Cisco Express Forwarding: Command Changes

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This feature module details changes to commands that are required to support updates to Cisco Express Forwarding.

In Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA and 12.2(33)SXH, Cisco Express Forwarding has been updated to support new features and new hardware. These updates enable Cisco Express Forwarding to operate with the Multiprotocol Label Switching (MPLS) High Availability (HA) applications and the MPLS Forwarding Infrastructure (MFI).

Cisco Express Forwarding provides a forwarding path and maintains a complete forwarding and adjacency table for both the software and hardware forwarding engines.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for Cisco Express Forwarding: Command Changes" section on page 114.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Contents

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Information About Cisco Express Forwarding: Command Changes

Before using the Cisco Express Forwarding commands, you should understand the following concepts:

Deleted Commands

The following commands are obsolete and are no longer available from Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA and 12.2(33)SXH (no replacement commands are provided):

- **clear adjacency epoch**
- **clear cef linecard events**
- **clear ip cef epoch**
- **clear ip cef events**
- **clear ip cef * prefix-statistics**
- **debug adjacency adjlist**
- **debug ip cef bulk-xfer**
- **debug ip cef elog-cef**
- **debug ip cef elog-plat**
- **debug ip cef stats**
- **ip cef switch**
- **ip cef linecard event-log**
- **ip cef linecard reloader**
- **ip cef load-sharing algorithm jittered**
- **ip cef nsf sync**
- **ip cef table event-log**
- **ip cef table resolution-timer**
- **ip cef table short-mask-protection**
- **show cef events**
- **show cef linecard events**

Replaced Commands

Table 1 lists all replaced Cisco Express Forwarding commands, starting with Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA and 12.2(33)SXH, for the Cisco 7500 series routers:

Table 1   *Replaced Cisco Express Forwarding Commands—Cisco 7500 Series Routers*

This Command	Replaces This Command
cef table consistency-check	ip cef table consistency-check
debug cef fib attached export	debug ip cef adjfib
ip cef	ip cef switch
monitor event-trace cef ipv4 clear	clear ip cef event-log
monitor event-trace cef linecard size	ip cef linecard event-log max-events
show adjacency	show adjacency nexthop
show ip cef switching statistics	show cef drop
show ip cef switching statistics	show cef not-cef-switched
show monitor event-trace	show cef events
show monitor event-trace cef events	show ip cef events (still visible)
show monitor event-trace cef events all	show cef events [internal]
show monitor event-trace cef linecard	show cef linecard events

Table 2 lists all replaced Cisco Express Forwarding commands, starting with Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA and 12.2(33)SXH, for the Cisco 10000 series routers:

Table 2   *Replaced Cisco Express Forwarding Commands—Cisco 10000 Series Routers*

This Command	Replaces This Command
cef table consistency-check	ip cef table consistency-check
debug cef fib attached export	debug ip cef adjfib
ip cef linecard event-log max-events	–
monitor event-trace cef ipv4 clear	clear ip cef event-log
show adjacency	show adjacency nexthop
show ip cef switching statistics	NA
show ip cef switching statistics	show cef drop
show monitor event-trace	show cef events
show monitor event-trace cef events	show ip cef events (still visible)
show monitor event-trace cef events all	show cef events [internal]
–	show cef linecard events

How to Configure Cisco Express Forwarding: Command Changes

There are no configuration tasks for this feature.

Configuration Examples for Cisco Express Forwarding: Command Changes

There are no configuration examples for this feature.

Additional References

For additional information related to the Cisco Express Forwarding command changes, see the following references:

- Related Documents, page 4
- Standards, page 4
- MIBs, page 4
- RFCs, page 5
- Technical Assistance, page 5

Related Documents

Related Topic	Document Title
NetFlow	*MPLS High Availability: Overview,* Release 12.2(25)S

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

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

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register on Cisco.com.	http://www.cisco.com/techsupport

Command Reference

This section contains the following new and modified commands:

- **cef table consistency-check**
- **clear adjacency**
- **clear cef linecard**
- **clear cef table**
- **clear ip cef inconsistency**
- **debug adjacency**
- **debug cef**
- **debug ip cef**
- **debug ip cef accounting non-recursive**
- **debug ip cef fragmentation**
- **debug ip cef hash**
- **debug ip cef rrhash**
- **debug ip cef subblock**
- **debug ip cef table**
- **ip route-cache**
- **monitor event-trace (EXEC)**
- **monitor event-trace (global)**
- **show adjacency**

- **show cef**
- **show cef features global**
- **show cef interface**
- **show ip cef**
- **show ip cef adjacency**
- **show ip cef non-recursive**
- **show ip cef switching statistics**
- **show ip cef tree**
- **show ip cef unresolved**
- **show ip traffic**
- **show monitor event-trace**
- **show xdr**

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*] [**error-message**] [**auto-repair delay** *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*] [**error-message**] [**auto-repair delay** *seconds* **holddown** *seconds*] [**data-checking**]

Syntax Description		
ipv4	Checks IPv4 addresses.	
ipv6	Checks IPv6 addresses.	
	Note On the Cisco 10000 series routers, IPv6 is supported on 12.2(28)SB and later releases.	
type	(Optional) Specifies the type of consistency check to enable.	
lc-detect	(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).	
	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.	
scan-lc-rp	(Optional) (Distributed platforms only) Performs a passive scan check of tables on the line card.	
	This consistency checker operates on the line card by examining the FIB table for a configurable time period and sending the next *x* 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.	
scan-rp-lc	(Optional) Operates on the RSP (opposite of the **scan-lc-rp** consistency checker) by examining the FIB table for a configurable time period and sending the next *x* prefixes to the line card.	
	The line card does an exact lookup. If it finds the prefix missing, the line card reports an inconsistency and signals the RSP for confirmation.	
scan-rib-ios	(Optional) (Distributed platforms only) Compares the Routing Information Base (RIB) to the FIB table and provides the number of entries missing from the FIB table.	
scan-ios-rib	(Optional) (Distributed platforms only) Compares the FIB table to the RIB and provides the number of entries missing from the RIB.	

count *count-number*	(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 **scan-rib-ios** and **scan-ios-rib** keywords. The default count number is 0 for the **lc-detect**, **scan-lc-rp**, and **scan-rp-lc** keywords.
period *seconds*	(Optional) Period between scans. Valid values are from 30 to 3600 seconds. The default is 60 seconds.
error-message	(Optional) Enables the consistency checker to generate an error message when it detects an inconsistency. By default, this function is disabled.
auto-repair	(Optional) Enables the auto repair function. By default, this function is enabled. You can enter the **no** 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.
delay *seconds*	(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.
holddown *seconds*	(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.
data-checking	(Optional) Enables the consistency checker data-checking utility. By default, this function is disabled.

Defaults All consistency checkers are disabled.

Command Modes Global configuration

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.

Usage Guidelines This command replaces the **ip cef table consistency-check** command.

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

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.

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
clear arp-cache	Deletes all dynamic entries from the ARP cache.
debug adjacency	Enables the display of information about the adjacency database.

Command	Description
show adjacency	Displays Cisco Express Forwarding adjacency table information.
show mls cef adjacency	Displays information about the hardware Layer 3 switching adjacency node.

clear cef linecard

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

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

Syntax Description

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

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 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, it's 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
show cef linecard	Displays Cisco Express Forwarding-related interface information by line card.

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

Defaults   No default behaviors or values.

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.

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, it's 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 blue in the IPv4 address family:

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

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, 9.1.41.0/24, vrf Default, 1 path, flags 0100
0220
06:56:01: FIBtable: IPv4: Adding route for 9.1.41.0/24 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
cef table consistency-check	Clears the Cisco Express Forwarding tables.
clear ip cef inconsistency	Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers.

Command	Description
debug cef	Enables the display of information about Cisco Express Forwarding events.
debug ip cef table	Enables the collection of events that affect entries in the Cisco Express Forwarding tables.
show cef table consistency-check	Displays Cisco Express Forwarding consistency checker table values.
show ip cef inconsistency	Displays Cisco Express Forwarding IP prefix inconsistencies.

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 user EXEC or privileged EXEC mode.

clear ip cef inconsistency

Syntax Description   This command has no arguments or keywords.

Defaults   This command has no default settings.

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 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.

Usage Guidelines   This command clears the Cisco Express Forwarding inconsistency checker statistics and records that accumulate when the **ip 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
	ip cef table consistency-check	Enables Cisco Express Forwarding table consistency checker types and parameters.
	show ip cef inconsistency	Displays Cisco Express Forwarding IP prefix inconsistencies.

debug adjacency

To enable the display of information about the adjacency database, use the **debug adjacency** command in privileged EXEC mode. To disable the display of these events, use the **no** form of this command.

> **debug adjacency** [**epoch** | **ipc** | **state** | **table**] [*prefix*] [*interface*] [**connectionid** *id*] [**link** {**ipv4** | **ipv6** | **mpls**}]

> **no debug adjacency** [**epoch** | **ipc** | **state** | **table**] [*prefix*] [*interface*] [**connectionid** *id*] [**link** {**ipv4** | **ipv6** | **mpls**}]

Syntax Description

epoch	(Optional) Displays adjacency epoch events.
ipc	(Optional) Displays interprocess communication (IPC) events for adjacencies.
state	(Optional) Displays adjacency system state machine events.
table	(Optional) Displays adjacency table operations.
prefix	(Optional) Displays debugging events for the specified IP address or IPv6 address. **Note** On the Cisco 10000 series routers, IPv6 is supported in Cisco IOS Release 12.2(28)SB and later releases.
interface	(Optional) Displays debugging events for the specified interface. 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.
connectionid *id*	(Optional) Displays debugging events for the specified client connection identification number.
link {**ipv4**	**ipv6**	**mpls**}	(Optional) Displays debugging events for the specified link type (IP, IPv6, or Multiprotocol Label Switching [MPLS] traffic). **Note** On the Cisco 10000 series routers, IPv6 is supported in Cisco IOS Release 12.2(28)SB and later releases.

Defaults   Debugging events are not displayed.

Command Modes   Privileged EXEC

Command History

Release	Modification
12.0(7)XE	This command was introduced on the Cisco 7600 series routers.
12.1(1)E	This command was implemented on the Cisco 7600 series routers.
12.2(14)SX	This command was implemented on the Supervisor Engine 720.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S, and the *prefix*, *interface*, **connectionid** *id*, and **link** {**ipv4**	**ipv6**	**mpls**} keywords and arguments were added.

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.

Usage Guidelines   Because debugging output is assigned high priority in the CPU process, you should use debug commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Also, you should use debug commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased debug command processing overhead will affect system use.

You can use any combination of the *prefix*, *interface*, **connectionid** *id*, and **link** {**ipv4** | **ipv6** | **mpls**} keywords and arguments (in any order) as a filter to enable debugging for a specified subset of adjacencies.

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

Examples   The following example shows how to display information on the adjacency database:

```
Router# debug adjacency

*Jan 27 06:22:50.543: ADJ-ios_mgr: repopulate adjs on up event for Ethernet3/0
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854
(incomplete) no src set: init/update from interface
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854
(incomplete) no src set: set bundle to IPv6 adjacency oce
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854
(incomplete) no src set: allocated, setup and inserted OK
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854
(incomplete) src IPv6 ND: source IPv6 ND added OK
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854
(incomplete) src IPv6 ND: computed macstring (len 14): OK
*Jan 27 06:22:50.543: ADJ: IPV6 adj out of Ethernet3/0, addr FE80::20C:CFFF:FEDF:6854 src
IPv6 ND: made complete (macstring len 0 to 14/0 octets)
00:04:40: %LINK-3-UPDOWN: Interface Ethernet3/0, changed state to up
00:04:41: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0, changed
```

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	Displays Cisco Express Forwarding adjacency table information.
show mls cef adjacency	Displays information about the hardware Layer 3 switching adjacency node.

debug cef

To enable the display of information about Cisco Express Forwarding events, use the **debug cef** command in privileged EXEC mode. To disable the display of Cisco Express Forwarding events, use the **no** form of this command.

> **debug cef** {**all** | **assert** | **background** | **broker** | **consistency-check** | **elog** | **epoch** | **fib** [**attached export** | **subblock**] | **hardware** {**notification** | **queries**} | **hash** | **high-availability** | **interest** | **interface** | **iprm** | **issu** | **loadinfo** | **memory** | **non-ip** | **path** [**extension** | **list** | **scope**]] | **subtree context** | **switching background** | **table** | **xdr**}

> **no debug cef** {**all** | **assert** | **background** | **broker** | **consistency-check** | **elog** | **epoch** | **fib** [**attached export** | **subblock**] | **hardware** {**notification** | **queries**} | **hash** | **high-availability** | **interest** | **interface** | **iprm** | **issu** | **loadinfo** | **memory** | **non-ip** | **path** [**extension** | **list** | **scope**]] | **subtree context** | **switching background** | **table** | **xdr**}

Syntax Description		
all		Displays debug messages for all Cisco Express Forwarding events.
assert		Displays debug messages for Cisco Express Forwarding assert events.
background		Displays debug messages for Cisco Express Forwarding background events.
broker		Displays debug messages for Cisco Express Forwarding broker events.
consistency-check		Displays debug messages for Cisco Express Forwarding consistency checker events.
elog		Displays debug messages for Cisco Express Forwarding elog events.
epoch		Displays debug messages for Cisco Express Forwarding epoch events.
fib [**attached export**	**subblock**]		Displays debug messages for Cisco Express Forwarding Forwarding Information Base entry events.
hardware {**notification**	**queries**}		Displays debug messages for Cisco Express Forwarding hardware API notifications or hardware API queries.
hash		Displays debug messages for Cisco Express Forwarding load-balancing hash algorithms.
high-availability		Displays debug messages for Cisco Express Forwarding high availability events.
interest		Displays debug messages for Cisco Express Forwarding interest list events.
interface		Displays debug messages for Cisco Express Forwarding interface events.
iprm		Displays debug messages for Cisco Express Forwarding IP rewrite manager events. (This keyword is not available in Cisco IOS Release 12.2(33)SRA.)
issu		Displays debug messages for Cisco Express Forwarding In Service Software Upgrade (ISSU) events.

loadinfo	Displays debug messages for Cisco Express Forwarding loadinfo events.
memory	Displays debug messages for Cisco Express Forwarding memory events.
non-ip	Displays debug messages for Cisco Express Forwarding non-IP entry events.
path [**extension**	**list**	**scope**]	Displays debug messages for Cisco Express Forwarding path events.
subtree context	Displays debug messages for Cisco Express Forwarding subtree context events.
switching background	Displays debug messages for Cisco Express Forwarding switching background events.
table	Displays debug messages for Cisco Express Forwarding table events.
xdr	Displays debug messages for Cisco Express Forwarding External Data Representation (XDR) events.

Defaults   Debugging information about Cisco Express Forwarding events is not displayed.

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.

Usage Guidelines   Because debugging output is assigned high priority in the CPU process, you should use debug commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Moreover, you should use debug commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased debug command processing overhead will affect system use.

Examples   The following is sample output from the **debug cef all** command:

```
Router# debug cef all

06:23:38: HW-API: Counter poll: Label[label=implicit-null]
06:23:38: HW-API: Counter poll: Label[label=implicit-null]
06:23:38: HW-API: Counter poll: Label[label=implicit-null]
06:23:43: FIBbg: Timer 'FIB checkers: IPv4 scan-rib-ios scanner' expired, callin
g 0x40FA03FC, context 0x00010003)
06:23:43: FIBbg: Restarting timer 'FIB checkers: IPv4 scan-rib-ios scanner' with
```

```
 delay 60000
06:23:43: FIBbg: Timer 'FIB checkers: IPv4 scan-ios-rib scanner' expired, callin
g 0x40FA03FC, context 0x00010004)
06:23:43: FIBbg: Restarting timer 'FIB checkers: IPv4 scan-ios-rib scanner' with
 delay 60000
06:23:43: FIBbg: Timer 'FIB checkers: IPv6 scan-ios-rib scanner' expired, callin
g 0x40FA03FC, context 0x00020004)
06:23:43: FIBbg: Restarting timer 'FIB checkers: IPv6 scan-ios-rib scanner' with
 delay 60000
06:23:43: FIBbg: Timer 'FIB checkers: IPv4 scan-rp-lc scanner' expired, calling
0x40FA03FC, context 0x00010002)
06:23:43: FIBbg: Restarting timer 'FIB checkers: IPv4 scan-rp-lc scanner' with d
elay 60000
06:23:43: FIBbg: Timer 'FIB checkers: IPv6 scan-rp-lc scanner' expired, calling
0x40FA03FC, context 0x00020002)
06:23:43: FIBbg: Restarting timer 'FIB checkers: IPv6 scan-rp-lc scanner' with d
elay 60000
06:23:48: HW-API: Counter poll: Label[label=implicit-null]
06:23:48: HW-API: Counter poll: Label[label=implicit-null]
06:23:48: HW-API: Counter poll: Label[label=implicit-null]
06:23:58: HW-API: Counter poll: Label[label=implicit-null]
06:24:06: FIBtable: IPv4: Event modified, 0.0.0.0/0, vrf Default, 1 path, flags
00420005
06:24:06: FIBpath: Configuring IPv4 path 444B2AB0 from rib (idb=NULL, gw=9.1.41.
1, gw_table=0, rr=1) and host prefix 0.0.0.0
06:24:06: FIBpath: Configured recursive-nexthop 9.1.41.1[0] 444B2AB0 path
06:24:06: FIBfib: [v4-0.0.0.0/0 (44AAC750)] Mod type - null
06:24:06: FIBtable: IPv4: Event up, default, 0.0.0.0/0, vrf Default, 1 path, fla
gs 00420005
06:24:06: FIBtable: IPv4: Adding route for 0.0.0.0/0 but route already exists. T
rying modify.
06:24:06: FIBpath: Configuring IPv4 path 444B2AA0 from rib (idb=NULL, gw=9.1.41.
1, gw_table=0, rr=1) and host prefix 0.0.0.0sh ip
06:24:06: FIBpath: Configured recursive-nexthop 9.1.41.1[0] 444B2AA0 path
06:24:06: FIBfib: [v4-0.0.0.0/0 (44AAC750)] Mod type - null vrf
06:24:07: FIBbg: Timer 'FIB checkers: IPv4 scan-hw-sw scanner' expired, calling
0x40FA03FC, context 0x00010005)
06:24:07: FIBbg: Restarting timer 'FIB checkers: IPv4 scan-hw-sw scanner' with d
elay 60000
06:24:07: FIBbg: Timer 'FIB checkers: IPv4 scan-sw-hw scanner' expired, calling
0x40FA03FC, context 0x00010006)
06:24:07: FIBbg: Restarting timer 'FIB checkers: IPv4 scan-sw-hw scanner' with d
elay 60000
  Name                          Default RD        Interfaces
  red                           1:1               Ethernet4/0/5
```

Related Commands	**Command**	**Description**
	cef table consistency-check	Enables Cisco Express Forwarding consistency checker table values by type and parameter.
	clear cef table	Clears the Cisco Express Forwarding tables.
	clear ip cef inconsistency	Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers.
	debug ip cef table	Enables the collection of events that affect entries in the Cisco Express Forwarding tables.
	show cef table consistency-check	Displays Cisco Express Forwarding consistency checker table values.
	show ip cef inconsistency	Displays Cisco Express Forwarding IP prefix inconsistencies.

debug ip cef

To troubleshoot various Cisco Express Forwarding events, use the **debug ip cef** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug ip cef** {**drops** [**rpf** [*access-list*]] [*access-list*] | **receive** [*access-list*] | **events** [*access-list*] | **interface** | **dialer**}

> **no debug ip cef** {**drops** [**rpf** [*access-list*]] [*access-list*] | **receive** [*access-list*] | **events** [*access-list*] | **interface** | **dialer**}

Specific to Interprocess Communication (IPC) Records

> **debug ip cef** {**ipc** | **interface-ipc** | **prefix-ipc** [*access-list*]}

> **no debug ip cef** {**ipc** | **interface-ipc** | **prefix-ipc** [*access-list*]}

Cisco 10000 Series Routers Only

> **debug ip cef** {**drops** [**rpf** [*access-list*]] [*access-list*] | **receive** [*access-list*] | **events** [*access-list*]}

> **no debug ip cef** {**drops** [**rpf** [*access-list*]] [*access-list*] | **receive** [*access-list*] | **events** [*access-list*]}

Cisco 10000 Series Routers Only—Specific to IPC Records

> **debug ip cef ipc**

> **no debug ip cef ipc**

Syntax Description

drops	Records dropped packets.
rpf	(Optional) Records the result of the Reverse Path Forwarding (RPF) check for packets.
access-list	(Optional) Limits debugging collection to packets that match the list.
receive	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, the packets are Cisco Express Forwarding switched; otherwise the packets are process switched.
events	Records general Cisco Express Forwarding events.
interface	Records IP Cisco Express Forwarding interface events.
dialer	Records IP Cisco Express Forwarding interface events for dialer interfaces.
ipc	Records information related to IPC in Cisco Express Forwarding. Possible types of events are the following: • IPC messages received out of sequence • Status of resequenced messages • Status of buffer space for IPC messages • Transmission status of IPC messages • Throttle requests sent from a line card to the Route Processor

interface-ipc	Records IPC updates related to interfaces. Possible reporting includes an interface coming up or going down and updates to fibhwidb and fibidb.
prefix-ipc	Records updates related to IP prefix information. Possible updates include the following:

- Debugging of IP routing updates in a line card

- Reloading of a line card with a new table

- Updates related to exceeding the maximum number of routes

- Control messages related to Forwarding Information Base (FIB) table prefixes

Defaults   This command is disabled.

Command Modes   Privileged EXEC

Command History

Release	Modification
11.2GS	This command was introduced.
11.1CC	Support for multiple platforms was added.
12.0(5)T	The **rpf** keyword was added.
12.2(4)T	The **dialer** keyword was added.
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.

Usage Guidelines   This command gathers additional information for the handling of Cisco Express Forwarding interface, IPC, or packet events.

Note   For packet events, we recommend that you use an access control list (ACL) to limit the messages recorded.

Examples   The following is sample output from the **debug ip cef rpf** command for a packet that is dropped when it fails the RPF check. IP address 172.17.249.252 is the source address, and Ethernet 2/0/0 is the input interface.

```
Router# debug ip cef drops rpf

IP CEF drops for RPF debugging is on
00:42:02:CEF-Drop:Packet from 172.17.249.252 via Ethernet2/0/0 -- unicast rpf check
```

The following is sample output for Cisco Express Forwarding packets that are not switched using information from the FIB table but are received and sent to the next switching layer:

```
Router# debug ip cef receive

IP CEF received packets debugging is on
00:47:52:CEF-receive:Receive packet for 10.1.104.13
```

Table 3 describes the significant fields shown in the display.

Table 3   debug ip cef receive Field Descriptions

Field	Description
CEF-Drop:Packet from 172.17.249.252 via Ethernet2/0/0 -- unicast rpf check	A packet from IP address 172.17.249.252 is dropped because it failed the RPF check.
CEF-receive:Receive packet for 10.1.104.13	Cisco Express Forwarding has received a packet addressed to the router.

The following is sample output from the **debug ip cef dialer** command for a legacy dialer:

```
Router# debug ip cef dialer

00:19:50:CEF-Dialer (legacy):add link to 10.10.10.2 via Dialer1 through BRI0/0:1
00:19:50:CEF-Dialer:adjacency added:0x81164850
00:19:50:CEF-Dialer:adjacency found:0x81164850; fib->count:1
00:19:50:CEF-Dialer:setup loadinfo with 1 paths
```

The following is sample output from the **debug ip cef dialer** command for a dialer profile:

```
Router# debug ip cef dialer

00:31:44:CEF-Dialer (profile dynamic encap (not MLP)):add link to 10.10.10.2 via Dialer1
through Dialer1
00:31:44:CEF-Dialer:adjacency added:0x81164850
00:31:44:CEF-Dialer:adjacency found:0x81164850; fib->count:1
```

Table 4 describes the significant fields shown in the display.

Table 4   debug ip cef dialer Field Descriptions

Field	Description
CEF-Dialer (legacy):add link to 10.10.10.2 via Dialer1 through BRI0/0:1	A link was added to IP address 10.10.10.2 for legacy Dialer1 through physical interface BRI0/0:1.
CEF-Dialer (profile dynamic encap (not MLP)):add link to 10.10.10.2 via Dialer1 through Dialer1	A link was added to IP address 10.10.10.2 for dialer profile Dialer1 through Dialer1.

Related Commands	Command	Description
	ip cef	Enables Cisco Express Forwarding on the RPC card.
	show ip cef	Displays entries in the FIB or displays a summary of the FIB.

debug ip cef accounting non-recursive

To troubleshoot Cisco Express Forwarding accounting records, use the **debug ip cef accounting non-recursive** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug ip cef accounting non-recursive**

> **no debug ip cef accounting non-recursive**

Syntax Description   This command has no arguments or keywords.

Defaults   This command is disabled.

Command Modes   Privileged EXEC

Command History

Release	Modification
11.1CC	This command was introduced.
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.

Usage Guidelines   This command records accounting events for nonrecursive prefixes when the **ip cef accounting non-recursive** command is enabled in global configuration mode.

Examples   The following is sample output from the **debug ip cef accounting non-recursive** command:

```
Router# debug ip cef accounting non-recursive

03:50:19:CEF-Acct:tmstats_binary:Beginning generation of tmstats
ephemeral file (mode binary)
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF2000
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1EA0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF17C0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1D40
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1A80
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0740
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF08A0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0B60
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0CC0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0F80
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF10E0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1240
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF13A0
```

```
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1500
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1920
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0E20
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1660
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF05E0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0A00
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF1BE0
03:50:19:CEF-Acct:snapshoting loadinfo 0x63FF0480
03:50:19:CEF-Acct:tmstats_binary:aggregation complete, duration 0 seconds
03:50:21:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:24:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:24:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:27:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:29:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:32:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:35:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:38:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:41:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:45:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:48:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:49:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:52:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:55:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:writing 45 bytes
03:50:57:CEF-Acct:tmstats_binary:tmstats file written, status 0
```

Table 5 describes the significant fields shown in the display.

Table 5   debug ip cef accounting non-recursive Field Descriptions

Field	Description
Beginning generation of tmstats ephemeral file (mode binary)	Tmstats file is being created.
CEF-Acct:snapshoting loadinfo 0x63FF2000	Baseline counters are being written to the tmstats file for each nonrecursive prefix.
CEF-Acct:tmstats_binary:aggregation complete, duration 0 seconds	Tmstats file creation is complete.
CEF-Acct:tmstats_binary:writing 45 bytes	Nonrecursive accounting statistics are being updated to the tmstats file.
CEF-Acct:tmstats_binary:tmstats file written, status 0	Update of the tmstats file is complete.

Related Commands

Command	Description
debug ip cef	Troubleshoots various Cisco Express Forwarding events.
ip cef accounting	Enables Cisco Express Forwarding network accounting.
show ip cef	Displays entries or a summary of the FIB table.

debug ip cef fragmentation

To report fragmented IP packets when Cisco Express Forwarding is enabled, use the **debug ip cef fragmentation** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command:

> **debug ip cef fragmentation**

> **no debug ip cef fragmentation**

Syntax Description   This command has no arguments or keywords.

Defaults   This command is disabled.

Command Modes   Privileged EXEC

Command History

Release	Modification
12.0(14)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(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.

Usage Guidelines   This command is used to troubleshoot fragmentation problems when Cisco Express Forwarding switching is enabled.

Examples   The following is sample output from the **debug ip cef fragmentation** command:

```
Router# debug ip cef fragmentation

00:59:45:CEF-FRAG:no_fixup path:network_start 0x5397CF8E datagramstart 0x5397CF80
data_start 0x397CF80 data_block 0x397CF40 mtu 1000 datagramsize 1414 data_bytes 1414
00:59:45:CEF-FRAG:send frag:datagramstart 0x397CF80 datagramsize 442 data_bytes 442
00:59:45:CEF-FRAG:send frag:datagramstart 0x38BC266 datagramsize 1006 data_bytes 1006
00:59:45:CEF-FRAG:no_fixup path:network_start 0x5397C60E datagramstart 0x5397C600
data_start 0x397C600 data_block 0x397C5C0 mtu 1000 datagramsize 1414 data_bytes 1414
00:59:45:CEF-FRAG:send frag:datagramstart 0x397C600 datagramsize 442 data_bytes 442
00:59:45:CEF-FRAG:send frag:datagramstart 0x38BC266 datagramsize 1006 data_bytes 1006
```

Table 6 describes the significant fields shown in the display.

Table 6   debug ip cef fragmentation Field Descriptions

Field	Description
no_fixup path	A packet is being fragmented in the no_fixup path.
network_start 0x5397CF8E	Memory address of the IP packet.
datagramstart 0x5397CF80	Memory address of the encapsulated IP packet.
data_start 0x397CF80	For particle systems, the memory address where data starts for the first packet particle.
data_block 0x397C5C0	For particle systems, the memory address of the first packet particle data block.
mtu 1000	Maximum transmission unit of the output interface.
datagramsize 1414	Size of the encapsulated IP packet.
data_bytes 1414	For particle systems, the sum of the particle data bytes that make up the packet.
send frag	Fragment is being forwarded.

Related Commands

Command	Description
debug ip cef	Troubleshoots various Cisco Express Forwarding events.

debug ip cef hash

To record Cisco Express Forwarding load sharing hash algorithm events, use the **debug ip cef hash** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip cef hash

no debug ip cef hash

Syntax Description This command has no arguments or keywords.

Defaults This command is disabled.

Command Modes Privileged EXEC

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(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. This command is not supported on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.This command is not supported on the Cisco 7600 router.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines Use this command when changing the load sharing algorithm to display the hash table details.

Examples The following is sample output from the **debug ip cef hash** command with IP Cisco Express Forwarding load algorithm tunnel information:

```
Router# debug ip cef hash

01:15:06:%CEF:ip cef load-sharing algorithm tunnel 0
01:15:06:%CEF:Load balancing algorithm:tunnel
01:15:06:%CEF:Load balancing unique id:1F2BA5F6
01:15:06:%CEF:Destroyed load sharing hash table
01:15:06:%CEF:Sending hash algorithm id 2, unique id 1F2BA5F6 to slot 255
```

The following lines show IP Cisco Express Forwarding load algorithm universal information:

```
01:15:28:%CEF:ip cef load-sharing algorithm universal 0
01:15:28:%CEF:Load balancing algorithm:universal
01:15:28:%CEF:Load balancing unique id:062063A4
01:15:28:%CEF:Creating load sharing hash table
01:15:28:%CEF:Hash table columns for valid max_index:
01:15:28:12: 9  7  7 4  4 10  0  7 10  4  5  0  4  7  8  4
01:15:28:15: 3 10 10  4 10  4  0  7  1  7 14  6 13 13 11 13
01:15:28:16: 1  3  7 12  4 14  8  7 10  4  1 12  8 15  4  8
01:15:28:%CEF:Sending hash algorithm id 3, unique id 062063A4 to slot 255
```

Table 7 describes the significant fields shown in the display.

Table 7   debug ip cef hash Field Descriptions

Field	Description
ip cef load-sharing algorithm tunnel 0	Echo of the user command.
Load balancing algorithm:tunnel	Load sharing algorithm is set to tunnel.
Load balancing unique id:1F2BA5F6	ID field in the command is usually 0. In this instance, the router chose a pseudo random ID of 1F2BA5F6.
Destroyed load sharing hash table	Purge the existing hash table.
Sending hash algorithm id 2, unique id 1F2BA5F6 to slot 255	Algorithm is being distributed.
Creating load sharing hash table	Hash table is being created.
Hash table columns for valid max_index:	Generated hash table.

Related Commands	**Command**	**Description**
	debug ip cef	Troubleshoots various Cisco Express Forwarding events.
	debug ip cef rrhash	Records Cisco Express Forwarding removal of receive hash events.

debug ip cef rrhash

To record Cisco Express Forwarding removal of receive hash events, use the **debug ip cef rrhash** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip cef rrhash

no debug ip cef rrhash

Syntax Description   This command has no arguments or keywords.

Defaults   This command is disabled.

Command Modes   Privileged EXEC

Command History

Release	Modification
12.2(2)T	This command was introduced.
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. This command is not supported on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA. This command is not supported on the Cisco 7600 routers.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines   Use this command to verify the removal of receive hash events when you are shutting down or deleting an interface.

Examples   The following is sample output from the **debug ip cef rrhash** command:

```
Router# debug ip cef rrhash

00:27:15:CEF:rrhash/check:found 10.1.104.7 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.0 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.255 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.7 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.7 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.0 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.255 on down idb [ok to delete]
00:27:15:CEF:rrhash/check:found 10.1.104.7 on down idb [ok to delete]
```

Table 8 describes the significant fields shown in the display.

Table 8   debug ip cef rrhash Field Descriptions

Field	Description
rrhash/check	Verify address is on the receive list.
found 10.1.104.7 on down idb [ok to delete]	Found a valid address on the receive list for a shutdown interface that can be deleted.

Related Commands

Command	Description
debug ip cef	Troubleshoots various Cisco Express Forwarding events.
debug ip cef hash	Records Cisco Express Forwarding removal of receive hash events.

debug ip cef subblock

To troubleshoot Cisco Express Forwarding subblock events, use the **debug ip cef subblock** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug ip cef subblock** [**id** {**all** | **hw** *hw-id* | **sw** *sw-id* }] [**xdr** {**all** | **control** | **event** | **none** | **statistic**}]

> **no debug ip cef subblock** [**id** {**all** | **hw** *hw-id* | **sw** *sw-id* }] [**xdr** {**all** | **control** | **event** | **none** | **statistic**}]

Syntax Description

id	(Optional) Subblock types.
all	(Optional) All subblock types.
hw *hw-id*	(Optional) Hardware subblock and identifier.
sw *sw-id*	(Optional) Software subblock and identifier.
xdr	(Optional) Exernal Data Representation (XDR) message types.
control	(Optional) All XDR message types.
event	(Optional) Event XDR messages only.
none	(Optional) No XDR messages.
statistic	(Optional) Statistic XDR messages.

Defaults

This command is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0S	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(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.

Usage Guidelines

This command is used to record Cisco Express Forwarding subblock messages and events.

Examples

The following is sample output from the **debug ip cef subblock** command:

```
Router# debug ip cef subblock

00:28:12:CEF-SB:Creating unicast RPF subblock for FastEthernet6/0
00:28:12:CEF-SB:Linked unicast RPF subblock to FastEthernet6/0.
```

```
00:28:12:CEF-SB:Encoded unit of unicast RPF data (length 16) for FastEthernet6/0
00:28:12:CEF-SB:Sent 1 data unit to slot 6 in 1 XDR message
```

Cisco 10000 Series Router Example

The following is sample output from the **debug ip cef subblock** command:

```
Router# debug ip cef subblock

00:28:12:CEF-SB:Creating unicast RPF subblock for FastEthernet6/0/0
00:28:12:CEF-SB:Linked unicast RPF subblock to FastEthernet6/0/0.
00:28:12:CEF-SB:Encoded unit of unicast RPF data (length 16) for FastEthernet6/0/0
00:28:12:CEF-SB:Sent 1 data unit to slot 6 in 1 XDR message
```

Table 9 describes the significant fields shown in the display.

Table 9   debug ip cef subblock Field Descriptions

Field	Description
Creating unicast RPF subblock for FastEthernet6/0/0	Creating an Unicast Reverse Path Forwarding (Unicast RPF) interface descriptor subblock.
Linked unicast RPF subblock to FastEthernet6/0/0	Linked the subblock to the specified interface.
Encoded unit of unicast RPF data (length 16) for FastEthernet6/0/0	Encoded the subblock information in an XDR.
Sent 1 data unit to slot 6 in 1 XDR message	Sent the XDR message to a line card through the IPC.

Related Commands

Command	Description
debug ip cef	Troubleshoots various Cisco Express Forwarding events.

debug ip cef table

To enable the collection of events that affect entries in the Cisco Express Forwarding tables, use the **debug ip cef table** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip cef table [*access-list* | **consistency-checkers**]

no debug ip cef table [*access-list* | **consistency-checkers**]

Syntax Description

access-list	(Optional) Controls collection of consistency checker parameters from specified lists.
consistency-checkers	(Optional) Sets consistency checking characteristics.

Defaults
This command is disabled.

Command Modes
Privileged EXEC

Command History

Release	Modification
11.2GS	This command was introduced.
11.1CC	Support was added for multiple platforms.
12.0(15)S	The **consistency-checkers** keyword was added.
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(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.

Usage Guidelines
This command is used to record Cisco Express Forwarding table events related to the Forwarding Information Base (FIB) table. Possible types of events include the following:

- Routing updates that populate the FIB table
- Flushing of the FIB table
- Adding or removing of entries to the FIB table
- Table reloading process

Examples   The following is sample output from the **debug ip cef table** command:

```
Router# debug ip cef table

01:25:46:CEF-Table:Event up, 10.1.1.1/32 (rdbs:1, flags:1000000)
01:25:46:CEF-IP:Checking dependencies of 0.0.0.0/0
01:25:47:CEF-Table:attempting to resolve 10.1.1.1/32
01:25:47:CEF-IP:resolved 10.1.1.1/32 via 10.1.104.1 to 10.1.104.1 Ethernet2/0/0
01:26:02:CEF-Table:Event up, default, 0.0.0.0/0 (rdbs:1, flags:400001)
01:26:02:CEF-IP:Prefix exists - no-op change
```

Cisco 10000 Series Router Example

The following is sample output from the **debug ip cef table** command:

```
Router# debug ip cef table

01:25:46:CEF-Table:Event up, 10.1.1.1/32 (rdbs:1, flags:1000000)
01:25:46:CEF-IP:Checking dependencies of 0.0.0.0/0
01:25:47:CEF-Table:attempting to resolve 10.1.1.1/32
01:25:47:CEF-IP:resolved 10.1.1.1/32 via 10.1.104.1 to 10.1.104.1  GigabitEthernet2/0/0
01:26:02:CEF-Table:Event up, default, 0.0.0.0/0 (rdbs:1, flags:400001)
01:26:02:CEF-IP:Prefix exists - no-op change
```

Table 10 describes the significant fields shown in the display.

Table 10   debug ip cef table Field Descriptions

Field	Description
CEF-Table	Indicates a table event.
Event up, 10.1.1.1/32	IP prefix 10.1.1.1/32 is being added.
rdbs:1	Event is from routing descriptor block 1.
flags:1000000	Indicates the network descriptor block flags.
CEF-IP	Indicates a Cisco Express Forwarding IP event.
Checking dependencies of 0.0.0.0/0	Resolves the next hop dependencies for 0.0.0.0/0.
attempting to resolve 10.1.1.1/32	Resolves the next hop dependencies.
resolved 10.1.1.1/32 via 10.1.104.1 to 10.1.104.1 Ethernet2/0/0	Next hop to IP prefix 10.1.1.1/32 is set and is added to the table.
Event up, default, 0.0.0.0/0 Prefix exists - no-op change	Indicates no table change is necessary for 0.0.0.0/32.

Related Commands

Command	Description
cef table consistency-check	Enables Cisco Express Forwarding consistency checker table values by type and parameter.
clear cef table	Clears the Cisco Express Forwarding tables.
clear ip cef inconsistency	Clears Cisco Express Forwarding inconsistency statistics and records found by the Cisco Express Forwarding consistency checkers.
debug cef	Enables the display of information about Cisco Express Forwarding events.
debug ip cef	Troubleshoots various Cisco Express Forwarding events.
show cef table consistency-check	Displays Cisco Express Forwarding consistency checker table values.
show ip cef inconsistency	Displays Cisco Express Forwarding IP prefix inconsistencies.

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.)
flow	(Optional) Enables NetFlow accounting for packets that are received by the interface.
policy	(Optional) Enables fast-switching for packets that are forwarded using policy-based routing (PBR).
same-interface	(Optional) Enables fast-switching of packets onto the same interface on which they arrived.

Defaults

Fast Switching

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

Distributed Switching

Distributed switching is disabled.

Cisco Express Forwarding and Distributed Cisco Express Forwarding

When Cisco Express Forwarding or distributed Cisco Express Forwarding operation is enabled globally, all interfaces that support Cisco Express Forwarding or distributed Cisco Express Forwarding are enabled by default.

NetFlow Accounting

NetFlow accounting is disabled.

Fast Switching for PBR (FSPBR)

FSPBR is disabled.

Command Modes   Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
11.1	The **flow** keyword was added.
11.2GS	The **cef** and **distributed** keywords were added.

Release	Modification
11.1CC	**cef** keyword support was added for multiple platforms.
12.0	The **policy** keyword was added.
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.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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

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	**Configuring Fast Switching and Disabling Cisco Express Forwarding Switching**

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 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.10
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP Distributed switching is disabled
  IP Feature Fast switching turbo vector
  IP Null turbo vector
  IP multicast fast switching is enabled
```

The following example shows that 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 interface fastethernet 0/0/0:

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

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 17.252.245.2 255.255.255.0
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 reenable 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
```

Configuring Fast Switching for Traffic That Is Received and Transmitted over the Same Interface

The following example shows how to enable fast switching and disable 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 255.255.255.255
  Address determined by non-volatile memory
```

```
 MTU is 1500 bytes
 Helper address is not set
 Directed broadcast forwarding is disabled
 Multicast reserved groups joined: 224.0.0.10
 Outgoing access list is not set
 Inbound  access list is not set
 Proxy ARP is enabled
 Security level is default
 Split horizon is enabled
 ICMP redirects are always sent
 ICMP unreachables are always sent
 ICMP mask replies are never sent
 IP fast switching is enabled
 IP fast switching on the same interface is enabled
 IP Flow switching is disabled
 IP Distributed switching is disabled
 IP Feature Fast switching turbo vector
 IP Null turbo vector
 IP multicast fast switching is enabled
 IP multicast distributed fast switching is disabled
 IP route-cache flags are Fast
 Router Discovery is disabled
 IP output packet accounting is disabled
 IP access violation accounting is disabled
 TCP/IP header compression is disabled
 RTP/IP header compression is disabled
 Probe proxy name replies are disabled
 Policy routing is disabled
 Network address translation is disabled
 WCCP Redirect outbound is disabled
 WCCP Redirect inbound is disabled
 WCCP Redirect exclude is disabled
 BGP Policy Mapping is disabled
 IP multicast multilayer switching is disabled
```

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

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

Enabling NetFlow Accounting

The following example shows how to enable NetFlow switching:

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

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

```
Router# show ip interface fastEthernet 0/0/0

FastEthernet0/0/0 is up, line protocol is up
  Internet address is 10.1.1.254/24
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
```

```
Directed broadcast forwarding is disabled
Multicast reserved groups joined: 224.0.0.10
Outgoing access list is not set
Inbound  access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachables are always sent
ICMP mask replies are never sent
IP fast switching is enabled
IP fast switching on the same interface is disabled
IP Flow switching is enabled
IP Distributed switching is disabled
IP Flow switching turbo vector
IP Null turbo vector
IP multicast fast switching is enabled
IP multicast distributed fast switching is disabled
IP route-cache flags are Fast, Flow
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled
BGP Policy Mapping is disabled
IP multicast multilayer switching is disabled
```

Configuring Distributed Switching

The following example shows how to enable distributed switching:

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

The following example shows that distributed Cisco Express Forwarding switching is for interface fastethernet 0/0/0:

```
Router# show cef interface fastEthernet 0/0/0

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

```
Transmit limit accumulator 0x48001A02 (0x48001A02)
IP MTU 1500
```

Configuring Fast Switching for PBR

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

```
Router(config)# access-list 1 permit 10.1.1.0 0.0.0.255
Router(config)# route-map mypbrtag 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 interface fastethernet 0/0/0:

```
Router# show ip interface fastEthernet 0/0/0

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

Related Commands

Command	Description
exit	Leaves aggregation cache mode.
ip cef	Enables Cisco Express Forwarding on the RP card.
ip cef distributed	Enables distributed Cisco Express Forwarding operation.
ip flow ingress	Configures NetFlow on a subinterface.
show ip interface	Displays the usability status of interfaces configured for IP.
show cef interface	Displays detailed Cisco Express Forwarding information for interfaces.
show mpoa client	Displays the routing table cache used to fast switch IP traffic.
set ip default next-hop	Configures a default IP next hop for PBR.
set default interface	Configures a default interface for PBR.
set interface	Configures a specified interface for PBR.

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**}

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> **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

component	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 **monitor event-trace ?** command.
clear	Clears existing trace messages for the specified component from memory on the networking device.
continuous	Continuously displays the latest event trace entries.
disable	Turns off event tracing for the specified component.
dump	Writes the event trace results to the file configured using the **monitor event-trace** command in global configuration mode. The trace messages are saved in binary format.
pretty	(Optional) Saves the event trace message in ASCII format.
enable	Turns on event tracing for the specified component.
one-shot	Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the **monitor event-trace** command in global configuration mode.
size	Sets the number of messages that can be written to memory for a single instance of a trace. **Note** Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the **show monitor event-trace** *component* **parameters** command. When the number of event trace messages in memory exceeds the size, new messages will begin to overwrite the older messages in the file.
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 *type mod/port*	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.
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.

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 reenable 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
```

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This example shows how to stop event tracing, clear the current contents of memory, and reenable 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
monitor event-trace (global)	Configures event tracing for a specified Cisco IOS software subsystem component.
monitor event-trace dump-traces	Saves trace messages for all event traces currently enabled on the networking device.
show monitor event-trace	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*}

Cisco 10000 Series Routers

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

Syntax Description		
	component	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 **monitor event-trace ?** command.
	disable	Turns off event tracing for the specified component.
	dump-file *filename*	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.
	enable	Turns on event tracing for the specified component provided that the component has been configured using the **monitor event-trace** command.
	size *number*	Sets the number of messages that can be written to memory for a single instance of a trace. Valid values are 1 to 65536.
		Note Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the **show monitor event-trace** *component* **parameters** command.
		When the number of event trace messages in memory exceeds the size, new messages will begin to overwrite the older messages in the file.
	stacktrace *number*	Enables the stack trace at tracepoints and specifies the depth of the stack trace stored. Valid values are 1 to 16.
	clear	Clears existing trace messages for the specified component from memory on the networking device.
	continuous	Continuously displays the latest event trace entries.
	one-shot	Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the **monitor event-trace** command.

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

Command Modes   Global configuration

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(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.

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 users 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.

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

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 [**summary** | *ip-address* | *interface-type interface-number* | **null** *number* | **port-channel** *number* | **sysclock** *number* | **vlan** *number* | *ipv6-address* | **fcpa** *number* | **link** {**ipv4** | **ipv6** | **mpls**} | **connectionid** *number* | **detail** | **serial** *number*]

Syntax Description

summary	(Optional) Displays a summary of Cisco Express Forwarding adjacency information.
ip-address	(Optional) An IP address or IPv6 address.
	Note　On the Cisco 10000 series routers IPv6 is supported on Cisco IOS Release 12.2(28)SB or later releases.
interface-type interface-number	(Optional) Interface type and number. Valid values for the *interface-type* argument are **atm**, **async**, **auto-template**, **ctunnel**, dial**e**r, **esconphy**, **fastethernet**, **filter**, **filtergroup**, **gigabitethernet**, **group-async**, **longreachethernet**, **loopback**, **mfr**, **multilink**, **portgroup**, **pos**, **tunnel**, **vif**, **virutal-template**, **voabypassin**, **voabypassout**, **voafilterin**, **voafilterout**, **voain**, and **voaout**.
null *number*	(Optional) Specifies the null interface. The valid value is **0**.
port-channel *number*	(Optional) Specifies the channel interface; valid values are 1 to 282.
sysclock *number*	(Optional) Telecom-bus clock controller; valid values are 1 to 6.
vlan *number*	(Optional) Specifies the VLAN; valid values are 1 to 4094.
ipv6-address	(Optional) Specifies the associated IPv6 address.
fcpa *number*	(Optional) The fiber channel; valid values are 1 to 6.
link {**ipv4**	**ipv6**	**mpls**}	(Optional) Specifies the link type (IP, IPv6, or Multiprotocol Label Switching (MPLS) traffic of the adjacency).
connectionid *number*	(Optional) Specifies the client connection identification number.
detail	(Optional) Displays the protocol detail and timer information.
serial *number*	(Optional) Specifies the serial interface number; valid values are 1 to 6.

Defaults　This command has no default settings.

Command Modes　User EXEC
Privileged EXEC

Command History

Release	Modification
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.

Release	Modification
12.1(1)E	Support was added for the Cisco 7600 series routers.
12.1(3a)E3	The number of valid values for **port-channel** *number* changed.
12.1(5c)EX	This command was modified to include Layer 3 information.
12.1(11b)E	The **atm**, **ge-wan**, and **pos** keywords were added.
12.2(8)T	The **detail** keyword output was modified to show the epoch value for each entry of the adjacency table.
	The **summary** 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 and new keywords 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.

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:

Cisco 7500 Series Router

```
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)
```

Cisco 10000 Series Router

```
Router# show adjacency

Protocol Interface              Address
IP      FastEthernet2/0/0       172.20.52.1(3045)
IP      FastEthernet2/0/0       172.20.52.22(11)
```

Cisco 7500 and 10000 Series Router

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
                                 AABBCC019002AABBCC012C0286DD
                                 IPv6 ND    never
                                 Epoch: 0
IPV6    Ethernet2/0             3FFE:2002::A8BB:CCFF:FE01:9002(5)
                                 0 packets, 0 bytes
                                 AABBCC019002AABBCC012C0286DD
                                 IPv6 ND    never
                                 Epoch: 0
```

Table 11 describes the significant fields shown in the displays.

Table 11   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:

For a Cisco 7500 Series Router

```
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
```

For a Cisco 7600 Series Router

```
Router# show adjacency detail
```

```
Protocol Interface              Address
IP      FastEthernet2/3         172.20.52.1(3045)
                                0 packets, 0 bytes
                                000000000FF920000380000000000000
                                00000000000000000000000000000000
                                00605C865B2800D0BB0F980B0800
                                ARP         03:58:12
IP      FastEthernet2/3         172.20.52.22(11)
                                0 packets, 0 bytes
                                000000000FF920000380000000000000
                                00000000000000000000000000000000
                                00801C93804000D0BB0F980B0800
                                ARP         03:58:06
```

For a Cisco 10000 Series Router

```
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:

For a Cisco 7500 Series Router

```
Router# show adjacency tunnel 1 link detail
```

```
Protocol Interface              Address
IP      Tunnel1                 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
```

For a Cisco 7600 Series Router

```
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)
```

For a Cisco 10000 Series Router

```
Router# show adjacency tunnel 1 link detail
```

```
Protocol Interface          Address
IP       Tunnel1            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** | **broker** *broker-name* [**detail**] | **fib** | **hardware-vectors** | **idb** | **linecard** [*linecard-number*] [**detail** | **internal**] | **loadinfo** | **memory** [**summary** | **chunk-utilisation**] | **non-ip** | **nsf** | **path** [**list**] | **table** [**consistency-check** | **detail** | **internal**]}

Syntax Description

accounting	Displays Cisco Express Forwarding accounting state.
background	Displays Cisco Express Forwarding background processing.
broker *broker-name* [**detail**]	(Distributed platforms only) Displays Cisco Express Forwarding information related to update brokers.
fib	Displays Cisco Express Forwarding Forwarding Information Base (FIB) entries.
hardware-vectors	Displays the hardware application programming interface (API) vector function table.
idb	Displays Cisco Express Forwarding interface descriptor blocks.
linecard [*linecard-number*] [**detail**	**internal**]	(Distributed platforms only) Displays Cisco Express Forwarding information for line cards. The *linecard-number* argument *s*pecifies the line card slot number.
loadinfo	Displays Cisco Express Forwarding loadinfo events.
memory [**summary**	**chunk-utilisation**]	Displays Cisco Express Forwarding memory usage.
non-ip	Displays Cisco Express Forwarding paths for non-IP traffic.
nsf	(Distributed platforms only) Displays Cisco Express Forwarding nonstop forwarding (NSF) statistics.
path [**list**]	Displays Cisco Express Forwarding paths.
table [**consistency-check**	**detail**	**internal**]	Displays the Cisco Express Forwarding 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.
12.0(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.

Release	Modification
12.2(25)S	The **drop** and **not-cef-switched** keywords were removed. The **accounting**, **background**, **broker**, **fib**, **hardware-vectors**, **idb**, **loadinfo**, **memory**, **non-ip**, **nsf**, **path**, and **table** 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.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

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 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 following example shows how to display Cisco Express Forwarding information for all line cards:

```
Router# show cef linecard

Slot    XDRSent  Flags
 1          497  up
 4          497  up
*2          329  up

VRF Default, version 20, 11 routes
Slot Version    I/Fs State     Flags
1         0        4 Active    sync, table-up
4         0       12 Active    sync, table-up
2         0        2 Active    sync, table-up

VRF red, version 15, 9 routes
Slot Version    I/Fs State     Flags
1         0        0 Active    sync, table-up
4         0        1 Active    sync, table-up
2         0        0 Active    sync, table-up

VRF vpn1, version 11, 8 routes
Slot Version    I/Fs State     Flags
1         0        1 Active    sync, table-up
4         0        2 Active    sync, table-up
2         0        1 Active    sync, table-up
```

Related Commands

Command	Description
clear cef linecard	Clears Cisco Express Forwarding information from line cards.
show cef interface	Displays detailed Cisco Express Forwarding information for all interfaces.

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.

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
```

Table 12 describes the significant fields shown in the display.

Table 12   ***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
	show cef interface	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

type number	(Optional) Interface type and number.
	No space is required between the interface type and number.
statistics	(Optional) Displays switching statistics for an interface or interfaces.
detail	(Optional) Displays detailed Cisco Express Forwarding information for the specified interface type and number.
internal	(Optional) Displays internal Cisco Express Forwarding interface status and configuration.
brief	(Optional) Summarizes the Cisco Express Forwarding interface state.
policy-statistics	(Optional) Displays Border Gateway Protocol (BGP) policy statistical information for a specific interface or for all interfaces.
input	(Optional) Displays BGP accounting policy statistics for traffic that is traveling through an input interface.
output	(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 **statistics** keyword was added.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T, and the **detail** keyword was added.
12.2(13)T	The **policy-statistics** keyword was added.
12.0(22)S	The **input** and **output** keywords were added.
	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.

Release	Modification
12.3(4)T	The **input** and **output** keywords were added.
	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 **internal** keyword was 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.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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
```

Table 13 describes the significant fields shown in the displays.

Table 13   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.
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.

Table 13   *show cef interface Field Descriptions (continued)*

Field	Description
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.
Input fast flags	Indicates the input status of various switching features: 0x0001 (input Access Control List [ACL] enabled) 0x0002 (policy routing enabled) 0x0004 (input rate limiting) 0x0008 (MAC/Prec accounting) 0x0010 (DSCP/PREC/QOS GROUP) 0x0020 (input named access lists) 0x0040 (NAT enabled on input) 0x0080 (crypto map on input) 0x0100 (QPPB classification) 0x0200 (inspect on input) 0x0400 (input classification) 0x0800 ([1]casa input enable) 0x1000 (Virtual Private Network [VPN] enabled on a [2]swidb) 0x2000 (input idle timer enabled) 0x4000 (unicast Reverse Path Forwarding [RPF] check) 0x8000 (per-address ACL enabled) 0x10000 (deaggregating a packet) 0x20000 ([3]GPRS enabled on input) 0x40000 (URL RenDezvous) 0x80000 (QoS classification) 0x100000 (FR switching on interface) 0x200000 ([4]WCCP redirect on input) 0x400000 (input classification)

Table 13   show cef interface Field Descriptions (continued)

Field	Description
Output fast flags	Indicates the output status of various switching features, as follows: • 0x0001 (output ACL enabled) • 0x0002 (IP accounting enabled) • 0x0004 (WCC redirect enabled interface) • 0x0008 (rate limiting) • 0x0010 (MAC/Prec accounting) • 0x0020 (DSCP/PREC/QOS GROUP) • 0x0040 (D-QOS classification) • 0x0080 (output named access lists) • 0x0100 (NAT enabled on output) • 0x0200 (TCP intercept enabled) • 0x0400 (crypto map set on output) • 0x0800 (output firewall) • 0x1000 ([5]RSVP classification) • 0x2000 (inspect on output) • 0x4000 (QoS classification) • 0x8000 (QoS preclassification) • 0x10000 (output stile)
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.

1. Cisco applications and services architecture (CASA)
2. Software interface descriptor block (SWIDB)
3. General packet radio system (GPRS)
4. Web cache communication protocol (WCCP)
5. 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
```

Table 14 describes the significant fields shown in the display.

Table 14   show cef interface policy-statistics Field Descriptions

Field	Description
Index	Traffic index set with the **route-map** 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
clear cef linecard	Clears Cisco Express Forwarding information from line cards.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing.
show cef	Displays information about packets forwarded by Cisco Express Forwarding.
show cef drop	Displays which packets the line cards dropped, or displays which packets were not express forwarded.
show cef linecard	Displays Cisco Express Forwarding interface information by line card.

show ip cef

To display entries in the 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.

> **show ip cef** [**vrf** *vrf-name*] [**unresolved** [**detail**] | [**detail** | **summary**]]

Specific FIB Entries Based on IP Address Information

> **show ip cef** [**vrf** *vrf-name*] [*network* [*mask*]] [**longer-prefixes**] [**detail**]

Specific FIB Entries Based on Interface Information

> **show ip cef** [**vrf** *vrf-name*] [*interface-type interface-number*] [**detail**]

Specific FIB Entries Based on Nonrecursive Routes

> **show ip cef** [**vrf** *vrf-name*] **non-recursive** [**detail**]

Syntax Description		
vrf	(Optional) Specifies a Virtual Private Network (VPN) routing and forwarding (VRF) instance.	
vrf-name	(Optional) Name assigned to the VRF.	
unresolved	(Optional) Displays unresolved FIB entries.	
detail	(Optional) Displays detailed FIB entry information.	
summary	(Optional) Displays a summary of the FIB.	
network	(Optional) Network number for which to display a FIB entry.	
mask	(Optional) Network mask to be used with the specified network value.	
longer-prefixes	(Optional) Displays FIB entries for more specific destinations.	
interface-type interface-number	(Optional) Interface type and number for which to display FIB entries.	
non-recursive	Displays only nonrecursive routes.	

Command Modes User EXEC
Privileged EXEC

Command History

Release	Modification
11.2GS	This command was introduced for the Cisco 12012 Internet router.
11.1CC	Multiple platform support was added.
12.0(5)T	The **vrf** keyword was added.
12.0(17)ST	The display of a message indicating support for Border Gateway Protocol (BGP) policy accounting was added.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.0(26)S	Output display was added for the **summary** keyword.

Release	Modification
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.

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 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
```

Table 15 describes the significant fields shown in the display.

Table 15   show ip cef unresolved 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.
version	Version of the Cisco Express Forwarding table.
packets, bytes	Number of packets and bytes switched through the name entry.
dependencies	Number of table entries that point to the named entry.

Table 15 *show ip cef unresolved Field Descriptions (continued)*

Field	Description
recursive	Indicates that the destination is reachable through another route.
unresolved	Number of entries that do not have resolved recursions.

The following is sample output from the **show ip cef summary** command:

```
Router# show ip cef summary

IP Distributed CEF with switching (Table Version 135165)
45788 routes, 0 reresolve, 4 unresolved routes (0 old, 4 new)
45788 leaves, 2868 nodes, 8442864 bytes, 135165 inserts, 89377 invalidations
0 load sharing elements, 0 bytes, 0 references
1 CEF resets, 0 revisions of existing leaves
refcounts: 527870 leaf, 466167 node
```

For a description of significant fields in this display, see Table 15.

The following is sample output from the **show ip cef summary** command for Cisco IOS Release 12.0(26)S and later releases that displays a summary of the IP Cisco Express Forwarding table information, which includes the percentage of memory used and current alarm status of Cisco Express Forwarding hardware resources on all E2 and Cisco IP Services Engine (ISE) line cards in a Cisco 12000 series Internet router:

```
Router# show ip cef summary

IP Distributed CEF with switching (Table Version 2283113), flags=0x0
  164413 routes, 0 reresolve, 0 unresolved (0 old, 0 new), peak 3451
  2234324 instant recursive resolutions, 0 used background process
  304 load sharing elements, 336 references
  14758 in-place/0 aborted modifications
  36745512 bytes allocated to the FIB table data structures
  universal per-destination load sharing algorithm, id B03E8BB3
  2(0) CEF resets
  Resolution Timer: Exponential (currently 1s, peak 1s)
  Tree summary:
   8-8-8-8 stride pattern
   short mask protection disabled
   164413 leaves, 11622 nodes using 16691988 bytes
  Transient memory used: 168, max: 865064

  Table epoch: 0 (164413 entries at this epoch)

Hardware resource allocation status summary
Green (Normal), Yellow (Caution) Red (Alarm)
Slot HW Resource Name       Util      Alert
1    E3 Rx PLU               22        G
1    E3_Rx_TLU               6         G
2    E3 Rx PLU               22        G
2    E3_Rx_TLU               6         G
3    E3 Rx PLU               22        G
3    E3_Rx_TLU               6         G
9    E3 Rx PLU               22        G
9    E3_Rx_TLU               6         G

Adjacency Table has 11 adjacencies
```

Table 16 describes the significant fields shown in the display.

Table 16   *show ip cef summary 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.
peak	Highest number of unresolved recursions.
load sharing elements, bytes, references	Information about load sharing elements: how many, number of associated bytes, and number of associated references.
load sharing algorithm, id	Type of load sharing, whether the router is configured for per destination or per packet and the identifier.
leaves, nodes, bytes	Number of elements in the Cisco Express Forwarding table and how much memory they use.
Table epoch	Number indicating the version of a Cisco Express Forwarding table from 0 to 255..
slot	Slot number in which an E2 or ISE line card is installed.
Hw Resource Name	Internal name of each hardware resource used by Cisco Express Forwarding: • E2: Cisco 12000 series Engine 2 line card • E3: Cisco 12000 Sseries ISE • Rx: Received by the router • Tx: Transmitted by the router • PLU: Pointer lookup memory • TLU: Table lookup memory
Util	Percentage of the resource used for Cisco Express Forwarding fast-path forwarding.
Alert	Operational status of the resource, based on utilization percentage: • G: Green (Normal)—Less than the yellow threshold percentage is used. • Y: Yellow (Caution)—80% to 95% is used (configurable). • R: Red (Alarm)—95% or more is used.

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 172.19.233.33.

```
Router# show ip cef e0/0 172.19.233.33 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

172.19.233.33/32, version 7417, cached adjacency 172.19.233.33 0 packets, 0 bytes,
Adjacency-prefix
```

```
via 172.19.233.33, Ethernet0/0, 0 dependencies
next hop 172.19.233.33, Ethernet0/0
valid cached adjacency
```

Table 17 describes the significant fields shown in the display.

Table 17   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.
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.
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 192.168.5.0, showing that the Border Gateway Protocol (BGP) policy accounting bucket number 4 (traffic_index 4) is assigned to this prefix:

```
Router# show ip cef 192.168.5.0 detail

192.168.5.0/24, version 21, cached adjacency to POS7/2
0 packets, 0 bytes, traffic_index 4
via 10.14.1.1, 0 dependencies, recursive
next hop 10.14.1.1, POS7/2 via 10.14.1.0/30
valid cached adjacency
```

The following example shows the forwarding table associated with the VRF named vrf1:

```
Router# show ip cef vrf vrf1

Prefix               Next Hop          Interface
0.0.0.0/32           receive
10.11.0.0/16         10.50.0.1         Ethernet1/3
10.12.0.0/16         10.52.0.2         POS6/0
10.50.0.0/16         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
10.255.255.255/32    receive
10.51.0.0/16         10.52.0.2         POS6/0
224.0.0.0/24         receive
255.255.255.255/32   receive
```

Table 18 describes the significant fields shown in the display.

Table 18   show ip cef vrf Field Descriptions

Field	Description
Prefix	Specifies the network prefix.
Next Hop	Specifies the BGP next hop address.
Interface	Specifies the VRF interface.

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 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.

> **show ip cef** [**vrf** *vrf-name*] **adjacency** *interface-type interface-number ip-prefix* [**checksum** | **detail** **epoch** *epoch-number* | **internal** | **platform** | **source**]

To display Cisco Express Forwarding and distributed Cisco Express Forwarding recursive and direct prefixes resolved through special adjacency types representing nonstandard switching paths, use this form of the **show ip cef adjacency** command in user EXEC or privileged EXEC mode.

> **show ip cef** [**vrf** *vrf-name*] **adjacency** {**discard** | **drop** | **glean** | **null** | **punt**} [**detail**] [**checksum** | **detail** | **epoch** *epoch-number* | **internal** | **platform** | **source**]

For Cisco 10000 Series Routers

To display Cisco Express Forwarding and recursive and direct prefixes resolved through an adjacency, use the **show ip cef adjacency** command in user EXEC or privileged EXEC mode.

> **show ip cef** [**vrf** *vrf-name*] **adjacency** *interface-type interface-number ip-prefix* [**detail** | **internal** | **platform**]

To display Cisco Express Forwarding and recursive and direct prefixes resolved through special adjacency types representing nonstandard switching paths, use the **show ip cef adjacency** command in user EXEC or privileged EXEC mode.

> **show ip cef** [**vrf** *vrf-name*] **adjacency** {**discard** | **drop** | **glean** | **null** | **punt**} [**detail**] [**internal**] [**platform**]

Syntax Description		
vrf	(Optional) A Virtual Private Network (VPN) routing and forwarding (VRF) instance.	
vrf-name	(Optional) Name assigned to the VRF.	
interface-type interface-number	Interface type and number for which to display Forwarding Information Base (FIB) entries.	
ip-prefix	Next-hop IP prefix, in dotted decimal format (A.B.C.D).	
checksum	(Optional) Displays FIB entry checksums.	
detail	(Optional) Displays detailed information for each Cisco Express Forwarding adjacency type entry.	
epoch *epoch-number*	(Optional) Displays adjacency type entries filtered by epoch number. The epoch number range is from 0 to 255.	
internal	(Optional) Displays data for adjacency type entries.	
platform	(Optional) Displays platform-specific adjacency information.	
source	(Optional) Displays source-specific adjacency information.	
discard	Discard adjacency. Sets up the adjacency for loopback interfaces. Loopback IP addresses are receive entries in the FIB table.	
drop	Drop adjacency. Packets forwarded to this adjacency are dropped.	

glean	Glean adjacency. Represents destinations on a connected interface for which no Address Resolution Protocol (ARP) cache entry exists.
null	Null adjacency. Formed for the null 0 interface. Packets forwarded to this adjacency are dropped.
punt	Punt adjacency. Represents destinations that cannot be switched in the normal path and that are punted to the next-fastest switching vector.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.1CC	This command was introduced.
12.0(5)T	The **vrf** 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	Several new 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 Releae 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

An adjacency is a node that can be reached by one Layer 2 hop.

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
```

Cisco 10000 Series Routers Examples Only

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:

```
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
```

Table 19 describes the significant fields shown in the display.

Table 19   show ip cef adjacency Field Descriptions

Field	Description
Prefix	Destination IP prefix.
Next Hop	Next hop IP address.
Interface	Next hop interface.

Related Commands	Command	Description
	show adjacency	Displays Cisco Express Forwarding adjacency table information.
	show ip cef summary	Displays a summary of the entries in the FIB.

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		
detail	(Optional) Displays detailed nonrecursive route entry information.	
epoch *epoch-number*	(Optional) Displays adjacency type entries filtered by epoch number. The epoch number range is from 0 to 255.	
internal	(Optional) Displays data for nonrecursive route entries.	
platform	(Optional) Displays platform-specific nonrecursive route entries.	
source	(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 **epoch, internal**, **platform**, and **source** keywords were added, and the *epoch-number* 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.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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 Tunnel55
2001:zzz:500::/40
     nexthop FE80::nnnn:801A Tunnel32
2001:zzz::/35
     nexthop 3FFE:mmm:8023:21::2 Tunnel26
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
```

Cisco 10000 Series Router Example

The following is sample output from the s**how 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
```

Table 20 describes the significant fields shown in the displays.

Table 20   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 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
show ip cef	Displays entries in the FIB.
show ip cef summary	Displays a summary of the entries in the FIB.
show ip cef unresolved	Displays unresolved entries in the 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 user EXEC or privileged EXEC mode.

show ip cef switching statistics [**feature**]

Syntax Description

feature	(Optional) The output is ordered by feature.

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.

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
```

Cisco 10000 Series Router 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
```

Table 21 describes the significant fields shown in the displays.

Table 21   show ip cef switching statistics Field Descriptions

Field	Description
Path	Switch path where the feature was executed. Available switch paths are platform-dependent. Following are example switch paths for the Cisco 7200 series router: • RIB—process switching with Cisco Express Forwarding assistance • (low-end switching [LES])—Cisco Express Forwarding switch path • PAS—Cisco Express Forwarding turbo switch path Following are example switch paths for the Cisco 7500 series router: • RIB—centralized process switching with Cisco Express Forwarding assistance • LES—centralized Cisco Express Forwarding switch path on the Route/Switch Processor (RSP) • RSP—centralized Cisco Express Forwarding turbo switch path on the RSP • Slot NN—distributed Cisco Express Forwarding turbo switch path on the Versatile Interface Processor (VIP) in the indicated slot number
Feature	Feature that returned the statistics.
Reason	Packet description.
Consume	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.
Drop	Number of packets dropped.
Punt	Number of packets that could not be switched in the normal path and were punted to the next-fastest switching vector.
Punt2Host	Number of packets that could not be switched in the normal path and were punted to the host. 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.
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
	show cef interface	Displays Cisco Express Forwarding-related interface information.
	show ip cef	Displays entries in the FIB.
	show ip route	Displays router advertisement information received from onlink routers.

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		
statistics		(Optional) Displays the default tree statistics.
dependents		(Optional) Displays the dependents of the selected tree with optional prefix filter.
prefix-filter		(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.

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:

Cisco 7500 Series Router Example

```
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
```
Table 22 describes the significant fields shown in the display for a Cisco 7500 series router.

Table 22 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: *number* node	This line is not present in the example output. If this line is present in output, it indicates a memory allocation error at the indicated node.

Cisco 10000 Series Router Example

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
```

Table 23 describes the significant fields shown in the display for a Cisco 10000 series router.

Table 23   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: *number* node	This line is not present in the example output. 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		
	detail	(Optional) Displays detailed FIB entry information.
	epoch *epoch-number*	(Optional) Displays the basic unresolved routes filtered by a specified epoch number. The epoch number range is from 0 to 255.
	internal	(Optional) Displays data structures for unresolved routes.
	platform	(Optional) Displays platform-specific information on unresolved routes.
	source	(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	Several new 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.

Usage Guidelines
The **show ip cef unresolved detail** command displays detailed information for all unresolved FIB entries.

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
```

Cisco 10000 Series Router Example

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
show cef interface	Displays Cisco Express Forwarding interface information.
show ip cef	Displays entries in the FIB.
show ip cef summary	Displays a summary of the entries in the FIB.

show ip traffic

To display statistics about IP traffic, use the **show ip traffic** command in user EXEC or privileged EXEC mode.

show ip traffic

Syntax Description   This command has no arguments or keywords.

Command Modes   User EXEC
Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2	The output was enhanced to displays 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.

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
```

Cisco 10000 Series Routers Example Only

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
         0 options denied, 0 source IP address zero
```

Table 24 describes the significant fields shown in the display.

Table 24   show ip traffic Field Descriptions

Field	Description
format errors	Indicates a gross error in the packet format, such as an impossible Internet header length.
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 Address Resolution Protocol (ARP) request entry and therefore did not send a datagram.
no route	Counted when the Cisco IOS software discards a datagram it did not know how to route.

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**] [*component* {**all** | **back** *hour:minute* | **clock** *hour:minute* | **from-boot** *seconds* | **latest** | **parameters**}]

Syntax Description		
all-traces	(Optional) Displays all event trace messages in memory to the console.
component	(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 **monitor event-trace ?** command.
all	Displays all event trace messages currently in memory for the specified component.
back *hour:minute*	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 in hours and minutes format (hh:mm).
clock *hour:minute*	Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).
from-boot *seconds*	Displays event trace messages starting from a specified number of seconds after booting (uptime). To display the uptime, in seconds, enter the **show monitor event-trace** *component* **from-boot ?** command.
latest	Displays only the event trace messages since the last **show monitor event-trace** command was entered.
parameters	Displays the trace parameters. The only parameter displayed is the size (number of trace messages) of the trace file.

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(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
		The **spa** component keyword was added to support online insertion and removal (OIR) event messages for shared port adapters (SPAs).
		The **bfd** keyword was added for the *component* argument to display trace messages relating to the Bidirectional Forwarding Detection (BFD) feature.
	12.4(4)T	Support for the **bfd** keyword was added for Cisco IOS Release 12.4(4)T.
	12.0(31)S	Support for the **bfd** 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.

Release	Modification
12.4(9)T	The **cfd** keyword was added as an entry for the *component* 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.

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 **cfd** 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

IPC Component Example

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
```

BFD Component for Cisco IOS Release 12.2(18)SXE, 12.0(31)S, and 12.4(4)T

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
```

SPA Component Example

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
```

Cisco Express Forwarding Component 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
```

Cisco Express Forwarding Component Examples for Cisco 10000 Series Routers Only

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
```

CFD Component for Cisco IOS Release 12.4(9)T

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 Assistence 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
monitor event-trace (EXEC)	Controls event trace functions for a specified Cisco IOS software subsystem component.
monitor event-trace (global)	Configures event tracing for a specified Cisco IOS software subsystem component.
monitor event-trace dump-traces	Saves trace messages for all event traces currently enabled on the networking device.

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

client {*client-name*	**all**}	Displays client basic information or statistics for a client or all clients.
statistics	(Optional) Displays XDR statistics.
linecard	(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.
linecard-number	(Optional) Specifies the line card slot number.
internal	(Optional) (RSP only) Displays internal information.
multicast-group	Displays XDR multicast groups.
timers	Displays XDR timers.

Defaults

This command has no default settings.

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.

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       Resequence 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       fibhwidb 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
```

Cisco 10000 Series Router 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 Queu(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        fibhwidb 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/redist redistribution
client
                      153   3660     78    1872     ISSU nego
        XDR ping           :
                      6     24       6     24       ping message
```

Related Commands	Command	Description
	show cef broker	Displays Cisco Express Forwarding information related to a selected update broker.

Feature Information for Cisco Express Forwarding: Command Changes

Table 25 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 25 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 25   *Feature Information for Cisco Express Forwarding: Command Changes*

Feature Name	Releases	Feature Information
Cisco Express Forwarding: Command Changes	12.2(25)S 12.2(28)SB 12.2(33)SRA 12.2(33)SXH	In Cisco IOS Releases 12.2(25)S, 12.2(28)SB, 12.2(33)SRA and 12.2(33)SXH, Cisco Express Forwarding has been updated to support new features and new hardware. These updates enable Cisco Express Forwarding to operate with the Multiprotocol Label Switching (MPLS) High Availability (HA) applications and the MPLS Forwarding Infrastructure (MFI).
		This feature module details changes to commands that are required to support updates to Cisco Express Forwarding.
		In 12.2(25)S, this feature was introduced and supported on the Cisco 7500 series routers.
		In 12.2(28)SB, this feature was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
		In 12.2(33)SRA, this feature was integrated into Cisco IOS Release 12.2(33)SRA.
		In 12.2(33)SXH, this feature was integrated into Cisco IOS Release 12.2(33)SXH.

Glossary

XDR—eXternal Data Representation. A set of library routines that let a C programmer describe arbitrary data structures in a machine-independent fashion. XDR defines a standard representation for data in the network to support heterogeneous network computing.

RP—Route Processor module in the Cisco 7500 series routers that contains the CPU, system software, and most of the memory components that are used in the router. Sometimes called a *supervisory processor*.

RSP—Route/Switch Processor. Processor module in the Cisco 7500 series routers that integrates the functions of the Route Processor (RP) and the Switch Processor (SP).

SP—Cisco 7500-series processor module that acts as the administrator for all CxBus activities. Sometimes called CiscoBus controller.

Note Refer to *Internetworking Terms and Acronyms* for terms not included in this glossary.