Cisco Express Forwarding Commands

This chapter describes the commands used to configure and monitor Cisco Express Forwarding (CEF) on .

For detailed information about CEF concepts, configuration tasks, and examples, see *Cisco IOS XR IP Addresses and Services Configuration Guide*.

cef load-balancing algorithm adjust

To configure a rotate bit count value to adjust that is rotate the hash result so that it can vary from a next-hop router in a cascaded setup, use the **cef load-balancing algorithm adjust** command in global configuration mode. This command addresses traffic polarization issues in routers in a cascaded setup.

cef load-balancing algorithm adjust *value*

Syntax Description

value	This value is subject to a 'modulo' of 4 when applied on ASR 9000 Ethernet Line Card. For example, if the value configured is 10, the actual adjust value applied on ASR 9000 Ethernet Line Cards will be "10 mod 4" which is '2'. ASR 9000 Enhanced Ethernet Line Card will continue using the same adjust value as configured. Range is from 0 to 31.
	Note: the hash shift command changes the hash result that is computed by the ingress linecard. This hash change affects both IPv4 and IPv6 for Equal Cost Multipath (ECMP) as well as the Bundle Member selection when used as either a routed (sub)-interface or as attachment circuit (AC) in L2VPN

Command Default   None

Command Modes   Global configuration

Command History

Release	Modification
Release 4.2.3	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

Examples   The following example shows how rotate bit count value to adjust the hash result:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# cef load-balancing algorithm adjust 2
```

cef load-balancing fields

To select the hashing algorithm that is used for load balancing during forwarding, use the **cef load-balancing fields** command in Global Configuration mode. To undo a configuration and to default to the load balancing option of L3, use the **no** form of this command.

cef load-balancing fields {**L4**}

no cef load-balancing fields {**L4**}

Syntax Description

L3	Specifies the Layer 3 load-balancing for the hash algorithm that is based on the following fields:
	• Source IP address—Specifies the source IP address field in the IP packet header.
	• Destination IP address—Specifies the destination IP address in the IP packet header.
	• Router ID—Specifies the unique IP address that is assigned to the router.
	Since L3 is configured as the default value, you do not need to use the **cef load-balancing fields** command unless you want to configure Layer 4.

L4	Specifies the Layer 3 and Layer 4 load-balancing for the hash algorithm that is based on the following fields:
	• Source IP address—Specifies the source IP address field in the IP packet header.
	• Destination IP address—Specifies the destination IP address in the IP packet header.
	• Source port—Specifies the value of the source port field in the TCP, UDP, or SCP packet header for Layer 4.
	• Destination port—Specifies the value of the destination port field in the TCP, UDP, or SCP packet header for Layer 4.
	• Router ID—Specifies the unique IP address that is assigned to the router.
	• Protocol—Specifies the value of the protocol field as specified in the IP packet header for Layer 4.
	• Slot Number:Rx UIDB Index—Specifies the slot number.

Command Default   When the router ID, source, and destination IP address fields are selected for load balancing, the default value is L3.

Command Modes   Global Configuration mode

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

You can undo only a Layer 4 configuration.

The existing 3-tuple hash provides good-balancing for packet flows with different Layer 3 information (for example, source and destination IP addresses). However, this hash algorithm performs well for cases in which different packet flows, which are identified by Layer 4 content, contain the same Layer 3 packet information. For example, a network, which uses Port Address Translation (PAT) on one end of the network, distributes traffic to a content provider on the other end of the network that supports redundant access using the same IP address.

A new hash algorithm, which uses additional Layer 4 information from the Layer 3 packet, is needed to provide improved load-balancing support in the system. On the Cisco IOS XR software, the 7-tuple hash algorithm is implemented to provide improved load-balancing. The following inputs are processed:

- Layer 3 information
- Source IP address
- Destination IP address
- Protocol
- Layer 4 information
- Source port
- Destination port
- Router ID
- Slot Number:Rx UIDB Index

- Source IP address
- Destination IP address
- Router ID

Task ID

Task ID	Operations
ipv4	read, write

Examples

The following example shows how to configure Layer 3 and Layer 4 load-balancing for the hash algorithm from the **cef load-balancing fields** command:

```
RP/0/0/CPU0:router# cef load balacing fields
```

The following example shows sample output that displays summary information for all locations from the **show cef summary** command:

```
RP/0/0/CPU0:router# show cef load-balancing location all

Router ID is 1.1.1.101

IP CEF with switching (Table Version 0) for node0_0_CPU0

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286202
  286110 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20599920 bytes
  11112 load sharing elements, 3012008 bytes, 297064 references
  8 shared load sharing elements, 3008 bytes
  11104 exclusive load sharing elements, 3009000 bytes
  0 CEF route update drops, 2864666 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 1 adjacency
  1 incomplete adjacency

IP CEF with switching (Table Version 0) for node0_0_CPU1

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286202
  286110 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20599920 bytes
  11112 load sharing elements, 3012008 bytes, 297064 references
  8 shared load sharing elements, 3008 bytes
  11104 exclusive load sharing elements, 3009000 bytes
  0 CEF route update drops, 2864666 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 1 adjacency
  1 incomplete adjacency

IP CEF with switching (Table Version 0) for node0_1_CPU0

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286228
  286112 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20600064 bytes
  11114 load sharing elements, 3590384 bytes, 297064 references
  8 shared load sharing elements, 3424 bytes
  11106 exclusive load sharing elements, 3586960 bytes
  0 CEF route update drops, 4076380 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 77 adjacencies
  22 incomplete adjacencies

IP CEF with switching (Table Version 0) for node0_2_CPU0

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286202
  286110 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20599920 bytes
  11112 load sharing elements, 3012008 bytes, 297064 references
  8 shared load sharing elements, 3008 bytes
  11104 exclusive load sharing elements, 3009000 bytes
  0 CEF route update drops, 2864666 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
```

```
     0 deleted stale prefixes
     0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 1 adjacency
  1 incomplete adjacency

IP CEF with switching (Table Version 0) for node0_2_CPU1

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286202
  286110 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20599920 bytes
  11112 load sharing elements, 3012008 bytes, 297064 references
  8 shared load sharing elements, 3008 bytes
  11104 exclusive load sharing elements, 3009000 bytes
  0 CEF route update drops, 2864666 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 1 adjacency
  1 incomplete adjacency

IP CEF with switching (Table Version 0) for node0_3_CPU0

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286204
  286110 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20599920 bytes
  11111 load sharing elements, 3589556 bytes, 297062 references
  7 shared load sharing elements, 3148 bytes
  11104 exclusive load sharing elements, 3586408 bytes
  0 CEF route update drops, 4076376 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 21 adjacencies
  12 incomplete adjacencies

IP CEF with switching (Table Version 0) for
node0_RSP0_CPU0
node0_RP0_CPU0

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286242
  286122 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20600784 bytes
  11124 load sharing elements, 3014696 bytes, 297064 references
  8 shared load sharing elements, 3008 bytes
  11116 exclusive load sharing elements, 3011688 bytes
  0 CEF route update drops, 4075013 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 15 adjacencies
  1 incomplete adjacency
```

Related Commands

Command	Description
show cef, on page 43	Displays information about packets forwarded by Cisco Express Forwarding (CEF).
show cef summary, on page 51	Displays summary information for the Cisco Express Forwarding (CEF) table.

Command	Description
show cef ipv4 exact-route, on page 65	Displays an IPv4 Cisco Express Forwarding (CEF) exact route.
show cef ipv4 summary, on page 82	Displays a summary of the IPv4 Cisco Express Forwarding (CEF) table
show cef ipv6 exact-route, on page 99	Displays the path an IPv6 flow comprising a source and destination address would take.
show cef ipv6 summary, on page 116	Displays a summary of the IPv6 Cisco Express Forwarding (CEF) table.

clear adjacency statistics

To clear adjacency packet and byte counter statistics, use the **clear adjacency statistics** command in EXEC mode.

clear adjacency statistics [**ipv4** [**nexthop** *ipv4-address*]| **mpls**| **ipv6**] [*interface-type interface-instance*| **location** *node-id*]

Syntax Description

ipv4	(Optional) Clears only IPv4 adjacency packet and byte counter statistics.
nexthop *ipv4-address*	(Optional) Clears adjacency statistics that are destined to the specified IPv4 nexthop.
mpls	(Optional) Clears only MPLS adjacency statistics.
ipv6	(Optional) Clears only IPv6 adjacency statistics.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-instance	(Optional) Either a physical interface instance or a virtual interface instance: • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation. ◦ *rack*: Chassis number of the rack. ◦ *slot*: Physical slot number of the line card. ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0. ◦ *port*: Physical port number of the interface. **Note** In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0. • Virtual interface instance. Number range varies depending on interface type. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Clears detailed adjacency statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   The **clear adjacency statistics** command is useful for troubleshooting network connection and forwarding problems.

If you do not specify any of the optional keywords, all adjacency statistics are cleared for the node on which the command is issued.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Related Commands

Command	Description
show adjacency, on page 40	Displays the IPv4 CEF adjacency table.

clear cef ipv4 drops

To clear Cisco Express Forwarding (CEF) IPv4 packet drop counters, use the **clear cef ipv4 drops**command in EXEC mode.

clear cef ipv4 drops location *node-id*

Syntax Description

location *node-id*	Clears IPv4 packet drop counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, this command will clear IPv4 CEF drop counters only for the node on which the command is issued.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples   The following example displays sample output for the IPv4 Cisco Express Forwarding (CEF) table packet drop counters, and clears IPv4 CEF drop counters for location 0/1/CPU0:

```
RP/0/0/CPU0:router# show cef ipv4 drops

CEF Drop Statistics
Node: 0/1/CPU0
  Unresolved drops     packets :          0
  Unsupported drops    packets :          0
  Null0 drops          packets :          0
  No route drops       packets :          0
  No Adjacency drops   packets :          0
  Checksum error drops packets :          0
```

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```
        RPF drops          packets :            0
        RPF suppressed drops packets :          0
        RP destined drops    packets :          0
Node: 0/6/CPU0
        Unresolved drops     packets :          0
        Unsupported drops    packets :          0
        Null0 drops          packets :          0
        No route drops       packets :          0
        No Adjacency drops   packets :          0
        Checksum error drops packets :          0
        RPF drops            packets :          0
        RPF suppressed drops packets :          0
        RP destined drops    packets :          0
Node: 0/RSP0RP00/CPU0
        Unresolved drops     packets :          0
        Unsupported drops    packets :          0
        Null0 drops          packets :          0
        No route drops       packets :          0
        No Adjacency drops   packets :          0
        Checksum error drops packets :          0
        RPF drops            packets :          0
        RPF suppressed drops packets :          0
        RP destined drops    packets :          0
Node: 0/RSP0RP00/CPU0
        Unresolved drops     packets :          0
        Unsupported drops    packets :          0
        Null0 drops          packets :          0
        No route drops       packets :          0
        No Adjacency drops   packets :          0
        Checksum error drops packets :          0
        RPF drops            packets :          0
        RPF suppressed drops packets :          0
        RP destined drops    packets :          0

RP/0/0/CPU0:router# clear cef ipv4 drops location 0/1/CPU0

  Node: 0/1/CPU0
  Clearing CEF Drop Statistics
```

Related Commands

Command	Description
show cef ipv4 drops, on page 63	Displays IPv4 packet drop counters.

clear cef ipv4 exceptions

To clear IPv4 Cisco Express Forwarding (CEF) exception packet counters, use the **clear cef ipv4 exceptions** command in EXEC mode mode.

clear cef ipv4 exceptions location *node-id*

Syntax Description

location *node-id*	Clears IPv4 CEF exception packet counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, this command will clear IPv4 CEF exception packet counters for all nodes.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples   The following example displays sample output for the IPv4 Cisco Express Forwarding (CEF) exception packet counters, and clear s IPv4 CEF exception packets node 0/1/CPU0:

```
RP/0/0/CPU0:router# show cef ipv4 exceptions

CEF Exception Statistics
Node: 0/1/CPU0
  Slow encap  packets :          0
  Unsupported packets :          0
  Redirect    packets :          0
  Receive     packets :          0
  Broadcast   packets :          0
  IP options  packets :          0
```

```
                    TTL expired packets :              0
                    Fragmented  packets :              0
Node: 0/6/CPU0
   Slow encap  packets :                 0
   Unsupported packets :                 0
   Redirect    packets :                 0
   Receive     packets :                 0
   Broadcast   packets :                 0
   IP options  packets :                 0
   TTL expired packets :                 0
   Fragmented  packets :                 0
Node: 0/0/CPU0
   Slow encap  packets :                 1
   Unsupported packets :                 0
   Redirect    packets :                 0
   Receive     packets :             71177
   Broadcast   packets :             23648
   IP options  packets :                 0
   TTL expired packets :                 0
   Fragmented  packets :                 0
Node: 0/0/CPU0
   Slow encap  packets :                 0
   Unsupported packets :                 0
   Redirect    packets :                 0
   Receive     packets :            167314
   Broadcast   packets :             22656
   IP options  packets :                 0
   TTL expired packets :                 0
   Fragmented  packets :                 0

RP/0/0/CPU0:router# clear cef ipv4 exceptions location 0/1/CPU0

Node: 0/1/CPU0
Clearing CEF Exception Statistics
```

Related Commands

Command	Description
show cef ipv4 exceptions, on page 68	Displays IPv4 CEF exception packet counters.

clear cef ipv4 interface bgp-policy-statistics

To clear Cisco Express Forwarding (CEF) IPv4 interface Border Gateway Protocol (BGP) policy statistics, use the **clear cef ipv4 interface bpg-policy-statistics** command in EXEC mode.

clear cef ipv4 interface *type interface-path-id* **bpg-policy-statistics**

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface.
	Use the **show interfaces** command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   This command is not supported on ASR 9000 Ethernet Line Cards. This command clears the Border Gateway Protocol (BGP) policy accounting counters for the specified interface.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples   The following example shows how to clear IPv4 CEF BGP policy statistics on a tenGigE interface:

```
RP/0/0/CPU0:router# clear cef ipv4 interface tenGigE 0/4/0/0 bgp-policy-statistics
```

Related Commands

Command	Description
show cef ipv4 interface bgp-policy-statistics, on page 75	Displays IPv4 CEF BGP policy statistics.

clear cef ipv4 interface rpf-statistics

To clear Cisco Express Forwarding (CEF) IPv4 interface unicast reverse path forwarding (RPF) statistics, use the **clear cef ipv4 interface rpf-statistics** command in EXEC mode.

clear cef ipv4 interface *type interface-path-id* **rpf-statistics** [**location** *node-id*]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.

interface-path-id	Either a physical interface instance or a virtual interface instance as follows:
	
	 • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
	
	   ◦ *rack*: Chassis number of the rack.
	
	   ◦ *slot*: Physical slot number of the modular services card or line card.
	
	   ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	   ◦ *port*: Physical port number of the interface.
	
	 Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.
	
	 • Virtual interface instance. Number range varies depending on interface type.
	
	 For more information about the syntax for the router, use the question mark (?) online help function.

location *node-id*	(Optional) Clears IPv4 unicast reverse path forwarding (RPF) counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

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Usage Guidelines   The **clear cef ipv4 interface rpf-statistics** command clears the unicast reverse path forwarding (RPF) counters for the specified interface.

Task ID

Task ID	Operations
cef	read

Examples   The following example shows how to clear IPv4 CEF RPF statistics:

```
RP/0/0/CPU0:router# clear cef ipv4 interface tenGigE 0/4/0/0 rpf-statistics
```

clear cef ipv6 drops

To clear Cisco Express Forwarding (CEF) IPv6 packet drop counters, use the **clear cef ipv6 drop** command in EXEC mode.

clear cef ipv6 drops location *node-id*

Syntax Description

location *node-id*	Clears IPv6 packet drop counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, this command clears IPv6 CEF drop counters for all nodes.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples   The following example displays sample output for the IPv6 Cisco Express Forwarding (CEF) table packet drop counters, and clears IPv6 CEF drop counters for location 0/1/CPU0:

```
RP/0/0/CPU0:router# clear cef ipv6 drops

CEF Drop Statistics
Node: 0/1/CPU0
  Unresolved drops     packets :            0
  Unsupported drops    packets :            0
  Null0 drops          packets :            0
  No route drops       packets :            0
  No Adjacency drops   packets :            0
  Checksum error drops packets :            0
```

```
      RPF drops            packets :            0
      RPF suppressed drops packets :            0
      RP destined drops    packets :            0
Node: 0/6/CPU0
      Unresolved drops     packets :            0
      Unsupported drops    packets :            0
      Null0 drops          packets :            0
      No route drops       packets :            0
      No Adjacency drops   packets :            0
      Checksum error drops packets :            0
      RPF drops            packets :            0
      RPF suppressed drops packets :            0
      RP destined drops    packets :            0
Node: 0/0/CPU0
      Unresolved drops     packets :            0
      Unsupported drops    packets :            0
      Null0 drops          packets :            0
      No route drops       packets :            0
      No Adjacency drops   packets :            0
      Checksum error drops packets :            0
      RPF drops            packets :            0
      RPF suppressed drops packets :            0
      RP destined drops    packets :            0
Node: 0/0/CPU0
      Unresolved drops     packets :            0
      Unsupported drops    packets :            0
      Null0 drops          packets :            0
      No route drops       packets :            0
      No Adjacency drops   packets :            0
      Checksum error drops packets :            0
      RPF drops            packets :            0
      RPF suppressed drops packets :            0
      RP destined drops    packets :            0

RP/0/0/CPU0:router# clear cef ipv6 drop

Node: 0/1/CPU0
Clearing CEF Drop Statistics
```

Related Commands

Command	Description
show cef ipv6 drops, on page 96	Displays IPv6 packet drop counters.

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clear cef ipv6 exceptions

clear cef ipv6 exceptions

To clear IPv6 Cisco Express Forwarding (CEF) exception packet counters, use the **clear cef ipv6 exceptions** command in EXEC mode.

clear cef ipv6 exceptions location *node-id*

Syntax Description

location *node-id*	Clears IPv6 CEF exception packet counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **location** keyword was made mandatory.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command clears IPv6 CEF exception packet counters for all nodes.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples

The following example displays sample output for the IPv6 Cisco Express Forwarding (CEF) exception packet counters, and clears the IPv6 CEF exception packets for location:

```
RP/0/0/CPU0:router# show cef ipv6 exceptions

CEF Exception Statistics
Node: 0/1/CPU0
  Slow encap  packets :          0
  Unsupported packets :          0
  Redirect    packets :          0
```

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```
            Receive     packets :                0
            Broadcast   packets :                0
            IP options  packets :                0
            TTL expired packets :                0
            Fragmented  packets :                0
       Node: 0/6/CPU0
            Slow encap  packets :                0
            Unsupported packets :                0
            Redirect    packets :                0
            Receive     packets :                0
            Broadcast   packets :                0
            IP options  packets :                0
            TTL expired packets :                0
            Fragmented  packets :                0
       Node: 0/0/CPU0
            Slow encap  packets :                0
            Unsupported packets :                0
            Redirect    packets :                0
            Receive     packets :                0
            Broadcast   packets :                0
            IP options  packets :                0
            TTL expired packets :                0
            Fragmented  packets :                0
       Node: 0/0/CPU0
            Slow encap  packets :                0
            Unsupported packets :                0
            Redirect    packets :                0
            Receive     packets :                0
            Broadcast   packets :                0
            IP options  packets :                0
            TTL expired packets :                0
            Fragmented  packets :                0

       RP/0/0/CPU0:router# clear cef ipv6 exceptions location 0/1/CPU0

       Node: 0/1/CPU0
       Clearing CEF Exception Statistics
```

Related Commands

Command	Description
show cef ipv6 exceptions, on page 101	Displays IPv6 CEF exception packet counters.

clear cef ipv6 interface bgp-policy-statistics

To clear Cisco Express Forwarding (CEF) IPv6 interface Border Gateway Protocol (BGP) policy statistics, use the **clear cef ipv6 interface bpg-policy-statistics** command in EXEC mode.

clear cef ipv6 interface *type interface-path-id* **bpg-policy-statistics**

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines   The **clear cef ipv6 interface bgp-policy-statistics** command clears the Border Gateway Protocol (BGP) policy accounting counters for the specified interface.

Task ID

Task ID	Operations
basic-services	read, write
cef	read, write

Examples   The following example shows how to clear IPv6 CEF BGP policy statistics:

```
RP/0/0/CPU0:router# clear cef ipv6 interface MgmtEth 0/CPU0/0 bgp-policy-statistics
```

clear cef ipv6 interface rpf-statistics

To clear Cisco Express Forwarding (CEF) IPv6 interface reverse path forwarding (RPF) statistics, use the **clear cef ipv6 interface rpf-statistics**command in EXEC mode.

clear cef ipv6 interface *type interface-path-id* **rpf-statistics** [**location** *node-id*]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Clears IPv6 unicast reverse path forwarding (RPF) counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines   The **clear cef ipv6 interface rpf-statistics** command clears the unicast reverse path forwarding (RPF) counters for the specified interface.

Task ID

Task ID	Operations
cef	read

Examples   The following example shows how to clear IPv6 CEF RPF statistics:

```
RP/0/0/CPU0:router# clear cef ipv6 interface MgmtEth 0/CPU0/0 rpf-statistics
```

ipv4 bgp policy accounting

To enable Border Gateway Protocol (BGP) policy accounting, use the **ipv4 bgp policy accounting** command in interface configuration mode. To disable BGP policy accounting, use the **no** form of this command.

ipv4 bgp policy accounting {**input**| **output** {**destination-accounting** [**source-accounting**]| **source-accounting** [**destination-accounting**]}}

no ipv4 bgp policy accounting {**input**| **output** {**destination-accounting** [**source-accounting**]| **source-accounting** [**destination-accounting**]}}

Syntax Description

input	Enables BGP policy accounting policy on the ingress IPv4 unicast interface.
output	Enables BGP policy accounting policy on the egress IPv4 unicast interface.
{**destination-accounting** [**source-accounting**] | **source-accounting** [**destination-accounting**]}	When you specify the ingress or egress interface, you must specify one of the following keywords: • **destination-accounting** —Enables accounting policy on the basis of the destination address. • **source-accounting** —Enables accounting policy on the basis of the source address. After specifying **destination-accounting** you can optionally specify **source-accounting** , or after specifying **source-accounting** , you can optionally specify **destination-accounting** .

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

When you use the **no** form of the command, accounting is disabled for both the source and destination. To change accounting on either the destination or source address, reconfigure the **ipv4 bgp policy accounting** command specifying the **destination-accounting** or **source-accounting** keyword. In the following example, you want BGP policy accounting disabled on the source address after enabling source and destination address accounting earlier:

```
RP/0/0/CPU0:router(config-if)# ipv4 bgp policy accounting output destination-accounting
```

See the *Cisco IOS XR Routing Configuration Guide for the Cisco XR 12000 Series Router* for information about configuring a BGP policy. BGP accounting policy is based on community lists, autonomous system numbers, or autonomous system paths.

For BGP policy propagation to function, you must enable BGP.

To specify the accounting policy, the proper route policy configuration must be in place, matching specific BGP attributes using the **set traffic-index** command. In BGP router configuration mode, use the **table-policy** command to modify the accounting buckets when the IP routing table is updated with routes learned from BGP. To display accounting policy information, use the **show cef ipv4 interface bgp-policy-statistics**, **show bgp polic**y, and **show route bgp** commands.

This command is not supported on ASR 9000 Ethernet Line Cards.

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to configure BGP policy accounting:

```
RP/0/0/CPU0:router(config)# interface gigabitethernet pos 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv4 bgp policy accounting output source-accounting
```

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*
show bgp policy	Displays information about BGP advertisements under a proposed policy. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*
	Displays IPv4 CEF BGP policy statistics.
show route	Displays the current routes for BGP in the RIB. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*
table-policy	Applies a routing policy to routes being installed into the routing table. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*

ipv4 bgp policy propagation

To enable QoS Policy Propagation on BGP (QPPB) on an interface, use the **ipv4 bgp policy propagation** command in interface configuration mode. To disable QoS policy propagation on BGP, use the **no** form of this command.

ipv4 bgp policy propagation {input} {ip-precedence | qos-group} {destination | source}

no ipv4 bgp policy propagation {input} {ip-precedence | qos-group} {destination | source}

Syntax Description

input	Enables QPPB on the ingress IPv4 unicast interface.
ip-precedence	Specifies that the QoS policy is based on the IP precedence.
qos-group	Specifies that the QoS policy is based on the QoS group ID.
destination	Specifies that the IP precedence bit or QoS group ID from the destination address entry is used in the route table.
source	Specifies that the IP precedence bit or QoS group ID from the source address entry is used in the route table.

Command Default

The default is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

For the QPPB feature to work, you must enable BGP and CEF. In addition, the proper route-map configuration must be in place to specify the IP precedence or QoS group ID (for example, **set precedence** command).

If you specify both source and destination on the interface, the software looks up the source address in the routing table and classifies the packet based on the source address first; then the software looks up the destination address in the routing table and reclassifies it based on the destination address.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to enable QPPB on the GigabitEthernet interface:

The following example shows how to enable QPPB on the Packet-over-SONET/SDH (POS) interface:

```
RP/0/0/CPU0:router(config)# interface gigabitethernet pos 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv4 address 192.3.1.1 255.255.255.252
RP/0/0/CPU0:router(config-if)# ipv4 bgp policy propagation input ip-precedence destination
```

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy.
show bgp policy	Displays information about BGP advertisements under a proposed policy.
show cef ipv4 interface bgp-policy-statistics, on page 75	Displays IPv4 CEF BGP policy statistics.
show route	Displays the current routes for BGP in the RIB.
table-policy	Applies a routing policy to routes being installed into the routing table. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*

ipv4 verify unicast source reachable-via

To enable IPv4 unicast Reverse Path Forwarding (RPF) checking, use the **ipv4 verify unicast source reachable-via** command in an appropriate configuration mode. To disable unicast RPF, use the **no** form of this command.

ipv4 verify unicast source reachable-via {any| rx} [allow-default] [allow-self-ping]

no ipv4 verify unicast source reachable-via {any| rx} [allow-default] [allow-self-ping]

Syntax Description

any	Enables loose unicast RPF checking. If loose unicast RPF is enabled, a packet is not forwarded unless its source prefix exists in the routing table.
rx	Enables strict unicast RPF checking. If strict unicast RPF is enabled, a packet is not forwarded unless its source prefix exists in the routing table and the output interface matches the interface on which the packet was received.
allow-default	(Optional) Enables the matching of default routes. This option applies to both loose and strict RPF.
allow-self-ping	(Optional) Enables the router to ping out an interface.This option applies to both loose and strict RPF.

Command Default

IPv4 unicast RPF is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.2	This command was introduced .
Release 3.3.0	The strict option information was added.

Usage Guidelines

Use the **ipv4 verify unicast source reachable-via** interface command to mitigate problems caused by malformed or forged (spoofed) IP source addresses that pass through a router. Malformed or forged source addresses can indicate denial-of-service (DoS) attacks based on source IP address spoofing.

When strict unicast RPF is enabled on an interface, the router examines all packets received on that interface. The router checks to make sure that the source address appears in the routing table and matches the interface on which the packet was received.

When loose unicast RPF is enabled on an interface, the router examines all packets received on that interface. The router checks to make sure that the source address can be reached through any of the router interfaces.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write
config-services	read, write

Examples

This example shows how to configure strict RPF on gigabitethernet interface 0/1/0/0:

```
RP/0/0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv4 verify unicast source reachable-via rx
```

This example shows how to configure loose RPF on gigabitethernet interface 0/0/0/1:

```
RP/0/0/CPU0:routerios(config)# interface gigabitethernet 0/0/0/1
RP/0/0/CPU0:routerios(config-if)# ipv4 verify unicast source reachable-via any
```

ipv6 bgp policy accounting

To enable Border Gateway Protocol (BGP) policy accounting, use the **ipv6 bgp policy accounting** command in interface configuration mode. To disable BGP policy accounting, use the **no** form of this command.

ipv6 bgp policy accounting {**input**| **output** {**destination-accounting** [**source-accounting**]| **source-accounting** [**destination-accounting**]}}

no ipv6 bgp policy accounting {**input**| **output** {**destination-accounting** [**source-accounting**]| **source-accounting** [**destination-accounting**]}}

Syntax Description

input	Enables BGP policy accounting policy on the ingress IPv6 unicast interface.
output	Enables BGP policy accounting policy on the egress IPv6 unicast interface.
{**destination-accounting** [**source-accounting**] | **source-accounting** [**destination-accounting**]}	When you specify the ingress or egress interface, you must specify one of the following keywords: • **destination-accounting** —Enables accounting policy on the basis of the destination address. • **source-accounting** —Enables accounting policy on the basis of the source address. After specifying **destination-accounting** , you can optionally specify **source-accounting** or, after specifying **source-accounting** , you can optionally specify **destination-accounting** .

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

When you use the **no** form of the command, accounting is disabled for both the source and destination. To change accounting on either the destination or source address, reconfigure the **ipv6 bgp policy accounting** command, specifying the **destination-accounting** or **source-accounting** keyword. In the following example,

you want BGP policy accounting disabled on the source address after enabling source and destination address accounting earlier:

```
RP/0/0/CPU0:routeripv6 bgp policy accounting output destination-accounting
```
See the *Cisco IOS XR Routing Configuration Guide for the Cisco XR 12000 Series Router* for information about configuring a BGP policy. BGP accounting policy is based on community lists, autonomous system numbers, or autonomous system paths.

For BGP policy propagation to function, you must enable BGP.

To specify the accounting policy, the proper route policy configuration must be in place matching specific BGP attributes using the **set traffic-index** command. In BGP router configuration mode, use the **table-policy** command to modify the accounting buckets when the IP routing table is updated with routes learned from BGP. To display accounting policy information, use the **show cef ipv4 interface bgp-policy-statistics, show bgp policy**, and **show ip route bgp** commands.

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to configure BGP policy accounting:

```
RP/0/

0

/
CPU0:router(config)# interface

pos
0/1/0/0
RP/0/

0

/
CPU0:router(config-if)# ipv6 bgp policy accounting output source-accounting
```


Related Commands

Command	Description
route-policy (BGP)	Defines a route policy. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*
show bgp policy	Displays information about BGP advertisements under a proposed policy. For more information, see *Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router*

Command	Description
show cef ipv6 interface bgp-policy-statistics, on page 107	Displays IPv6 CEF BGP policy statistics.

ipv6 verify unicast source reachable-via

To enable IPv6 unicast Reverse Path Forwarding (RPF) checking, use the **ipv6 verify unicast source reachable-via** command in interface configuration mode. To disable IPv6 unicast RPF checking, use the **no** form of this command.

ipv6 verify unicast source reachable-via {**any**| **rx**} [**allow-default**] [**allow-self-ping**]

no ipv6 verify unicast source reachable-via {**any**| **rx**} [**allow-default**] [**allow-self-ping**]

Syntax Description

any	Enables loose unicast RPF checking. If loose unicast RPF is enabled, a packet is not forwarded unless its source prefix exists in the routing table.
rx	Enables strict unicast RPF checking. If strict unicast RPF is enabled, a packet is not forwarded unless its source prefix exists in the routing table and the output interface matches the interface on which the packet was received.
allow-default	(Optional) Enables the matching of default routes. This option applies to both loose and strict RPF.
allow-self-ping	(Optional) Enables the router to ping out an interface. This option applies to both loose and strict RPF.

Command Default   Loose IPv6 unicast RPF is disabled.

Command Modes   Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The keywords **any**, **rx**, **allow-default**, and **allow-self-ping** were added.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read, write
ipv6	read, write

Examples　　　The following example shows how to enable loose RPF checking on POS interface 0/1/0/0:

```
RP/0/0/CPU0:router(config)# interface pos 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv6 verify unicast source reachable-via any
```

The following example shows how to configure strict RPF on gigabitethernet interface 0/1/0/0:

```
RP/0/0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv6 verify unicast source reachable-via rx
```

The following example shows how to configure loose RPF on gigabitethernet interface 0/0/0/1 : .

```
RP/0/0/CPU0:routerios(config)# interface gigabitethernet 0/0/0/1
RP/0/0/CPU0:routerios(config-if)# ipv6 verify unicast source reachable-via any
```

Related Commands

Command	Description
ipv4 verify unicast source reachable-via , on page 32	Enables IPv4 unicast RPF checking.

rp mgmtethernet forwarding

To enable switching from the line card to the route processor Management Ethernet interfaces, use the **rp mgmtethernet forwarding** command in Global Configuration mode. To disable switching from the modular services card to the route processor Management Ethernet interfaces, use the **no** form of this command.

rp mgmtethernet forwarding

no rp mgmtethernet forwarding

Syntax Description   This command has no keywords or arguments.

Command Default   Switching is disabled.

Command Modes   Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced .

Usage Guidelines   The rp mgmtethernet forwarding command needs LC reload to take effect.

Note   If enabled, the RP CPU is used to forward packets because the RP does not have a packet processing engine like the line cards.

Task ID

Task ID	Operations
cef	read, write

Examples   The following example shows how to enable switching from the modular services card to the RP Management Ethernet interfaces:

```
RP/0/0/CPU0:router(config)# rp mgmtethernet forwarding
```

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

show adjacency

To display Cisco Express Forwarding (CEF) adjacency table information, use the **show adjacency** command in EXEC mode.

show adjacency [**ipv4** [**nexthop** *ipv4-address*]| **mpls**| **ipv6**] [*interface type interface-instance*] **[remote] [detail]** [**location** *node-id*]

Syntax Description

ipv4	(Optional) Displays only IPv4 adjacencies.
nexthop *ipv4-address*	(Optional) Displays adjacencies that are destined to the specified IPv4 nexthop.
mpls	(Optional) Displays only MPLS adjacencies.
ipv6	(Optional) Displays only IPv6 adjacencies.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-instance	Either a physical interface instance or a virtual interface instance: • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation. 　◦ *rack*: Chassis number of the rack. 　◦ *slot*: Physical slot number of the line card. 　◦ *module*: Module number. A physical layer interface module (PLIM) is always 0. 　◦ *port*: Physical port number of the interface. **Note**　In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0. • Virtual interface instance. Number range varies depending on interface type. For more information about the syntax for the router, use the question mark (?) online help function.
remote	(Optional) Displays only remote adjacencies. A remote adjacency is an internal adjacency used to forward packets between line cards.
detail	(Optional) Displays detailed adjacency information, including Layer 2 information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines   This 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.

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the CEF adjacency table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   The following is sample output from **show adjacency** command with the **location** keyword specified:

```
RP/0/0/CPU0:router# show adjacency location 0/0/CPU0

Interface Address Version  Refcount  Protocol
gigabitethernet0
/0/1/2(src mac only) 6 1 ipv4
gigabitethernet0
/0/1/2 point to point 7 100004
gigabitethernet0
/0/1/2                 (interface)              3 1
```
This table describes the significant fields shown in the display.

Table 1: show adjacency Command Field Descriptions

Field	Description
Interface	Outgoing interface associated with the adjacency.
Address	Address can represent one of these addresses: • Next hop IPv4 or IPv6 address • Point-to-Point address Information in parentheses indicates different types of adjacency.

Field	Description
Version	Version number of the adjacency. Updated whenever the adjacency is updated.
Refcount	Number of references to this adjacency.
Protocol	Protocol for which the adjacency is associated.
0f000800 and 000c86f33d330800453a21c10800	Layer 2 encapsulation string.
mtu	Value of the maximum transmission unit (MTU).
flags	Internal field.
packets	Number of packets going through the adjacency.
bytes	Number of bytes going through the adjacency.

Related Commands

Command	Description
clear adjacency statistics, on page 11	Clears the IPv4 CEF adjacency table.

show cef

To display information about packets forwarded by Cisco Express Forwarding (CEF), use the **show cef** command in EXEC mode.

show cef [*prefix* [*mask*]] [**hardware** {**egress**| **ingress**}| **detail**] [**location** {*node-id*| **all**}]

Syntax Description

prefix	(Optional) Longest matching CEF entry for the specified IPv4 destination prefix.
mask	(Optional) Exact CEF entry for the specified IPv4 prefix and mask.
hardware	(Optional) Displays detailed information about hardware.
egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
all	(Optional) Displays all locations.

Command Default

When the prefix is not explicitly specified, this command displays all the IPv4 prefixes that are present in CEF. When not specified, the location defaults to the active Route Processor (RP) node.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output shows the load information flag from the **show cef** command for both **hardware** and **ingress** keywords:

```
RP/0/0/CPU0:router# show cef 101.1.3.0/24 hardware ingress location 0/3/CPU0
101.1.3.0/24, version 0, internal 0x40000001 (0x598491e8) [1], 0x0 (0x0),
(0x0)
 local adjacency 10.0.101.2
 Prefix Len 24, traffic index 0, precedence routine (0)
 BGP Attribute: id: 8, Local id: 6, Origin AS: 1003, Next Hop AS: 4

   via 10.0.101.2, 2 dependencies, recursive
    next hop 10.0.101.2 via 10.0.101.2/32


 Number of Mnodes:   2
 Mnode 0 HW Location: 0x00080404  HW Value
[ 0x0081a600 00000000 00000000 00000000 ]

 Leaf Mnode 1  HW Location: 0x040d3030
 Hardware Leaf:      PLU Leaf Value
[ 0x8000d800 028842c6 00000000 1fff2000 ]

 FCR  2 TLU Address 0x00210b19 TI 0 AS 6

VPN Label 1 0

 ************* IGP LoadInfo *****************
 Loadinfo HW Max Index  0
 Loadinfo SW Max Index  0
 PBTS Loadinfo Attached: No
 LI Path [ 0]  HFA Info: 0x10204028   FCR: 4
 *******************************************


 -----------------------------------------------
 HW Rx Adjacency  0 Detail:
 -----------------------------------------------
    Rx Adj HW Address   0x02040280  (ADJ)
    packets 0  bytes 0
    HFA Bits 0x80 gp 16 mtu 9248 (Fabric MTU) TAG length 0
    OI 0x409 (Tx uidb 0 PPindex 1033)
    OutputQ 0 Output-port 0x0 local-outputq 0x8000

[ 0x80181040 00002420 00000409 00008000 ]
[ 0x00000000 00000000 00000000 00000000 ]
[ 0x00000000 00000000 00000000 00000000 ]
```

show cef bgp-attribute

To display Border Gateway Protocol (BGP) attributes for Cisco Express Forwarding (CEF), use the **show cef bgp-attribute** command in EXEC mode.

show cef bgp-attribute [**attribute-id index-id**] [**local-attribute-id index-id**] [**location** *node-id*]

Syntax Description

attribute-id *index-id*	(Optional) Displays FIB attribute index.
local-attribute-id *index-id*	(Optional) Displays FIB local attribute index.
location *node-id*	(Optional) Displays BGP information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

The default location is active RP.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

The following example shows how to use the **show cef bgp-attribute** command:

```
RP/0/0/CPU0:router# show cef bgp-attribute

Total number of entries: 75742
BGP Attribute ID: 0x2058a, Local Attribute ID: 0x1
    Origin AS:    195, Next Hop AS:      195
BGP Attribute ID: 0x20583, Local Attribute ID: 0x2
    Origin AS:     22, Next Hop AS:       22
BGP Attribute ID: 0x20582, Local Attribute ID: 0x3
    Origin AS:     21, Next Hop AS:       21
BGP Attribute ID: 0x20585, Local Attribute ID: 0x4
    Origin AS:     28, Next Hop AS:       28
```

```
BGP Attribute ID: 0x20584, Local Attribute ID: 0x5
    Origin AS:    27, Next Hop AS:        27
BGP Attribute ID: 0x2057f, Local Attribute ID: 0x6
    Origin AS:    86, Next Hop AS:        86
BGP Attribute ID: 0x2058b, Local Attribute ID: 0x7
    Origin AS:    196, Next Hop AS:       196
BGP Attribute ID: 0x20589, Local Attribute ID: 0x8
    Origin AS:    194, Next Hop AS:       194
```

This table describes the significant fields shown in the display.

Table 2: show cef bgp-attribute Command Field Descriptions

Field	Description
BGP Attribute ID	Displays the id assigned by BGP.
Local Attribute ID	Displays the id assigned by FIB.
Origin AS	Displays the origin AS of the prefix that carries this attribute id.
Next Hop AS	Displays the AS that contains the BGP nexthop for this prefix.

Related Commands

Command	Description
show cef, on page 43	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef external

To display Cisco Express Forwarding (CEF) external client dependency information, use the **show cef external** command in EXEC mode.

show cef external [**hardware** {**ingress** | **egress**}] [**prefix**] {**ifhandle** | **tunnel-id** | **client-name**} {**6vpe** | **6pe-ipvpn** | **eos0-ldi** | **ip-reachability**} [**detail**] [**location node-id**]

Syntax Description

hardware	(Optional) Displays hardware information.
ingress	(Optional) Displays hardware information programmed in ingress packet forwarding hardware.
egress	(Optional) Displays hardware information programmed in egress packet forwarding hardware.
prefix	(Optional) Displays external client information for a specific prefix.
ifhandle	Specifies interface handle.
tunnel-id	Specifies the tunnel identifier.
client-name	Name of a particular client. The dependency information for the given client name is displayed.
6vpe	Displays 6VPE (IPv6 VPN Provide Edge) dependency information.
6vpe-ipvpn	Displays 6VPE over IP-VPN dependency information.
eos0-ldi	Displays Multiprotocol Label Switching (MPLS) end of stack 0 (EOS0) load balancing dependency information.
ip-reachability	Displays Internet Protocol (IP) reachability information.
detail	(Optional) Displays the dependency information in detail.
location *node-id*	(Optional) Displays external client dependency information for the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.5.0	This command was enhanced to show 6VPE external client dependency.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from the show cef external command:

```
RP/0/0/CPU0:router#show cef external hardware egress location 0/0/CPU0
Mon Dec 13 11:09:21.041 UTC

IPV4:
-----
Client Name      : l2fib_mgr (comp-id: 0x7e6d) (0x9f6f70fc)
Protocol         : ipv4
Prefix           : 3.3.3.3 (0x9f13d22c)
Gateway array    : 9e8fb058 (0x201500/1)
Loadinfo         : 9fbd41a8 (0x10181101/1)
Number of notifs : 1
Interest type    : EOS0 LDI updates
Table Id         : 0xe0000000
Cookie Value     : 6c326669625f6d67720000000
State            : resolved, cached plat context
Via              : 16000/0
Added to pend list: Dec 13 11:08:37.920
    Load distribution: 0 (refcount 1)

    Hash  OK  Interface              Address
    0     Y   0/0/0/9    10.0.9.2


Data identical on all NPs:

---- ECD LDI platform context data ----
 Flags: 0x21
 L2VPN LDI index: 0x1 (Search Key:0x100)
 Preferred path index: 0x5002dea0
 Cached L2FIB notification data:
    l2vpn_ldi_index: 0x1 (Search Key:0x100)
    recursion_level: 1 (RECURSION_NONE), num_paths: 1

      IGP Path info #0
      is_unresolved: 0
      Primary path: is_lag: 0, sfp_or_lagid: 1, ifhandle: 0x4000440
      Bkup path: is not valid
```

```
                    ---- End of platform context data ----


                    RP/0/0/CPU0:router#show cef external hardware egress location 0/0/CPU0
                    Mon Dec 13 11:22:47.605 UTC

                    IPV4:
                    -----
                    Client Name      : l2fib_mgr (comp-id: 0x7e6d) (0x9f6f70fc)
                    Protocol         : ipv4
                    Prefix           : 100.100.100.2 (0x9f13d22c)
                    Gateway array    : 9e8fb058 (0x201500/1)
                    Loadinfo         : 9fbd41a8 (0x10181101/1)
                    Number of notifs : 2
                    Interest type    : EOS0 LDI updates
                    Table Id         : 0xe0000000
                    Cookie Value     : 6c326669625f6d67720000000
                    State            : resolved, cached plat context
                    Via              : 16006/0
                    Added to pend list: Dec 13 11:21:23.037

                        Load distribution: 0 (refcount 1)

                        Hash  OK  Interface              Address
                        0     Y   recursive              16006/0

                    Data identical on all NPs:

                    ---- ECD LDI platform context data ----
                     Flags: 0x21
                     L2VPN LDI index: 0x2 (Search Key:0x200)
                     Preferred path index: 0x5002dea8
                     Cached L2FIB notification data:
                        l2vpn_ldi_index: 0x2 (Search Key:0x200)
                        recursion_level: 2 (RECURSION_ONE), num_paths: 1

                           BGP Path info #0

                             IGP Path info #0
                             is_unresolved: 0
                             Primary path: is_lag: 0, sfp_or_lagid: 1, ifhandle: 0x4000440
                             Bkup path: is not valid
                    ---- End of platform context data ----
```

Related Commands

Command	Description
show cef, on page 43	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

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show cef recursive-nexthop

To display Cisco Express Forwarding (CEF) recursive next-hop information, use the **show cef recursive-nexthop** command in EXEC mode.

show cef recursive-nexthop [hardware] [**location node-id**]

Syntax Description

hardware	(Optional) Displays hardware information related to the recursive next hop.
location *node-id*	(Optional) Displays recursive next-hop information for the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.5.0	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Related Commands

Command	Description
show cef, on page 43	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef summary

To display summary information for the Cisco Express Forwarding (CEF) table, use the **show cef summary** command in EXEC mode.

show cef summary [**location** {*node-id*| **all**}]

Syntax Description

location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
all	(Optional) Displays all locations.

Command Default

The **show cef summary** command assumes the IPv4 CEF table and the active RP node as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef summary location 0/1/CPU0

Router ID is 10.1.1.1

IP CEF with switching (Table Version 0) for node0_1_CPU0

  Load balancing: L3
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 318
  170 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 12240 bytes
  183 load sharing elements, 57292 bytes, 184 references
  19 shared load sharing elements, 7036 bytes
  164 exclusive load sharing elements, 50256 bytes
  0 CEF route update drops, 10 revisions of existing leaves
```

```
   Resolution Timer: 15s
   0 prefixes modified in place
   0 deleted stale prefixes
   21 prefixes with label imposition, 60 prefixes with label information
Adjacency Table has 49 adjacencies
   25 incomplete adjacencies
```

This table describes the significant fields shown in the display.

Table 3: show cef summary Command Field Descriptions

Field	Description
Load balancing	Current load-balancing mode. The default value is L3.
Table Version	Version of the CEF table.
tableid	Table identification number.
vrfname	VRF name.
flags	Option value for the table
routes	Total number of routes.
reresolve	Total number of routes being reresolved.
unresolved (*x* old, *x* new)	Number of routes not yet resolved.
load sharing elements	Total number of internal load-sharing data structures.
bytes	Total memory used by internal load sharing data structures.
references	Total reference count of all internal load sharing data structures.
CEF resets	Number of CEF table resets.
revisions of existing leaves	Number of updates to existing prefixes.
Exponential (currently *x*s, peak *x*s)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Adjacency Table has *x* adjacencies	Total number of adjacencies.
x incomplete adjacency	Total number of incomplete adjacencies.

Related Commands

Command	Description
cef load-balancing fields, on page 5	Selects the hashing algorithm that is used for load balancing during forwarding.
show cef, on page 43	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef ipv4

To display the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4** [*prefix* [*mask*]| *interface-type interface-instance*] **[detail]** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
prefix	(Optional) Longest matching CEF entry for the specified IPv4 destination prefix.
mask	(Optional) Exact CEF entry for the specified IPv4 prefix and mask.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.

interface-instance	Either a physical interface instance or a virtual interface instance:
	
	• Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation.
	
	   ◦ *rack*: Chassis number of the rack.
	
	   ◦ *slot*: Physical slot number of the line card.
	
	   ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	   ◦ *port*: Physical port number of the interface.
	
	Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.
	
	• Virtual interface instance. Number range varies depending on interface type.
	
	For more information about the syntax for the router, use the question mark (?) online help function.

detail	(Optional) Displays full CEF entry information.
location *node-id*	(Optional) Displays the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If the location is not specified, the command defaults to the active RP node.

Command Modes

EXEC mode

Command History	Release	Modification
	Release 3.2	This command was introduced.
	Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
	Release 3.5.0	The sample output for the **detail** keyword is modified for a specific prefix.

Usage Guidelines If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the CEF table on the node in which the command is issued. Otherwise, the command is effective on the node specified by the **location** *node-id* keyword and argument.

Task ID	Task ID	Operations
	cef	read

Examples The following sample output is from the **show cef ipv4** command:

```
RP/0/0/CPU0:router/CPU0:router# show cef ipv4
Prefix              Next Hop           Interface
10.0.0.0/0          10.25.0.1          MgmtEth0/0/CPU0/0
10.0.0.0/32         broadcast
10.25.0.0/16        attached           MgmtEth0/0/CPU0/0
10.25.12.10/32      receive            MgmtEth0/0/CPU0/0
10.25.13.12/32      10.25.13.12        MgmtEth0/0/CPU0/0
10.25.16.11/32      10.25.16.11        MgmtEth0/0/CPU0/0
10.25.22.10/32      10.25.22.10        MgmtEth0/0/CPU0/0
10.25.26.10/32      10.25.26.10        MgmtEth0/0/CPU0/0
10.25.41.2/32       10.25.41.2         MgmtEth0/0/CPU0/0
10.25.41.5/32       10.25.41.5         MgmtEth0/0/CPU0/0
10.25.42.5/32       10.25.42.5         MgmtEth0/0/CPU0/0
10.25.44.15/32      10.25.44.15        MgmtEth0/0/CPU0/0
10.25.55.2/32       10.25.55.2         MgmtEth0/0/CPU0/0
10.25.255.255/32    10.25.255.255      MgmtEth0/0/CPU0/0
10.0.0.0/4          0.0.0.0
10.0.0.1/32         0.0.0.0
10.255.255.255/32   broadcast
```
This table describes the significant fields shown in the display.

Table 4: show cef ipv4 Command Field Descriptions

Field	Description
Prefix	Prefix in the IPv4 CEF table.
Next Hop	Next hop of the prefix.
Interface	Interface associated with the prefix.

show cef ipv4 adjacency

To display Cisco Express Forwarding (CEF) IPv4 adjacency status and configuration information, use the **show cef ipv4 adjacency** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 adjacency** [*interface-type interface-path-id*] [**location** *node-id*] **[detail] [discard] [glean] [null] [punt] [remote] [protected]**

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface- path-id	(Optional) Either a physical interface instance or a virtual interface instance: • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation. ◦ *rack*: Chassis number of the rack. ◦ *slot*: Physical slot number of the line card. ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0. ◦ *port*: Physical port number of the interface. **Note** In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0. • Virtual interface instance. Number range varies depending on interface type. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
detail	(Optional) Displays the detailed adjacency information.
discard	(Optional) Filters out and displays only the discarded adjacency information.
glean	(Optional) Filters out and displays only the glean adjacency information.
null	(Optional) Filters out and displays only the adjacency information.
punt	(Optional) Filters out and displays only the punt adjacency information.

remote	(Optional) Filters out and displays only the remote adjacency information.
protected	(Optional) Filters out and displays only the IP-Fast Reroute (FRR) protected adjacency information.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, the **show cef ipv4 adjacency** command displays the CEF adjacency table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from **show cef ipv4 adjacency**   command :

```
RP/0/0/CPU0:router:# show cef ipv4 adjacency MgmtEth 0/0/CPU0/0
Display protocol is ipv4
Interface    Address                                        Type    Refcount
Mg0/0/CPU0/0Prefix: 10.25.0.3/32                            local   2
             Adjacency: PT:0x782a2900 12.25.0.3/32
             Interface: Mg0/0/CPU0/0
             MAC: 00.d0.02.75.ab.fd.00.11.93.ef.e3.50.08.00
             Interface Type: 0x8, Base Flags: 0x1
             Dependent adj type: remote
             Dependent adj intf: Mg0/0/CPU0/0
Mg0/

0/CPU0/0Prefix: 10.24.0.32/32                              remote  6
             Adjacency: PT:0x782a2b58
             Interface: Mg0/0/CPU0/0
             MAC: 28.4e.4f.4e.45.29
             Interface Type: 0x8, Base Flags: 0x0
```
This table describes the significant fields shown in the display.

Table 5: show cef ipv4 adjacency Command Field Descriptions

Field	Description
Interface	Interface associated with the prefix.
Address	Prefix address information.
Type	Type of adjacency, can be either local or remote.
Refcount	Number of times the adjacency is referenced by other routers.

show cef ipv4 adjacency hardware

To display Cisco Express Forwarding (CEF) IPv4 adjacency hardware status and configuration information, use the **show cef ipv4 adjacency hardware** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 adjacency hardware** {**egress**| **ingress**} [**detail**| **discard**| **drop**| **glean**| **location** *node-id*| **null**| **punt**| **protected**| **remote**]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
discard	(Optional) Displays the discard adjacency information.
drop	(Optional) Displays the drop adjacency information.
glean	(Optional) Displays the glean adjacency information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
protected	(Optional) Filters out and displays only the IP-Fast Reroute (FRR) protected adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Release	Modification
Release 3.6.0	The following enhancements were added:
	• The TE flag value was added to the sample output for both **ingress** and **egress** keywords to display the load information flag.
	• The **protected** keyword was added for IP-FRR.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output shows the load information flag from the **show cef ipv4 adjacency hardware** command for the **egress** keyword:

```
RP/0/0/CPU0:router# show cef ipv4 adjacency hardware egress detail location 0/2/CPU0

Display protocol is ipv4
Interface    Address                                       Type    Refcount

tt0          Prefix: 0.0.0.0/32                            local   5
             no next-hop adj
             Interface: NULLIFHNDL
             Mac-length is 0
             tunnel interface
             Interface Type: 0x24, Base Flags: 0x2001
             Dependent adj type: remote
             Dependent adj intf: tt0

  TE Flags       : 0x41
  TLU3(temp)  : 0x200b801
  [HW: 0x00000001 0x20020000 0x08000000 0x00080000]
    type         : FWD
    num. entries : 1
    uidb index   : 2
    num. labels  : 0
    label        : 0
    encapsulation : unknown (0x8000000)
    next ptr     : 0x800
  TLU4           : 0x3000800
    Entry[0]
    [HW: 0x00000080 0x0013c48f 0x880b05ea 0x00580000]
      label        : 0
      num. labels  : 0
      local        : 1
      mtu          : 1514
      default sharq : 11
      member link  : 0

Te0/2/0/1                                                  special 2
             Interface: Te0/2/0/1 Type:  glean
             Interface Type: 0x1e, Base Flags: 0x4400
             Dependent adj type: remote
```

```
                Dependent adj intf: Te0/2/0/1
TLU 3 Unavailable
```
This table describes the significant fields shown in the display.

Table 6: show cef ipv4 adjacency hardware Command Field Descriptions

Field	Description
Interface	Interface associated with the prefix.
Address	Prefix address information.
Type	Type of adjacency, can be either local or remote.
Refcount	Number of times the adjacency is referenced by other routers.

show cef ipv4 drops

To display IPv4 Cisco Express Forwarding (CEF) table packet drop counters, use the **show cef ipv4 drops** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 drops** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays IPv4 CEF table packet drop counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

A packet might be dropped from the IPv4 CEF table because of unresolved CEF entries, unsupported features, absence of route information, absence of adjacency information, or an IP checksum error.

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays IPv4 CEF packet drop counters for all nodes.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv4 drops** for location command:

```
RP/0/0/CPU0:router# show cef ipv4 drops

CEF Drop Statistics
Node: 0/0/CPU0
```

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```
Unresolved drops    packets :              0
Unsupported drops   packets :              0
Null0 drops         packets :              0
No route drops      packets :              0
No Adjacency drops  packets :              0
Checksum error drops packets :             0
RPF drops           packets :              0
RPF suppressed drops packets :             0
RP destined drops   packets :              0
```

Table 7: show cef ipv4 drop Command Field Descriptions

Field	Description
Unresolved drops	Drops due to unresolved routes.
Unsupported drops	Drops due to an unsupported feature.
Null0 drops	Drops to the Null0 interface.
No route drops	Number of packets dropped because there were no routes to the destination.
No Adjacency drops	Number of packets dropped because there were no adjacencies established.
Checksum error drops	Drops due to IPv4 checksum error.
RPF drops	Drops due to IPv4 unicast RPF[1].
RPF suppressed drops	Drops suppressed due to IPv4 unicast RPF.
RP destined drops	Drops destined for the router.

[1] RPF = Reverse Path Forwarding

Related Commands

Command	Description
clear cef ipv4 drops, on page 13	Clears IPv4 CEF packet drop counters.

show cef ipv4 exact-route

To display an IPv4 Cisco Express Forwarding (CEF) exact route, use the **show cef ipv4 exact-route** command in EXEC mode.

show cef [**vrf** *vrf-name*]**ipv4 exact-route**{*source-address destination-address*}[**protocol***protocol-name*] [**source-port***source-port*] [**destination-port***destination-port*] [**ingress-interface***type interface-path-id*][*policy-class-value*][**detail** | **location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
source-address	The IPv4 source address in x.x.x.x format.
destination-address	The IPv4 destination address in x.x.x.x format.
protocol *protocol name*	(Optional) Displays the specified protocol for the route.
source-port *source-port*	(Optional) Sets the UDP source port. The range is from 0 to 65535.
destination-port *destination-port*	(Optional) Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	(Optional) Sets the ingress interface.
type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
policy-class *value*	(Optional) Displays the class for the policy-based tunnel selection. The range for the tunnel policy class value is from 1 to 7.
detail	(Optional) Displays full CEF entry information.
location *node-id*	(Optional) Displays the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default No default behavior or values

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	The following keywords were added so that the Layer 4 information can be specified for the exact route: • protocol • source-port • destination-port • ingress-interface The **policy-class** keyword was added to tunnel policy.

Usage Guidelines   If the Layer 4 information is enabled, the source-port, destination-port, protocol, and ingress-interface fields are required. Otherwise, the output of the **show cef ipv4 exact-route** command is not correct.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from the **show cef ipv4 exact-route** command:

```
RP/0/0/CPU0:router# show cef ipv4 exact-route 10.1.1.1 10.1.1.2 detail

0.0.0.0/0, version 432, proxy default, internal 0x2000201[1]
 Prefix Len 0, traffic index 0, precedence routine (0)
   via MgmtEth0/RP1/CPU0/0
```
This table describes the significant fields shown in the display.

Table 8: show cef ipv4 exact-route Command Field Descriptions

Field	Description
Prefix	Prefix in the IPv4 CEF table .
Next Hop	Next hop of the prefix
Interface	Interface associated with the prefix

Related Commands

Command	Description
cef load-balancing fields, on page 5	Selects the hashing algorithm that is used for load balancing when forwarding.
show mpls forwarding exact-route	Displays the path an MPLS flow that comprises a source and destination address would take.

show cef ipv4 exceptions

To display IPv4 Cisco Express Forwarding (CEF) exception packet counters, use the **show cef ipv4 exceptions** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 exceptions** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays CEF exception packet counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines CEF exception packets are those packets that have been sent from the hardware to the software because they require additional handling. The types of IPv4 CEF exception packets are displayed in the command's output and are defined.

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays IPv4 CEF exception packet counters on all nodes.

Task ID

Task ID	Operations
cef	read

Examples The following is sample output from the **show cef ipv4 exceptions** command:

```
RP/0/0/CPU0:router# show cef ipv4 exceptions
```

```
CEF Exception Statistics
Node: 0/0/CPU0
  Slow encap  packets :              0
  Redirect    packets :              0
  Receive     packets :         306404
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :              0
  Fragmented  packets :              0
Node: 0/1/CPU0
  Slow encap  packets :              0
  Redirect    packets :              0
  Receive     packets :              0
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :              0
  Fragmented  packets :              0
Node: 0/2/CPU0
  Slow encap  packets :              0
  Redirect    packets :              0 Receive     packets :              0
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :            314
  Fragmented  packets :              0
Node: 0/3/CPU0
  Slow encap  packets :              0
  Redirect    packets :              0
  Receive     packets :              0
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :              0
  Fragmented  packets :              0
```

This table describes the significant fields shown in the display.

Table 9: show cef ipv4 exceptions Command Field Descriptions

Field	Description
Slow encap	Number of packets requiring special processing during encapsulation.
Redirect	Number of ICMP[2] redirect messages sent.
Receive	Number of packets destined to the router.
Broadcast	Number of broadcasts received.
IP options	Number of IP option packets.
TTL expired	Number of packets with expired TTLs[3].
Fragmented	Number of packets that have been fragmented.

2 ICMP = internet control message protocol

3 TTL = time to live

Related Commands

Command	Description
clear cef ipv4 exceptions, on page 15	Clears IPv4 CEF exception packet counters.

show cef ipv4 hardware

To display Cisco Express Forwarding (CEF) IPv4 hardware status and configuration information, use the **show cef ipv4 hardware** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 hardware** {**egress**| **ingress** [**detail**| **location** *node-id*]}

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

show cef ipv4 interface

To display IPv4 Cisco Express Forwarding (CEF)-related information for an interface, use the **show cef ipv4 interface** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 interface** *type interface-path-id* **[detail]** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.

in terface-path-id	Either a physical interface instance or a virtual interface instance as follows:
	
	• Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
	
	    ◦ *rack*: Chassis number of the rack.
	
	    ◦ *slot*: Physical slot number of the modular services card or line card.
	
	    ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	    ◦ *port*: Physical port number of the interface.
	
	Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.
	
	• Virtual interface instance. Number range varies depending on interface type.
	
	For more information about the syntax for the router, use the question mark (?) online help function.

detail	(Optional) Displays detailed CEF information for all the interfaces on the node in which the command is issued.
location *node-id*	(Optional) Displays IPv4 CEF-related information for an interface. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History	Release	Modification
	Release 3.2	This command was introduced.
	Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, the **show cef ipv4 interface rpf-statistics** command displays the CEF-related information for the interface on the route processor.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv4 interface** command:

```
RP/0/0/CPU0:router# show cef ipv4 interface MgmtEth 0/0/CPU0/0

MgmtEth0/0/CPU0/0 is up (if_handle 0x01000100)
  Forwarding is enabled
  ICMP redirects are never sent
  IP MTU 1500, TableId 0xe0000000
  Reference count 2
```

This table describes the significant fields shown in the display.

Table 10: show cef ipv4 interface Command Field Descriptions

Field	Description
MgmtEth 0/0/CPU0/0 is up	Status of the interface.
if_handle	Internal interface handle.
Forwarding is enabled	Indicates that Cisco Express Forwarding (CEF) is enabled.
ICMP redirects are always sent or never sent	Indicates whether ICMP[4] redirect messages should be sent. By default, ICMP redirect messages are always sent.
IP MTU	Value of the IPv4 MTU[5] size set on the interface.
Reference count	Internal reference counter.

---

4 ICMP = internet control message protocol

5 MTU = maximum transmission unit

show cef ipv4 interface bgp-policy-statistics

To display IPv4 Cisco Express Forwarding (CEF)-related Border Gateway Protocol (BGP) policy statistics information for an interface, use the **show cef ipv4 interface bgp-policy-statistics** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 interface** *type interface-path-id* **bgp-policy-statistics** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Displays IPv4 CEF-related information for an interface. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	The **location** keyword was added.

Usage Guidelines

This command is not supported on ASR 9000 Ethernet Line Cards. This command displays all the configured BGP policy counters for the specified interface.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv4 interface bgp-policy-statistics** command:

```
RP/0/0/CPU0:router# show cef ipv4 interface TenGigE 0/2/0/4 bgp-policy-statistics

TenGigE0/2/0/4 is up
Input BGP policy accounting on src IP address enabled
buckets packets  bytes
0       184054   10157753
6       65688590 4204069760
7       65688590 4204069760
8       65688654 4204073856
9       65688656 4204073984
10      65688655 4204073920
30      32844290 1510837340
31      32844291 1510837386
32      32844294 1510837524
33      32844296 1510837616
34      32844298 1510837708
35      32844302 1510837892
36      32844302 1510837892
37      32844303 1510837938
38      32844305 1510838030
39      32844307 1510838122
Output BGP policy accounting on dst IP address enabled
buckets packets bytes
0       754      43878
Output BGP policy accounting on src IP address enabled
buckets packets bytes
0       857      51706
```

This table describes the significant fields shown in the display.

Table 11: show cef ipv4 interface bgp-policy-statistics Command Field Descriptions

Field	Description
0/2/0/4 is up	Status of the interface.
Input BGP policy accounting on src IP address enabled	Enabled BGP policy accounting features.
buckets	Traffic index.
packets	Number of packets counted in the bucket.
bytes	Number of bytes counted in the bucket.

show cef ipv4 non-recursive

To display the IPv4 nonrecursive prefix entries in the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4 non-recursive** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 non-recursive [detail]** [**hardware** {**egress**| **ingress**}] [*interface-type interface-instance*] [**location** *node-id*]

Syntax Description		
vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
detail	(Optional) Displays detailed information about nonrecursive prefix entries in the IPv4 CEF table.
hardware	(Optional) Displays detailed information about hardware.
egress	(Optional) Displays egress packet switch exchange (PSE).
ingress	(Optional) Displays ingress packet switch exchange (PSE).
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-instance	(Optional) Either a physical interface instance or a virtual interface instance: • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation. ◦ *rack*: Chassis number of the rack. ◦ *slot*: Physical slot number of the line card. ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0. ◦ *port*: Physical port number of the interface. **Note** In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0. • Virtual interface instance. Number range varies depending on interface type. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Displays the IPv4 nonrecursive prefix entries in the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, the output displays the IPv4 CEF nonrecursive routes for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   The following is sample output from the **show cef ipv4 non-recursive** command:

```
RP/0/0/CPU0:routerrouter# show cef ipv4 non-recursive

Prefix              Next Hop            Interface
0.0.0.0/0           1012.8.0.1
0.0.0.0/32          broadcast
10.8.0.0/16         attached            MgmtEth0/0/CPU0/0
10.8.0.0/32         broadcast           MgmtEth0/0/CPU0/0
10.8.0.1/32         12.8.0.1            MgmtEth0/0/CPU0/0
10.8.0.2/32         12.8.0.2            MgmtEth0/0/CPU0/0
10.8.0.3/32         12.8.0.3            MgmtEth0/0/CPU0/0
10.8.16.10/32       12.8.16.10          MgmtEth0/0/CPU0/0
10.8.16.30/32       12.8.16.30          MgmtEth0/0/CPU0/0
10.8.16.40/32       12.8.16.40          MgmtEth0/0/CPU0/0
10.8.28.8/32        12.8.28.8           MgmtEth0/0/CPU0/0
10.8.28.101/32      12.8.28.101         MgmtEth0/0/CPU0/0
10.8.28.103/32      12.8.28.103         MgmtEth0/0/CPU0/0
10.8.28.104/32      12.8.28.104         MgmtEth0/0/CPU0/0
10.8.28.106/32      receive             MgmtEth0/0/CPU0/0
10.8.29.113/32      12.8.29.113         MgmtEth0/0/CPU0/0
10.8.29.118/32      12.8.29.118         MgmtEth0/0/CPU0/0
10.8.29.140/32      12.8.29.140         MgmtEth0/0/CPU0/0
10.8.33.101/32      12.8.33.101         MgmtEth0/0/CPU0/0
10.8.33.103/32      12.8.33.103         MgmtEth0/0/CPU0/0
10.8.33.105/32      12.8.33.105         MgmtEth0/0/CPU0/0
10.8.33.110/32      12.8.33.110         MgmtEth0/0/CPU0/0
10.8.57.1/32        12.8.57.1           MgmtEth0/0/CPU0/0
10.8.255.255/32     broadcast           MgmtEth0/0/CPU0/0
10.29.31.2/32       12.29.31.2          MgmtEth0/0/CPU0/0
10.255.0.0/16         attached          MgmtEth0/0/CPU0/0
10.255.254.254/32   10223.255.254.254    MgmtEth0/0/CPU0/0
10.0.0.0/4            0.0.0.0
```

```
10.0.0.0/24        receive
255.255.255.255/32   broadcast
```
This table describes the significant fields shown in the display.

Table 12: show cef ipv4 non-recursive Command Field Descriptions

Field	Description
Prefix	Nonrecursive prefixes detected on the node.
Next Hop	Routing next hop.
Interface	Interface associated with the nonrecursive prefix.

show cef ipv4 resource

To display the IPv4 nonrecursive prefix entries in the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4 resource** command in EXEC mode.

show cef ipv4 resource [detail] [**hardware** {**egress**| **ingress**}] [**location** *node-id*]

Syntax Description

detail	(Optional) Displays detailed information resources listed in the IPv4 CEF table.
hardware	(Optional) Displays detailed information about hardware.
egress	(Optional) Displays egress packet switch exchange (PSE).
ingress	(Optional) Displays ingress packet switch exchange (PSE).
location *node-id*	(Optional) Displays the IPv4 resource entries in the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The **hardware** keyword was added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, the output displays the IPv4 CEF nonrecursive routes for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   The following is sample output from the **show cef ipv4 resource** command:

```
RP/0/0/CPU0:router# show cef ipv4 resource detail

CEF resource availability summary state: GREEN
  ipv4 shared memory resource:
        CurrMode GREEN, CurrUtil 0%
        CurrAvail 1874526208 bytes, MaxAvail 1875693568 bytes
  ipv6 shared memory resource:
        CurrMode GREEN, CurrUtil 0%
        CurrAvail 1874591744 bytes, MaxAvail 1875365888 bytes
  mpls shared memory resource:
        CurrMode GREEN, CurrUtil 0%
        CurrAvail 1874407424 bytes, MaxAvail 1875038208 bytes
  common shared memory resource:
        CurrMode GREEN, CurrUtil 0%
        CurrAvail 1873215488 bytes, MaxAvail 1874972672 bytes
  TABLE hardware resource: GREEN
  LEAF hardware resource: GREEN
  LOADINFO hardware resource: GREEN
  NHINFO hardware resource: GREEN
  LABEL_INFO hardware resource: GREEN
  IDB hardware resource: GREEN
  FRR_NHINFO hardware resource: GREEN
  LDSH_ARRAY hardware resource: GREEN
  RSRC_MON hardware resource: GREEN
```

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show cef ipv4 summary

To display a summary of the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4 summary** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 summary** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays a summary of the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	The sample output was modified to display the load-balancing field for either Layer 3 or Layer 4.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays a summary of the IPv4 CEF table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output is from the **show cef ipv4 summary** command:

```
RP/0/0/CPU0:router# show cef ipv4 summary
Router ID is
10
```

```
0
.0.0.0

IP CEF with switching (Table Version 0)

  Load balancing: L3
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 367
  193 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 13896 bytes
  204 load sharing elements, 51904 bytes, 154 references
  17 shared load sharing elements, 5536 bytes
  187 exclusive load sharing elements, 46368 bytes
  0 CEF route update drops, 175 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  16 prefixes with label imposition, 51 prefixes with label information
Adjacency Table has 44 adjacencies
  1 incomplete adjacency
```

This table describes the significant fields shown in the display.

Table 13: show cef ipv4 summary Command Field Descriptions

Field	Description
Load balancing	Current load-balancing mode. The default value is L3.
Table Version	Version of the CEF table.
tableid	Table identification number.
vrfid	VPN routing and forwarding (VRF) identification (vrfid) number.
vrfname	VRF name.
vrid	Virtual router identification (vrid) number.
flags	Option value for the table
routes	Total number of routes.
reresolve	Total number of routes being reresolved.
unresolved (*x* old, *x* new)	Number of routes not yet resolved.
load sharing elements	Total number of internal load-sharing data structures.
bytes	Total memory used by internal load sharing data structures.
references	Total reference count of all internal load sharing data structures.
CEF resets	Number of CEF table resets.

Field	Description
revisions of existing leaves	Number of updates to existing prefixes.
Exponential (currently *x*s, peak *x*s)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Adjacency Table has *x* adjacencies	Total number of adjacencies.
x incomplete adjacency	Total number of incomplete adjacencies.

Related Commands

Command	Description
bundle-hash	Displays the path a bundle flow that comprises a source and destination address would take.
cef load-balancing fields, on page 5	Selects the hashing algorithm that is used for load balancing when forwarding.

show cef ipv4 unresolved

To display unresolved routes in the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4 unresolved** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv4 unresolved [detail]** [**hardware** {**egress**| **ingress**}] [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
detail	(Optional) Displays detailed information unresolved routes listed in the IPv4 CEF table.
hardware	(Optional) Displays detailed information about hardware.
egress	(Optional) Displays egress packet switch exchange (PSE).
ingress	(Optional) Displays ingress packet switch exchange (PSE).
location *node-id*	(Optional) Displays the unresolved routes in the IPv4 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	Both the **detail** and **hardware** keywords were added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, the output displays the unresolved routes for the node on which the command is issued.

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Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv4 unresolved** command when an unresolved route is detected:

```
RP/0/0/CPU0:router# show cef ipv4 unresolved

Prefix               Next Hop            Interface
10.3.3.3               102.2.2.2              ?
```

This table describes the significant fields shown in the display.

Table 14: show cef ipv4 unresolved Command Field Descriptions

Field	Description
Prefix	Prefix of the unresolved CEF.
Next Hop	Next hop of the unresolved CEF.
Interface	Next hop interface. A question mark (?) indicates that the interface has not been resolved.

show cef ipv6

To display the IPv6 Cisco Express Forwarding (CEF) table, use the **show cef ipv6** command in EXEC mode.

show cef [**vrf***vrf-name*]**ipv6**[*interface-type interface-number | ipv6-prefix/ prefix-length*] [**detail**] [**location***node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
interface-type interface-number	(Optional) IPv6 prefixes going through the specified next hop interface.
ipv6-prefix/prefix-length	(Optional) Longest prefix entry in the CEF table matching the specified IPv6 prefix and prefix length.
detail	(Optional) Displays detailed IPv6 CEF table information.
location *node-id*	(Optional) Displays the IPv6 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the IPv6 CEF table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

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Examples   The following sample output is from the **show cef ipv6** command:

```
RP/0/0/CPU0:router# show cef ipv6

::/0

::/128
  drop
::1/128
  loopback
66::4/128
  receive      Loopback0
2222::/64
  connected   0/4/0/0
2222::1/128
  receive     0/4/0/0
3333::/64
  connected   0/3/0/0
3333::2/128
  receive     0/3/0/0
5656::2/128
  recursive   fe80::3031:48ff:fe53:5533, 0/3/0/0
7777::/64
  connected   0/0/0/0
7777::2/128
  receive     0/0/0/0
9999::1/128
  recursive   fe80::205:5fff:fe1d:7600, 0/4/0/0
ff00::/8
  drop
ff02::1/128
  receive
ff02::2/128
  receive
ff02::5/128
  receive
ff02::6/128
  receive
ff02::1:ff00:0/104
  receive
```

This table describes the significant fields shown in the display.

Table 15: show cef ipv6 Command Field Descriptions

Field	Description
drop	Indicates that packets sent to the destination prefix are dropped.
loopback	Indicates that the prefix points to a loopback address. Packets sent to loopback addresses are dropped.
receive	Indicates that the prefix is configured on one of the router interfaces. Packets sent to those prefixes are received by the router.
connected	Indicates that the prefix points to a directly connected next-hop interface.

Field	Description
recursive	Indicates that the prefix is not directly connected but is reachable through the next-hop prefix displayed.

The following sample output is from the **show cef ipv6** with the **detail** keyword:

```
RP/0/0/CPU0:router# show cef ipv6 detail


::/0
  flags: source_rib
  Loadinfo owner: <this route>
  fast adj: glean
  path 1:
    flags     :
    next hop  : ::
    interface :
/0/0/0

::/128
  flags: drop, source_fib
  Loadinfo owner: <this route>
  fast adj: drop
  path 1:
    flags     :
    next hop  : ::
    interface : <not specified>

::1/128
  flags: loopback, source_fib
  Loadinfo owner: <this route>
  fast adj: loopback
  path 1:
    flags     :
    next hop  : ::
    interface : <not specified>

66::4/128
  flags: receive, source_rib
  Loadinfo owner: <this route>
  fast adj: receive
  path 1:
    flags     : point-to-point
    next hop  : ::
    interface : Loopback0
```
This table describes the significant output fields shown in the display.

Table 16: show cef ipv6 detail Command Field Descriptions

Field	Description
flags:	Properties of the indicated prefix.
Loadinfo owner:	Owner of the Loadinfo used by the prefix for forwarding. The Loadinfo owner is the prefix that owns the array of pointers to adjacencies.
fast adj:	Cached adjacency used for forwarding.

Field	Description
path 1:	The following three items are displayed below path 1: • flags–Properties of the path. • next hop–Next-hop prefix if the packet is being forwarded. • interface–Next-hop interface if the packet is being forwarded.

show cef ipv6 adjacency

To display Cisco Express Forwarding (CEF) IPv6 adjacency status and configuration information, use the **show cef ipv6 adjacency** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 adjacency** [*interface-type interface-path-id*] [**location** *node-id*] **[detail] [discard] [glean] [null] [punt] [remote]**

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.

interface- path-id	(Optional) Either a physical interface instance or a virtual interface instance:
	
	 • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation.
	
	  ◦ *rack*: Chassis number of the rack.
	
	  ◦ *slot*: Physical slot number of the line card.
	
	  ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	  ◦ *port*: Physical port number of the interface.
	
	 Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.
	
	 • Virtual interface instance. Number range varies depending on interface type.
	
	 For more information about the syntax for the router, use the question mark (?) online help function.

location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
detail	(Optional) Displays the detailed adjacency information.
discard	(Optional) Filters out and displays only the discarded adjacency information.
glean	(Optional) Filters out and displays only the glean adjacency information.
null	(Optional) Filters out and displays only the null adjacency information.
punt	(Optional) Filters out and displays only the punt adjacency information.

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remote	(Optional) Filters out and displays only the remote adjacency information.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the CEF adjacency table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples The following sample output is from the **show cef ipv6 adjacency** command:

```
RP/0/0/CPU0:router# show cef ipv6 adjacency
```
This is a sample output from the **show cef ipv6 adjacency remote detail** command:

```
RP/0/0/CPU0:router# show cef ipv6 adjacency remote detail location 0/3/CPU0

Display protocol is ipv6
Interface    Address                                        Type    Refcount

Te0/2/0/3    Ifhandle: 0x8000240                            remote  2
             Adjacency: PT:0xa1bed9e4
             Interface: Te0/2/0/3
             Interface Type: 0x0, Base Flags: 0x0 (0xa55f3114)
             Nhinfo PT: 0xa55f3114, Idb PT: 0xa2d850d8, If Handle: 0x8000240
             Ancestor If Handle: 0x0


tt103        Ifhandle: 0x120                                remote  1
             no next-hop adj
             Interface: NULLIFHNDL
             tunnel adjacency
             Interface Type: 0x24, Base Flags: 0x200 (0xa61ddc30)
             Nhinfo PT: 0xa61ddc30, Idb PT: 0xa2d851d8, If Handle: 0x120
             Ancestor If Handle: 0x0


tt2993       Ifhandle: 0xf9a0                               remote  1
             no next-hop adj
             Interface: NULLIFHNDL
             tunnel adjacency
```

```
                         Interface Type: 0x24, Base Flags: 0x200 (0xa65634f0)
                         Nhinfo PT: 0xa65634f0, Idb PT: 0xa2d94a58, If Handle: 0xf9a0
                         Ancestor If Handle: 0x0


         tt2994          Ifhandle: 0xf9e0                            remote   1
                         no next-hop adj
                         Interface: NULLIFHNDL
                         tunnel adjacency
                         Interface Type: 0x24, Base Flags: 0x200 (0xa65641e0)
                         Nhinfo PT: 0xa65641e0, Idb PT: 0xa2d94a98, If Handle: 0xf9e0
                         Ancestor If Handle: 0x0


         tt2995          Ifhandle: 0xfa20                            remote   1
                         no next-hop adj
                         Interface: NULLIFHNDL
                         tunnel adjacency
                         Interface Type: 0x24, Base Flags: 0x200 (0xa6564350)
                         Nhinfo PT: 0xa6564350, Idb PT: 0xa2d94ad8, If Handle: 0xfa20
                         Ancestor If Handle: 0x0
```

show cef ipv6 adjacency hardware

To display Cisco Express Forwarding (CEF) IPv6 adjacency hardware status and configuration information, use the **show cef ipv6 adjacency hardware** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 adjacency hardware** {**egress**| **ingress**} [**detail**| **discard**| **drop**| **glean**| **location** *node-id*| **null**| **punt**| **remote**]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
discard	(Optional) Displays the discard adjacency information.
drop	(Optional) Displays the drop adjacency information.
glean	(Optional) Displays the glean adjacency information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output is from the **show cef ipv6 adjacency hardware** command:

```
RP/0/0/CPU0:router# show cef ipv6 adjacency hardware
```

show cef ipv6 drops

To display IPv6 Cisco Express Forwarding (CEF) table packet drop counters, use the **show cef ipv6 drops** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 drops** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays IPv6 CEF table packet drop counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

A packet might be dropped by the IPv6 CEF table because of unresolved CEF entries, unsupported features, absence of route information, absence of adjacency information, or an IP checksum error.

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the packet drops for all nodes.

Note Because no hardware forwarding occurs on the route processor (RP), no packet drop information is displayed for that node.

Task ID

Task ID	Operations
cef	read

Examples   The following is sample output from the **show cef ipv6 drops** command:

```
RP/0/0/CPU0:router# show cef ipv6 drops location 0/2/CPU0

 IPv6 CEF Drop Statistics
  Line status down      ingress :                0 egress :  Not Applicable
  Packet sanity fail    ingress :                0 egress :               0
  PLU set to drop       ingress :                0 egress :               0
  Unknown type,plu drop ingress :                0 egress :               0
  Packet length err     ingress :                0 egress :               0
  TCAM src-comp err     ingress :                0 egress :               0
```
This table describes the significant fields shown in the display.

Table 17: show cef ipv6 drop Command Field Descriptions

Field	Description
Line status down	Packet drops due to the line protocol of the incoming interface being down.
Packet sanity fail	Packet drops due to the prefix failing the IPv6 sanity test. The sanity test verifies that the IPv6 packet is valid.
PLU set to drop	Packet drops due the IPv6 destination prefix being set to drop.
Unknown type, plu drop	Packet drops due to the prefix being of an unknown type.
Packet length errs	Length specified in the header does not match the actual length of the packet received.
TCAM src-comp err	Packet drops due to source compression errors that have occurred in the hardware.

```
RP/0/0/CPU0:router# show cef ipv6 drops location 0/RSP0/CPU0

CEF Drop Statistics
Node: 0/RSP0/CPU0
Unresolved drops      packets :                0
Unsupported drops     packets :                0
Null0 drops           packets :                0
No route drops        packets :                0
No Adjacency drops    packets :                0
Checksum error drops packets :                 0
RPF drops             packets :                0
RPF suppressed drops packets :                 0
RP destined drops     packets :                0
Discard drops         packets :                0
GRE lookup drops      packets :                0
GRE processing drops packets :
```

Table 18: show cef ipv6 drops Command Field Descriptions

Field	Description
Unresolved drops	Drops due to unresolved routes.
Unsupported drops	Drops due to an unsupported feature.
Null0 drops	Drops to the Null0 interface.
No route drops	Number of packets dropped because there were no routes to the destination.
No Adjacency drops	Number of packets dropped because there were no adjacencies established.
Checksum error drops	Drops due to IPv6 checksum error.
RPF drops	Drops due to IPv6 unicast RPF[6].
RPF suppressed drops	Drops suppressed due to IPv4 unicast RPF.
RP destined drops	Drops destined for the router.
Discard drops	Drops that were discarded.
GRE lookup drops	
GRE processing drops	

6   RPF = Reverse Path Forwarding

Related Commands

Command	Description
clear cef ipv6 drops, on page 21	Clears IPv6 CEF packet drop counters.

show cef ipv6 exact-route

To display the path an IPv6 flow comprising a source and destination address would take, use the **show cef ipv6 exact-route** command in EXEC mode.

show cef [vrf *vrf-name* **]ipv6 exact-route**{*source-address destination-address* } **[protocol name][source-port] [destination-port] [ingress-interface** *type interface-path-id* **][policy-class** *value***][detail | location** *node-id]*

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
source-address	The IPv6 source address in x:x::x format.
destination-address	The IPv6 destination address in x:x::x format.
protocol *protocol name*	(Optional) Displays the specified protocol for the route.
source-port *source-port*	(Optional) Sets the UDP source port. The range is from 0 to 65535.
destination-port *destination-port*	(Optional) Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	(Optional) Sets the ingress interface.
type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
policy-class *value*	(Optional) Displays the class for the policy-based tunnel selection. The range for the tunnel policy class value is from 1 to 7.
detail	(Optional) Displays full CEF entry information.
location *node-id*	(Optional) Displays the IPv6 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	The following keywords were added so that the Layer 4 information can be specified for the exact route:
	• protocol
	• source-port
	• destination-port
	• ingress-interface
	The **policy-class** keyword was added to tunnel policy.

Usage Guidelines   If the Layer 4 information is enabled, the source-port, destination-port, protocol, and ingress-interface fields are required. Otherwise, the output of the **show cef ipv6 exact-route** command is not correct.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from the **show cef ipv6 exact-route** command:

```
RP/0/0/CPU0:router# show cef ipv6 exact-route 222::2 9999::6751 location

0/3/CPU0 source address: 222::2 destination address: 9999::6751
interface : 0/3/0/3 non local interface
```

Related Commands

Command	Description
cef load-balancing fields, on page 5	Selects the hashing algorithm that is used for load balancing when forwarding.

show cef ipv6 exceptions

To display IPv6 Cisco Express Forwarding (CEF) exception packet counters, use the **show cef ipv6 exceptions** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 exceptions** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays IPv6 CEF exception packet counters for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

CEF exception packets are those packets that have been sent from the hardware to the software because they require additional handling. The types of IPv6 CEF exception packets are displayed in the output of **show cef ipv6 exceptions**.

If you do not specify a node with **location** keyword and *node-id* argument, this command displays IPv6 CEF exception packet counters for all nodes.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv6 exceptions** command:

```
RP/0/0/CPU0:router# show cef ipv6 exceptions location 0/3/CPU0
```

```
IPv6 CEF Exception Statistics
Node: 0/3/CPU0
  TTL err             ingress :              0 egress :  Not Applicable
  Link-local dst addr   ingress :              0 egress :              0
  Hop-by-Hop header     ingress :              0 egress :              0
  PLU entry set to punt ingress :              0 egress :              0
  Packet too big        ingress :  Not Applicable egress :              0
  Med priority punt     ingress :              0 egress :  Not Applicable
```

This table describes the significant fields shown in the display.

Table 19: show cef ipv6 exceptions Command Field Descriptions

Field	Description
TTL err	Packets sent to software for processing because the packet header of the IPv6 prefix had a TTL[7] error.
Link-local dst addr	Packets sent to the software for processing because the destination address of the IPv6 prefix is link local.
Hop-by-Hop header	Packets sent to the software for processing because the IPv6 packet has a hop-by-hop header.
PLU entry set to punt	Packets sent to software for processing because the IPv6 prefix is set to punt.
Packet too big	Packets sent to the software for processing because the packet size exceeded the MTU[8].
Med priority punt	Field used internally for troubleshooting.

[7] TTL = time to live

[8] MTU = maximum transmission unit

Related Commands

Command	Description
clear cef ipv6 exceptions, on page 23	Clears IPv6 CEF exception packet counters.

show cef ipv6 hardware

To display Cisco Express Forwarding (CEF) IPv6 hardware status and configuration information, use the **show cef ipv6 hardware** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 hardware** {**egress**| **ingress** [**detail**| **location** *node-id*]}

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output displays the full details from the **show cef ipv6 hardware** command:

```
RP/0/0/CPU0:router# show cef ipv6 hardware egress detail

::/0, version 0, proxy default, default route handler, drop adjacency, internal
```

```
 Prefix Len 0, traffic index 0, precedence routine (0)
  gateway array (0x0) reference count 1, flags 0x4000, source 4,
                 [0 type 3 flags 0x109000 (0x7895114c) ext 0x0 (0x0)]
   LW-LDI[type=3, refc=1, ptr=0x78a7d0dc, sh-ldi=0x7895114c]
    via point2point, 0 dependencies, weight 0, class 0
      next hop point2point
       drop adjacency


      Load distribution: 0 (refcount 0)

      Hash  OK  Interface                 Address
       0    Y   Unknown                   drop
ff02::/16, version 0, receive
  Prefix Len 16
ff02::2/128, version 0, receive
  Prefix Len 128
ff02::1:ff00:0/104, version 0, receive
  Prefix Len 104
```

show cef ipv6 interface

To display IPv6 Cisco Express Forwarding (CEF)-related information for an interface, use the **show cef ipv6 interface** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 interface** *type interface-path-id* **[detail]** [**location** *node-id*]**[rpf-drop]**

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
detail	(Optional) Displays detailed CEF information for all the interfaces on the node in which the command is issued.
location *node-id*	(Optional) Displays IPv4 CEF-related information for an interface. The *node-id* argument is entered in the *rack/slot/module* notation.
rpf-drop	(Optional) Displays information about the drops due to IPv6 unicast RPF.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, the **show cef ipv6 interface** command displays the CEF-related information for the interface on the route processor.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output is from the **show cef ipv6 interface** command:

```
RP/0/0/CPU0:router# show cef ipv6 interface
```

show cef ipv6 interface bgp-policy-statistics

To display IPv6 Cisco Express Forwarding (CEF)-related BGP policy statistics information for an interface, use the **show cef ipv6 interface bgp-policy-statistics** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 interface** *type interface-path-id* **bgp-policy-statistics** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.6.0	The **location** keyword was added.

Usage Guidelines

The **show cef ipv6 interface bgp-policy-statistics** command displays all the configured BGP policy counters for the specified interface.

Task ID

Task ID	Operations
cef	read

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

Examples

The following sample output is from the **show cef ipv6 interface bgp-policy-statistics** command:

```
RP/0/0/CPU0:router# show cef ipv6 interface bgp-policy-statistics
```

show cef ipv6 interface rpf-statistics

To display IPv6 Cisco Express Forwarding (CEF)-related Unicast Reverse Path Forwarding (RPF) statistics information for an interface, use the **show cef ipv6 interface rpf-statistics** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 interface** *type interface-path-id* **rpf-statistics** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.
in terface-path-id	Either a physical interface instance or a virtual interface instance as follows:

- Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
  - ◦ *rack*: Chassis number of the rack.
  - ◦ *slot*: Physical slot number of the modular services card or line card.
  - ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
  - ◦ *port*: Physical port number of the interface.

  Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.

- Virtual interface instance. Number range varies depending on interface type.

  For more information about the syntax for the router, use the question mark (?) online help function.

location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from the **show cef ipv6 interface rpf-statistics** command:

```
RP/0/0/CPU0:router# show cef ipv6 interface POS 0/1/0/0 rpf-statistics
```

show cef ipv6 non-recursive

To display the IPv6 nonrecursive prefix entries in the IPv6 Cisco Express Forwarding (CEF) table, use the **show cef ipv6 non-recursive** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 non-recursive** [**hardware** {**egress**| **ingress**}] [**detail**] [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
hardware	(Optional) Displays Cisco Express Forwarding (CEF) IPv6 hardware status and configuration information.
egress	(Optional) Displays information from the egress packet switch exchange (PSE) file.
ingress	(Optional) Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
location *node-id*	(Optional) Displays the nonrecursive prefix entries in the IPv6 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	Both the **hardware** and **detail** keywords were added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the nonrecursive routes for the node on which the command is issued.

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv6 non-recursive** command:

```
RP/0/0/CPU0:router# show cef ipv6 non-recursive

::/0

::/128
  drop
::1/128
  loopback
66::4/128
  receive    Loopback0
2222::/64
  connected  0/4/0/0
2222::1/128
  receive    0/4/0/0
3333::/64
  connected  0/3/0/0
3333::2/128
  receive    0/3/0/0
7777::/64
  connected  0/0/0/0
7777::2/128
  receive    0/0/0/0
ff00::/8
  drop
ff02::1/128
  receive
ff02::2/128
  receive
ff02::5/128
  receive
ff02::6/128
  receive
ff02::1:ff00:0/104
  receive
```

This table describes the significant fields shown in the display.

Table 20: show cef ipv6 non-recursive Command Field Descriptions

Field	Description
drop	Indicates that packets sent to the destination prefix are dropped.
loopback	Indicates that the prefix points to a loopback address. Packets sent to loopback addresses are dropped.
receive	Indicates that the prefix is configured on one of the router interfaces. Packets sent to those prefixes are received by the router.

Field	Description
connected	Indicates that the prefix points to a directly connected next-hop interface.

show cef ipv6 resource

To display the IPv6 nonrecursive prefix entries in the IPv6 Cisco Express Forwarding (CEF) table, use the **show cef ipv6 resource** command in EXEC mode.

show cef ipv6 resource [detail] [**hardware** {**egress**| **ingress**}] [**location** *node-id*]

Syntax Description

detail	(Optional) Displays detailed information resources listed in the IPv6 CEF table.
hardware	(Optional) Displays Cisco Express Forwarding (CEF) IPv6 hardware status and configuration information.
egress	(Optional) Displays information from the egress packet switch exchange (PSE) file.
ingress	(Optional) Displays information from the ingress packet switch exchange (PSE) file.
location *node-id*	(Optional) Displays the IPv6 resource entries in the IPv6 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, the output displays the IPv6 CEF nonrecursive routes for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   The following is sample output from the **show cef ipv6 resource** command:

```
RP/0/0/CPU0:router# show cef ipv6 resource

CEF resource availability summary state: GREEN
  ipv4 shared memory resource: GREEN
  ipv6 shared memory resource: GREEN
  mpls shared memory resource: GREEN
  common shared memory resource: GREEN
  TABLE hardware resource: GREEN
  LEAF hardware resource: GREEN
  LOADINFO hardware resource: GREEN
  NHINFO hardware resource: GREEN
  LABEL_INFO hardware resource: GREEN
  IDB hardware resource: GREEN
  FRR_NHINFO hardware resource: GREEN
  LDSH_ARRAY hardware resource: GREEN
  RSRC_MON hardware resource: GREEN
```

show cef ipv6 summary

To display a summary of the IPv6 Cisco Express Forwarding (CEF) table, use the **show cef ipv6 summary** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 summary** [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
location *node-id*	(Optional) Displays a summary of the IPv6 CEF table for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	The sample output was modified to display the load-balancing field for either Layer 3 or Layer 4.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays a summary of the IPv6 CEF table for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show cef ipv6 summary** command:

```
RP/0/0/CPU0:router# show cef ipv6 summary

IP CEF with switching (Table Version 0)
```

```
       Load balancing: L3
       Tableid 0xe0800000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
       Vrfname default, Refcount 12
       4 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 288 bytes
       0 load sharing elements, 0 bytes, 0 references
       0 shared load sharing elements, 0 bytes
       0 exclusive load sharing elements, 0 bytes
       0 CEF route update drops, 0 revisions of existing leaves
       Resolution Timer: 15s
       0 prefixes modified in place
       0 deleted stale prefixes
       0 prefixes with label imposition, 0 prefixes with label information
Adjacency Table has 44 adjacencies
       1 incomplete adjacency
```

This table describes the significant fields shown in the display.

Table 21: show cef ipv6 summary Command Field Descriptions

Field	Description
Load balancing	Current load-balancing mode. The default value is L3.
Table Version	Version of the CEF table.
routes	Total number of routes.
unresolved (*x* old, *x* new)	Number of routes not yet resolved.
load sharing elements	Total number of internal load-sharing data structures.
bytes	Total memory used by internal load sharing data structures.
references	Total reference count of all internal load sharing data structures.
CEF resets	Number of CEF table resets.
revisions of existing leaves	Number of updates to existing prefixes.
Exponential (currently *x*s, peak *x*s)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Router ID	Router identification.
Adjacency Table has *x* adjacencies	Total number of adjacencies.
x incomplete adjacency	Total number of incomplete adjacencies.

Related Commands

Command	Description
bundle-hash	Displays the path a bundle flow that comprises a source and destination address would take. For more information, see *Cisco IOS XR Interface and Hardware Component Command Reference for the Cisco XR 12000 Series Router*

show cef ipv6 unresolved

To display the unresolved routes in the IPv6 Cisco Express Forwarding (CEF) table, use the **show cef ipv6 unresolved** command in EXEC mode.

show cef [**vrf** *vrf-name*] **ipv6 unresolved [detail]** [**hardware** {**egress**| **ingress**}] [**location** *node-id*]

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
detail hardware	(Optional) Displays full details.
	(Optional) Displays Cisco Express Forwarding (CEF) IPv6 hardware status and configuration information.
hardware egress	(Optional) Displays Cisco Express Forwarding information from the egress packet switch exchange (CEF PSE) IPv6 hardware status and configuration information file .
egress ingress	(Optional) Displays information from the egress ingress packet switch exchange (PSE) file.
ingress detail	(Optional) Displays information from the ingress packet switch exchange (PSE) file full details .
location *node-id*	(Optional) Displays the unresolved routes in the IPv6 CEF table for the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the unresolved routes for the node on which the command is issued.

Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router, Release 4.3.x

Task ID

Task ID	Operations
cef	read

Examples

This following is sample output from **show cef ipv6 unresolved** command when an unresolved route is detected:

```
RP/0/0/CPU0:router# show cef ipv6 unresolved

9999::/64
  unresolved
```

This table describes the significant fields shown in the display.

Table 22: show cef ipv6 unresolved Command Field Descriptions

Field	Description
xxxx::/xx	Detected unresolved route.

show cef mpls adjacency

To display the Multiprotocol Label Switching (MPLS) adjacency table, use the **show cef mpls adjacency** command in EXEC mode.

show cef mpls adjacency [*interface-type interface-path-id*] [**detail| discard| drop| glean| null| punt| remote**] [**location** *node-id*]

Syntax Description

interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.

interface- path-id	(Optional) Either a physical interface instance or a virtual interface instance:
	
	 • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash mark between values is required as part of the notation.
	
	   ◦ *rack*: Chassis number of the rack.
	
	   ◦ *slot*: Physical slot number of the line card.
	
	   ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	   ◦ *port*: Physical port number of the interface.
	
	 Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.
	
	 • Virtual interface instance. Number range varies depending on interface type.
	
	 For more information about the syntax for the router, use the question mark (?) online help function.

detail	(Optional) Displays full details.
discard	(Optional) Displays the discard adjacency information.
drop	(Optional) Displays the drop adjacency information.
glean	(Optional) Displays the glean adjacency information.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
remote	(Optional) Displays the remote adjacency information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The following keywords were added: • detail • discard • drop • glean • null • punt • remote

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, the **show cef mpls adjacency** command displays the MPLS adjacency table for the node in which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples   This following is sample output from **show cef mpls adjacency** command:

```
RP/0/0/CPU0:router# show cef mpls adjacency
```

Related Commands

Command	Description
show cef mpls adjacency hardware, on page 124	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.

Command	Description
show cef mpls interface, on page 126	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 128	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls adjacency hardware

To display the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information, use the **show cef mpls adjacency hardware** command in EXEC mode.

show cef mpls adjacency hardware {**egress**| **ingress**} [**detail**| **discard**| **drop**| **glean**| **location** *node-id*| **null**| **punt**| **remote**]

Syntax Description

egress	Displays information from the egress packet switch exchange (PSE) file.
ingress	Displays information from the ingress packet switch exchange (PSE) file.
detail	(Optional) Displays full details.
discard	(Optional) Displays the discard adjacency information.
drop	(Optional) Displays the drop adjacency information.
glean	(Optional) Displays the glean adjacency information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

This following is sample output from **show cef mpls adjacency hardware** command:

```
RP/0/0/CPU0:router# show cef mpls adjacency hardware
```

Related Commands

Command	Description
show cef mpls adjacency, on page 121	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls interface, on page 126	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 128	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls interface

To display the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface, use the **show cef mpls interface** command in EXEC mode.

show cef mpls interface *type interface-path-id* **[detail]** [**location** *node-id*]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.

in terface-path-id	Either a physical interface instance or a virtual interface instance as follows:
	
	• Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
	
	  ◦ *rack*: Chassis number of the rack.
	
	  ◦ *slot*: Physical slot number of the modular services card or line card.
	
	  ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.
	
	  ◦ *port*: Physical port number of the interface.
	
	Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.
	
	• Virtual interface instance. Number range varies depending on interface type.
	
	For more information about the syntax for the router, use the question mark (?) online help function.

detail	(Optional) Displays detailed CEF information for all the interfaces on the node in which the command is issued.
location *node-id*	(Optional) Displays IPv4 CEF-related information for an interface. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines   If you do not specify a node with the **location** keyword and *node-id* argument, the **show cef mpls interface** command displays the CEF-related information for the interface on the route processor.

Task ID

Task ID	Operations
cef	read

Examples   The following sample output is from the **show cef mpls interface** command:

```
RP/0/0/CPU0:router# show cef mpls interface
```

Related Commands

Command	Description
show cef mpls adjacency, on page 121	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 124	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls unresolved, on page 128	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls unresolved

To display the Multiprotocol Label Switching (MPLS) unresolved routes, use the **show cef mpls unresolved** command in EXEC mode.

show cef mpls unresolved [detail] [**location** *node-id*]

Syntax Description

detail	(Optional) Displays detailed adjacency information, including Layer 2 information.
location *node-id*	(Optional) Displays detailed CEF information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output is from the **show cef mpls unresolved** command:

```
RP/0/0/CPU0:router# show cef mpls unresolved

Label/EOS        Next Hop           Interface
20001/0
20001/1
```
This table describes the significant fields shown in the display.

Table 23: show cef mpls unresolved Command Field Descriptions

Field	Description
Label/EOS	MPLS forwarding label/End of Stack (EOS) bit.
Next Hop	Next hop of the prefix.
Interface	Interface associated with the prefix.

Related Commands

Command	Description
show cef mpls adjacency, on page 121	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 124	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls interface, on page 126	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.

show cef vrf

To display the contents of the VPN routing and forwarding (VRF) instance, use the **show cef vrf** command in EXEC mode.

show cef vrf [*vrf-name*]

Syntax Description

vrf-name	Name of the VRF instance.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines   To display unresolved routes, you must use the **unresolved** keyword explicitly.

Task ID

Task ID	Operations
cef	read

Examples   This following is sample output from **show cef vrf** command when an unresolved route is detected:

```
RP/0/0/CPU0:router# show cef vrf 0

Prefix             Next Hop            Interface
0.0.0.0/0          drop                default handler
0.0.0.0/32         broadcast
224.0.0.0/4        0.0.0.0
224.0.0.0/24       receive
255.255.255.255/32 broadcast
```

This table describes the significant fields shown in the display.

Table 24: show cef vrf Command Field Descriptions

Field	Description
Prefix	Prefix in the IPv4 CEF table.

Field	Description
Next Hop	Next hop of the prefix.
Interface	Interface associated with the prefix.