VRF instance used to send SNMP notifications.</p> <ul style="list-style-type: none"> <li>• In Cisco IOS Release 12.2(54)SE, the <i>vrf-name</i> argument is required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>informs</b>  | <p>(Optional) Specifies that notifications should be sent as informs.</p> <ul style="list-style-type: none"> <li>• In Cisco IOS Release 12.2(54)SE, the <b>informs</b> keyword is required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>traps</b>    | <p>(Optional) Specifies that notifications should be sent as traps. This is the default.</p> <ul style="list-style-type: none"> <li>• In Cisco IOS Release 12.2(54)SE, the <b>traps</b> keyword is required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>version</b>  | <p>(Optional) Specifies the version of the SNMP that is used to send the traps or informs. The default is 1.</p> <ul style="list-style-type: none"> <li>• In Cisco IOS Release 12.2(54)SE, the <b>version</b> keyword is required and the <b>priv</b> keyword is not supported.</li> </ul> <p>If you use the <b>version</b> keyword, one of the following keywords must be specified:</p> <ul style="list-style-type: none"> <li>• <b>1</b> --SNMPv1.</li> <li>• <b>2c</b> --SNMPv2C.</li> <li>• <b>3</b> --SNMPv3. The most secure model because it allows packet encryption with the <b>priv</b> keyword. The default is <b>noauth</b>.</li> </ul> <p>One of the following three optional security level keywords can follow the <b>3</b> keyword:</p> <ul style="list-style-type: none"> <li>• <b>auth</b> --Enables message digest algorithm 5 (MD5) and Secure Hash Algorithm (SHA) packet authentication.</li> <li>• <b>noauth</b> --Specifies that the noAuthNoPriv security level applies to this host. This is the default security level for SNMPv3.</li> <li>• <b>priv</b> --Enables Data Encryption Standard (DES) packet encryption (also called "privacy").</li> </ul> |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>community-string</i>  | <p>Password-like community string sent with the notification operation.</p> <p><b>Note</b> You can set this string using the <b>snmp-server host</b> command by itself, but Cisco recommends that you define the string using the <b>snmp-server community</b> command prior to using the <b>snmp-server host</b> command.</p> <p><b>Note</b> The “at” sign (@) is used for delimiting the context information.</p> |
| <b>udp-port</b>          | <p>(Optional) Specifies that SNMP traps or informs are to be sent to a network management system (NMS) host.</p> <ul style="list-style-type: none"> <li>In Cisco IOS Release 12.2(54)SE, the <b>udp-port</b> keyword is not supported.</li> </ul>                                                                                                                                                                   |
| <i>port</i>              | <p>(Optional) User Datagram Protocol (UDP) port number of the NMS host. The default is 162.</p> <ul style="list-style-type: none"> <li>In Cisco IOS Release 12.2(54)SE, the <i>port</i> argument is not supported.</li> </ul>                                                                                                                                                                                       |
| <i>notification-type</i> | <p>(Optional) Type of notification to be sent to the host. If no type is specified, all available notifications are sent. See the “Usage Guidelines” section for more information about the keywords available.</p>                                                                                                                                                                                                 |

**Command Default**

This command behavior is disabled by default. A recipient is not specified to receive notifications.

**Command Modes**

Global configuration (config)

**Command History**

| Release  | Modification                                                                                                                                                                                                                                                                                                                              |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.0     | This command was introduced.                                                                                                                                                                                                                                                                                                              |
| 12.0(3)T | <p>This command was modified.</p> <ul style="list-style-type: none"> <li>The <b>version 3</b> [<b>auth</b>   <b>noauth</b>   <b>priv</b>] syntax was added as part of the SNMPv3 Support feature.</li> <li>The <b>hsrp</b> notification-type keyword was added.</li> <li>The <b>voice</b> notification-type keyword was added.</li> </ul> |

| Release   | Modification                                                                                                                                                                                                                                                                                                                                         |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1(3)T  | This command was modified. The <b>calltracker</b> notification-type keyword was added for the Cisco AS5300 and AS5800 platforms.                                                                                                                                                                                                                     |
| 12.2(2)T  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>vrf</b> <i>vrf-name</i> keyword-argument pair was added.</li> <li>• The <b>ipmobile</b> notification-type keyword was added.</li> <li>• Support for the <b>vsimaster</b> notification-type keyword was added for the Cisco 7200 and Cisco 7500 series routers.</li> </ul> |
| 12.2(4)T  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>pim</b> notification-type keyword was added.</li> <li>• The <b>ipsec</b> notification-type keyword was added.</li> </ul>                                                                                                                                                  |
| 12.2(8)T  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>mpls-traffic-eng</b> notification-type keyword was added.</li> <li>• The <b>director</b> notification-type keyword was added.</li> </ul>                                                                                                                                  |
| 12.2(13)T | This command was modified. <ul style="list-style-type: none"> <li>• The <b>srp</b> notification-type keyword was added.</li> <li>• The <b>mpls-ldp</b> notification-type keyword was added.</li> </ul>                                                                                                                                               |
| 12.3(2)T  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>flash</b> notification-type keyword was added.</li> <li>• The <b>l2tun-session</b> notification-type keyword was added.</li> </ul>                                                                                                                                        |
| 12.3(4)T  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>cpu</b> notification-type keyword was added.</li> <li>• The <b>memory</b> notification-type keyword was added.</li> <li>• The <b>ospf notification-type</b> keyword was added.</li> </ul>                                                                                 |
| 12.3(8)T  | This command was modified. The <b>iplocalpool notification-type</b> keyword was added for the Cisco 7200 and 7301 series routers.                                                                                                                                                                                                                    |
| 12.3(11)T | This command was modified. The <b>vrp</b> keyword was added.                                                                                                                                                                                                                                                                                         |

| Release    | Modification                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.3(14)T  | <p>This command was modified.</p> <ul style="list-style-type: none"> <li>• Support for SNMP over IPv6 transport was integrated into Cisco IOS Release 12.3(14)T. Either an IP or IPv6 Internet address can be specified as the <i>hostname</i> argument.</li> <li>• The <b>eigrp</b> notification-type keyword was added.</li> </ul>                                                                                   |
| 12.4(20)T  | This command was modified. The <b>license</b> notification-type keyword was added.                                                                                                                                                                                                                                                                                                                                     |
| 15.0(1)M   | <p>This command was modified.</p> <ul style="list-style-type: none"> <li>• The <b>nhrp</b> notification-type keyword was added.</li> <li>• The automatic insertion of the <b>snmp-server community</b> command into the configuration, along with the community string specified in the <b>snmp-server host</b> command, was changed. The <b>snmp-server community</b> command must be manually configured.</li> </ul> |
| 12.0(17)ST | This command was modified. The <b>mpls-traffic-eng</b> notification-type keyword was added.                                                                                                                                                                                                                                                                                                                            |
| 12.0(21)ST | This command was modified. The <b>mpls-ldp notification-type</b> keyword was added.                                                                                                                                                                                                                                                                                                                                    |
| 12.0(22)S  | <p>This command was modified.</p> <ul style="list-style-type: none"> <li>• All features in Cisco IOS Release 12.0ST were integrated into Cisco IOS Release 12.0(22)S.</li> <li>• The <b>mpls-vpn</b> notification-type keyword was added.</li> </ul>                                                                                                                                                                   |
| 12.0(23)S  | This command was modified. The <b>l2tun-session</b> notification-type keyword was added.                                                                                                                                                                                                                                                                                                                               |
| 12.0(26)S  | This command was modified. The <b>memory</b> notification-type keyword was added.                                                                                                                                                                                                                                                                                                                                      |
| 12.0(27)S  | <p>This command was modified.</p> <ul style="list-style-type: none"> <li>• Support for SNMP over IPv6 transport was added. Either an IP or IPv6 Internet address can be specified as the <i>hostname</i> argument.</li> <li>• The <b>vrf vrf-name</b> keyword and argument combination was added to support multiple Lightweight Directory Protocol (LDP) contexts for VPNs.</li> </ul>                                |
| 12.0(31)S  | This command was modified. The <b>l2tun-pseudowire-status</b> notification-type keyword was added.                                                                                                                                                                                                                                                                                                                     |
| 12.2(18)S  | This command was integrated into Cisco IOS Release 12.2(18)S.                                                                                                                                                                                                                                                                                                                                                          |



| Release                    | Modification                                                                                                                                                                                                       |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.2(25)S                  | This command was modified. <ul style="list-style-type: none"> <li>• The <b>cpu</b> notification-type keyword was added.</li> <li>• The <b>memory</b> notification-type keyword was added.</li> </ul>               |
| 12.2(28)SB                 | This command was integrated into Cisco IOS Release 12.2(28)SB.                                                                                                                                                     |
| 12.2(33)SRA                | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                                                                                                                                    |
| 12.2(31)SB2                | The <b>cef</b> notification-type keyword was added.                                                                                                                                                                |
| 12.2(33)SXH                | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                                                                                                                                    |
| 12.2(33)SB                 | This command was integrated into Cisco IOS Release 12.2(33)SB.                                                                                                                                                     |
| 12.2(33)SXI5               | This command was modified. <ul style="list-style-type: none"> <li>• The <b>dhcp-snooping</b> notification-type keyword was added.</li> <li>• The <b>errdisable</b> notification-type keyword was added.</li> </ul> |
| 12.2(54)SE                 | This command was modified. See the <a href="#">snmp-server host</a> , on page 524 for the command syntax for these switches.                                                                                       |
| 12.2(33)SXJ                | This command was integrated into Cisco IOS Release 12.2(33)SXJ. The <b>public storm-control</b> notification-type keyword was added.                                                                               |
| 15.0(1)S                   | This command was modified. The <b>flowmon notification-type</b> keyword was added.                                                                                                                                 |
| Cisco IOS XE Release 2.1   | This command was integrated into Cisco IOS XE Release 2.1.                                                                                                                                                         |
| 15.2(1)S                   | This command was modified. The <b>p2mp-traffic-eng</b> notification-type keyword was added.                                                                                                                        |
| Cisco IOS XE Release 3.2SE | This command was implemented in Cisco IOS XE Release 3.2SE.                                                                                                                                                        |
| Cisco IOS XE Release 3.3SE | This command was implemented in Cisco IOS XE Release 3.3SE.                                                                                                                                                        |

### Usage Guidelines

If you enter this command with no optional keywords, the default is to send all notification-type traps to the host. No informs will be sent to the host.

The **no snmp-server host** command with no keywords disables traps, but not informs, to the host. To disable informs, use the **no snmp-server host informs** command.

**Note**

If a community string is not defined using the **snmp-server community** command prior to using this command, the default form of the **snmp-server community** command will automatically be inserted into the configuration. The password (community string) used for this automatic configuration of the **snmp-server community** command will be the same as that specified in the **snmp-server host** command. This automatic command insertion and use of passwords is the default behavior for Cisco IOS Release 12.0(3) and later releases. However, in Cisco IOS Release 12.2(33)SRE and later releases, you must manually configure the **snmp-server community** command. That is, the **snmp-server community** command will not be seen in the configuration.

SNMP notifications can be sent as traps or inform requests. Traps are unreliable because the receiver does not send acknowledgments when it receives traps. The sender cannot determine if the traps were received. However, an SNMP entity that receives an inform request acknowledges the message with an SNMP response protocol data unit (PDU). If the sender never receives the response, the inform request can be sent again. Thus, informs are more likely to reach their intended destination than traps.

Compared to traps, informs consume more resources in the agent and in the network. Unlike a trap, which is discarded as soon as it is sent, an inform request must be held in memory until a response is received or the request times out. Also, traps are sent only once; an inform may be tried several times. The retries increase traffic and contribute to a higher overhead on the network.

If you do not enter an **snmp-server host** command, no notifications are sent. To configure the router to send SNMP notifications, you must enter at least one **snmp-server host** command. If you enter the command with no optional keywords, all trap types are enabled for the host.

To enable multiple hosts, you must issue a separate **snmp-server host** command for each host. You can specify multiple notification types in the command for each host.

When multiple **snmp-server host** commands are given for the same host and kind of notification (trap or inform), each succeeding command overwrites the previous command. Only the last **snmp-server host** command will be in effect. For example, if you enter an **snmp-server host inform** command for a host and then enter another **snmp-server host inform** command for the same host, the second command will replace the first.

The **snmp-server host** command is used in conjunction with the **snmp-server enable** command. Use the **snmp-server enable** command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one **snmp-server enable** command and the **snmp-server host** command for that host must be enabled.

Some notification types cannot be controlled with the **snmp-server enable** command. Some notification types are always enabled, and others are enabled by a different command. For example, the **linkUpDown** notifications are controlled by the **snmp trap link-status** command. These notification types do not require an **snmp-server enable** command.

The availability of notification-type options depends on the router type and the Cisco IOS software features supported on the router. For example, the **envmon** notification type is available only if the environmental monitor is part of the system. To see what notification types are available on your system, use the command help ? at the end of the **snmp-server host** command.

The **vrf** keyword allows you to specify the notifications being sent to a specified IP address over a specific VRF VPN. The VRF defines a VPN membership of a user so that data is stored using the VPN.

In the case of the NMS sending the query having a correct SNMP community but not having a read or a write view, the SNMP agent returns the following error values:

- For a get or a getnext query, returns GEN\_ERROR for SNMPv1 and AUTHORIZATION\_ERROR for SNMPv2C.
- For a set query, returns NO\_ACCESS\_ERROR.

### Notification-Type Keywords

The notification type can be one or more of the following keywords.



#### Note

The available notification types differ based on the platform and Cisco IOS release. For a complete list of available notification types, use the question mark (?) online help function.

- **aaa server** --Sends SNMP authentication, authorization, and accounting (AAA) traps.
- **adsl** --Sends Asymmetric Digital Subscriber Line (ADSL) LINE-MIB traps.
- **atm** --Sends ATM notifications.
- **authenticate-fail** --Sends an SNMP 802.11 Authentication Fail trap.
- **auth-framework** --Sends SNMP CISCO-AUTH-FRAMEWORK-MIB notifications.
- **bgp** --Sends Border Gateway Protocol (BGP) state change notifications.
- **bridge** --Sends SNMP STP Bridge MIB notifications.
- **bstun** --Sends Block Serial Tunneling (BSTUN) event notifications.
- **bulkstat** --Sends Data-Collection-MIB notifications.
- **c6kxbar** --Sends SNMP crossbar notifications.
- **callhome** --Sends Call Home MIB notifications.
- **calltracker** -- Sends Call Tracker call-start/call-end notifications.
- **casa** --Sends Cisco Appliances Services Architecture (CASA) event notifications.
- **ccme** --Sends SNMP Cisco netManager Event (CCME) traps.
- **cef** --Sends notifications related to Cisco Express Forwarding.
- **chassis** --Sends SNMP chassis notifications.
- **cnpd** --Sends Cisco Network-based Application Recognition (NBAR) Protocol Discovery (CNPD) traps.
- **config** --Sends configuration change notifications.
- **config-copy** --Sends SNMP config-copy notifications.
- **config-ctid** --Sends SNMP config-ctid notifications.
- **cpu** --Sends CPU-related notifications.
- **csg** --Sends SNMP Content Services Gateway (CSG) notifications.
- **deauthenticate** --Sends an SNMP 802.11 Deauthentication trap.
- **dhcp-snooping** --Sends DHCP snooping MIB notifications.

- **director** --Sends notifications related to DistributedDirector.
- **disassociate** --Sends an SNMP 802.11 Disassociation trap.
- **dlsnw** --Sends data-link switching (DLSW) notifications.
- **dnis** --Sends SNMP Dialed Number Identification Service (DNIS) traps.
- **dot1x** --Sends 802.1X notifications.
- **dot11-mibs** --Sends dot11 traps.
- **dot11-qos** --Sends SNMP 802.11 QoS Change trap.
- **ds1** --Sends SNMP digital signaling 1 (DS1) notifications.
- **ds1-loopback** --Sends ds1-loopback traps.
- **dspu** --Sends downstream physical unit (DSPU) notifications.
- **eigrp** --Sends Enhanced Interior Gateway Routing Protocol (EIGRP) stuck-in-active (SIA) and neighbor authentication failure notifications.
- **energywise** --Sends SNMP energywise notifications.
- **entity** --Sends Entity MIB modification notifications.
- **entity-diag** --Sends SNMP entity diagnostic MIB notifications.
- **envmon** --Sends Cisco enterprise-specific environmental monitor notifications when an environmental threshold is exceeded.
- **errdisable** --Sends error disable notifications.
- **ethernet-cfm** --Sends SNMP Ethernet Connectivity Fault Management (CFM) notifications.
- **event-manager** --Sends SNMP Embedded Event Manager notifications.
- **firewall** --Sends SNMP Firewall traps.
- **flash** --Sends flash media insertion and removal notifications.
- **flexlinks** --Sends FLEX links notifications.
- **flowmon** --Sends flow monitoring notifications.
- **frame-relay** --Sends Frame Relay notifications.
- **fru-ctrl** --Sends entity field-replaceable unit (FRU) control notifications.
- **hsrp** --Sends Hot Standby Routing Protocol (HSRP) notifications.
- **icsudsu** --Sends SNMP ICSUDSU traps.
- **iplocalpool** --Sends IP local pool notifications.
- **ipmobile** --Sends Mobile IP notifications.
- **ipmulticast** --Sends IP multicast notifications.
- **ipsec** --Sends IP Security (IPsec) notifications.
- **isakmp** --Sends SNMP ISAKMP notifications.
- **isdn** --Sends ISDN notifications.

- **l2tc** --Sends SNMP L2 tunnel configuration notifications.
- **l2tun-pseudowire-status** --Sends pseudowire state change notifications.
- **l2tun-session** --Sends Layer 2 tunneling session notifications.
- **license** --Sends licensing notifications as traps or informs.
- **llc2** --Sends Logical Link Control, type 2 (LLC2) notifications.
- **mac-notification** --Sends SNMP MAC notifications.
- **memory** --Sends memory pool and memory buffer pool notifications.
- **module** --Sends SNMP module notifications.
- **module-auto-shutdown** --Sends SNMP module autosutdown MIB notifications.
- **mpls-fast-reroute** --Sends SNMP Multiprotocol Label Switching (MPLS) traffic engineering fast reroute notifications.
- **mpls-ldp** --Sends MPLS Label Distribution Protocol (LDP) notifications indicating status changes in LDP sessions.
- **mpls-traffic-eng** --Sends MPLS traffic engineering notifications, indicating changes in the status of MPLS traffic engineering tunnels.
- **mpls-vpn** --Sends MPLS VPN notifications.
- **msdp** --Sends SNMP Multicast Source Discovery Protocol (MSDP) notifications.
- **mvpn** --Sends multicast VPN notifications.
- **nhrp** --Sends Next Hop Resolution Protocol (NHRP) notifications.
- **ospf** --Sends Open Shortest Path First (OSPF) sham-link notifications.
- **pim** --Sends Protocol Independent Multicast (PIM) notifications.
- **port-security** --Sends SNMP port-security notifications.
- **power-ethernet** --Sends SNMP power Ethernet notifications.
- **public storm-control** --Sends SNMP public storm-control notifications.
- **pw-vc** --Sends SNMP pseudowire virtual circuit (VC) notifications.
- **p2mp-traffic-eng** --Sends SNMP MPLS Point to Multi-Point MPLS-TE notifications.
- **repeater** --Sends standard repeater (hub) notifications.
- **resource-policy** --Sends CISCO-ERM-MIB notifications.
- **rf** --Sends SNMP RF MIB notifications.
- **rogue-ap** --Sends an SNMP 802.11 Rogue AP trap.
- **rsrb** --Sends remote source-route bridging (RSRB) notifications.
- **rsvp** --Sends Resource Reservation Protocol (RSVP) notifications.
- **rtr** --Sends Response Time Reporter (RTR) notifications.
- **sdlc** --Sends Synchronous Data Link Control (SDLC) notifications.

- **sdlc** --Sends SDLC Logical Link Control (SDLLC) notifications.
- **slb** --Sends SNMP server load balancer (SLB) notifications.
- **snmp** --Sends any enabled RFC 1157 SNMP linkUp, linkDown, authenticationFailure, warmStart, and coldStart notifications.




---

**Note** To enable RFC-2233-compliant link up/down notifications, you should use the **snmp server link trap** command.

---

- **sonet** --Sends SNMP SONET notifications.
- **srp** --Sends Spatial Reuse Protocol (SRP) notifications.
- **stpx** --Sends SNMP STPX MIB notifications.
- **srst** --Sends SNMP Survivable Remote Site Telephony (SRST) traps.
- **stun** --Sends serial tunnel (STUN) notifications.
- **switch-over** --Sends an SNMP 802.11 Standby Switchover trap.
- **syslog** --Sends error message notifications (Cisco Syslog MIB). Use the **logging history level** command to specify the level of messages to be sent.
- **syslog** --Sends error message notifications (Cisco Syslog MIB). Use the **logging history level** command to specify the level of messages to be sent.
- **tty** --Sends Cisco enterprise-specific notifications when a TCP connection closes.
- **udp-port** --Sends the notification host's UDP port number.
- **vlan-mac-limit** --Sends SNMP L2 control VLAN MAC limit notifications.
- **vlancreate** --Sends SNMP VLAN created notifications.
- **vlandelete** --Sends SNMP VLAN deleted notifications.
- **voice** --Sends SNMP voice traps.
- **vrrp** --Sends Virtual Router Redundancy Protocol (VRRP) notifications.
- **vsimaster** --Sends Virtual Switch Interface (VSI) Master notifications.
- **vswitch** --Sends SNMP virtual switch notifications.
- **vtp** --Sends SNMP VLAN Trunking Protocol (VTP) notifications.
- **wlan-wep** --Sends an SNMP 802.11 Wireless LAN (WLAN) Wired Equivalent Privacy (WEP) trap.
- **x25** --Sends X.25 event notifications.
- **ygcp** --Sends External Media Gateway Control Protocol (XGCP) traps.

### SNMP-Related Notification-Type Keywords

The *notification-type* argument used in the **snmp-server host** command do not always match the keywords used in the corresponding **snmp-server enable traps** command. For example, the *notification-type* argument applicable to Multiprotocol Label Switching Protocol (MPLS) traffic engineering tunnels is specified as **mpls-traffic-eng** (containing two hyphens and no embedded spaces). The corresponding parameter in the

**snmp-server enable traps** command is specified as **mpls traffic-eng** (containing an embedded space and a hyphen).

This syntax difference is necessary to ensure that the CLI interprets the *notification-type* keyword of the **snmp-server host** command as a unified, single-word construct, which preserves the capability of the **snmp-server host** command to accept multiple *notification-type* keywords in the command line. The **snmp-server enable traps** commands, however, often use two-word constructs to provide hierarchical configuration options and to maintain consistency with the command syntax of related commands. The table below maps some examples of **snmp-server enable traps** commands to the keywords used in the **snmp-server host** command.

**Table 99: snmp-server enable traps Commands and Corresponding Notification Keywords**

| snmp-server enable traps Command                                                     | snmp-server host Command Keyword                              |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------|
| snmp-server enable traps l2tun session                                               | l2tun-session                                                 |
| snmp-server enable traps mpls ldp                                                    | mpls-ldp                                                      |
| snmp-server enable traps mpls traffic-eng <sup>6</sup>                               | mpls-traffic-eng                                              |
| snmp-server enable traps mpls vpn                                                    | mpls-vpn                                                      |
| snmp-server host <i>host-address community-string udp-port port</i> p2mp-traffic-eng | snmp-server enable traps mpls p2mp-traffic-eng<br>[down   up] |

<sup>6</sup> See the *Cisco IOS Multiprotocol Label Switching Command Reference* for documentation of this command.

## Examples

If you want to configure a unique SNMP community string for traps but prevent SNMP polling access with this string, the configuration should include an access list. The following example shows how to name a community string comaccess and number an access list 10:

```
Router(config)# snmp-server community comaccess ro 10
Router(config)# snmp-server host 10.0.0.0 comaccess
Router(config)# access-list 10 deny any
```



### Note

The “at” sign (@) is used as a delimiter between the community string and the context in which it is used. For example, specific VLAN information in BRIDGE-MIB may be polled using *community @VLAN-ID* (for example, public@100), where 100 is the VLAN number.

The following example shows how to send RFC 1157 SNMP traps to a specified host named myhost.cisco.com. Other traps are enabled, but only SNMP traps are sent because only **snmp** is specified in the **snmp-server host** command. The community string is defined as comaccess.

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com comaccess snmp
```

The following example shows how to send the SNMP and Cisco environmental monitor enterprise-specific traps to address 10.0.0.0 using the community string public:

```
Router(config)# snmp-server enable traps snmp
```

```
Router(config)# snmp-server enable traps envmon
Router(config)# snmp-server host 10.0.0.0 public snmp envmon
```

The following example shows how to enable the router to send all traps to the host myhost.cisco.com using the community string public:

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com public
```

The following example will not send traps to any host. The BGP traps are enabled for all hosts, but only the ISDN traps are enabled to be sent to a host. The community string is defined as public.

```
Router(config)# snmp-server enable traps bgp
Router(config)# snmp-server host myhost.cisco.com public isdn
```

The following example shows how to enable the router to send all inform requests to the host myhost.cisco.com using the community string public:

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com informs version 2c public
```

The following example shows how to send HSRP MIB informs to the host specified by the name myhost.cisco.com. The community string is defined as public.

```
Router(config)# snmp-server enable traps hsrp
Router(config)# snmp-server host myhost.cisco.com informs version 2c public hsrp
```

The following example shows how to send all SNMP notifications to example.com over the VRF named trap-vrf using the community string public:

```
Router(config)# snmp-server host example.com vrf trap-vrf public
```

The following example shows how to configure an IPv6 SNMP notification server with the IPv6 address 2001:0DB8:0000:ABCD:1 using the community string public:

```
Router(config)# snmp-server host 2001:0DB8:0000:ABCD:1 version 2c public udp-port 2012
```

The following example shows how to specify VRRP as the protocol using the community string public:

```
Router(config)# snmp-server enable traps vrrp
Router(config)# snmp-server host myhost.cisco.com traps version 2c public vrrp
```

The following example shows how to send all Cisco Express Forwarding informs to the notification receiver with the IP address 10.0.1.1 using the community string public:

```
Router(config)# snmp-server enable traps cef
Router(config)# snmp-server host 10.0.1.1 informs version 2c public cef
```

The following example shows how to enable all NHRP traps, and how to send all NHRP traps to the notification receiver with the IP address 10.0.0.0 using the community string public:

```
Router(config)# snmp-server enable traps nhrp
Router(config)# snmp-server host 10.0.0.0 traps version 2c public nhrp
```

The following example shows how to enable all P2MP MPLS-TE SNMP traps, and send them to the notification receiver with the IP address 172.20.2.160 using the community string "comp2mppublic":

```
Router(config)# snmp-server enable traps mpls p2mp-traffic-eng
Router(config)# snmp-server host 172.20.2.160 comp2mppublic udp-port 162 p2mp-traffic-eng
```

## Related Commands

| Command               | Description                                                   |
|-----------------------|---------------------------------------------------------------|
| <b>show snmp host</b> | Displays recipient details configured for SNMP notifications. |



| Command                                        | Description                                                                                                  |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>snmp-server enable peer-trap poor qov</b>   | Enables poor quality of voice notifications for applicable calls associated with a specific voice dial peer. |
| <b>snmp-server enable traps</b>                | Enables SNMP notifications (traps and informs).                                                              |
| <b>snmp-server enable traps nhrp</b>           | Enables SNMP notifications (traps) for NHRP.                                                                 |
| <b>snmp-server informs</b>                     | Specifies inform request options.                                                                            |
| <b>snmp-server link trap</b>                   | Enables linkUp/linkDown SNMP traps that are compliant with RFC 2233.                                         |
| <b>snmp-server trap-source</b>                 | Specifies the interface from which an SNMP trap should originate.                                            |
| <b>snmp-server trap-timeout</b>                | Defines how often to try resending trap messages on the retransmission queue.                                |
| <b>test snmp trap storm-control event-rev1</b> | Tests SNMP storm-control traps.                                                                              |

## switchover pxf restart

To configure the number of parallel express forwarding (PXF) restarts that are allowed before a switchover to a redundant Performance Routing Engine (PRE) module, use the **switchover pxf restart** command in redundancy configuration (main-cpu) mode. To disable switchovers due to PXF restarts, use the **no** form of this command.

**switchover pxf restart** *number-of-restarts time-period*

**no switchover pxf restart**

### Syntax Description

|                           |                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>number-of-restarts</i> | The number of PXF restarts that are allowed within the specified time period. If the PXF processors restart this many times within the given time period, the router switches over to the redundant PRE module. The valid range is 1 to 25. The default is 2 PXF restarts within 5 hours. |
| <i>time-period</i>        | Time period, in hours, that PXF restart counts are monitored. The valid range is 0 to 120 hours.<br><br><b>Note</b> A value of <b>0</b> specifies that a switchover occurs on the configured <i>number-of-restarts</i> regardless of the time period.                                     |

### Command Default

If this command is not configured, the default is 2 PXF restarts within 5 hours.

### Command Modes

Redundancy configuration, main-cpu mode (config-r-mc)

### Command History

| Release     | Modification                                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------|
| 12.2(15)BC2 | This command was introduced on the Cisco uBR10012 router.                                                   |
| 12.3(7)     | This command was introduced on the Cisco 10000 series router and integrated into Cisco IOS Release 12.3(7). |
| 12.2SB      | This command was integrated into Cisco IOS Release 12.2SB.                                                  |

### Usage Guidelines

The startup and running configurations of the standby PRE are synchronized with the active PRE, ensuring the fastest possible cut-over time if the active PRE fails. A second switchover is prevented for 2 hours if a PXF restart occurs on the new active PRE.

A PXF restart following a PXF fault may restore service more quickly when the features in use are not configured for nonstop forwarding with stateful switchover (NSF/SSO), or when SSO mode is not configured on the router. Conversely, a PRE switchover in response to a PXF restart may restore service more quickly when NSF/SSO is configured on the router and all configured features support NSF/SSO.

When a switchover occurs because of repeated PXF restarts, the router displays the following system message:

```
C10KEVENTMGR-3-PXF_FAIL_SWITCHOVER: Multiple PXF failures, switchover to redundant PRE initiated.
```

## Examples

The following example shows how to configure the router so that if five PXF restarts occur within a one-hour period, the router initiates a switchover to the redundant PRE module.

```
Router(config)# redundancy  
Router(config-red)# main-cpu  
Router(config-r-mc)# switchover pxf restart 5 1
```

## Related Commands

| Command                                   | Description                                                                                                           |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>main-cpu</b>                           | Enters main-cpu redundancy configuration mode to configure the synchronization of the active and standby PRE modules. |
| <b>redundancy</b>                         | Configures the synchronization of system files between the active and standby PRE modules.                            |
| <b>redundancy force-failover main-cpu</b> | Forces a manual switchover between the active and standby PRE modules.                                                |
| <b>show redundancy</b>                    | Displays the current redundancy status.                                                                               |

# test cef table consistency

To test the Cisco Express Forwarding Forwarding Information Base (FIB) for prefix consistency, use the **test cef table consistency** command in privilege EXEC mode.

**test cef table consistency [detail]**

## Syntax Description

|               |                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>detail</b> | (Optional) Displays detailed information about the consistency of prefixes in the Cisco Express Forwarding FIB table. |
|---------------|-----------------------------------------------------------------------------------------------------------------------|

## Command Modes

Privileged EXEC (#)

## Command History

| Release     | Modification                                                                                      |
|-------------|---------------------------------------------------------------------------------------------------|
| 12.2(25)S   | This command was introduced. This command replaces the <b>show ip cef inconsistency command</b> . |
| 12.2(28)SB  | This command was integrated into Cisco IOS Release 12.2(28)SB.                                    |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA.                                   |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH.                                   |
| 12.4(20)T   | This command was integrated into Cisco IOS Release 12.4(20)T.                                     |

## Usage Guidelines

This command displays recorded Cisco Express Forwarding consistency records found by the lc-detect, scan-rib-ios, scan-ios-rib, scan-lc-rp, and scan-rp-lc detection mechanisms. The scan-lc-rp and scan-rp-lc detection mechanisms are available only on routers with line cards.

You can configure the Cisco Express Forwarding prefix consistency-detection mechanisms using the **cef table consistency-check** command.

## Examples

The following is sample output from the **test cef table consistency** command:

```
Router# test cef table consistency
full-scan-rib-ios: Checking IPv4 RIB to FIB consistency
full-scan-ios-rib: Checking IPv4 FIB to RIB consistency
No IPv4 inconsistencies found, check took 00:00:00.000
The following is sample output from the test cef table consistency detail command:
```

```
Router# test cef table consistency detail
full-scan-rib-ios: Checking IPv4 RIB to FIB consistency
```

```

full-scan-rib-ios: FIB checked 12 prefixes, and found 0 missing.
full-scan-ios-rib: Checking IPv4 FIB to RIB consistency
full-scan-ios-rib: Checked 12 FIB prefixes in 1 pass, and found 0 extra.
full-scan-rp-lc: Sent 26 IPv4 prefixes to linecards in 1 pass
full-scan-rp-lc: Initiated IPv4 FIB check on linecards..4..1..0..
full-scan-rp-lc: FIB IPv4 check completed on linecards..1..0..4..
full-scan-rp-lc: Linecard 4 checked 26 IPv4 prefixes (ignored 0). 0 inconsistent.
full-scan-rp-lc: Linecard 1 checked 26 IPv4 prefixes (ignored 0). 0 inconsistent.
full-scan-rp-lc: Linecard 0 checked 26 IPv4 prefixes (ignored 0). 0 inconsistent.
full-scan-rib-ios: Checking IPv6 RIB to FIB consistency
full-scan-rib-ios: FIB checked 16 prefixes, and found 5 missing.
full-scan-ios-rib: Checking IPv6 FIB to RIB consistency
full-scan-ios-rib: Checked 11 FIB prefixes in 1 pass, and found 0 extra.
full-scan-rp-lc: Sent 11 IPv6 prefixes to linecards in 1 pass
full-scan-rp-lc: Initiated IPv6 FIB check on linecards..4..1..0..
full-scan-rp-lc: FIB IPv6 check completed on linecards..1..4..0..
full-scan-rp-lc: Linecard 4 checked 11 IPv6 prefixes (ignored 0). 0 inconsistent.
full-scan-rp-lc: Linecard 1 checked 11 IPv6 prefixes (ignored 0). 0 inconsistent.
full-scan-rp-lc: Linecard 0 checked 11 IPv6 prefixes (ignored 0). 0 inconsistent.
No IPv4 inconsistencies found, check took 00:00:01.444
Warning: 5 IPv6 inconsistencies found, check took 00:00:01.240
The table below describes the significant fields shown in the display.

```

**Table 100: test cef consistency detail Field Descriptions**

| Field                                                            | Description                                                                                                  |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| FIB checked 12 prefixes, and found 0 missing                     | The scan-rib-ios consistency checker checked 12 prefixes in the FIB against the FIB and found 0 missing.     |
| Checked 12 FIB prefixes in 1 pass, and found 0 extra.            | The scan-ios-rib consistency checker checked 12 prefixes in the RIB and found no extra prefixes in one pass. |
| Linecard 4 checked 26 IPv4 prefixes (ignored 0). 0 inconsistent. | The scan-rp-lc consistency checker found no inconsistencies on line card 4 after checking 26 IPv4 prefixes.  |

## Related Commands

| Command                            | Description                                                                      |
|------------------------------------|----------------------------------------------------------------------------------|
| <b>cef table consistency check</b> | Enables Cisco Express Forwarding table consistency checker types and parameters. |

