



Cisco Express Forwarding Commands



Note All commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router that is introduced from Cisco IOS XR Release 6.3.2. References to earlier releases in Command History tables apply to only the Cisco NCS 5500 Series Router.



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- Note**
- Starting with Cisco IOS XR Release 6.6.25, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 560 Series Routers.
 - Starting with Cisco IOS XR Release 6.3.2, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router.
 - References to releases before Cisco IOS XR Release 6.3.2 apply to only the Cisco NCS 5500 Series Router.
 - Cisco IOS XR Software Release 7.0.1 specific updates are not applicable for the following variants of Cisco NCS 540 Series Routers:
 - N540-28Z4C-SYS-A
 - N540-28Z4C-SYS-D
 - N540X-16Z4G8Q2C-A
 - N540X-16Z4G8Q2C-D
 - N540X-16Z8Q2C-D
 - N540-12Z20G-SYS-A
 - N540-12Z20G-SYS-D
 - N540X-12Z16G-SYS-A
 - N540X-12Z16G-SYS-D
-

This chapter describes the commands used to configure and monitor Cisco Express Forwarding (CEF) on NCS 5000 routers.

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

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cef adjacency route override rib

Use this command to enable CEF prefer Adjacency Information Base (AIB) prefixes over Routing Information Base (RIB) prefixes in the Global configuration mode. To disable CEF prefer AIB prefixes over RIB prefixes, use the **no** form of this command.

cef adjacency route override rib

no cef adjacency route override rib

Syntax Description

route	Enables adjacency route configuration
override	Sets override options for the adjacency routes.
rib	Sets options for adjacency routes to override the RIB routes.

Command Default

By default, CEF prefers RIB prefixes over AIB prefixes.

Command Modes

Global configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

CEF may prefer the L2 adjacency for forwarding over the RIB (routing) entry under the following conditions:

- When there is no local ARP entry (yet).
ARP learning may result in the router creating a forwarding entry.
- A forwarding entry of /32 (or /128 for IPv6) RIB routes are overridden when there is a covering connected or attached route.
If an interface has a larger subnet, and you want to redirect a /32 out of that subnet of a different interface via a static route.

This can be seen in scenarios of EVPN and or HSRP, or in bridge domains with a BVI and multiple EFP's.

To deviate from the behavior of preferring a L2 adjacency for forwarding over a route entry, use the **cef adjacency route override rib** command.

Task ID

Task ID	Operation
cef	read, write

Example

The following example shows how to override the CEF adjacency route:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef adjacency route override rib
```

cef load-balancing

To configure load-balancing parameters, use the **cef load-balancing** command in Global configuration mode. To enable the default CEF load-balancing behavior, use the **no** form of this command.

```
cef load-balancing { mode hierarchical { ucmp group-size | ecmp min-path } <range> |
recursive oor mode dampening-and-dlb [ dampening resource-threshold <percentage> | dlb
resource-threshold <percentage> | max-duration <secs> ] }
```

Syntax Description	Parameter	Description
	mode	Specifies the mode as hierarchical.
	hierarchical	Specifies the configuration for multi-level load balancing in CEF.
	ucmp	Specifies the ucmp parameters for CEF load-balancing configuration.
	group-size	Enables ucmp group size for hierarchical load balancing (HLB).
	ecmp	Specifies the ecmp parameters for CEF load-balancing configuration.
	min-path	Specifies the minimum number of paths required for hierarchical ecmp load balancing.
	<i>range</i>	Specifies the range of values for configuring the group size for ucmp and minimum paths for ecmp in hierarchical load balancing. The routers supports the values ranging from 1 to 128.
	recursive	Enables recursive route configuration.
	oor	Enables oor configuration.
	dlb	Specifies the dynamic load balancing (DLB) parameter in CEF load balancing.
	dampening-and-dlb	Enables dampening and dlb mode for oor handling.
	dampening	Configure dampening mode parameters.
	resource-threshold	Specifies the resource threshold percentage to enable dynamic load-balancing mode.
	<i>percentage</i>	Specifies the threshold percentage for enabling FIB dampening and DLB features.
	max-duration	Specifies the maximum duration time configuration for dampening and dynamic load balancing in CEF load balancing.
	<i>secs</i>	Specifies the maximum duration time, in seconds, for configuring dampening and dynamic load balancing in CEF load balancing. You can configure the time range from 1 to 600 seconds.

Command Default None

Command Modes Global configuration

Command History	Release	Modification
	Release 24.2.1	This command was introduced.

Usage Guidelines

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

The **cef load-balancing mode hierarchical ecmp min-paths** command is a replacement for the **cef hierarchical-load-balancing ecmp min-paths** command.

If the number of paths exceeds 128, HLB is automatically applied.

The **cef load-balancing mode hierarchical ucmp group-size** command is a replacement for the **cef hierarchical-load-balancing ucmp group-size** command.

Task ID	Task ID	Operation
	cef	read, write

Example

The following example shows how to enable FIB dampening and DLB features with default values of dampening threshold percentage and max switchover duration and dlb threshold percentage as (70%, 300 sec, 90%)

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef load-balancing recursive oor mode dampening-and-dlb
```

The following example shows how to enable FIB dampening and DLB features with default values of dampening threshold percentage and max switchover duration and dlb threshold percentage as (70%, 90%).

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef load-balancing recursive oor mode dampening-and-dlb max-duration
600
```

The following example shows how to configure dampening and dynamic load balancing with specified resource-threshold for dampening and dlb each and maximum duration for switchover time.



Note The dampening threshold value should be lower than the DLB threshold.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef load-balancing recursive oor mode dampening-and-dlb dampening
resource-threshold 99 max-duration 600 dlb resource-threshold 99
```

The following example shows how to configure the group size for ucmp in hierarchical load balancing

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef load-balancing mode hierarchical ucmp group-size 128
```

The following example shows how to configure the minimum paths for hierarchical ecmp load balancing.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router# cef load-balancing mode hierarchical ecmp min-path 128
```

clear cef ipv4 drops

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

clear cef ipv4 drops location *node-id*

Syntax Description	location <i>node-id</i> Clears IPv4 packet drop counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--

Command Default	No default behavior or values
------------------------	-------------------------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> 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/RP0/CPU0:

```
RP/0/RP0/CPU0:router# show cef ipv4 drops
```

```
CEF Drop Statistics
Node: 0/RP0/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 :           0
  LISP punt drops       packets :           0
  LISP encap err drops  packets :           0
  LISP decap err drops  packets :           0
```

```
Node: 0/RP1/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 :      0
  LISP punt drops       packets :      0
  LISP encap err drops  packets :      0
  LISP decap err drops  packets :      0
```

```
RP/0/RP0/CPU0:router# clear cef ipv4 drops location 0/RP0/CPU0
```

```
Node: 0/RP0/CPU0
Clearing CEF Drop Statistics
```

clear cef ipv4 exceptions

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

clear cef ipv4 exceptions location *node-id*

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

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> 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/RP0/CPU0:

```
RP/0/RP0/CPU0:router# show cef ipv4 exceptions
```

```
CEF Exception Statistics
Node: 0/RP0/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/RP1/CPU0
  Slow encap packets :          3
  Unsupported packets :          0
  Redirect packets   :          0
  Receive packets   :        12787
  Broadcast packets  :        74814
```

```
IP options packets :          0
TTL expired packets :          0
Fragmented packets :          0
```

```
RP/0/RP0/CPU0:router# clear cef ipv4 exceptions location 0/RP0/CPU0
```

```
Node: 0/RP0/CPU0
```

```
Clearing CEF Exception Statistics
```

clear cef ipv6 drops

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

clear cef ipv6 drops location *node-id*

Syntax Description	location <i>node-id</i> Clears IPv6 packet drop counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	XR EXEC mode
----------------------	--------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> 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/RP0/CPU0:

```
RP/0/RP0/CPU0:router# show cef ipv6 drops
```

```
CEF Drop Statistics
Node: 0/RP0/CPU0
  Unresolved drops   packets :      0
  Unsupported drops  packets :      0
  Null0 drops        packets :      0
  No route drops     packets :      1
  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 :      0
  LISP punt drops    packets :      0
  LISP encap err drops packets :      0
```

```
LISP decap err drops packets :          0
Node: 0/RP1/CPU0
  Unresolved drops      packets :          0
  Unsupported drops     packets :          0
  Null0 drops           packets :          0
  No route drops        packets :          1
  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 :          0
  LISP punt drops       packets :          0
  LISP encap err drops  packets :          0
  LISP decap err drops  packets :          0
```

```
RP/0/RP0/CPU0:router# clear cef ipv6 drop
```

```
Node: 0/RP0/CPU0
Clearing CEF Drop Statistics
```

clear cef ipv6 exceptions

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

clear cef ipv6 exceptions location *node-id*

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

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	XR EXEC mode
----------------------	--------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> 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/RP0/CPU0:router# show cef ipv6 exceptions

CEF Exception Statistics
Node: 0/RP0/CPU0
  Slow encap packets :           0
  Unsupported packets :           0
  Redirect packets   :           0
  Receive packets   :            1
  Broadcast packets  :           0
  IP options packets :           0
  TTL expired packets :           0
  Fragmented packets :           0

Node: 0/RP1/CPU0
  Slow encap packets :           0
  Unsupported packets :           0
  Redirect packets   :           0
  Receive packets   :            7
```

```
Broadcast packets :          0
IP options packets :         0
TTL expired packets :        0
Fragmented packets :         0
```

```
RP/0/RP0/CPU0:router# clear cef ipv6 exceptions location 0/RP0/CPU0
```

```
Node: 0/RP0/CPU0
Clearing CEF Exception Statistics
```

hw-module fib bgppa stats-mode

To enable the BGP policy accounting on the main interface or on the sub interface, run the **hw-module fib bgppa stats-mode** command with the **main-intf** or the **sub-intf** keywords respectively.

hw-module fib bgppa stats-mode {main-intf | sub-intf}

Syntax Description	bgppa BGP policy accounting
	stats-mode Stats accounting mode
	main-intf Account the BGP policy accounting stats for the main interface.
	sub-intf Account the BGP policy accounting stats for the sub interface.

Command Default None

Command Modes Interface configuration

Command History	Release	Modification
	Release 7.9.1	This command was introduced.

Usage Guidelines

- The BGP policy accounting feature is applicable for the following address families:
 - IPv4
 - IPv6
- After configuring the command, you must reload the router for the BGP policy accounting feature to take effect.

Task ID	Task ID	Operation
	bgp	read, write

The following example shows the configuration of the main interface and the sub interface. You must reload the router after configuring the following commands to take effect.

For main interface:

```
Router# config
Router(config)# hw-module fib bgppa stats-mode main-intf

Router(config)# commit
```

For sub interface:

```
Router# config  
Router(config)# hw-module fib bgppa stats-mode sub-intf  
Router(config)# commit
```

hw-module profile load-balance algorithm

To modify the hashing algorithm that is used for ECMP and bundle member selection, use the **hw-module profile load-balance algorithm** command in XR Config mode.

hw-module profile load-balance algorithm { **L3-only** | **PPPoE** | **gtp** | **gtp-mpls** | **inner-l2-field** | **ip-tunnel** | **layer2** | **mpls-lsr-ler** | **mpls-lsr-ler-optimized** | **mpls-safe-speculative-parsing** }

Syntax Description	
ip-tunnel	Allows the hashing algorithm to use the outer IPv4 GRE header even while doing an IP tunnel decapsulation.
layer2	Allows the hashing algorithm to use the inner IP header information while doing layer 2 forwarding with inner payload as MPLS.
gtp	Allows hashing based on the tunnel id in GTP-U packets.
gtp-mpls	Allows hashing based on the tunnel id in GTP-U packets instead of Layer 4 packets when underlay network is MPLS.
mpls-safe-speculative-parsing	Allows hashing based on the first nibble of the MAC DA address.
pppoe	Allows hashing based on inner IPv4 or IPv6 headers for PPPoE packets. We recommend enabling this hashing on head and tail nodes.
L3-Only	Allows hashing for L3 header only. We recommend enabling this hashing when majority of traffic is fragmented.
mpls-lsr-ler	<p>Allows hashing in Label Edge Router (LER) and Label Switched Routers (LSRs) with MPLS traffic.</p> <p>This profile is recommended to be used when the following traffic flows are prominent:</p> <ul style="list-style-type: none"> • IPv4 pop and lookup flows (EthoMPLS2/3oIPv4oL4) with L4 as TCP or UDP • IPv6 pop and lookup flows (EthoMPLS2/3oIPv6oXX) with L4 as TCP or UDP
mpls-lsr-ler-optimized	<p>Allows optimized hashing in LER and LSR with MPLS IPv6 traffic.</p> <p>This profile is recommended to be used when the following traffic flows are prominent:</p> <ul style="list-style-type: none"> • 4 Label IPv6 flows (EthoMPLS4/6oIPv6) • IPv6 pop and lookup flows (EthoMPLS2/3oIPv6oXX) with L4 as non-TCP/UDP (for example, no next header, GRE)
inner-L2-field	Allows the hashing algorithm to use the inner ethernet fields of the source MAC and destination MAC addresses.

Command Default No load-balancing profile is configured.

Command Modes XR Config mode

Command History	Release	Modification
	7.10.1	The mpls-lsr-ler-optimized keyword was introduced.
	7.7.2	The inner-l2-field keyword was introduced.
	6.5.1	This command was modified.
	6.3.2	This command was introduced.

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

Without control-word, L2VPN traffic is considered to be IPv4 or IPv6 traffic depending on the presence of nibble 4 or nibble 6 in the payload after the last label in the traffic. The matching offset fields are considered for load-balancing hash calculation. This may cause hashing of a single flow to different links resulting in decrease of end user throughput.



- Note**
- Only one of the load-balancing profiles should be enabled at a time. The last configured CLI takes precedence.
 - While adding or removing the **hw-module profile load-balance algorithm mpls-lsr-ler** and **hw-module profile load-balance algorithm mpls-lsr-ler-optimized** commands, there is no need to reload the router.
 - While adding or removing the **hw-module profile load-balance algorithm ip-tunnel** and **hw-module profile load-balance algorithm PPPoE** commands, you must reload the router.
 - The **hw-module profile segment-routing srv6** is mutually exclusive with **hw-module profile load-balance algorithm PPPoE** and **hw-module profile load-balance algorithm ip-tunnel** commands.

Task ID	Task ID	Operation
	bundle	read, write

This example shows how to configure the **hw-module profile load-balance algorithm** command to use the outer IPv4 GRE header for hashing even while doing an IP tunnel decapsulation.

```
RP/0/RP0/CPU0:Router(config)# hw-module profile load-balance algorithm ip-tunnel
```

This example shows how to configure the **hw-module profile load-balance algorithm** command to use the tunnel id in GTP-U packets for hashing.

```
RP/0/RP0/CPU0:Router(config)# hw-module profile load-balance algorithm gtp
```

This example shows how to configure the **hw-module profile load-balance algorithm** command to hash the L2VPN traffic to the right egress link.

```
RP/0/RP0/CPU0:Router(config)# hw-module profile load-balance algorithm  
mpls-safe-speculative-parsing
```

This example shows how to configure the **hw-module profile load-balance algorithm** command to hash the IPv6 traffic with four MPLS labels to ensure optimized load-balancing.

```
RP/0/RP0/CPU0:ios(config)#hw-module profile load-balance algorithm mpls-lsr-ler-optimized
```

pppoe payload

To enable load balancing based on PPPoE payload IPV4/IPV6 header when PPPoE header is on ETH, use the **hw-module profile load-balance algorithm pppoe** command in XR Config mode. To restore the default values, use the **no** form of this command.

hw-module profile load-balance algorithm pppoe [**ip-tunnel** | **layer2** | **gtp** | **mpls-safe-speculative-parsing**]

Syntax Description		
	ip-tunnel	Allows the hashing algorithm to use the outer IPv4 GRE header even while doing an IP tunnel decapsulation.
	layer2	Allows the hashing algorithm to use the inner IP header information while doing layer 2 forwarding with inner payload as MPLS.
	gtp	Allows hashing based on the tunnel id in GTP-U packets.
	mpls-safe-speculative-parsing	Allows hashing based on the first nibble of the MAC DA address.

Command Modes XR Config mode

Command History	Release	Modification
	Release 7.4.1	This command was introduced.

Usage Guidelines Without control-word, L2VPN traffic is considered to be IPv4 or IPv6 traffic depending on the presence of nibble 4 or nibble 6 in the payload after the last label in the traffic. The matching offset fields are considered for load-balancing hash calculation. This may cause hashing of a single flow to different links resulting in decrease of end user throughput.

Task ID	Task ID	Operations
	bundle	read, write

Examples

This example shows how to configure the **hw-module profile load-balance algorithm** command to use the outer IPv4 GRE header for hashing even while doing an IP tunnel decapsulation.

:

```
Router(config)#hw-module profile load-balance algorithm ip-tunnel
Fri Jul 23 08:44:28.724 UTC
reload of all chassis/all line cards is required only for PPPoE option configuration/removal
Router(config)#
Router(config)#
Router(config)#
Router(config)#commit
Fri Jul 23 08:44:36.701 UTC
```

```

Router(config)#Router(config)#no hw-module p
port-range profile
Router(config)#no hw-module profile load-balance algorithm ip-tunnel
Fri Jul 23 08:44:50.292 UTC
reload of all chassis/all line cards is required only for PPPoE option configuration/removal
Router(config)#commit
Fri Jul 23 08:44:53.504 UTC
Router(config)#

```

This example shows how to configure the **hw-module profile load-balance algorithm** command to use the tunnel id in GTP-U packets for hashing.

```

Router(config)#hw-module profile load-balance algorithm gtp
Fri Jul 23 08:45:00.823 UTC
reload of all chassis/all line cards is required only for PPPoE option configuration/removal
Router(config)#
Router(config)#commit
Fri Jul 23 08:45:03.651 UTC
Router(config)#
Router(config)#
Router(config)#no hw-module profile load-balance algorithm gtp
Fri Jul 23 08:45:14.485 UTC
reload of all chassis/all line cards is required only for PPPoE option configuration/removal
Router(config)#commit
Fri Jul 23 08:45:17.172 UTC

```

This example shows how to configure the **hw-module profile load-balance algorithm** command to hash the L2VPN traffic to the right egress link .

```

Router(config)#hw-module profile load-balance algorithm ?
L3-only L3 Header only Hash.
PPPoE PPPoE session based optimized hash. Reload is required for this option
gtp GTP optimized.
gtp-mpls GTP over MPLS optimized hash.
ip-tunnel IP tunnel optimized.
layer2 Layer 2 optimized.
mpls-safe-speculative-parsing MPLS safe Speculative parsing.Router(config)#

```

show adjacency

To display Cisco Express Forwarding (CEF) adjacency table information, use the **show adjacency** command in XR 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 <i>ipv4-address</i>	(Optional) Displays adjacencies that are destined to the specified IPv4 nexthop.
mpls	(Optional) Displays only MPLS adjacencies.
ipv6	(Optional) Displays only IPv6 adjacencies.
<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-instance</i>	<p>Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	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	Task	Operations
	cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show adjacency location 0/RP1/CPU0
```

```
Interface      Address Version Refcount Protocol
Mg0/RP1/CPU0/0 1.73.57.180 49 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.181 55 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.250 14 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.91  48 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.92  60 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.52.5   21 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.52.52 17723 2( 0)  ipv4
Mg0/RP1/CPU0/0 1.73.46.4   80 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.1   86 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.2   88 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.10  84 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.250 23 2( 0)   ipv4
Te0/5/0/11/3   110.0.0.2   3 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.3    20 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.2    7 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.1    15 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.44.250 8 2( 0)   ipv4
```

```
RP/0/RP0/CPU0:router# show adjacency location 0/RP1/CPU0
```

```
Interface      Address Version Refcount Protocol
Mg0/RP1/CPU0/0 1.73.57.180 49 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.181 55 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.250 14 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.91  48 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.57.92  60 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.52.5   21 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.52.52 17723 2( 0)  ipv4
Mg0/RP1/CPU0/0 1.73.46.4   80 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.1   86 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.2   88 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.10  84 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.46.250 23 2( 0)   ipv4
Te0/5/0/11/3   110.0.0.2   3 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.3    20 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.2    7 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.0.1    15 2( 0)   ipv4
Mg0/RP1/CPU0/0 1.73.44.250 8 2( 0)   ipv4
```

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: <ul style="list-style-type: none"> • Next hop IPv4 or IPv6 address • Point-to-Point address Information in parentheses indicates different types of adjacency.
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.

show cef

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

```
show cef [prefix [mask]] [hardware {egress} | detail] [npu 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.
detail	(Optional) Displays full details.
npu	(Optional) Displays CEF entries that are processed by the egress NPU.
location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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

XR EXEC mode

Command History

Release	Modification
Release 24.2.1	This command was modified. The npu keyword was introduced.
Release 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.

```
Router# show cef 1.81.0.0/16 hardware ingress location 0/RP0/CPU0
1.81.0.0/16, version 10, internal 0x1000001 0x0 (ptr 0x8d793370) [1], 0x0 (0x0), 0x0 (0x0)
```

```

Updated Nov 24 03:56:15.876
local adjacency 1.73.0.1
Prefix Len 16, traffic index 0, precedence n/a, priority 3
via 1.73.0.1/32, 2 dependencies, recursive [flags 0x0]
path-idx 0 NHID 0x0 [0x8d7934f0 0x0]
next hop 1.73.0.1/32 via 1.73.0.1/32
RP/0/RP1/CPU0:ncs5508#show cef 1.81.0.0/16 hardware ingress loc 0/5/cpu0
1.81.0.0/16, version 10, internal 0x1000001 0x0 (ptr 0x8853a698) [1], 0x0 (0x0), 0x0 (0x0)
Updated Nov 24 03:56:15.880
Prefix Len 16, traffic index 0, precedence n/a, priority 3
via 1.73.0.1/32, 2 dependencies, recursive [flags 0x0]
path-idx 0 NHID 0x0 [0x8853a4e8 0x0]
next hop 1.73.0.1/32 via 1.73.0.1/32

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
Handle: 0x8893c7d8 type: 0 FEC handle: 0x887557a8

REC-SHLDI HAL PD context :
ecd_marked:0, collapse_bwalk_required:0, load_shared_lb:0

RSHLDI:
PI:0x0x883e8908 PD:0x0x883e8984 rev:0 p-rev:0 flag:0x1
FEC hdl: 0x887557a8 fec index: 0x2000101e(4126) num paths: 1
Path:0 fec index: 0x2000101e(4126) DSP:0x16033036

Router# show cef ipv6 fccc:0:2:ce00:: hardware egress npu location 0/0/CPU0
Using NPU option is resource intensive and may result in system
instability and possibly result in traffic loss.
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] : y
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] :Do you really want to
continue[confirm with only 'y' or 'n'] [y/n] : y
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] :Do you really want to
continue[confirm with only 'y' or 'n'] [y/n] :y
fccc:0:2:ce00::/64, version 725, SRv6 Headend, internal 0x1000001 0x220 (ptr 0x8dace0a8)
[1], 0x400 (0x8daa1138), 0x0 (0x8e664250)
Updated Oct 12 20:35:51.433
local adjacency to Bundle-Ether1301

Prefix Len 64, traffic index 0, precedence n/a, priority 2
gateway array (0x8d93b398) reference count 2, flags 0x0, source rib (7), 0 backups
[4 type 3 flags 0x8401 (0x8d9efe68) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x8daa1138, sh-ldi=0x8d9efe68]
gateway array update type-time 1 Oct 10 11:22:17.595
LDI Update time Oct 10 11:22:17.595
LW-LDI-TS Oct 12 20:35:51.450
Accounting: 0/0 packets/bytes output (per-prefix-per-path mode)
via fe80::11/128, Bundle-Ether1301, 13 dependencies, weight 0, class 0 [flags 0x0]
path-idx 0 NHID 0x20049 [0x901b88b0 0x0]
next hop fe80::11/128
local adjacency
Accounting: 0/0 packets/bytes output

LEAF - HAL pd context :
sub-type : IPV6, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0,
HW Walk:
LEAF:
PI:0x308dace0a8 PD:0x308dace140 rev:2474 type: IPV6 (1) TBL: 0xe0800000

```

```

LEAF location: LPM
FEC key: 0x14b40000a0d0
LEAF ip6route HW: <<<< New information
                  npu:0x0 fec index:0x2000ffce

LWLDI:
  PI:0x308daa1138 PD:0x308daa1180 rev:2473 p-rev:2381 ldi type:IP
  FEC key: 0x14b40000a0d0 fec index: 0x2000ffce(65486) num paths: 1 bkup paths: 0
  IMP pattern:3
  PI:0x308daa1138 PD:0x308daa1180 rev:2473 p-rev:2381 dpa-rev:1070462
  FEC key: 0x14b40000a0d0 fec index: 0x2000ffce(65486) num paths: 1 bkup paths: 0
  Path:0 fec index: 0x2000ffce(65486) DSP: 0xc000001
        SRV6 Encap key: 0xf1c0000040011844 SRV6 Encap Id: 0x40011844 Remote: 0
        Alloc Size: 1 SID: Func: 48 (LOC_STATS)
        Hardware Programmed SID: {}
        uSID Shift slots:0

  FEC:
    npu:0x0 fec:0x2000ffce port:0xc000001 encap:0x40011844

  SHLDI:
    PI:0x308d9efe68 PD:0x308d9eff10 rev:2381 dpa-rev:195026 cbf_enabled:0
    ppts_enabled:0 surpf_enable:0 flag:0x0
    FEC key: 0x14340000a0d0 fec index: 0x2000ffc5(65477) num paths: 1 bkup paths:
0
    p-rev:2364
    Path:0 fec index: 0x2000ffc5(65477) DSP:0xc000001 Dest fec index: 0x0(0)
    FEC: <<<< New information
    npu:0x0 fec:0x2000ffc5 port:0xc000001 encap:0x40010001

  TX-NHINFO:
    PI: 0x30901b88b0 PD: 0x30901b8950 rev:2364 dpa-rev:195015 Encap hdl: (nil)
    Encap id: 0x40010001 Remote: 0 L3 int: 45 flags: 0x7 transport_encap_id:0x0

    npu_mask: 0x1 DMAC: fc:82:a0:51:04:82
    ENCAP: <<<< New information
    npu:0x0 mac:0x820451a082fc vlan:0x2d

Load distribution: 0 (refcount 4)

Hash OK Interface Address
0 Y Bundle-Ether1301 fe80::11

```

show cef bgp-attribute

To display Border Gateway Protocol (BGP) attributes for Cisco Express Forwarding (CEF), use the **show cef bgp-attribute** command in XR 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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default The default location is active RP.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines This command has no keywords or arguments.

Task ID	Task ID	Operations
	cef	read

Examples

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

```
RP/0/RP0/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.

show cef global object-id summary

To display summary of all tables and information about the allocation counts within its database for Cisco Express Forwarding (CEF), use the **show cef global object-id summary** command in EXEC mode.

show cef global object-id [summary { location }]

Syntax Description	summary Displays summary of all tables and information about the allocation counts within its database.				
Command Default	No default behavior or values				
Command Modes	EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 25.3.1</td> <td>The command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 25.3.1	The command was introduced.
Release	Modification				
Release 25.3.1	The command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>cef</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operation	cef	read
Task ID	Operation				
cef	read				

This example displays the summary and allocated informations of object-id for Cisco Express Forwarding (CEF) on the router:

```
Router# show cef global object-id summary
```

```
FIB object id statistics:
```

```
-----
Table: Local Unique (Default)
alloced 642, updated 804, freed 203, moved 0, inuse 439, hi water 631
```

```
Table: Global Unique (Encap-ID)
alloced 0, updated 0, freed 0, moved 0, inuse 0, hi water 0
```

show cef global object-id table

To displays all the allocated object-id within the table for Cisco Express Forwarding (CEF), use the **show cef global object-id table** command in EXEC mode.

```
show cef global object-id [ table { default | { id | { id | { dependants | location } | location } } |
encap-id | id | { id | { dependants | location } | location } } ]
```

Syntax Description	default
	Displays all information about object-id allocated within the default table.
encap-id	Displays all information about object-id allocated within the encap-id table.
dependants	Displays all information about the direct dependants of the selected object-id.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 25.3.1	The command was introduced.

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

Task ID	Task ID	Operation
	cef	read

This example displays the allocated object-id within the table for Cisco Express Forwarding (CEF) on the router:

```
Router# show cef global object-id table default

Object-ID: 0x1171802008000000
ptr:0x223362dff098 type:LTEP-NVE-TBL flags:0 refcnt:0 Not Yet Recorded
Object-ID: 0x1169802008000001
ptr:0x223362dff0f0 type:GRIBI-TBL flags:0 refcnt:0 Not Yet Recorded
Object-ID: 0x1199802008000002

Router# show cef global object-id table encap-id

Object-ID: 0x1120002008000000
ENCAP_ID ptr:0x223364490098 Encap ID:0 [N/A]
Object-ID: 0x1120002008000001
ENCAP_ID ptr:0x223364490140 Encap ID:0x222222 [N/A]
Object-ID: 0x1120002008000002
```

show cef summary

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

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

Syntax Description	
	location <i>node-id</i> (Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 XR EXEC mode

Command History	Release	Modification
	Release 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/RP0/CPU0:router# show cef summary location 0/RP0/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.
rerresolve	Total number of routes being reresolved.
unresolved (<i>x</i> old, <i>x</i> 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 <i>xs</i> , peak <i>xs</i>)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Adjacency Table has <i>x</i> adjacencies	Total number of adjacencies.
<i>x</i> incomplete adjacency	Total number of incomplete adjacencies.

show cef ipv4

To display the IPv4 Cisco Express Forwarding (CEF) table, use the **show cef ipv4** command in XR 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>prefix</i>	(Optional) Longest matching CEF entry for the specified IPv4 destination prefix.
<i>mask</i>	(Optional) Exact CEF entry for the specified IPv4 prefix and mask.
<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-instance</i>	<p>Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RSP0) and the module is CPU0. Example: interface MgmtEth0/RSP0 /CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
detail	(Optional) Displays full CEF entry information.
location <i>node-id</i>	(Optional) Displays the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

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

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 24.4.1	The command is enhanced to include additional details about Layer 2 IPv4 prefixes that resolve as nexthop Layer 3 prefixes.
	Release 6.0	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 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/RP0/CPU0:router/CPU0:router# show cef ipv4
Prefix                Next Hop              Interface
-----
0.0.0.0/0            drop                  default handler
0.0.0.0/32           broadcast
1.75.55.1/32         1.76.0.1/32          <recursive>
1.76.0.0/16          attached              MgmtEth0/RP0/CPU0/0
1.76.0.0/32          broadcast             MgmtEth0/RP0/CPU0/0
1.76.0.1/32          1.76.0.1/32          MgmtEth0/RP0/CPU0/0
1.76.0.2/32          1.76.0.2/32          MgmtEth0/RP0/CPU0/0
1.76.0.3/32          1.76.0.3/32          MgmtEth0/RP0/CPU0/0
1.76.11.2/32         1.76.11.2/32         MgmtEth0/RP0/CPU0/0
```

```
RP/0/RP0/CPU0:router/CPU0:router# show cef ipv4
Prefix                Next Hop              Interface
-----
0.0.0.0/0            drop                  default handler
0.0.0.0/32           broadcast
1.75.55.1/32         1.76.0.1/32          <recursive>
1.76.0.0/16          attached              MgmtEth0/RP0/CPU0/0
1.76.0.0/32          broadcast             MgmtEth0/RP0/CPU0/0
1.76.0.1/32          1.76.0.1/32          MgmtEth0/RP0/CPU0/0
1.76.0.2/32          1.76.0.2/32          MgmtEth0/RP0/CPU0/0
1.76.0.3/32          1.76.0.3/32          MgmtEth0/RP0/CPU0/0
1.76.11.2/32         1.76.11.2/32         MgmtEth0/RP0/CPU0/0
```

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.

Field	Description
Interface	Interface associated with the prefix.

In the following example, the IPv4 Layer 2 prefixes, which resolve as nexthop for Layer 3 prefixes are collapsed.

```
Router#show cef ipv4 209.165.201.1 detail
Output received:
Mon Dec  2 08:31:43.765 UTC
209.165.201.1/27, version 47031, internal 0x5000001 0x40 (ptr 0x98246ad8) [1], 0x0 (0x0),
0x0 (0x0)
Updated Dec  2 08:27:35.523
Prefix Len 32, traffic index 0, precedence n/a, priority 4
gateway array (0x98099098) reference count 1, flags 0x2010, source rib (7), 0 backups
[1 type 3 flags 0x40441 (0x98134438) ext 0x0 (0x0)]
LW-LDI[type=0, refc=0, ptr=0x0, sh-ldi=0x0]
gateway array update type-time 1 Dec  2 08:27:35.523
LDI Update time Dec  2 08:31:14.951

Level 1 - Load distribution: 0 1
[0] via 209.165.200.225/27, recursive
[1] via 209.165.200.226/27, recursive

via 209.165.200.225/27, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
path-idx 0 NHID 0x0 [0x982355c8 0x0]
next hop 209.165.200.225/27 via 209.165.200.225/27

Load distribution: 0 1 2 2 (refcount 1)

Hash  OK  Interface                Address
0      Y   HundredGigE0/0/0/0/2     fe80::2
1      Y   Bundle-Ether1201         fe80::2
2      Y   Bundle-Ether1301         fe80::3
3      Y   Bundle-Ether1301         fe80::3

via 209.165.200.226/27, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
path-idx 1 NHID 0x0 [0x98235678 0x0]
next hop 209.165.200.226/27 via 209.165.200.226/27

Load distribution: 0 1 2 2 (refcount 1)

Hash  OK  Interface                Address
4      Y   HundredGigE0/0/0/0/2     fe80::2
5      Y   Bundle-Ether1201         fe80::2
6      Y   Bundle-Ether1301         fe80::3
7      Y   Bundle-Ether1301         fe80::3
```

show cef ipv4 adjacency

To display Cisco Express Forwarding (CEF) IPv4 adjacency status and configuration information, use the **show cef ipv4 adjacency** command in XR 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface- path-id</i>	(Optional) Either a physical interface instance or a virtual interface instance: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. 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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 History	Release	Modification
	Release 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/RP0/CPU0:router# show cef ipv4 adjacency

Display protocol is ipv4
Interface      Address                                          Type      Refcount
-----
Hu0/6/0/16
    Interface: Hu0/6/0/16 Type: glean
    Interface Type: 0x0, Base Flags: 0x220 (0x8ceb3f98)
    Nhinfo PT: 0x8ceb3f98, Idb PT: 0x8cb35a20,
    If Handle: 0x30001e0 no dependent adj
    Ancestor If Handle: 0x0
Update time Dec 7 11:20:35.145

Hu0/6/0/16 Prefix: 10.0.22.2/32                  local    9
    Adjacency: PT:0x8d5752b8 10.0.22.2/32
    Interface: Hu0/6/0/16
    NHID: 0x0
    MAC: e6.07.2b.8d.33.f0.e6.48.5c.10.b3.a0.08.00
    Interface Type: 0x0, Base Flags: 0x1 (0x8d001fa0)
    Nhinfo PT: 0x8d001fa0, Idb PT: 0x8cb35a20,
    If Handle: 0x30001e0 no dependent adj
    Ancestor If Handle: 0x0
Update time Dec 7 11:20:45.022

Hu0/6/0/18
    Interface: Hu0/6/0/18 Type: glean
    Interface Type: 0x0, Base Flags: 0x220 (0x8ceb44c0)
    Nhinfo PT: 0x8ceb44c0, Idb PT: 0x8cb35920,
    If Handle: 0x30001f0 no dependent adj
    Ancestor If Handle: 0x0
Update time Dec 7 11:20:33.449

Hu0/6/0/18 Prefix: 10.0.62.2/32                  local    10
    Adjacency: PT:0x8d5794a0 10.0.62.2/32
    Interface: Hu0/6/0/18
    NHID: 0x0
    MAC: e6.07.2b.8d.34.48.e6.48.5c.10.b3.a8.08.00
    Interface Type: 0x0, Base Flags: 0x1 (0x8d002aa0)
    Nhinfo PT: 0x8d002aa0, Idb PT: 0x8cb35920
    If Handle: 0x30001f0 no dependent adj
    Ancestor If Handle: 0x0
```

Update time Dec 7 11:20:45.019

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 XR EXEC mode.

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

Syntax Description		
vrf	(Optional)	Displays VPN routing and forwarding (VRF) instance information.
<i>vrf-name</i>	(Optional)	Name of a VRF.
egress		Displays information from the egress 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 <i>node-id</i>	(Optional)	Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 History	Release	Modification
	Release 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 ipv4 adjacency hardware** command for the **egress** keyword:

```
RP/0/RP0/CPU0:router# show cef ipv4 adjacency hardware egress detail location 0/2/CPU0

Display protocol is ipv4
Interface      Address                                          Type      Refcount

Hu0/6/0/16
                Interface: Hu0/6/0/16 Type: glean
                Interface Type: 0x0, Base Flags: 0x220 (0x87874298)
                Nhinfo PT: 0x87874298, IdB PT: 0x874f4a20, If Handle: 0x30001e0
                no dependent adj
                Ancestor If Handle: 0x0
Update time Dec  7 11:20:35.155

                SP-NHINFO:
                Trap Port: 0x16033036, Trap handle: (nil), npu_mask: 3f

Hu0/6/0/16    Prefix: 10.0.22.2/32                          local    9
                Adjacency: PT:0x8661b378 10.0.22.2/32
                Interface: Hu0/6/0/16
                NHID: 0x0
                MAC: e6.07.2b.8d.33.f0.e6.48.5c.10.b3.a0.08.00
                Interface Type: 0x0, Base Flags: 0x1 (0x88074420)
                Nhinfo PT: 0x88074420, IdB PT: 0x874f4a20, If Handle: 0x30001e0
                no dependent adj
                Ancestor If Handle: 0x0
Update time Dec  7 11:20:45.623

                TX-NHINFO:
                Encap hdl: 0x8a975b58 Encap id: 0x4003f004 Remote: 64
                L3 int: 0 npu_mask: 0
```

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 XR EXEC mode.

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

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

Command Default No default behavior or values

Command History	Release	Modification
	Release 6.0	This command was introduced.

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.

The **show cef ipv4 drop** command output counters include CEF table packet drop counters for IPv4 and IPv6 packets.

Task ID	Task ID	Operations
	cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv4 drops
```

```
CEF Drop Statistics
Node: 0/RP0/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 : 0
```

show cef ipv4 drops

```

LISP punt drops      packets :           0
LISP encap err drops packets :           0
LISP decap err drops packets :           0

Node: 0/RP1/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 :           0
LISP punt drops     packets :           0
LISP encap err drops packets :           0
LISP decap err 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.
Discard drops	Drops those were discarded.
GRE lookup drops	GRE packets dropped during GRE Lookup.
GRE processing drops	GRE packets dropped during GRE Processing.
LISP punt drops	LISP packets dropped during software processing of the packets.
LISP encap err drops	LISP encap packets dropped due to errors.
LISP decap err drops	LISP Decap packets dropped due to errors.

¹ RPF = Reverse Path Forwarding

show cef ipv4 exact-route

To display an IPv4 Cisco Express Forwarding (CEF) exact route, use the **show cef ipv4 exact-route** command in XR 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] [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.				
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.				
detail	(Optional) Displays full CEF entry information.				
location node-id	(Optional) Displays the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.				
Command Default	No default behavior or values				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				

Usage Guidelines

If the Layer 4 information is enabled, the source-port, destination-port, and protocol 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/RP0/CPU0:router# show cef ipv4 exact-route 159.0.0.0 189.0.0.0

189.0.0.0/24, version 1952527, internal 0x1000001 0x83 (ptr 0x9019ebd0) [1], 0x0 (0x91a814b8),
0xa20 (0x8dcc6700)
Updated Dec  9 17:15:37.521
local adjacency 10.0.94.2
Prefix Len 24, traffic index 0, precedence n/a, priority 2
  via TenGigE0/4/0/30/0
    via 10.0.94.2/32, TenGigE0/4/0/30/0, 7 dependencies, weight 0, class 0 [flags 0x0]
      path-idx 0 NHID 0x0 [0x8cffee20 0x8cffe20]
      next hop 10.0.94.2/32
      local adjacency
        local label 75001          labels imposed {ImplNull}
```

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

show cef ipv4 exceptions

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

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

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

Command Default No default behavior or values

Command Modes

Command History

Release	Modification
Release 6.0	This command was introduced.

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/# show cef ipv4 exceptions

CEF Exception Statistics
Node: 0/RP0/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/RP1/CPU0
  Slow encap packets :          3
  Unsupported packets :          0
  Redirect packets :           0
```

```

Receive      packets :          12787
Broadcast   packets :          74814
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

show cef ipv4 hardware

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

```
show cef [vrf vrf-name] ipv4 hardware {egress | [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.
detail	(Optional) Displays full details.
location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 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 ipv4 hardware** command:

```
RP/0/RP0/CPU0:router# sh cef ipv4 hardware egress detail location 0/6/CPU0
0.0.0.0/0, version 0, proxy default, default route handler, drop adjacency,
internal 0x1001011 0x0 (ptr 0x887e40a8) [1], 0x0 (0x88772098), 0x0 (0x0)
Updated Dec 20 22:22:08.311
Prefix Len 0, traffic index 0, precedence n/a, priority 15
gateway array (0x88534098) reference count 1, flags 0x200, source default (12), 0 backups
[2 type 3 flags 0xa401 (0x885db098) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x88772098, sh-ldi=0x885db098]
gateway array update type-time 1 Dec 20 22:22:08.311
LDI Update time Dec 20 22:22:08.327
LW-LDI-TS Dec 20 22:22:08.337
via 0.0.0.0/32, 3 dependencies, weight 0, class 0 [flags 0x0]
```

show cef ipv4 hardware

```

path-idx 0 NHID 0x0 [0x8778d3c8 0x0]
next hop 0.0.0.0/32
drop adjacency

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
  Handle: 0x88c40098 type: 0 FEC handle: 0x8894d098

LWLDI:
  PI:0x88772098 PD:0x887720d8 rev:1 p-rev:0 ldi type:3
  FEC hdl: 0x8894d098 fec index: 0x0(0) num paths:1, bkup: 0

SHLDI:
  PI:0x885db098 PD:0x885db118 rev:0 p-rev:0 flag:0x0
  FEC hdl: 0x8894d098 fec index: 0x20001001(4097) num paths: 1 bkup paths: 0
  Path:0 fec index: 0x20001001(4097) DSP:0x16033037

SP-NHINFO:
  PD: 0x8778d438, Trap Port: 0x16033037, Trap handle: (nil), npu_mask: 3f

Load distribution: 0 (refcount 2)

Hash OK Interface Address
0 Y Unknown drop
0.0.0.0/32, version 0, broadcast
Updated Dec 20 22:22:08.365
Prefix Len 32

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
  Handle: 0x88c404d8 type: 0 FEC handle: 0x88957fe8

LWLDI:
  PI:0x887723e8 PD:0x88772428 rev:11 p-rev:8 ldi type:3
  FEC hdl: 0x88957fe8 fec index: 0x0(0) num paths:1, bkup: 0

SHLDI:
  PI:0x885dc478 PD:0x885dc4f8 rev:8 p-rev:0 flag:0x0
  FEC hdl: 0x88957fe8 fec index: 0x20001004(4100) num paths: 1 bkup paths: 0
  Path:0 fec index: 0x20001004(4100) DSP:0x16033037

SP-NHINFO:
  PD: 0x8778d548, Trap Port: 0x16033037, Trap handle: (nil), npu_mask: 3f

1.75.55.1/32, version 11, internal 0x1000001 0x0 (ptr 0x887e4d50) [1], 0x0 (0x0), 0x0 (0x0)

Updated Dec 20 22:22:24.596
Prefix Len 32, traffic index 0, precedence n/a, priority 3
gateway array (0x88534de0) reference count 3, flags 0x4010, source rib (7), 0 backups
  [1 type 3 flags 0x48501 (0x885e45a8) ext 0x0 (0x0)]
LW-LDI[type=0, refc=0, ptr=0x0, sh-ldi=0x0]
gateway array update type-time 1 Dec 20 22:22:24.594
LDI Update time Dec 20 22:22:24.727
  via 1.76.0.1/32, 2 dependencies, recursive [flags 0x0]

```

```

path-idx 0 NHID 0x0 [0x887e4c78 0x0]
next hop 1.76.0.1/32 via 1.76.0.1/32

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
    Handle: 0x88c42078 type: 0 FEC handle: 0x88999bc8

REC-SHLDI HAL PD context :
ecd_marked:0, collapse_bwalk_required:0, load_shared_lb:0

RSHLDI:
    PI:0x0x885e45a8 PD:0x0x885e4624 rev:0 p-rev:0 flag:0x1
    FEC hdl: 0x88999bc8 fec index: 0x20001012(4114) num paths: 1
    Path:0 fec index: 0x20001012(4114) DSP:0x16033036
        MPLS Encap Handle: (nil) LL Encap Handle: (nil)

TX-NHINFO: INCOMPLETE
    Trap Port: 0x16033036 npu_mask: 0

Load distribution: 0 (refcount 1)

Hash OK Interface Address
0 Y MgmtEth0/RP0/CPU0/0 1.76.0.1
1.76.0.0/16, version 8, attached, connected, glean adjacency,
internal 0x3000061 0x0 (ptr 0x887e49f0) [1], 0x0 (0x88773cc0), 0x0 (0x0)
Updated Dec 20 22:22:23.985
Prefix Len 16, traffic index 0, precedence n/a, priority 0
gateway array (0x88534b88) reference count 1, flags 0x0, source rib (7), 0 backups
[2 type 3 flags 0x8401 (0x885e1de8) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x88773cc0, sh-ldi=0x885e1de8]
gateway array update type-time 1 Dec 20 22:22:23.986
LDI Update time Dec 20 22:22:23.986
LW-LDI-TS Dec 20 22:22:24.179
via MgmtEth0/RP0/CPU0/0, 2 dependencies, weight 0, class 0 [flags 0x8]
path-idx 0 NHID 0x0 [0x8778e3b8 0x0]
glean adjacency

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
    Handle: 0x88c417f8 type: 0 FEC handle: 0x88983d28

LWLDI:
    PI:0x88773cc0 PD:0x88773d00 rev:61 p-rev:60 ldi type:3
    FEC hdl: 0x88983d28 fec index: 0x0(0) num paths:1, bkup: 0

SHLDI:
    PI:0x885e1de8 PD:0x885e1e68 rev:60 p-rev:0 flag:0x0
    FEC hdl: 0x88983d28 fec index: 0x2000100e(4110) num paths: 1 bkup paths: 0
    Path:0 fec index: 0x2000100e(4110) DSP:0x16033036

SP-NHINFO:
    PD: 0x8778e428, Trap Port: 0x16033036, Trap handle: (nil), npu_mask: 3f

```

show cef ipv4 hardware

```

Load distribution: 0 (refcount 2)

Hash OK Interface Address
0 Y MgmtEth0/RP0/CPU0/0 glean
1.76.0.0/32, version 0, broadcast
Updated Dec 20 22:22:24.459
Prefix Len 32

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:
LEAF:
Handle: 0x88c41c38 type: 0 FEC handle: 0x8898ec78

LWLDI:
PI:0x88774010 PD:0x88774050 rev:65 p-rev:64 ldi type:3
FEC hdl: 0x8898ec78 fec index: 0x0(0) num paths:1, bkup: 0

SHLDI:
PI:0x885e31c8 PD:0x885e3248 rev:64 p-rev:0 flag:0x0
FEC hdl: 0x8898ec78 fec index: 0x20001010(4112) num paths: 1 bkup paths: 0
Path:0 fec index: 0x20001010(4112) DSP:0x16033037

SP-NHINFO:
PD: 0x8778d548, Trap Port: 0x16033037, Trap handle: (nil), npu_mask: 3f

1.76.0.1/32, version 0, internal 0x1020001 0x0 (ptr 0x887e4c78) [2], 0x0 (0x887741b8), 0x0
(0x0)
Updated Dec 20 22:22:24.593
Prefix Len 32, traffic index 0, Adjacency-prefix, precedence n/a, priority 15
gateway array (0x88534ea8) reference count 1, flags 0x0, source internal (11), 0 backups
[2 type 3 flags 0x8401 (0x885e3bb8) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x887741b8, sh-ldi=0x885e3bb8]
gateway array update type-time 1 Dec 20 22:22:24.594
LDI Update time Dec 20 22:22:24.594
LW-LDI-TS Dec 20 22:22:24.657
via 1.76.0.1/32, MgmtEth0/RP0/CPU0/0, 3 dependencies, weight 0, class 0 [flags 0x0]
path-idx 0 NHID 0x0 [0x87ee71b8 0x0]
next hop 1.76.0.1/32
local adjacency

LEAF - HAL pd context :
sub-type : IPV4, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0
HW Walk:

```

show cef ipv4 interface

To display IPv4 Cisco Express Forwarding (CEF)-related information for an interface, use the **show cef ipv4 interface** command in XR 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 interface-path-id	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RSP0) and the module is CPU0. Example: interface HundredGigE 0/RSP0 /CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command History	Release	Modification
	Release 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 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/RP0/CPU0:router# show cef ipv4 interface hundredGigE 0/4/0/0

HundredGigE0/4/0/0 is up if_handle 0x02000148 if_type IFT_HUNDREDGE(0x49)
  idb info 0x87674320 flags 0x8001 ext 0x89a1c648 flags 0x50
  Vrf Local Info (0x899dd790)
  Interface last modified Dec  7, 2015 08:07:58, create
  Reference count 1      Next-Hop Count 2
  Forwarding is enabled
  ICMP redirects are never sent
  ICMP unreachable are enabled
  Protocol MTU 8986, TableId 0xe0000000(0x87aff378)
  Protocol Reference count 2
  Primary IPV4 local address 10.0.1.0/32
```

This table describes the significant fields shown in the display.

Table 10: show cef ipv4 interface Command Field Descriptions

Field	Description
HundredGigE 0/RSP0/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 resource

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

```
show cef ipv4 resource [detail] [location node-id]
```

Syntax Description	detail (Optional) Displays detailed information resources listed in the IPv4 CEF table.				
	location node-id (Optional) Displays the IPv4 resource entries in the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.				
Command Default	No default behavior or values				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> argument, the output displays the IPv4 CEF nonrecursive routes for the node on which the command is issued.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>cef</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	cef	read
Task ID	Operations				
cef	read				

Examples

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

```
RP/0/RP0/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
```

show cef ipv4 resource

```
IDB hardware resource: GREEN
FRR_NHINFO hardware resource: GREEN
LDSH_ARRAY hardware resource: GREEN
RSRC_MON hardware resource: GREEN
```

show cef ipv4 summary

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

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines If you do not specify a node with the **location** keyword and *node-id* argument, this command displays 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/RP0/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 11: 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 (<i>x</i> old, <i>x</i> 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 <i>xs</i> , peak <i>xs</i>)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Adjacency Table has <i>x</i> adjacencies	Total number of adjacencies.
<i>x</i> incomplete adjacency	Total number of incomplete adjacencies.

show cef ipv4 unresolved

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

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

Syntax Description	Parameter	Description
	vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
	<i>vrf-name</i>	(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).
	location <i>node-id</i>	(Optional) Displays the unresolved routes in the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	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 unresolved 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 unresolved** command when an unresolved route is detected:

```
RP/0/RP0/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 12: 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 XR EXEC mode.

```
show cef [vrf vrf-name]] ipv6 [interface-type interface-number / ipv6-prefix/ prefix-length] [detail] [locationnode-id]
```

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 24.4.1	The command is enhanced to include additional details about Layer 2 IPv6 prefixes that resolve as nexthop Layer 3 prefixes.
	Release 6.0	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 IPv6 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 ipv6** command:

```
RP/0/RP0/CPU0:router# show cef ipv6

::/0
drop default handler
fe80::/10
```

```

receive
ff02::/16
receive
ff02::2/128
receive
ff02::1:ff00:0/104
receive
ff05::/16
receive
ff12::/16
receive

```

This table describes the significant fields shown in the display.

Table 13: 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.
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/RP0/CPU0:router# show cef ipv6 detail

::/0, version 0, proxy default, default route handler, drop adjacency, internal 0x1001011
0x0 (ptr 0x8d7d52dc) [1], 0x0 (0x8db46098), 0x0 (0x0)
Updated Nov 22 22:57:58.580
Prefix Len 0, traffic index 0, precedence n/a, priority 15
via ::/128, 3 dependencies, weight 0, class 0 [flags 0x0]
path-idx 0 NHID 0x0 [0x8cf1c218 0x0]
next hop ::/128
drop adjacency
::ffff:90.0.0.1/128, version 14, attached, receive
Updated Nov 25 15:28:03.320
Prefix Len 128
internal 0x1004141 (ptr 0x8d7d48b4) [1], 0x0 (0x8db462c8), 0x0 (0x0)
fe80::/10, version 0, receive
Updated Nov 22 22:57:58.611
Prefix Len 10
internal 0x1004001 (ptr 0x8d7d4cc4) [1], 0x0 (0x8db461e8), 0x0 (0x0)
ff02::/16, version 0, receive
Updated Nov 22 22:57:58.611
Prefix Len 16
internal 0x1004001 (ptr 0x8d7d4f14) [1], 0x0 (0x8db46140), 0x0 (0x0)
ff02::2/128, version 0, receive
Updated Nov 22 22:57:58.611
Prefix Len 128
internal 0x1004001 (ptr 0x8d7d4fe4) [1], 0x0 (0x8db46108), 0x0 (0x0)

```

```

ff02::1:ff00:0/104, version 0, receive
Updated Nov 22 22:57:58.601
Prefix Len 104
internal 0x1004001 (ptr 0x8d7d520c) [1], 0x0 (0x8db460d0), 0x0 (0x0)
ff05::/16, version 0, receive
Updated Nov 22 22:57:58.607
Prefix Len 16
internal 0x1004001 (ptr 0x8d7d513c) [1], 0x0 (0x8db461b0), 0x0 (0x0)
ff12::/16, version 0, receive
Updated Nov 22 22:57:58.607
Prefix Len 16
internal 0x1004001 (ptr 0x8d7d4d94) [1], 0x0 (0x8db46178), 0x0 (0x0)

```

This table describes the significant output fields shown in the display.

Table 14: 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.
path 1:	The following three items are displayed below path 1: <ul style="list-style-type: none"> • 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.

In the following example, the IPv6 Layer 2 prefixes, which resolve as nexthop for Layer 3 prefixes are collapsed. This is indicated by the **collapsed** keyword in the output. The SRv6 SID lists indicate the different encapsulation layers or hierarchy.

```

Router#show cef ipv6 2001:DB8:A:B::1/64
Thu Jun 6 12:48:52.399 EDT
2001:DB8:A:B::1/64, version 8, SRv6 Headend, internal 0x1000001 0x0 (ptr 0x63851c98) [1],
0x1400 (0x63851da0), 0x0 (0x638b2128)
Updated Jun 6 12:41:10.589
Prefix Len 64, traffic index 0, precedence n/a, priority 0, encap-id 0x11deadbeef
gateway array (0x61e1a798) reference count 1, flags 0x10, source rib (7), 0 backups
[2 type 3 flags 0x40008501 (0x63853e38) ext 0x0 (0x0) (collapsed)]
LW-LDI[type=3, refc=1, ptr=0x63851da0, sh-ldi=0x63853e38]
gateway array update type-time 1 Jun 6 12:41:10.589
LDI Update time Jun 6 12:41:10.629
LW-LDI-TS Jun 6 12:41:10.629
Accounting: Disabled
via 2001:DB8::1/128, 1 dependency, recursive [flags 0x3000000]
path-idx 0 NHID 0x0 [0x63a2c098 0x0]
next hop 2001:DB8::1/128 via 2001:DB8::1
SRv6 H.Encaps.Red SID-list {2001:DB8:1:e002::}
SRv6 H.Insert.Red SID-list {}
SRv6 H.Insert.Red SID-list {bbbb:bbbb:3:: bbbb:bbbb:4::}
via 2001:DB8::1/128, 1 dependency, recursive [flags 0x3000000]
path-idx 1 NHID 0x0 [0x63a2c270 0x0]
next hop 2001:DB8::1/128 via 2001:DB8::1
SRv6 H.Encaps.Red SID-list {bbbb:bbbb:2:e002::}

```

SRv6 H.Insert.Red SID-list {}

Load distribution: 0 1 2 2 (refcount 2)

Hash	OK	Interface		Address
0	Y	UNKNOWN intf 0x00000013		10::2
1	Y	UNKNOWN intf 0x00000014		20::2
2	Y	UNKNOWN intf 0x00000013		10::2
3	Y	UNKNOWN intf 0x00000013		10::2

show cef ipv6 adjacency

To display Cisco Express Forwarding (CEF) IPv6 adjacency status and configuration information, use the **show cef ipv6 adjacency** command in XR 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Either a physical interface instance or a virtual interface instance: <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> • <i>rack</i>: Chassis number of the rack. • <i>slot</i>: Physical slot number of the line card. • <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. • <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RSP0) and the module is CPU0. Example: interface MgmtEth0/RSP0 /CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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.
remote	(Optional) Filters out and displays only the remote adjacency information.

show cef ipv6 adjacency

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	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/RP0/CPU0:router# show cef ipv6 adjacency

Hu0/4/0/6                                special 2
      Interface: Hu0/4/0/6 Type: glean
      Interface Type: 0x0, Base Flags: 0x220 (0x8cf24d98)
      Nhinfo PT: 0x8cf24d98, Idb PT: 0x8cb39da0, If Handle: 0x2000198
no dependent adj
      Ancestor If Handle: 0x0
      Update time Dec 20 22:29:18.442

Hu0/4/0/6    Prefix: 10:0:18::2/128                local  6
      no next-hop adj
      Interface: NULLIFHNDL
      NHID: 0x0
      Mac-length is 0
      incomplete
      Interface Type: 0x0, Base Flags: 0x8 (0x8d318778)
      Nhinfo PT: 0x8d318778, Idb PT: 0x8cb39da0, If Handle: 0x2000198
no dependent adj
      Ancestor If Handle: 0x0
      Update time Dec 20 22:29:18.446

Hu0/4/0/25                                special 2
      Interface: Hu0/4/0/25 Type: glean
      Interface Type: 0x0, Base Flags: 0x220 (0x8cf24d18)
      Nhinfo PT: 0x8cf24d18, Idb PT: 0x8cb39420, If Handle: 0x2000230
no dependent adj
      Ancestor If Handle: 0x0
      Update time Dec 20 22:29:09.986

Hu0/4/0/25    Prefix: fe80::e407:2bff:fe8d:3418/128        local  3
      Adjacency: PT:0x8d568048 fe80::e407:2bff:fe8d:3418/128
      Interface: Hu0/4/0/25
      NHID: 0x0
      MAC: e6.07.2b.8d.34.18.e6.48.5c.10.b2.a4.86.dd
```

```

Interface Type: 0x0, Base Flags: 0x1 (0x8d318558)
Nhinfo PT: 0x8d318558, Idb PT: 0x8cb39420, If Handle: 0x2000230
no dependent adj
Ancestor If Handle: 0x0
Update time Dec 20 22:29:15.089

```

This is a sample output from the **show cef ipv6 adjacency remote detail** command:

```
RP/0/RP0/CPU0:router# show cef ipv6 adjacency remote detail location 0/RP0/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 XR EXEC mode.

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

Syntax Description		
vrf	(Optional)	Displays VPN routing and forwarding (VRF) instance information.
<i>vrf-name</i>	(Optional)	Name of a VRF.
egress		Displays information from the egress 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 <i>node-id</i>	(Optional)	Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 XR EXEC mode

Command History	Release	Modification
	Release 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 ipv6 adjacency hardware** command:

```
RP/0/RP0/CPU0:router# sh cef ipv6 adjacency hardware egress location 0/6/CPU
```

```
Display protocol is ipv6
```

```
Interface      Address                                          Type      Refcount
```

```
Te0/2/0/24/0                                     special 2
```

```
Interface: Te0/2/0/24/0 Type: glean
```

```
Interface Type: 0x0, Base Flags: 0x220 (0x877c4280)
```

```
Nhinfo PT: 0x877c4280, Idb PT: 0x87414620, If Handle: 0x10002c0
```

```
no dependent adj
```

```
Ancestor If Handle: 0x0
```

```
Update time Dec 20 22:29:31.635
```

```
SP-NHINFO:
```

```
PD: 0x877c42f8, Trap Port: 0x16033036, Trap handle: (nil), npu_mask: 3f
```

```
Te0/2/0/24/0 Prefix: 10:0:8::2/128                local 3
```

```
Adjacency: PT:0x86ca5ba0 10:0:8::2/128
```

```
Interface: Te0/2/0/24/0
```

```
NHID: 0x0
```

```
MAC: 10.f3.11.4c.71.9c.e6.48.5c.10.b1.80.86.dd
```

```
Interface Type: 0x0, Base Flags: 0x1 (0x8adc4920)
```

```
Nhinfo PT: 0x8adc4920, Idb PT: 0x87414620, If Handle: 0x10002c0
```

```
no dependent adj
```

```
Ancestor If Handle: 0x0
```

```
Update time Dec 20 22:29:45.496
```

```
TX-NHINFO:
```

```
PD: 0x8adc4998 Encap hdl: 0x8ae01008 Encap id: 0x4003f008 Remote: 64
```

```
L3 int: 0 npu_mask: 0
```

```
Te0/2/0/24/0 Prefix: fe80::12f3:11ff:fe4c:719c/128        local 5
```

```
Adjacency: PT:0x86ca64e0 fe80::12f3:11ff:fe4c:719c/128
```

```
Interface: Te0/2/0/24/0
```

```
NHID: 0x0
```

```
MAC: 10.f3.11.4c.71.9c.e6.48.5c.10.b1.80.86.dd
```

```
Interface Type: 0x0, Base Flags: 0x1 (0x8adc4c80)
```

```
Nhinfo PT: 0x8adc4c80, Idb PT: 0x87414620, If Handle: 0x10002c0
```

```
no dependent adj
```

```
Ancestor If Handle: 0x0
```

```
Update time Dec 20 22:29:49.590
```

```
RP/0/RP0/CPU0:fretta-54#sh cef ipv4 hardware
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
RP/0/RP0/CPU0:fretta-54#sh cef ipv4 hardware egress ?
```

```
detail      Display full information
flags       Interpret any flags in the output(cisco-support)
internal    internal information
location    specify a node name
|          Output Modifiers
```

show cef ipv6 drops

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

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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.

The **show cef ipv6 drop** command output counters include CEF table packet drop counters for IPv4 and IPv6 packets.

Task ID	Task	Operations
	cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 drops location 0/RP0/CPU0

CEF Drop Statistics
Node: 0/RP0/CPU0
  Unresolved drops      packets :                0
```

```

Unsupported drops    packets :           0
Null0 drops         packets :           0
No route drops      packets :           1
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 :           0
LISP punt drops     packets :           0
LISP encap err drops packets :           0
LISP decap err drops packets :           0

```

Table 15: 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 IPv6 unicast RPF.
RP destined drops	Drops destined for the router.
Discard drops	Drops those were discarded
GRE lookup drops	GRE packets dropped during GRE Lookup.
GRE processing drops	GRE packets dropped during GRE Processing.
LISP punt drops	LISP packets dropped during software processing of the packets.
LISP encap err drops	LISP encap packets dropped due to errors.
LISP decap err drops	LISP Decap packets dropped due to errors.

⁶ RPF = Reverse Path Forwarding

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 XR EXEC mode.

```
show cef [vrf vrf-name]ipv6 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>source-address</i>	The IPv6 source address in x:x::x format.
<i>destination-address</i>	The IPv6 destination address in x:x::x format.
protocol <i>protocol name</i>	(Optional) Displays the specified protocol for the route.
source-port <i>source-port</i>	(Optional) Sets the UDP source port. The range is from 0 to 65535.
destination-port <i>destination-port</i>	(Optional) Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	(Optional) Sets the ingress interface.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	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 <i>value</i>	(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 <i>node-id</i>	(Optional) Displays the IPv6 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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/RP0/CPU0:router# show cef ipv6 exact-route 222::2 9999::6751 location
0/RP0/CPU0 source address: 222::2 destination address: 9999::6751
interface : HundredGigE 0/3/0/3 non local interface
```

show cef ipv6 exceptions

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

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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/RP0/CPU0:router# show cef ipv6 exceptions location 0/RP0/CPU0

CEF Exception Statistics
Node: 0/RP0/CPU0
  Slow encap packets :          0
  Unsupported packets :          0
  Redirect packets :           0
  Receive packets :            1
  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 16: 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

show cef ipv6 hardware

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

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

Syntax Description	Parameter	Description
	vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
	<i>vrf-name</i>	(Optional) Name of a VRF.
	egress	Displays information from the egress packet switch exchange (PSE) file.
	detail	(Optional) Displays full details.
	npu	(Optional) Displays CEF entries that are processed by the egress NPU.
	location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 24.2.1	This command was modified. The npu keyword was introduced.
	Release 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 displays the full details from the **show cef ipv6 hardware** command:

```
RP/0/RP0/CPU0:router# show cef ipv6 hardware egress detail

::/0, version 0, proxy default, default route handler, drop adjacency, internal 0x1001011
0x0 (ptr 0x8d7d52dc) [1], 0x0 (0x8db46098), 0x0 (0x0)
Updated Nov 22 22:57:58.578
Prefix Len 0, traffic index 0, precedence n/a, priority 15
gateway array (0x8d87a098) reference count 1, flags 0x200, source default (12), 0 backups
[2 type 3 flags 0xa401 (0x8d9cf098) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x8db46098, sh-ldi=0x8d9cf098]
gateway array update type-time 1 Nov 22 22:57:58.578
```

```
LDI Update time Nov 22 22:57:58.595
LW-LDI-TS Nov 22 22:57:58.595
via ::/128, 3 dependencies, weight 0, class 0 [flags 0x0]
path-idx 0 NHID 0x0 [0x8cflc218 0x0]
next hop ::/128
drop adjacency
```

```
Load distribution: 0 (refcount 2)
```

```
Hash OK Interface Address
0 Y Unknown drop
::ffff:90.0.0.1/128, version 14, attached, receive
Updated Nov 25 15:28:03.318
Prefix Len 128
internal 0x1004141 (ptr 0x8d7d48b4) [1], 0x0 (0x8db462c8), 0x0 (0x0)
fe80::/10, version 0, receive
Updated Nov 22 22:57:58.608
Prefix Len 10
internal 0x1004001 (ptr 0x8d7d4cc4) [1], 0x0 (0x8db461e8), 0x0 (0x0)
ff02::/16, version 0, receive
Updated Nov 22 22:57:58.609
Prefix Len 16
internal 0x1004001 (ptr 0x8d7d4f14) [1], 0x0 (0x8db46140), 0x0 (0x0)
```

```
Router# show cef ipv6 fccc:0:2:ce00:: hardware egress npu location 0/0/CPU0
```

```
Using NPU option is resource intensive and may result in system
instability and possibly result in traffic loss.
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] : y
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] :Do you really want to
continue[confirm with only 'y' or 'n'] [y/n] : y
Do you really want to continue[confirm with only 'y' or 'n'] [y/n] :Do you really want to
continue[confirm with only 'y' or 'n'] [y/n] :y
fccc:0:2:ce00::/64, version 725, SRv6 Headend, internal 0x1000001 0x220 (ptr 0x8dace0a8)
[1], 0x400 (0x8daa1138), 0x0 (0x8e664250)
Updated Oct 12 20:35:51.433
local adjacency to Bundle-Ether1301

Prefix Len 64, traffic index 0, precedence n/a, priority 2
gateway array (0x8d93b398) reference count 2, flags 0x0, source rib (7), 0 backups
[4 type 3 flags 0x8401 (0x8d9efe68) ext 0x0 (0x0)]
LW-LDI[type=3, refc=1, ptr=0x8daa1138, sh-ldi=0x8d9efe68]
gateway array update type-time 1 Oct 10 11:22:17.595
LDI Update time Oct 10 11:22:17.595
LW-LDI-TS Oct 12 20:35:51.450
Accounting: 0/0 packets/bytes output (per-prefix-per-path mode)
via fe80::11/128, Bundle-Ether1301, 13 dependencies, weight 0, class 0 [flags 0x0]
path-idx 0 NHID 0x20049 [0x901b88b0 0x0]
next hop fe80::11/128
local adjacency
Accounting: 0/0 packets/bytes output
```

```
LEAF - HAL pd context :
sub-type : IPV6, ecd_marked:0, has_collapsed_ldi:0
collapse_bwalk_required:0, ecdv2_marked:0,
HW Walk:
LEAF:
PI:0x308dace0a8 PD:0x308dace140 rev:2474 type: IPV6 (1) TBL: 0xe0800000
LEAF location: LPM
FEC key: 0x14b40000a0d0
LEAF ip6route HW: <<<< New information
npu:0x0 fec index:0x2000ffce
```

show cef ipv6 hardware

```

LWLDI:
  PI:0x308daa1138 PD:0x308daa1180 rev:2473 p-rev:2381 ldi type:IP
  FEC key: 0x14b40000a0d0 fec index: 0x2000ffce(65486) num paths: 1 bkup paths: 0
  IMP pattern:3
  PI:0x308daa1138 PD:0x308daa1180 rev:2473 p-rev:2381 dpa-rev:1070462
  FEC key: 0x14b40000a0d0 fec index: 0x2000ffce(65486) num paths: 1 bkup paths: 0
  Path:0 fec index: 0x2000ffce(65486) DSP: 0xc000001
  SRV6 Encap key: 0xf1c0000040011844 SRV6 Encap Id: 0x40011844 Remote: 0
  Alloc Size: 1 SID: Func: 48 (LOC_STATS)
  Hardware Programmed SID: {}
  uSID Shift slots:0

FEC:
  npu:0x0 fec:0x2000ffce port:0xc000001 encap:0x40011844

SHLDI:
  PI:0x308d9efe68 PD:0x308d9eff10 rev:2381 dpa-rev:195026 cbf_enabled:0
  ppts_enabled:0 surpf_enable:0 flag:0x0
  FEC key: 0x14340000a0d0 fec index: 0x2000ffc5(65477) num paths: 1 bkup paths:
0
  p-rev:2364
  Path:0 fec index: 0x2000ffc5(65477) DSP:0xc000001 Dest fec index: 0x0(0)
  FEC: <<<< New information
  npu:0x0 fec:0x2000ffc5 port:0xc000001 encap:0x40010001

TX-NHINFO:
  PI: 0x30901b88b0 PD: 0x30901b8950 rev:2364 dpa-rev:195015 Encap hdl: (nil)
  Encap id: 0x40010001 Remote: 0 L3 int: 45 flags: 0x7 transport_encap_id:0x0

  npu_mask: 0x1 DMAC: fc:82:a0:51:04:82
  ENCAP: <<<< New information
  npu:0x0 mac:0x820451a082fc vlan:0x2d

Load distribution: 0 (refcount 4)

Hash OK Interface Address
0 Y Bundle-Ether1301 fe80::11

```

show cef ipv6 interface

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

```
show cef [vrf vrf-name] ipv6 interface type interface-path-id [detail] [location node-id]
```

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 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 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/RP0/CPU0:router# show cef ipv6 interface
fib_show_interface
```

show cef ipv6 interface

```

created item name: 1000/protocol/1/vrf/default/interface-info/1/
HundredGigE0/4/0/1 is down if_handle 0x02000170 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb3a020 flags 0x8001 ext 0x0
  Vrf Local Info (0x0)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 0
  Protocol Reference count 0
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address NOT PRESENT
HundredGigE0/4/0/2 is down if_handle 0x02000178 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb39fa0 flags 0x8001 ext 0x0
  Vrf Local Info (0x0)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 0
  Protocol Reference count 0
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address NOT PRESENT
HundredGigE0/4/0/3 is down if_handle 0x02000180 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb39f20 flags 0x8001 ext 0x0
  Vrf Local Info (0x0)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 0
  Protocol Reference count 0
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address NOT PRESENT
HundredGigE0/4/0/4 is down if_handle 0x02000188 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb39ea0 flags 0x8001 ext 0x0
  Vrf Local Info (0x0)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 0
  Protocol Reference count 0
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address NOT PRESENT
HundredGigE0/4/0/5 is down if_handle 0x02000190 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb39e20 flags 0x8001 ext 0x0
  Vrf Local Info (0x0)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 0
  Protocol Reference count 0
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address NOT PRESENT
HundredGigE0/4/0/6 is up if_handle 0x02000198 if_type UNKNOWN caps 0(0x0)
  idb info 0x8cb39da0 flags 0x8001 ext 0x8de7fd98 flags 0x0
  Vrf Local Info (0x8df2e100)
  Interface last modified Dec 20, 2015 22:28:52, create
  Reference count 1      Next-Hop Count 2
  Protocol Reference count 1
  Protocol ipv6 not configured or enabled on this card
  Primary IPV6 local address 10:0:18::1/128

```

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 XR EXEC mode.

```
show cef ipv6 resource [detail] [location node-id]
```

Syntax Description	detail (Optional) Displays detailed information resources listed in the IPv6 CEF table.				
	location node-id (Optional) Displays the IPv6 resource entries in the IPv6 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.				
Command Default	No default behavior or values				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	If you do not specify a node with the location keyword and <i>node-id</i> argument, the output displays the IPv6 CEF nonrecursive routes for the node on which the command is issued.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>cef</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	cef	read
Task ID	Operations				
cef	read				

Examples

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

```
RP/0/RP0/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 XR EXEC mode.

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines If you do not specify a node with the **location** keyword and *node-id* argument, this command displays 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/RP0/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 17: 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 (<i>x</i> old, <i>x</i> 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 <i>xs</i> , peak <i>xs</i>)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Router ID	Router identification.
Adjacency Table has <i>x</i> adjacencies	Total number of adjacencies.
<i>x</i> incomplete adjacency	Total number of incomplete adjacencies.

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 XR EXEC mode.

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	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 unresolved routes for the node on which the command is issued.

Task ID	Task ID	Operations
	cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 unresolved

9999::/64
  unresolved
```

This table describes the significant fields shown in the display.

Table 18: show cef ipv6 unresolved Command Field Descriptions

Field	Description
<code>xxxx::/xx</code>	Detected unresolved route.

show cef mpls adjacency

To display the Multiprotocol Label Switching (MPLS) adjacency table, use the **show cef mpls adjacency** command in XR 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 (RSP0) and the module is CPU0. Example: interface MgmtEth0/RSP0 /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 XR EXEC mode

Command History	Release	Modification
	Release 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 adjacency** command displays the MPLS adjacency table for the node in which the command is issued.

Task ID	Task ID	Operations
	cef	read

Examples

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

```
RP/0/RP0/CPU0:router# sh cef mpls adjacency inter

Display protocol is mpls
Interface      Address                                         Type      Refcount
-----
BE1906         Prefix: 10.0.86.1/32                          local      7
Adjacency: PT:0x8cba28d0 10.0.86.1/32
Interface: BE1906
NHID: 0x0
MAC: e6.48.5c.10.b4.8e.e6.07.2b.8d.34.88.88.47
Interface Type: 0x1c, Base Flags: 0x1 (0x8d10f620)
Nhinfo PT: 0x8d10f620, Idb PT: 0x8ca57320, If Handle:
0x8000174
no dependent adj
Ancestor If Handle: 0x0
Update time Dec 21 03:56:49.977

BE1904         Prefix: 10.0.85.1/32                          local      7
Adjacency: PT:0x8cba3c78 10.0.85.1/32
Interface: BE1904
NHID: 0x0
MAC: e6.48.5c.10.b4.86.e6.07.2b.8d.34.89.88.47
Interface Type: 0x1c, Base Flags: 0x1 (0x8d10f1a0)
Nhinfo PT: 0x8d10f1a0, Idb PT: 0x8ca572a0, If Handle:
0x800016c
no dependent adj
Ancestor If Handle: 0x0
Update time Dec 21 03:57:25.360
```

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 XR EXEC mode.

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

Syntax Description		
egress		Displays information from the egress 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 <i>node-id</i>		(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 XR EXEC mode

Command History	Release	Modification
	Release 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 is sample output from **show cef mpls adjacency hardware** command:

```
RP/0/RP0/CPU0:router# sh cef mpls adjacency inter

Display protocol is mpls
Interface      Address                                     Type      Refcount
```

```
BE1906      Prefix: 10.0.86.1/32                local  7
            Adjacency: PT:0x8cba28d0 10.0.86.1/32
            Interface: BE1906
            NHID: 0x0
            MAC: e6.48.5c.10.b4.8e.e6.07.2b.8d.34.88.88.47
            Interface Type: 0x1c, Base Flags: 0x1 (0x8d10f620)
            Nhinfo PT: 0x8d10f620, Idb PT: 0x8ca57320, If Handle:
0x8000174
no dependent adj
            Ancestor If Handle: 0x0
            Update time Dec 21 03:56:49.977

BE1904      Prefix: 10.0.85.1/32                local  7
            Adjacency: PT:0x8cba3c78 10.0.85.1/32
            Interface: BE1904
            NHID: 0x0
            MAC: e6.48.5c.10.b4.86.e6.07.2b.8d.34.89.88.47
            Interface Type: 0x1c, Base Flags: 0x1 (0x8d10f1a0)
            Nhinfo PT: 0x8d10f1a0, Idb PT: 0x8ca572a0, If Handle:
0x800016c
no dependent adj
            Ancestor If Handle: 0x0
            Update time Dec 21 03:57:25.360
```

show cef mpls drops

To display Multiprotocol Label Switching (MPLS) drop counters for packets that belong to a segment routing (SR) network, use the **show cef mpls drops** command in XR EXEC mode.

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

Syntax Description

location *node-id* (Optional) Displays detailed Cisco Express Forwarding (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

No default behavior or values

Command History

Release	Modification
Release 6.5.1	This command was introduced.

Usage Guidelines

Use this command to display the SR MPLS drop counters.

The incoming top MPLS label is inspected. If the label belongs to the Segment Routing Local Block (SRLB) or the Segment Routing Global Block (SRGB), an MPLS SR drop counter is incremented for unknown label value.



Note The NCS 5500 routerNCS 540 router does not support the TTL expiry counter. The `SR MPLS TTL expired packets` counter is always 0.



Note The drop counters will increment for manually allocated adjacency SIDs and prefix SIDs only. They will not increment for dynamically allocated adjacency SIDs.

Task ID

Task ID	Operation
cef	read

Example

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

```
RP/0/RP0/CPU0:router# show cef mpls drops location 0/0/CPU0
Sat Jun  9 03:49:27.100 IST
CEF Drop Statistics
Node: 0/0/CPU0
  SR MPLS unreachable packets :                100
```

```
SR MPLS TTL expired packets :          0
```

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 XR 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 (RSP0) and the module is CPU0.
Example: interface MgmtEth0/ RSP0

- 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

XR EXEC mode

Command History

Release	Modification
Release 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/RP0/CPU0:router# sh cef mpls interface hundredGigE 0/0/0/0

fib_show_interface
mpls_v6_item_name: 0/protocol/2/vrf/default/interface-info/1/130
HundredGigE0/0/0/0 is up if_handle 0x00000130 if_type IFT_HUNDREDGE(0x49)
  idb info 0x894d5c20 flags 0x8001 ext 0x89c545b8 flags 0x50
  Vrf Local Info (0x0)
Interface last modified Dec 20, 2015 12:00:36, create
Reference count 1      Next-Hop Count 2
Forwarding is enabled
Protocol MTU 1500, TableId 0(0x882b5098)
Protocol Reference count 2
```

show cef mpls unresolved

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

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

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

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 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/RP0/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 19: 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.