IP Addresses and Services Command Reference for Cisco CRS Routers

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Preface

The *IP Addresses and Services Command Reference for Cisco CRS Routers*contains commands related to IP addresses and services features.

The preface contains the following sections:

- Changes to This Document, on page xvii
- Communications, Services, and Additional Information, on page xviii

Changes to This Document

This table lists the technical changes made to this document since it was first published.

Table 1: Changes to this Document

Date	Change Summary
March 2018	Republished with documentation updates for Cisco IOS XR Release 6.3.2 and 6.4.1 features.
September 2017	Republished with documentation updates for Cisco IOS XR Release 6.3.1 features.
July 2017	Republished with documentation updates for Cisco IOS XR Release 6.2.2 features.
September 2015	Republished with documentation updates for Cisco IOS XR Release 5.3.2 features.
May 2015	Republished with documentation updates for Cisco IOS XR Release 5.3.1 features.
January 2015	Initial release of the cumulative command reference document that covers all updates from Release 4.3.0 onwards.

Communications, Services, and Additional Information

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Access List Commands

This module describes the Cisco IOS XR software commands used to configure IP Version 4 (IPv4) and IP Version 6 (IPv6) access lists.

An access control list (ACL) consists of one or more access control entries (ACEs) that collectively define the network traffic profile. This profile can then be referenced by Cisco IOS XR Software software features such as traffic filtering, priority or custom queueing, and dynamic access control. Each ACL includes an action element (permit or deny) and a filter element based on criteria such as source address, destination address, protocol, and protocol-specific parameters.

For detailed information about ACL concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear access-list ipv4, on page 3
- clear access-list ipv6, on page 6
- copy access-list ipv4 , on page 9
- copy access-list ipv6, on page 11
- deny (IPv4) , on page 13
- deny (IPv6) , on page 22
- ipv4 access-group, on page 27
- ipv4 access-list, on page 30
- ipv4 access-list log-update rate , on page 31
- ipv4 access-list log-update threshold , on page 32
- ipv6 access-group, on page 34
- ipv6 access-list, on page 36
- ipv6 access-list log-update rate, on page 39
- ipv6 access-list log-update threshold , on page 40
- ipv6 access-list maximum ace threshold, on page 41
- ipv6 access-list maximum acl threshold, on page 42
- permit (IPv4) , on page 43
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- remark (IPv4) , on page 60
- remark (IPv6) , on page 62
- resequence access-list ipv4 , on page 64
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- show access-lists afi-all, on page 68
- show access-lists ipv4 , on page 69

- show access-lists ipv4 standby, on page 76
- show access-lists ipv6, on page 77
- show access-lists ipv6 standby, on page 81

clear access-list ipv4

To clear IPv4 access list counters, use the **clear access-list ipv4** command in EXEC mode .

clear access-list ipv4 *access-list name* [*sequence-number* | hardware { ingress | egress}] [interface *type interface-path-id*][location *node-id* | sequence *number*]

Syntax Description

access-list-name	Name of a particular IPv4 access list. The name cannot contain a spaces or quotation marks, but can include numbers.
sequence-number	(Optional) Specific sequence number with which counters are cleared for an access list. Range is 1 to 2147483646.
hardware	Identifies the access list as an access group for an interface.
ingress	Specifies an inbound direction.
egress	Specifies an outbound direction.
interface	(Optional) Clears the interface statistics.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Clears hardware resource counters from the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
sequence *number*	(Optional) Clears counters for an access list with a specific sequence number. Range is 1 to 2147483646.

Command Default

The default clears the specified IPv4 access list.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The range for the *sequence-number* argument was changed from 2147483646 to 2147483644. The command name was changed from **clear ipv4 access-list** to **clear access-list ipv4** .
Release 3.5.0	The **interface** keyword was added.

Usage Guidelines

Use the **clear access-list ipv4** command to clear counters for a specified configured access list. Use a sequence number to clear counters for an access list with a specific sequence number.

Use the **hardware** keyword to clear counters for an access list that was enabled using the **ipv4 access-group** command.

Use an asterisk (***)** in place of the *access-list-name* argument to clear all access lists.

Note An access list can be shared among multiple interfaces. Clearing hardware counters clears all counters for all interfaces that use the specified access list in a given direction (ingress or egress).

Task ID

Task ID	Operations
basic-services	read, write
acl	read, write
bgp	read, write, execute

Examples

In the following example, counters for an access list named *marketing* are cleared:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 marketing

ipv4 access-list marketing
  10 permit ip 192.168.34.0 0.0.0.255 any (51 matches)
  20 permit ip 172.16.0.0 0.0.255.255 any (26 matches)
  30 deny tcp host 172.16.0.0 eq bgp host 192.168.202.203 30 (5 matches)

RP/0/RP0/CPU0:router# clear access-list ipv4 marketing

RP/0/RP0/CPU0:router# show access-lists ipv4 marketing

ipv4 access-list marketing
  10 permit ip 192.168.34.0 0.0.0.255 any
  20 permit ip 172.16.0.0 0.0.255.255 any
  30 deny tcp host 172.16.0.0 eq bgp host 192.168.202.203 30
```

In the following example, counters for an access list named acl_hw_1 in the outbound direction are cleared:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 acl_hw_1 hardware egress location 0/2/cp0

ipv4 access-list acl_hw_1
  10 permit icmp 192.168.36.0 0.0.0.255 any (251 hw matches)
  20 permit ip 172.16.3.0 0.0.255.255 any (29 hw matches)
  30 deny tcp any any (58 hw matches)

RP/0/RP0/CPU0:router# clear access-list ipv4 acl_hw_1 hardware egress location 0/2/cp0

RP/0/RP0/CPU0:router# show access-lists ipv4 acl_hw_1 hardware egress location 0/2/cp0

ipv4 access-list acl_hw_1
  10 permit icmp 192.168.36.0 0.0.0.255 any
```

```
20 permit ip 172.16.3.0 0.0.255.255 any
30 deny tcp any any
```

Related Commands

Command	Description
ipv4 access-group, on page 27	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
resequence access-list ipv4 , on page 64	Renumbers an existing statement and increments subsequent statements to allow a new IPv4 access list statements.

clear access-list ipv6

To clear IPv6 access list counters, use the **clear access-list ipv6** command in EXEC mode.

clear access-list ipv6 *access-list-name* [{*sequence-number* | **hardware** {**ingress** | **egress**}}] [**interface** *type interface-path-id*] [{**location** *node-id* | **sequence** *number*}]

Syntax Description

access-list-name	Name of a particular IPv6 access list. The name cannot contain a spaces or quotation marks, but can include numbers.
sequence-number	(Optional) Specific sequence number for a particular access control entry (ACE) with which counters are cleared for an access list. Range is 1 to 2147483644.
hardware	(Optional) Identifies the access list as an access group for an interface.
ingress	(Optional) Specifies an inbound direction.
egress	(Optional) Specifies an outbound direction.
interface	(Optional) Clears the interface statistics.
type	Optional) Interface type. For more information, use the question mark (?) online help function.
instance	Physical interface or virtual interface.
interface-path-id	**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	(Optional) Clears counters for an access list enabled on a card interface. The *node-id* argument is entered in the rack/slot/module notation.
sequence *number*	(Optional) Specifies a specific sequence number that clears access list counters. Range is 1 to 2147483644.

Command Default

The default clears the specified IPv6 access list.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The range for the *sequence-number* argument was changed from 2147483646 to 2147483644. The command name was changed from **clear ipv6 access-list** to **clear access-list ipv6** .
Release 3.5.0	The **interface** keyword was added.

Usage Guidelines

The **clear access-list ipv6** command is similar to the **clear access-list ipv4** command, except that it is IPv6-specific.

Use the **clear access-list ipv6** command to clear counters for a specified configured access list. Use a sequence number to clear counters for an access list with a specific sequence number

Use the**hardware** keyword to clear counters for an access list that was enabled using the **ipv6 access-group** command.

Use an asterisk (*****) in place of the *access-list-name* argument to clear all access lists.

Note An access list can be shared among multiple interfaces. Clearing hardware counters clears all counters for all interfaces that use the specified access list in a given direction (ingress or egress).

Task ID

Task ID	Operations
basic-services	read, write
acl	read, write
network	read, write

Examples

In the following example, counters for an access list named *marketing* are cleared:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 marketing
ipv6 access-list marketing
  10 permit ipv6 3333:1:2:3::/64 any (51 matches)
  20 permit ipv6 4444:1:2:3::/64 any (26 matches)
  30 permit ipv6 5555:1:2:3::/64 any (5 matches)
RP/0/RP0/CPU0:router# clear access-list ipv6 marketing
RP/0/RP0/CPU0:router# show access-lists ipv6 marketing
ipv6 access-list marketing
  10 permit ipv6 3333:1:2:3::/64 any
  20 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
```

In the following example, counters for an access list named acl_hw_1 in the outbound direction are cleared:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 acl_hw_1 hardware egress location 0/2/cp0
ipv6 access-list acl_hw_1
  10 permit ipv6 3333:1:2:3::/64 any (251 hw matches)
  20 permit ipv6 4444:1:2:3::/64 any (29 hw matches)
  30 deny tcp any any (58 hw matches)
RP/0/RP0/CPU0:router# clear access-list ipv6 acl_hw_1 hardware egress location 0/2/cp0
RP/0/RP0/CPU0:router# show access-lists ipv6 acl_hw_1 hardware egress location 0/2/cp0
ipv6 access-list acl_hw_1
  10 permit ipv6 3333:1:2:3::/64 any
```

```
20 permit ipv6 4444:1:2:3::/64 any
30 deny tcp any any
```

Related Commands

Command	Description
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.

copy access-list ipv4

To create a copy of an existing IPv4 access list, use the **copy access-list ipv4** command in EXEC mode.

copy access-list ipv4 *source-acl destination-acl*

Syntax Description

source-acl	Name of the access list to be copied.
destination-acl	Name of the destination access list where the contents of the *source-acl* argument is copied.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **copy ipv4 access-list** to **copy access-list ipv4** .

Usage Guidelines

Use the **copy access-list ipv4** command to copy a configured access list. Use the *source-acl* argument to specify the access list to be copied and the *destination-acl* argument to specify where to copy the contents of the source access list. The *destination-acl* argument must be a unique name; if the *destination-acl* argument name exists for an access list or prefix list, the access list is not copied. The **copy access-list ipv4** command checks that the source access list exists then checks the existing list names to prevent overwriting existing access lists or prefix lists.

Task ID

Task ID	Operations
acl	read, write
filesystem	execute

Examples

In the following example, a copy of access list list-1 is created:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 list-1

ipv4 access-list list-1
  10 permit tcp any any log
  20 permit ip any any
RP/0/RP0/CPU0:router# copy access-list ipv4 list-1 list-2
RP/0/RP0/CPU0:router# show access-lists ipv4 list-2
ipv4 access-list list-2
  10 permit tcp any any log
  20 permit ip any any
```

In the following example, copying the access list list-1 to list-3 is denied because a list-3 access list already exists:

```
RP/0/RP0/CPU0:router# copy access-list ipv4 list-1 list-3

list-3 exists in access-list

RP/0/RP0/CPU0:router# show access-lists ipv4 list-3

ipv4 access-list list-3
  10 permit ip any any
  20 deny tcp any any log
```

Related Commands

Command	Description
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

copy access-list ipv6

To create a copy of an existing IPv6 access list, use the **copy access-list ipv6** command in EXEC mode .

copy access-list ipv6 *source-acl destination-acl*

Syntax Description

source-acl	Name of the access list to be copied.
destination-acl	Destination access list where the contents of the *source-acl* argument is copied.

Command Default

No default behavior or value

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **copy ipv6 access-list** to **copy access-list ipv6** .

Usage Guidelines

Use the **copy access-list ipv6** command to copy a configured access list. Use the *source-acl* argument to specify the access list to be copied and the *destination-acl* argument to specify where to copy the contents of the source access list. The *destination-acl* argument must be a unique name; if the *destination-acl* argument name exists for an access list or prefix list, the access list is not copied. The **copy access-list ipv6** command checks that the source access list exists then checks the existing list names to prevent overwriting existing access lists or prefix lists.

Task ID

Task ID	Operations
acl	read, write
filesystem	execute

Examples

In this example, a copy of access list list-1 is created:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 list-1

ipv6 access-list list-1
  10 permit tcp any any log
  20 permit ipv6 any any

RP/0/RP0/CPU0:router# copy access-list ipv6 list-1 list-2

RP/0/RP0/CPU0:router# show access-lists ipv6 list-2

ipv6 access-list list-2
  10 permit tcp any any log
```

```
  20 permit ipv6 any any
```

In this example, copying access list list-1 to list-3 is denied because a list-3 access list already exists:

```
RP/0/RP0/CPU0:router# copy access-list ipv6 list-1 list-3

list-3 exists in access-list

RP/0/RP0/CPU0:router# show access-lists ipv6 list-3
ipv6 access-list list-3
  10 permit ipv6 any any
  20 deny tcp any any log
```

Related Commands

Command	Description
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
show access-lists ipv6, on page 77	Displays the contents of all current IPv6 access lists.

deny (IPv4)

To set conditions for an IPv4 access list, use the **deny** command in access list configuration mode. There are two versions of the **deny** command: **deny** (source), and **deny** (protocol). To remove a condition from an access list, use the **no** form of this command.

[*sequence-number*] **deny** *source* [*source-wildcard*] **counter** *counter-name* [{**log** | **log-input**}]
*[sequence-number]***deny***protocol source source-wildcard destination destination-wildcard* [**precedence***precedence*] [**dscp***dscp*] [**fragments**] [*packet-length operator packet-length value*] [**log | log-input**] [**ttl** *ttl value [value1....value2]*]
no *sequence-number*

Internet Control Message Protocol (ICMP)
[*sequence-number*] **deny icmp** *source source-wildcard destination destination-wildcard* [*icmp-type*] [*icmp-code*] [**precedence** *precedence*] [**dscp** *dscp*] [**fragments**] [{**log** | **log-input**}][**icmp-off**]

Internet Group Management Protocol (IGMP)
[*sequence-number*] **deny igmp** *source source-wildcard destination destination-wildcard* [*igmp-type*] [**precedence** *precedence*] [**dscp** *value*] [**fragments**] [{**log** | **log-input**}]

User Datagram Protocol (UDP)
[*sequence-number*] **deny udp** *source source-wildcard* [*operator* {*portprotocol-port*}] *destination destination-wildcard* [*operator* {*portprotocol-port*}] [**precedence** *precedence*] [**dscp** *dscp*] [**fragments**] [{**log** | **log-input**}]

Syntax Description

sequence-number	(Optional) Number of the **deny** statement in the access list. This number determines the order of the statements in the access list. The number can be from 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.) Use the **resequence access-list** command to change the number of the first statement and increment subsequent statements of a configured access list.
source	Number of the network or host from which the packet is being sent. There are three alternative ways to specify the source: • Use a 32-bit quantity in four-part dotted-decimal format. • Use the **any** keyword as an abbreviation for a *source* and *source-wildcard* of 0.0.0.0 255.255.255.255. • Use the **host** *source* combination as an abbreviation for a *source* and *source-wildcard* of *source* 0.0.0.0.
source-wildcard	Wildcard bits to be applied to the source. There are three alternative ways to specify the source wildcard: • Use a 32-bit quantity in four-part dotted-decimal format. Place ones in the bit positions you want to ignore. • Use the **any** keyword as an abbreviation for a *source* and *source-wildcard* of 0.0.0.0 255.255.255.255. • Use the **host** *source* combination as an abbreviation for a *source* and *source-wildcard* of *source* 0.0.0.0.

protocol	Name or number of an IP protocol. It can be one of the keywords **ahp** , **esp** , **eigrp** , **gre** , **icmp** , **igmp** , **igrp** , **ip** , **ipinip** , **nos** , **ospf** , **pim** , **pcp** , **sctp** , **tcp** , or **udp** , or an integer from 0 to 255 representing an IP protocol number. To match any Internet protocol (including ICMP, TCP, and UDP), use the **ip** keyword. ICMP, SCTP, and TCP allow further qualifiers, which are described later in this table.
destination	Number of the network or host to which the packet is being sent. There are three alternative ways to specify the destination: • Use a 32-bit quantity in four-part dotted-decimal format. • Use the **any** keyword as an abbreviation for the *destination* and *destination-wildcard* of 0.0.0.0 255.255.255.255. • Use the **host** *destination* combination as an abbreviation for a *destination* and *destination-wildcard* of *destination* 0.0.0.0.
destination-wildcard	Wildcard bits to be applied to the destination. There are three alternative ways to specify the destination wildcard: • Use a 32-bit quantity in four-part dotted-decimal format. Place ones in the bit positions you want to ignore. • Use the **any** keyword as an abbreviation for a *destination* and *destination-wildcard* of 0.0.0.0 255.255.255.255. • Use the **host** *destination* combination as an abbreviation for a *destination* and *destination-wildcard* of *destination* 0.0.0.0.
precedence *precedence*	(Optional) Packets can be filtered by precedence level (as specified by a number from 0 to 7) or by the following names: • **routine** –Match packets with routine precedence (0) • **priority** –Match packets with priority precedence (1) • **immediate** –Match packets with immediate precedence (2) • **flash** –Match packets with flash precedence (3) • **flash-override** –Match packets with flash override precedence (4) • **critical** –Match packets with critical precedence (5) • **internet** –Match packets with internetwork control precedence (6) • **network** –Match packets with network control precedence (7)

dscp *dscp*	(Optional) Differentiated services code point (DSCP) provides quality of service control. The values for *dscp* are as follows: • 0—63–Differentiated services codepoint value • af11–Match packets with AF11 dscp (001010) • af12–Match packets with AF12 dscp (001100) • af13–Match packets with AF13 dscp (001110) • af21–Match packets with AF21 dscp (010010) • af22–Match packets with AF22 dscp (010100) • af23–Match packets with AF23 dscp (010110) • af31–Match packets with AF31 dscp (011010) • af32–Match packets with AF32 dscp (011100) • af33–Match packets with AF33 dscp (011110) • af41–Match packets with AF41 dscp (100010) • af42—Match packets with AF42 dscp (100100) • af43–Match packets with AF43 dscp (100110) • cs1–Match packets with CS1(precedence 1) dscp (001000) • cs2–Match packets with CS2(precedence 2) dscp (010000) • cs3–Match packets with CS3(precedence 3) dscp (011000) • cs4–Match packets with CS4(precedence 4) dscp (100000) • cs5–Match packets with CS5(precedence 5) dscp (101000) • cs6–Match packets with CS6(precedence 6) dscp (110000) • cs7–Match packets with CS7(precedence 7) dscp (111000) • default–Default DSCP (000000) • ef–Match packets with EF dscp (101110)
fragments	(Optional) Causes the software to examine fragments of IPv4 packets when applying this access list entry. When this keyword is specified, fragments are subject to the access list entry.
packet-length operator	(Optional) Packet length operator used for filtering.
packet-length value	(Optional) Packet length used to match only packets in the range of the length.
log	(Optional) Causes an informational logging message about the packet that matches the entry to be sent to the console. (The level of messages logged to the console is controlled by the **logging console** command.) The message includes the access list number, whether the packet was permitted or denied; the protocol, whether it was TCP, UDP, ICMP, or a number; and, if appropriate, the source and destination addresses and source and destination port numbers. The message is generated for the first packet that matches a flow, and then at 5-minute intervals, including the number of packets permitted or denied in the prior 5-minute interval.
log-input	(Optional) Provides the same function as the **log** keyword, except that the logging message also includes the input interface.
ttl	(Optional) Turns on matching against time-to-life (TTL) value.

ttl value1 value2	(Optional) TTL value used for filtering. Range is 1 to 255. If only *value1* is specified, the match is against this value. If both *value1* and *value2* are specified, the packet TTL is matched against the range of TTLs between *value1* and *value2* .
icmp-off	(Optional) Turns off ICMP generation for denied packets.
icmp-type	(Optional) ICMP message type for filtering ICMP packets. Range is from 0 to 255.
icmp-code	(Optional) ICMP message code for filtering ICMP packets. Range is from 0 to 255.
igmp-type	(Optional) IGMP message type (0 to 15) or message name for filtering IGMP packets, as follows: • dvmrp • host-query • host-report • mtrace • mtrace-response • pim • precedence • trace • v2-leave • v2-report • v3-report
operator	(Optional) Operator is used to compare source or destination ports. Possible operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range). If the operator is positioned after the *source* and *source-wildcard* values, it must match the source port. If the operator is positioned after the *destination* and *destination-wildcard* values, it must match the destination port. If the operator is positioned after the **ttl** keyword, it matches the TTL value. The **range** operator requires two port numbers. All other operators require one port number.
protocol-port	Name of a TCP or UDP port. TCP and UDP port names are listed in the "Usage Guidelines" section. TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.
established	(Optional) For the TCP protocol only: Indicates an established connection.
match-any	(Optional) For the TCP protocol only: Filters on any combination of TCP flags.
match-all	(Optional) For the TCP protocol only: Filters on all TCP flags.

+ | -	(Required) For the TCP protocol **match-any** , **match-all** : Prefix *flag-name* with + or - . Use the + *flag-name* argument to match packets with the TCP flag set. Use the - *flag-name* argument to match packets when the TCP flag is not set.
flag-name	(Required) For the TCP protocol **match-any** , **match-all** . Flag names are: ack, fin, psh, rst, syn.

Command Default

There is no specific condition under which a packet is denied passing the IPv4 access list.

ICMP message generation is enabled by default.

Command Modes

IPv4 access list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The optional keywords **match-any** and **match-all** were added for the TCP protocol. The argument *flag-name* was added for the TCP protocol. The **match-any** and **match-all** keywords and the *flag-name* argument are supported. The optional keyword **icmp-off** was added for the ICMP protocol.
Release 3.4.0	The optional keyword **ttl** and the associated arguments *ttl value1* and *value2* and *operator,* with range values, were added to the command.

Usage Guidelines

Use the **deny** command following the **ipv4 access-list** command to specify conditions under which a packet cannot pass the access list.

By default, the first statement in an access list is number 10, and the subsequent statements are incremented by 10.

You can add **permit**, **deny**, or **remark** statements to an existing access list without retyping the entire list. To add a new **s**tatement anywhere other than at the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

If you want to add a statement between two consecutively numbered statements (for example, between lines 10 and 11), first use the **resequence access-list** command to renumber the first statement and increment the entry number of each subsequent statement. The *increment* argument causes new, unused line numbers between statements. Then add a new statement with the *entry-number* argument, specifying where it belongs in the access list.

The following is a list of precedence names:

- critical
- flash
- flash-override
- immediate
- internet
- network
- priority
- routine

The following is a list of ICMP message type names:

- administratively-prohibited
- alternate-address
- conversion-error
- dod-host-prohibited
- dod-net-prohibited
- echo
- echo-reply
- general-parameter-problem
- host-isolated
- host-precedence-unreachable
- host-redirect
- host-tos-redirect
- host-tos-unreachable
- host-unknown
- host-unreachable
- information-reply
- information-request
- mask-reply
- mask-request
- mobile-redirect
- net-redirect
- net-tos-redirect
- net-tos-unreachable
- net-unreachable
- network-unknown
- no-room-for-option
- option-missing
- packet-too-big
- parameter-problem
- port-unreachable
- precedence-unreachable
- protocol-unreachable
- reassembly-timeout
- redirect
- router-advertisement
- router-solicitation

- source-quench
- source-route-failed
- time-exceeded
- timestamp-reply
- timestamp-request
- traceroute
- ttl-exceeded
- unreachable

The following is a list of TCP port names that can be used instead of port numbers. Refer to the current *Assigned Numbers* RFC to find a reference to these protocols. You can find port numbers corresponding to these protocols by typing a ? in the place of a port number.

- bgp
- chargen
- cmd
- daytime
- discard
- domain
- echo
- exec
- finger
- ftp
- ftp-data
- gopher
- hostname
- ident
- irc
- klogin
- kshell
- login
- lpd
- nntp
- pim-auto-rp
- pop2
- pop3
- smtp
- sunrpc
- tacacs
- talk
- telnet
- time
- uucp
- whois
- www

The following UDP port names can be used instead of port numbers. Refer to the current *Assigned Numbers* RFC to find a reference to these protocols. You can find port numbers corresponding to these protocols by typing a ? in the place of a port number.

- biff
- bootpc
- bootps
- discard
- dnsix
- domain
- echo
- isakmp
- mobile-ip
- nameserver
- netbios-dgm
- netbios-ns
- netbios-ss
- ntp
- pim-auto-rp
- rip
- snmp
- snmptrap
- sunrpc
- syslog
- tacacs
- talk
- tftp
- time
- who
- xdmcp

Use the following flags in conjunction with the **match-any** and **match-all** keywords and the + and - signs to select the flags to display:

- ack
- fin
- psh
- rst
- syn

For example, **match-all** + *ack* + *syn* displays TCP packets with both the ack *and* syn flags set, or **match-any** + *ack* - *syn* displays the TCP packets with the ack set *or* the syn not set.

Note If any ACE in an ACL contains ABF clause, this ACL cannot be applied at any non-zero compression level.

Task ID

Task ID	Operations
ipv4	read, write
acl	read, write

Examples

This example shows how to set a deny condition for an access list named Internet filter:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list Internetfilter
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 deny 192.168.34.0 0.0.0.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# 20 deny 172.16.0.0 0.0.255.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# 25 deny tcp host 172.16.0.0 eq bgp host 192.168.202.203
 range 1300 1400
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.0.0.0 0.255.255.255
```

Related Commands

Command	Description
ipv4 access-group, on page 27	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an IPv4 access list
remark (IPv4) , on page 60	Inserts a helpful remark about an IPv4 access list entry.
resequence access-list ipv4 , on page 64	Changes the starting entry number of the first statement in an existing IPv4 access list, and the number by which subsequent statements are incremented.
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

deny (IPv6)

To set deny conditions for an IPv6 access list, use the **deny** command in IPv6 access list configuration mode. To remove the deny conditions, use the **no** form of this command.

[sequence-number] **deny** *protocol* {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*}] [**dscp***value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [*packet-length operator packet-length value*] [**log | log-input**] [**ttl** *operator ttl value*]
no *sequence-number*

Internet Control Message Protocol (ICMP)
*[sequence-number]***deny icmp** {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*icmp-type*] [*icmp-code*] [**dscp** *value*] [routing] [**authen**] [**destopts**] [**fragments**] [**log**] [**log-input**] [**icmp-off**]

Transmission Control Protocol (TCP)
*[sequence-number]***deny tcp** {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*}] {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*operator* {*port* | *protocol* | *port*}] [**dscp***value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [**established**] {**match-any | match-all | + | -**} [*flag-name*] [**log**] [**log-input**]

User Datagram Protocol (UDP)
*[sequence-number]***deny tcp** {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*}] {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*operator* {*port* | *protocol* | *port*}] [**dscp***value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [**established**] [*flag-name*] [**log**] [**log-input**]

Syntax Description

sequence-number	(Optional) Number of the **deny** statement in the access list. This number determines the order of the statements in the access list. Range is 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.) Use the **resequence access-list** command to change the number of the first statement and increment subsequent statements of a configured access list.
protocol	Name or number of an Internet protocol. It can be one of the keywords **ahp** , **esp** , **icmp** , **ipv6** , **pcp** , **sctp** , **tcp** , or **udp** , or an integer in the range from 0 to 255 representing an IPv6 protocol number.
source-ipv6-prefix / *prefix-length*	The source IPv6 network or class of networks about which to set deny conditions. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
any	An abbreviation for the IPv6 prefix ::/0.

operator {*port* | *protocol-port*}	(Optional) Operand that compares the source or destination ports of the specified protocol. Operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range). If the operator is positioned after the *source-ipv6-prefix / prefix-length* argument, it must match the source port. If the operator is positioned after the *destination-ipv6-prefix / prefix-length* argument, it must match the destination port. The **range** operator requires two port numbers. All other operators require one port number. The *port* argument is the decimal number of a TCP or UDP port. Range is 0 to 65535. The *protocol-port* argument is the name of a TCP or UDP port. TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.
destination-ipv6-prefix / prefix-length	Destination IPv6 network or class of networks about which to set deny conditions. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
host *destination-ipv6-address*	Destination IPv6 host address about which to set deny conditions. This *destination-ipv6-address* argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
dscp *value*	(Optional) Matches a differentiated services code point DSCP value against the traffic class value in the Traffic Class field of each IPv6 packet header. Range is 0 to 63.
routing	(Optional) Matches source-routed packets against the routing extension header within each IPv6 packet header.
authen	(Optional) Matches if the IPv6 authentication header is present.
destopts	(Optional) Matches if the IPv6 destination options header is present.
fragments	(Optional) Matches non-initial fragmented packets where the fragment extension header contains a nonzero fragment offset. The **fragments** keyword is an option only if the *operator* [*port-number*] arguments are not specified.
packet-length operator	(Optional) Packet length operator used for filtering.
packet-length value	(Optional) Packet length used to match only packets in the range of the length.

log	(Optional) Causes an informational logging message about the packet that matches the entry to be sent to the console. (The level of messages logged to the console is controlled by the **logging console** command.) The message includes the access list name and sequence number, whether the packet was denied; the protocol, whether it was TCP, UDP, ICMP, or a number; and, if appropriate, the source and destination addresses and source and destination port numbers. The message is generated for the first packet that matches, and then at 5-minute intervals, including the number of packets denied in the prior 5-minute interval.
log-input	(Optional) Provides the same function as the **log** keyword, except that the logging message also includes the input interface.
ttl	(Optional) Turns on matching against time-to-life (TTL) value.
operator	(Optional) Operand that compares the source or destination ports of the specified protocol. Operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range).
ttl value1 value2	(Optional) TTL value used for filtering. Range is 1 to 255. If only *value1* is specified, the match is against this value. If both *value1* and *value2* are specified, the packet TTL is matched against the range of TTLs between *value1* and *value2* .
icmp-off	(Optional) Turns off ICMP generation for denied packets
icmp-type	(Optional) ICMP message type for filtering ICMP packets. ICMP packets can be filtered by ICMP message type. Range is 0 to 255.
icmp-code	(Optional) ICMP message code for filtering ICMP packets. ICMP packets that are filtered by ICMP message type can also be filtered by the ICMP message code. Range is 0 to 255.
established	(Optional) For the TCP protocol only: Indicates an established connection.
match-any	(Optional) For the TCP protocol only: Filters on any combination of TCP flags.
match-all	(Optional) For the TCP protocol only: Filters on all TCP flags.
+ | -	(Required) For the TCP protocol **match-any** , **match-all** : Prefix *flag-name* with + or - . Use the + *flag-name* argument to match packets with the TCP flag set. Use the - *flag-name* argument to match packets when the TCP flag is not set.
flag-name	(Required) For the TCP protocol **match-any** , **match-all** . Flag names are: ack, fin, psh, rst, syn.

Command Default

No IPv6 access list is defined.

ICMP message generation is enabled by default.

Command Modes

IPv6 access list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The optional keywords **match-any** and **match-all** were added for the TCP protocol. The argument *flag-name* was added for the TCP protocol. The **match-any** and **match-all** keywords and the *flag-name* argument are supported. The optional keyword **icmp-off** was added for the ICMP protocol.
Release 3.4.0	The optional keyword **ttl** and the associated arguments *ttl value1, value2* and *operator,* with range values, were added to the command.

Usage Guidelines

The **deny** (IPv6) command is similar to the **deny** (IPv4) command, except that it is IPv6-specific.

Use the **deny** (IPv6) command following the **ipv6 access-list** command to define the conditions under which a packet passes the access list.

Note If any ACE in an ACL contains ABF clause, this ACL cannot be applied at any non-zero compression level.

Specifying **ipv6** for the *protocol* argument matches against the IPv6 header of the packet.

By default, the first statement in an access list is number 10, and the subsequent statements are numbered in increments of 10.

You can add permit, deny, or remark statements to an existing access list without retyping the entire list. To add a new statement anywhere other than at the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

Both the *source-ipv6-prefix/prefix-length* and *destination-ipv6-prefix/prefix-length* arguments are used for traffic filtering (the source prefix filters traffic based upon the traffic source; the destination prefix filters traffic based upon the traffic destination).

Note IPv6 prefix lists, not access lists, should be used for filtering routing protocol prefixes.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to configure the IPv6 access list named toCISCO and applies the access list to outbound traffic on Packet-over-SONET (POS) interface 0/2/0/2. Specifically, the first deny entry in the list keeps all packets that have a destination TCP port number greater than 5000 from exiting out of POS interface 0/2/0/2. The second deny entry in the list keeps all packets that have a source UDPo port number less than 5000 from exiting out of POS interface 0/2/0/2. The second deny entry also logs all matches to the console. The first permit entry in the list permits all ICMP packets to exit out of POS interface 0/2/0/2. The second permit entry in the list permits all

other traffic to exit out of POS interface 0/2/0/2. The second permit entry is necessary because an implicit deny all condition is at the end of each IPv6 access list.

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list toCISCO
RP/0/RP0/CPU0:router(config-ipv6-acl)# deny tcp any any gt 5000
RP/0/RP0/CPU0:router(config-ipv6-acl)# deny ipv6 any lt 5000 any log
RP/0/RP0/CPU0:router(config-ipv6-acl)# permit icmp any any
RP/0/RP0/CPU0:router(config-ipv6-acl)# permit any any
RP/0/RP0/CPU0:router(config)# interface POS 0/2/0/2
RP/0/RP0/CPU0:router(config-if)# ipv6 access-group tOCISCO out
```

Related Commands

Command	Description
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 55	Sets permit conditions for an IPv6 access list.
remark (IPv6) , on page 62	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 66	Changes the starting entry number of the first statement in an existing IPv6 access list, and the number by which subsequent statements are incremented.

ipv4 access-group

To control access to an interface, use the **ipv4 access-group** command in interface configuration mode. To remove the specified access group, use the **no** form of this command.

ipv4 access-group [**common** *acl-name*] *access-list-name* {**ingress** | **egress**} [**hardware-count**] [**interface-statistics**]
no ipv4 access-group [**common** *acl-name*] *access-list-name* {**ingress** | **egress**} [**hardware-count**] [**interface-statistics**]

Syntax Description

access-list-name	Name of an IPv4 access list as specified by an **ipv4 access-list** command.
common *acl-name*	Specifies the common access-list name.
ingress	Filters on inbound packets.
egress	Filters on outbound packets.
hardware-count	(Optional) Specifies to access a group's hardware counters.
interface-statistics	(Optional) Specifies per-interface statistics in the hardware.

Command Default

The interface does not have an IPv4 access list applied to it.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The keywords { **in** | **out** } were changed to { **ingress** | **egress** }.
Release 3.4.0	The argument *hw-count* was changed to *hardware-count* .
Release 3.5.0	The **interface-statistics** keyword was added.
Release 4.1.1	The **common** keyword was added.

Usage Guidelines

Use the **ipv4 access-group** command to control access to an interface. To remove the specified access group, use the **no** form of the command. Use the *access-list-name* argument to specify a particular IPv4 access list. Use the **ingress** keyword to filter on inbound packets or the**egress** keyword to filter on outbound packets. Use the *hardware-count* argument to enable hardware counters for the access group.

Permitted packets are counted only when hardware counters are enabled using the *hardware-count* argument. Denied packets are counted whether hardware counters are enabled, or not.

Filtering of MPLS packets through common ACL and interface ACL is not supported.

Restrictions for common ACLs are:

- Common ACL is supported in only ingress direction and for L3 interfaces only.
- The **interface-statistics** option is not available for common ACLs.
- The **hardware-count** option is available for only IPv4 ACLs.
- Only one common IPv4 and IPv6 ACL is supported on each line card.
- The common ACL option is not available for Ethernet Service (ES) ACLs.
- You can specify only common ACL or only interface ACL or both common and interface ACL in this command.
- The **compress** option is not supported for common ACLs.

Note For packet filtering applications using the **ipv4 access-group** command, packet counters are maintained in hardware for each direction. If an access group is used on multiple interfaces in the same direction, then packets are counted for each interface that has the *hardware-count* argument enabled.

If the access list permits the addresses, the software continues to process the packet. If the access list denies the address, the software discards the packet and returns an Internet Control Message Protocol (ICMP) host unreachable message.

If the specified access list does not exist, all packets are passed.

By default, the unique or per-interface ACL statistics are disabled.

Task ID

Task ID	Operations
acl	read, write
network	read, write

Examples

The following example shows how to apply filters on packets inbound and outbound from interface 0/2/0/2:

```
RP/0/RP0/CPU0:router(config)# interface  0/2/0/2
RP/0/RP0/CPU0:router(config-if)# ipv4 access-group p-ingress-filter ingress
RP/0/RP0/CPU0:router(config-if)# ipv4 access-group p-egress-filter egress
```

The following example shows how to apply per-interface statistics in the hardware:

```
RP/0/RP0/CPU0:router(config)# interface  0/2/0/2
RP/0/RP0/CPU0:router(config-if)# ipv4 access-group p-ingress-filter ingress
```

```
interface-statistics
```

This example shows how to configure common ACL:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# interface gigabitethernet  0/1/0/4
RP/0/RP0/CPU0:router(config-if)# ipv4 access-group common common-acl interface-acl ingress
```

Related Commands

Command	Description
clear access-list ipv4, on page 3	Resets the IPv4 access list match counters.
deny (IPv4) , on page 13	Sets the deny conditions for an ACE of an IPv4 access list.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an ACE of an IPv4 access list.
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.
show ipv4 interface	Displays the usability status of interfaces configured for IPv4.

ipv4 access-list

To define an IPv4 access list by name, use the **ipv4 access-list** command in Global Configuration mode. To remove all entries in an IPv4 access list, use the **no** form of this command.

ipv4 access-list *name*

Syntax Description

name	Name of the access list. Names cannot contain a space or quotation marks.

Command Default

No IPv4 access list is defined.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **ipv4 access-list** command to configure an IPv4 access list. This command places the router in access list configuration mode, in which the denied or permitted access conditions must be defined with the **deny** or **permit** command.

Use the **resequence access-list ipv4** command if you want to add a **permit** , **deny** , or **remark** statement between consecutive entries in an existing IPv4 access list. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software renumbers the existing statements, thereby making room to add new statements with the unused entry numbers.

Use the **ipv4 access-group** command to apply the access list to an interface.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to define a standard access list named Internetfilter:

```
Router(config)# ipv4 access-list Internetfilter
Router(config-if)# 10 permit 192.168.34.0 0.0.0.255
Router(config-if)# 20 permit 172.16.0.0 0.0.255.255
Router(config-if)# 30 permit 10.0.0.0 0.255.255.255
Router(config-if)# 39 remark Block BGP traffic from 172.16 net.
Router(config-if)# 40 deny tcp host 172.16.0.0 eq bgp host 192.168.202.203 range 1300 1400
```

Related Commands

Command	Description
show access-lists ipv4	Displays the contents of all current IPv4 access lists.

ipv4 access-list log-update rate

To specify the rate at which IPv4 access lists are logged, use the **ipv4 access-list log-update rate** command in Global Configuration mode. To return the update rate to the default setting, use the **no** form of this command.

ipv4 access-list log-update rate *rate-number*
no ipv4 access-list log-update rate *rate-number*

Syntax Description

rate-number	Rate at which IPv4 access hit logs are generated per second on the router. Range is 1 to 1000.

Command Default

Default is 1.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

The *rate-number* argument applies to all the IPv4 access-lists configured on the interfaces. That is, at any given time there can be between 1 and 1000 log entries for the system.

Task ID

Task ID	Operations
ipv4	read, write
acl	read, write

Examples

The following example shows how to configure a IPv4 access hit logging rate for the system:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list log-update rate 10
```

ipv4 access-list log-update threshold

To specify the number of updates that are logged for IPv4 access lists, use the **ipv4 access-list log-update threshold** command in Global Configuration mode. To return the number of logged updates to the default setting, use the **no** form of this command.

ipv4 access-list log-update threshold *update-number*
no ipv4 access-list log-update threshold *update-number*

Syntax Description

update-number	Number of updates that are logged for every IPv4 access list configured on the router. Range is 0 to 2147483647.

Command Default

For IPv4 access lists, 2147483647 updates are logged.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

IPv4 access list updates are logged at 5-minute intervals, following the first logged update. Configuring a lower number of updates (a number lower than the default) is useful when more frequent update logging is desired.

Task ID

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

Examples

This example shows how to configure a log threshold of ten updates for every IPv4 access list configured on the router:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list log-update threshold 10
```

Related Commands

Command	Description
deny (IPv4) , on page 13	Sets the deny conditions for an IPv4 access list.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an IPv4 access list

Command	Description
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

ipv6 access-group

To control access to an interface, use the **ipv6 access-group** command in interface configuration mode. To remove the specified access group, use the **no** form of this command.

ipv6 access-group *access-list-name* {**ingress** | **egress**} [**interface-statistics**]

Syntax Description

access-list-name	Name of an IPv6 access list as specified by an **ipv6 access-list** command.
ingress	Filters on inbound packets.
egress	Filters on outbound packets.
interface-statistics	(Optional) Specifies per-interface statistics in the hardware.

Command Default

The interface does not have an IPv6 access list applied to it.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The keywords { **in** | **out** } were changed to { **ingress** | **egress** }.
Release 3.5.0	The **interface-statistics** keyword was added.

Usage Guidelines

The **ipv6 access-group** command is similar to the **ipv4 access-group** command, except that it is IPv6-specific.

Use the **ipv6 access-group** command to control access to an interface. To remove the specified access group, use the **no** form of the command. Use the *access-list-name* to specify a particular IPv6 access list. Use the **ingress** keyword to filter on inbound packets or the **egress** keyword to filter on outbound packets.

Note For packet filtering applications using the **ipv6 access-group** command, packet counters are maintained in hardware for each direction. If an access group is used on multiple interfaces in the same direction, then packets are counted for each interface.

If the access list permits the addresses, the software continues to process the packet. If the access list denies the address, the software discards the packet and returns a rate-limited Internet Control Message Protocol (ICMP) host unreachable message.

If the specified access list does not exist, all packets are passed.

By default, the unique or per-interface ACL statistics are disabled.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

The following example shows how to apply filters on packets inbound and outbound from GigabitEthernet interface 0/2/0/2:

```
RP/0/
RP0
/CPU0:router(config)# interface gigabitethernet 0/2/0/2
RP/0/
RP0
/CPU0:router(config-if)# ipv6 access-group p-in-filter ingress
RP/0/
RP0
/CPU0:router(config-if)# ipv6 access-group p-out-filter egress
```

The following example shows how to apply per-interface statistics in the hardware:

```
RP/0/
RP0
/CPU0:router(config)# interface gigabitethernet 0/2/0/2
RP/0/
RP0
/CPU0:router(config-if)# ipv6 access-group p-in-filter ingress interface-statistics
```

Related Commands

Command	Description
ipv6 access-list(BNG)	Defines an IPv6 access list and enters IPv6 access list configuration mode.
show ipv6 interface	Displays the usability status of interfaces configured for IPv6.

ipv6 access-list

To define an IPv6 access list and to place the router in IPv6 access list configuration mode, use the **ipv6 access-list** command in Global Configuration mode. To remove the access list, use the **no** form of this command.

ipv6 access-list *name*

Syntax Description

name	Name of the IPv6 access list. Names cannot contain a space or quotation mark, or begin with a numeric.

Command Default

No IPv6 access list is defined.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **ipv6 access-list** command is similar to the **ipv4 access-list** command, except that it is IPv6-specific.

The IPv6 access lists are used for traffic filtering based on source and destination addresses, IPv6 option headers, and optional, upper-layer protocol type information for finer granularity of control. IPv6 access lists are defined by using the **ipv6 access-list** command in global configuration mode and their permit and deny conditions are set by using the **deny** and **permit** commands in IPv6 access list configuration mode. Configuring the **ipv6 access-list** command places the router in IPv6 access list configuration mode—the router prompt changes to router (config-ipv6-acl)#. From IPv6 access list configuration mode, permit and deny conditions can be set for the defined IPv6 access list.

Note Every IPv6 access list has an implicit **deny ipv6 any any** statement as its last match condition. An IPv6 access list must contain at least one entry for the implicit **deny ipv6 any any** statement to take effect.

Note IPv6 prefix lists, not access lists, should be used for filtering routing protocol prefixes.

Use the **ipv6 access-group** interface configuration command with the *access-list-name* argument to apply an IPv6 access list to an IPv6 interface.

Note Every IPv6 ACL has implicit **permit icmp any any nd-na** , **permit icmp any any nd-ns** , and **deny ipv6 any any** statements as its last match conditions. (The former two match conditions allow for ICMPv6 neighbor discovery.) An IPv6 ACL must contain at least one entry for the implicit **deny ipv6 any any** statement to take effect. **permit icmp any any nd-na permit icmp any any nd-ns deny ipv6 any any deny ipv6 any any**

The IPv6 neighbor discovery process makes use of the IPv6 network layer service; therefore, by default, IPv6 ACLs implicitly allow IPv6 neighbor discovery packets to be sent and received on an interface. In IPv4, the Address Resolution Protocol (ARP), which is equivalent to the IPv6 neighbor discovery process, makes use of a separate data link layer protocol; therefore, by default, IPv4 ACLs implicitly allow ARP packets to be sent and received on an interface.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

The following example shows how to configure the IPv6 access list named list2 and applies the ACL to outbound traffic on interface GigabitEthernet 0/2/0/2. Specifically, the first ACL entry keeps all packets from the network fec0:0:0:2::/64 (packets that have the site-local prefix fec0:0:0:2 as the first 64 bits of their source IPv6 address) from exiting out of interface GigabitEthernet 0/2/0/2. The second entry in the ACL permits all other traffic to exit out of interface GigabitEthernet 0/2/0/2. The second entry is necessary because an implicit deny all condition is at the end of each IPv6 ACL.

```
RP/0/
RP0
/CPU0:router(config)# ipv6 access-list list2
RP/0/
RP0
/CPU0:router(config-ipv6-acl)# 10 deny fec0:0:0:2::/64 any
RP/0/
RP0
/CPU0:router(config-ipv6-acl)# 20 permit any any

RP/0/
RP0
/CPU0:router# show ipv6 access-lists list2

ipv6 access-list list2
  10 deny ipv6 fec0:0:0:2::/64 any
  20 permit ipv6 any any

RP/0/
RP0
/CPU0:router(config)# interface gigabitethernet 0/2/0/2
RP/0/
RP0
/CPU0:router(config-if)# ipv6 access-group list2 out
```

Note IPv6 is automatically configured as the protocol type in **permit any any** and **deny any any** statements that are translated from global configuration mode to IPv6 access list configuration mode.

Note An IPv6 router does not forward to another network an IPv6 packet that has a link-local address as either its source or destination address (and the source interface for the packet is different from the destination interface for the packet).

ipv6 access-list log-update rate

To specify the rate at which IPv6 access lists are logged, use the **ipv6 access-list log-update rate** command in Global Configuration mode. To return the update rate to the default setting, use the **no** form of this command.

ipv6 access-list log-update rate *rate-number*
no ipv6 access-list log-update rate *rate-number*

Syntax Description

rate-number	Rate at which IPv6 access hit logs are generated per second on the router. Range is 1 to 1000.

Command Default

Default is 1.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

The *rate-number* argument applies to all the IPv6 access-lists configured on the interfaces. That is, at any given time there can be between 1 and 1000 log entries for the system.

Task ID

Task ID	Operations
ipv6	read, write
acl	read, write

Examples

This example shows how to configure a IPv6 access hit logging rate for the system:

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list log-update rate 10
```

ipv6 access-list log-update threshold

To specify the number of updates that are logged for IPv6 access lists (ACLs), use the **ipv6 access-list log-update threshold** command in Global Configuration mode. To return the number of logged updates to the default setting, use the **no** form of this command.

ipv6 access-list log-update threshold *update-number*
no ipv6 access-list log-update threshold *update-number*

Syntax Description

update-number	Number of updates that are logged for every IPv6 access list configured on the router. Range is 0 to 2147483647.

Command Default

For IPv6 access lists, 350000 updates are logged.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **ipv6 access-list log-update threshold** command is similar to the **ipv4 access-list log-update threshold** command, except that it is IPv6-specific.

IPv6 access list updates are logged at 5-minute intervals, following the first logged update. Configuring a lower number of updates (a number lower than the default) is useful when more frequent update logging is desired.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

This example shows how to configure a log threshold of ten updates for every IPv6 access list configured on the router:

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list log-update threshold 10
```

ipv6 access-list maximum ace threshold

To set the maximum number of access control entries (ACEs) for IPv6 access lists, use the **ipv6 access-list maximum ace threshold** command in Global Configuration mode. To reset the ACE limit for IPv6 access lists, use the **no** form of this command.

ipv6 access-list maximum ace threshold *ace-number*
no ipv6 access-list maximum ace threshold *ace-number*

Syntax Description

ace-number	Maximum number of configurable ACEs allowed. Range is 50000 to 350000.

Command Default

50,000 ACEs are allowed for IPv6 access lists.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	Range was 50000 to 100000 changed to 50000 to 350000.

Usage Guidelines

Use the **ipv6 access-list maximum ace threshold** command to set the maximum number of configurable ACEs for IPv6 access lists. Out of resource (OOR) limits the number of ACEs that can be configured in the system. When the maximum number of configurable ACEs is reached, configuration of new ACEs is rejected.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

This example shows how to set the maximum number of ACEs for IPv6 access lists to 75000:

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list maximum ace threshold 75000
```

Related Commands

Command	Description
show access-lists ipv6, on page 77	Displays the contents of all current IPv6 access lists.

ipv6 access-list maximum acl threshold

To set the maximum number of configurable IPv4 access control lists (ACLs), use the **ipv6 access-list maximum acl threshold** command in Global Configuration mode. To reset the IPv6 ACL limit, use the **no** form of this command.

ipv6 access-list maximum acl threshold *acl-number*
no ipv6 access-list maximum ace threshold *acl-number*

Syntax Description

acl-number	Maximum number of configurable ACLs allowed. Range is 1000 to 16000.

Command Default

1000 IPv6 ACLs can be configured.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	Maximum range was changed from 2000 to 16000.

Usage Guidelines

Use the **ipv6 access-list maximum acl threshold** command to set the maximum number of configurable IPv6 ACLs. Out of resource (OOR) limits the number of ACLs that can be configured in the system. When the limit is reached, configuration of new ACLs is rejected.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

This example shows how to set the maximum number of configurable IPv6 ACLs to 1500:

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list maximum acl threshold 1500
```

Related Commands

Command	Description
show access-lists ipv6, on page 77	Displays the contents of all current IPv6 access lists.

permit (IPv4)

To set conditions for an IPv4 access list, use the **permit** command in access list configuration mode. There are two versions of the **permit** command: **permit** (source), and **permit** (protocol). To remove a condition from an access list, use the **no** form of this command.

[*sequence-number*] **permit** *source* [*source-wildcard*] [{**log** | **log-input**}]
[*sequence-number*] **permit** *protocol source source-wildcard destination destination-wildcard* [**capture**] [**precedence** *precedence*] [**default nexthop1** [**vrf** *vrf-name*][**ipv4** *ipv4-address1*] **nexthop2**[**vrf** *vrf-name*][**ipv4** *ipv4-address2*] **nexthhop3**[**vrf** *vrf-name*][**ipv4** *ipv4-address3*]] [**dscp** *dscp*] [**fragments**] [{**log** | **log-input**}] [**nexthop** [**track** *track-name*]] [**ttl** *ttl value* [*value1 . . . value2*]]
no *sequence-number*

Internet Control Message Protocol (ICMP)
[*sequence-number*] **permit icmp** *source source-wildcard destination destination-wildcard* [*icmp-type*] [*icmp-code*] [**precedence** *precedence*] [**dscp** *dscp*] [**fragments**] [{**log** | **log-input**}] [**icmp-off**]

Internet Group Management Protocol (IGMP)
[*sequence-number*] **permit igmp** *source source-wildcard destination destination-wildcard* [*igmp-type*] [**precedence** *precedence*] [**dscp** *value*] [**fragments**] [{**log** | **log-input**}]

User Datagram Protocol (UDP)
[*sequence-number*] **permit udp** *source source-wildcard* [*operator* {*portprotocol-port*}] *destination destination-wildcard* [*operator* {*portprotocol-port*}] [**precedence** *precedence*] [**dscp** *dscp*] [**fragments**] [{**log** | **log-input**}]

Syntax Description

default	(Optional) Specifies the default next hop for this entry. If the **default** keyword is configured, ACL-based forwarding action is taken only if the results of the PLU lookup for the destination of the packets determine a default route; that is, no specified route is determined to the destination of the packet.
vrf *vrf-name*	Specifies VPN routing and forwarding (VRF) instance.

capture	Captures matching traffic. When the acl command is configured on the source mirroring port, if the ACL configuration command does not use the **capture** keyword, no traffic gets mirrored. If the ACL configuration uses the **capture** keyword, but the acl command is not configured on the source port, then the whole port traffic is mirrored and the **capture** action does not have any affect.
ipv4-address1 ipv4-address2 ipv4-address3	(Optional) Uses one to three next-hop addresses. The IP address types are defined as follows: • Default IP addresses—Specifies the next-hop router in the path toward the destination in which the packets must be forwarded, if there is no explicit route for the destination address of the packet in the routing table. The first IP address that is associated with a connected interface that is currently up is used to route the packets. • Specified IP addresses—Specifies the next-hop router in the path toward the destination in which the packets must be forwarded. The first IP address that is associated with a connected interface that is currently up is used to route the packets.

dscp *dscp*	(Optional) Differentiated services code point (DSCP) provides quality of service control. The values for *dscp* are as follows: • 0–63—Differentiated services codepoint value • af11—Match packets with AF11 dscp (001010) • af12—Match packets with AF12 dscp (001100) • af13—Match packets with AF13 dscp (001110) • af21—Match packets with AF21 dscp (010010) • af22—Match packets with AF22 dscp (010100) • af23—Match packets with AF23 dscp (010110) • af31—Match packets with AF31 dscp (011010) • af32—Match packets with AF32 dscp (011100) • af33—Match packets with AF33 dscp (011110) • af41—Match packets with AF41 dscp (100010) • af42—Match packets with AF42 dscp (100100) • af43–Match packets with AF43 dscp (100110) • cs1—Match packets with CS1 (precedence 1) dscp (001000) • cs2—Match packets with CS2 (precedence 2) dscp (010000) • cs3—Match packets with CS3 (precedence 3) dscp (011000) • cs4—Match packets with CS4 (precedence 4) dscp (100000) • cs5—Match packets with CS5 (precedence 5) dscp (101000) • cs6—Match packets with CS6 (precedence 6) dscp (110000) • cs7—Match packets with CS7 (precedence 7) dscp (111000) • default—Default DSCP (000000) • ef—Match packets with EF dscp (101110)

fragments	(Optional) Causes the software to examine noninitial fragments of IPv4 packets when applying this access list entry. When this keyword is specified, fragments are subject to the access list entry.
log	(Optional) Causes an informational logging message about the packet that matches the entry to be sent to the console. (The level of messages logged to the console is controlled by the **logging console** command.) The message includes the access list number, whether the packet was permitted or denied; the protocol, whether it was TCP, UDP, ICMP, or a number; and, if appropriate, the source and destination addresses and source and destination port numbers. The message is generated for the first packet that matches a flow, and then at 5-minute intervals, including the number of packets permitted or denied in the prior 5-minute interval.
log-input	(Optional) Provides the same function as the **log** keyword, except that the logging message also includes the input interface.
nexthop1, nexthop2, nexthop3	(Optional) Forwards the specified next hop for this entry.
track *track-name*	Specifies the TRACK Name for this nexthop.
ttl	(Optional) Turns on matching against time-to-life (TTL) value.
ttl value [*value1 ... value2*]	(Optional) TTL value used for filtering. Range is 1 to 255. If only *value* is specified, the match is against this value. If both *value1* and *value2* are specified, the packet TTL is matched against the range of TTLs between *value1* and *value2* .

icmp-off	(Optional) Turns off ICMP generation for denied packets
icmp-type	(Optional) ICMP message type for filtering ICMP packets. Range is from 0 to 255.
icmp-code	(Optional) ICMP message code for filtering ICMP packets. Range is from 0 to 255.
igmp-type	(Optional) IGMP message type (0 to 15) or message name for filtering IGMP packets, as follows: • dvmrp • host-query • host-report • mtrace • mtrace-response • pim • precedence • trace • v2-leave • v2-report • v3-report
operator	(Optional) Operator is used to compare source or destination ports. Possible operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range). If the operator is positioned after the *source* and *source-wildcard* values, it must match the source port. If the operator is positioned after the *destination* and *destination-wildcard* values, it must match the destination port. If the operator is positioned after the **ttl** keyword, it matches the TTL value. The **range** operator requires two port numbers. All other operators require one port number.

port	Decimal number a TCP or UDP port. Range is 0 to 65535. TCP ports can be used only when filtering TCP. UDP ports can be used only when filtering UDP.
protocol-port	Name of a TCP or UDP port. TCP and UDP port names are listed in the "Usage Guidelines" section. TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.
established	(Optional) For the TCP protocol only: Indicates an established connection.
match-any	(Optional) For the TCP protocol only: Filters on any combination of TCP flags.
match-all	(Optional) For the TCP protocol only: Filters on all TCP flags.
+ | -	(Required) For the TCP protocol **match-any** , **match-all** : Prefix *flag-name* with + or - . Use the + *flag-name* argument to match packets with the TCP flag set. Use the - *flag-name* argument to match packets when the TCP flag is not set.
flag-name	(Optional) For the TCP protocol **match-any** , **match-all** . Flag names are: **ack** , **fin** , **psh** , **rst** , **syn** .
counter	(Optional) Enables accessing ACL counters using SNMP query. The **counter** *counter-name* keyword is available on Cisco ASR 9000 Enhanced Ethernet Line Cards only.
counter-name	Defines an ACL counter name.

Command Default

There is no specific condition under which a packet is denied passing the IPv4 access list.

ICMP message generation is enabled by default.

Command Modes

IPv4 access list configuration

Command History

Release	Modification
Release 3.0	This command was introduced.
Release 3.3.0	The optional keywords **match-any** and **match-all** were added for the TCP protocol. The argument *flag-name* was added for the TCP protocol. The **match-any** and **match-all** keywords and the *flag-name* argument are supported. The optional keyword **icmp-off** was added for the ICMP protocol.
Release 3.4.0	The optional keyword **ttl** and the associated arguments *ttl value1, value2,* and *operator,* with range values, were added to the command.
Release 3.4.1	Both the **default nexthop** and **nexthop** keywords were added to support ACL-based forwarding.
Release 4.2	The **vrf** keyword and the associated *vrf-name* variable were added.

Usage Guidelines

Use the **permit** command following the **ipv4 access-list** command to specify conditions under which a packet can pass the access list.

By default, the first statement in an access list is number 10, and the subsequent statements are incremented by 10.

You can add **permit**, **deny**, or **remark** statements to an existing access list without retyping the entire list. To add a new **s**tatement anywhere other than at the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

If you want to add a statement between two consecutively numbered statements (for example, between lines 10 and 11), first use the **resequence access-list** command to renumber the first statement and increment the entry number of each subsequent statement. The *increment* argument causes new, unused line numbers between statements. Then add a new statement with the *entry-number* specifying where it belongs in the access list.

Note If any ACE in an ACL contains ABF clause, this ACL cannot be applied at any non-zero compression level.

The following is a list of precedence names:

- critical
- flash
- flash-override
- immediate
- internet
- network
- priority
- routine

The following is a list of ICMP message type names:

- administratively-prohibited
- alternate-address

- conversion-error
- dod-host-prohibited
- dod-net-prohibited
- echo
- echo-reply
- general-parameter-problem
- host-isolated
- host-precedence-unreachable
- host-redirect
- host-tos-redirect
- host-tos-unreachable
- host-unknown
- host-unreachable
- information-reply
- information-request
- mask-reply
- mask-request
- mobile-redirect
- net-redirect
- net-tos-redirect
- net-tos-unreachable
- net-unreachable
- network-unknown
- no-room-for-option
- option-missing
- packet-too-big
- parameter-problem
- port-unreachable
- precedence-unreachable
- protocol-unreachable
- reassembly-timeout
- redirect
- router-advertisement
- router-solicitation
- source-quench
- source-route-failed
- time-exceeded
- timestamp-reply
- timestamp-request
- traceroute
- ttl-exceeded
- unreachable

The following is a list of TCP port names that can be used instead of port numbers. Refer to the current *Assigned Numbers* RFC to find a reference to these protocols. You can find port numbers corresponding to these protocols by typing a ? in the place of a port number.

- bgp
- chargen
- cmd
- daytime
- discard
- domain
- echo
- exec
- finger
- ftp
- ftp-data
- gopher
- hostname
- ident
- irc
- klogin
- kshell
- login
- lpd
- nntp
- pim-auto-rp
- pop2
- pop3
- smtp
- sunrpc
- tacacs
- talk
- telnet
- time
- uucp
- whois
- www

The following UDP port names can be used instead of port numbers. Refer to the current *Assigned Numbers* RFC to find a reference to these protocols. You can find port numbers corresponding to these protocols by typing a ? in the place of a port number.

- biff
- bootpc
- bootps
- discard
- dnsix
- domain
- echo
- isakmp
- mobile-ip
- nameserver

- netbios-dgm
- netbios-ns
- netbios-ss
- ntp
- pim-auto-rp
- rip
- snmp
- snmptrap
- sunrpc
- syslog
- tacacs
- talk
- tftp
- time
- who
- xdmcp

Use the following flags in conjunction with the **match-any** and **match-all** keywords and the + and - signs to select the flags to display:

- ack
- fin
- psh
- rst
- syn

For example, **match-all** +*ack* +*syn* displays TCP packets with both the ack *and* syn flags set, or **match-any** +*ack* - *syn* displays the TCP packets with the ack set *or* the syn not set.

For ACL-based forwarding, we recommend that you use the **permit** command and **any any** keywords for the last ACL-based forwarding ACE rule to overwrite an implicit deny of security ACL. It ensures that all packets are forwarded with the traditional destination IP address if you do not want to drop any non-ABF related packets.

Task ID

Task ID	Operations
ipv4	read, write
acl	read, write

Examples

The following example shows how to set a permit condition for an access list named Internetfilter:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list Internetfilter
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 permit 192.168.34.0 0.0.0.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# 20 permit 172.16.0.0 0.0.255.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# 25 permit tcp host 172.16.0.0 eq bgp host
192.168.202.203 range 1300 1400
RP/0/RP0/CPU0:router(config-ipv4-acl)# deny 10.0.0.0 0.255.255.255
```

The following example shows how to configure ACL-based forwarding with security for an access list configuration:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list security-abf-acl
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 permit ipv4 10.0.0.0 0.255.255.255 any
RP/0/RP0/CPU0:router(config-ipv4-acl)# 15 permit ipv4 10.2.0.0 0.0.255.255 any nexthop
10.1.1.2
RP/0/RP0/CPU0:router(config-ipv4-acl)# 20 deny ipv4 10.1.0.0 0.0.255.255 any
RP/0/RP0/CPU0:router(config-ipv4-acl)# 25 permit ipv4 10.0.0.0 0.255.255.255 any
```

The following example shows how to configure a pure ACL-based forwarding:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list security-abf-acl
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 permit ipv4 10.0.0.0 0.255.255.255 any nexthop
50.1.1.2
RP/0/RP0/CPU0:router(config-ipv4-acl)# 15 permit ipv4 10.2.1.0 0.0.0.255 any
RP/0/RP0/CPU0:router(config-ipv4-acl)# 20 permit ipv4 10.2.0.0 0.0.255.255 any nexthop
10.1.1.2
RP/0/RP0/CPU0:router(config-ipv4-acl)# 25 permit ipv4 any any
```

The following example shows how to include optional nexthop or default nexthop addresses along with optional vrf-name for each nexthop combination of vrf-name and nexthop address, for forwarding action.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv4 access-list v4
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 permit ipv4 any any default nexthop1 vrf vrf_A
ipv4 1.1.1.1 nexthop2 vrf vrf_B ipv4 2.2.2.2 nexthop3 vrf vrf_C ipv4 33.3.3.3
```

Related Commands

Command	Description
deny (IPv4) , on page 13	Sets the conditions for an IPv4 access list.
ipv4 access-group, on page 27	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
remark (IPv4) , on page 60	Inserts a helpful remark about an IPv4 access list entry.

Command	Description
resequence access-list ipv4 , on page 64	Changes the starting entry number of the first statement in an existing IPv4 access list, and the number by which subsequent statements are incremented.
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

permit (IPv6)

To set permit conditions for an IPv6 access list, use the **permit** command in IPv6 access list configuration mode. To remove the permit conditions, use the **no** form of this command.

[sequence-number] **permit** *protocol* {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*} `capture`] [**dscp** *value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [**packet-length** *operator packet-length-value*] [**log** | **log-input**] [**ttl** *operator ttl value*] **no** *sequence-number*

Internet Control Message Protocol (ICMP)
[sequence-number] **permit icmp** {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*icmp-type*] [*icmp-code*] [**dscp** *value*] [`routing`] [**authen**] [**destopts**] [**fragments**] [**log**] [**log-input**] [**icmp-off**]

Transmission Control Protocol (TCP)
[sequence-number] **permit tcp** {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*}] {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*operator* {*port* | *protocol* | *port*}] [**dscp** *value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [**established**] {**match-any** | **match-all** | **+** | **-**} [*flag-name*] [**log**] [**log-input**]

User Datagram Protocol (UDP)
[sequence-number] **permit tcp** {*source-ipv6-prefix/ prefix-length* | *any* | *host source-ipv6-address* } [*operator* {*port* | *protocol-port*}] {*destination-ipv6-prefix/ prefix-length* | *any* | *host destination-ipv6-address* } [*operator* {*port* | *protocol* | *port*}] [**dscp** *value*] [**routing**] [**authen**] [**destopts**] [**fragments**] [**established**] [*flag-name*] [**log**] [**log-input**]

Syntax Description

sequence-number	(Optional) Number of the **permit** statement in the access list. This number determines the order of the statements in the access list. Range is 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.) Use the **resequence access-list** command to change the number of the first statement and increment subsequent statements of a configured access list.
protocol	Name or number of an Internet protocol. It can be one of the keywords **ahp** , **esp** , **icmp** , **ipv6** , **pcp** , **sctp** , **tcp** , or **udp** , or an integer in the range from 0 to 255 representing an IPv6 protocol number.
source-ipv6-prefix / *prefix-length*	Source IPv6 network or class of networks about which to set permit conditions. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
any	An abbreviation for the IPv6 prefix ::/0.
default	(Optional) Specifies the default next hop for this entry. If the **default** keyword is configured, ACL-based forwarding action is taken only if the results of the PLU lookup for the destination of the packets determine a default route; that is, no specified route is determined to the destination of the packet.

nexthop1, nexthop2, nexthop3	(Optional) Forwards the specified next hop for this entry.
host *source-ipv6-address*	Source IPv6 host address about which to set permit conditions. This *source-ipv6-address* argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
operator {*port* | *protocol-port*}	(Optional) Operand that compares the source or destination ports of the specified protocol. Operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range). If the operator is positioned after the *source-ipv6-prefix / prefix-length* argument, it must match the source port. If the operator is positioned after the *destination-ipv6-prefix / prefix-length* argument, it must match the destination port. The **range** operator requires two port numbers. All other operators require one port number. The *port* argument is the decimal number of a TCP or UDP port. A port number is a number from 0 to 65535. The *protocol-port* argument is the name of a TCP or UDP port. TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.
destination-ipv6-prefix / prefix-length	Destination IPv6 network or class of networks about which to set permit conditions. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
host *destination-ipv6-address*	Specifies the destination IPv6 host address about which to set permit conditions. This *destination-ipv6-address* argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
dscp *value*	(Optional) Matches a differentiated services code point (DSCP) value against the traffic class value in the Traffic Class field of each IPv6 packet header. Range is 0 to 63.
routing	(Optional) Matches source-routed packets against the routing extension header within each IPv6 packet header.
authen	(Optional) Matches if the IPv6 authentication header is present.
destopts	(Optional) Matches if the IPv6 destination options header is present.
fragments	(Optional) Matches non-initial fragmented packets where the fragment extension header contains a nonzero fragment offset. The **fragments** keyword is an option only if the *operator* [*port-number*] arguments are not specified.
packet-length operator	(Optional) Packet length operator used for filtering.
packet-length value	(Optional) Packet length used to match only packets in the range of the length.

log	(Optional) Causes an informational logging message about the packet that matches the entry to be sent to the console. (The level of messages logged to the console is controlled by the **logging console** command.) The message includes the access list name and sequence number, whether the packet was permitted; the protocol, whether it was TCP, UDP, ICMP, or a number; and, if appropriate, the source and destination addresses and source and destination port numbers. The message is generated for the first packet that matches, and then at 5-minute intervals, including the number of packets permitted in the prior 5-minute interval.
log-input	(Optional) Provides the same function as the **log** keyword, except that the logging message also includes the input interface.
ttl	(Optional) Turns on matching against time-to-life (TTL) value.
operator	(Optional) Operand that compares the source or destination ports of the specified protocol. Operands are **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range).
ttl value1 value2	(Optional) TTL value used for filtering. Range is 1 to 255. If only *value1* is specified, the match is against this value. If both *value1* and *value2* are specified, the packet TTL is matched against the range of TTLs between *value1* and *value2* .
icmp-off	(Optional) Turns off ICMP generation for denied packets
icmp-type	(Optional) ICMP message type for filtering ICMP packets. Range is from 0 to 255.
icmp-code	(Optional) ICMP message code for filtering ICMP packets. Range is from 0 to 255.
established	(Optional) For the TCP protocol only: Indicates an established connection.
match-any	(Optional) For the TCP protocol only: Filters on any combination of TCP flags.
match-all	(Optional) For the TCP protocol only: Filters on all TCP flags.
+ | -	(Required) For the TCP protocol **match-any** , **match-all** : Prefix *flag-name* with + or - . Use the + *flag-name* argument to match packets with the TCP flag set. Use the - *flag-name* argument to match packets when the TCP flag is not set.
flag-name	(Required) For the TCP protocol **match-any** , **match-all** . Flag names are: ack, fin, psh, rst, syn.

Command Default

No IPv6 access list is defined.

ICMP message generation is enabled by default.

Command Modes

IPv6 access list configuration

Command History

Release	Modification
Release 3.0	This command was introduced.

Release	Modification
Release 3.3.0	The optional keywords **match-any** and **match-all** were added for the TCP protocol. The argument *flag-name* was added for the TCP protocol. The **match-any** and **match-all** keywords and the *flag-name* argument are supported . The optional keyword **icmp-off** was added for the ICMP protocol.
Release 3.4.0	The optional keyword **ttl** and the associated arguments *ttl value1, value2,* and *operator,* with range values, were added to the command.

Usage Guidelines

The **permit** (IPv6) command is similar to the **permit** (IPv4) command, except that it is IPv6-specific.

Use the **permit** (IPv6) command following the **ipv6 access-list** command to define the conditions under which a packet passes the access list.

Specifying **ipv6** for the *protocol* argument matches against the IPv6 header of the packet.

By default, the first statement in an access list is number 10, and the subsequent statements are numbered in increments of 10.

You can add **permit**, **deny, or remark** statements to an existing access list without retyping the entire list. To add a new statement anywhere other than the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

Both the *source-ipv6-prefix/prefix-length* and *destination-ipv6-prefix/prefix-length* arguments are used for traffic filtering (the source prefix filters traffic based upon the traffic source; the destination prefix filters traffic based upon the traffic destination).

Note IPv6 prefix lists, and not access lists, should be used for filtering routing protocol prefixes.

The **fragments** keyword is an option available only if the *operator* [*port* | *protocol-port*] arguments are not specified.

Note If any ACE in an ACL contains ABF clause, this ACL cannot be applied at any non-zero compression level.

Task ID

Task ID	Operations
acl	read, write

Examples

This example shows how to configure the IPv6 access list named toCISCO and applies the access list to outbound traffic on interface 0/2/0/2. Specifically, the first deny entry in the list keeps all packets that have a destination TCP port number greater than 5000 from exiting out of interface 0/2/0/2. The second deny entry in the list keeps all packets that have a source UDP port number less than 5000 from exiting out of interface 0/2/0/2. The second deny entry also logs all matches to the console. The first permit entry in the list permits all ICMP packets to exit out of

interface 0/2/0/2. The second permit entry in the list permits all other traffic to exit out of interface 0/2/0/2. The second permit entry is necessary because an implicit deny all condition is at the end of each IPv6 access list.

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list toCISCO
RP/0/RP0/CPU0:router(config-ipv6-acl)# deny tcp any any gt 5000
RP/0/RP0/CPU0:router(config-ipv6-acl)# deny ipv6 any lt 5000 any log
RP/0/RP0/CPU0:router(config-ipv6-acl)# permit icmp any any
RP/0/RP0/CPU0:router(config-ipv6-acl)# permit any any
RP/0/RP0/CPU0:router(config)# interface  0/2/0/2
RP/0/RP0/CPU0:router(config-if)# ipv6 access-group tOCISCO out
```

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list  v6-abf-acl
RP/0/RP0/CPU0:router(config-ipv6-acl)# 10 permit ipv6 any any default nexthop1 vrf vrf_A
ipv6 11::1 nexthop2 vrf vrf_B ipv6 22::2 nexthop3 vrf vrf_C ipv6 33::3
RP/0/RP0/CPU0:router(config-ipv6-acl)# 20 permit ipv4 any any
RP/0/RP0/CPU0:router(config)# interface  0/0/2/0
RP/0/RP0/CPU0:router(config-if)#  ipv6 access-group v6-abf-acl ingress
```

Related Commands

Command	Description
deny (IPv6) , on page 22	Sets deny conditions for an IPv6 access list.
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
remark (IPv6) , on page 62	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 66	Changes the starting entry number of the first statement in an existing IPv6 access list, and the number by which subsequent statements are incremented.

remark (IPv4)

To write a helpful comment (remark) for an entry in an IPv4 access list, use the **remark** command in IPv4 access list configuration mode. To remove the remark, use the **no** form of this command.

[*sequence-number*] **remark** *remark*
no *sequence-number*

Syntax Description

sequence-number	(Optional) Number of the **remark** statement in the access list. This number determines the order of the statements in the access list. Range is 1 to 2147483646. (By default, the first statement is number 10; subsequent statements are incremented by 10.)
remark	Comment that describes the entry in the access list, up to 255 characters long.

Command Default

The IPv4 access list entries have no remarks.

Command Modes

IPv4 access list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **remark** command to write a helpful comment for an entry in an IPv4 access list. To remove the remark, use the **no** form of this command.

The remark can be up to 255 characters; anything longer is truncated.

If you know the sequence number of the remark you want to delete, you can remove it by entering the **no** *sequence-number* command.

Use the **resequence access-list ipv4** command if you want to add statements to an existing access list and the sequence numbers of consecutive entries do not permit additional statements.

Task ID

Task ID	Operations
ipv4	read, write
acl	read, write

Examples

In the following example, the user1 subnet is not allowed to use outbound Telnet:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list telnetting
RP/0/RP0/CPU0:router(config-ipv4-acl)# 10 remark Do not allow user1 to telnet out
RP/0/RP0/CPU0:router(config-ipv4-acl)# 20 deny tcp host 172.16.2.88 255.255.0.0 any eq
telnet
RP/0/RP0/CPU0:router(config-ipv4-acl)# 30 permit icmp any any
RP/0/RP0/CPU0:router# show ipv4 access-list telnetting
```

```
ipv4 access-list telnetting
  0 remark Do not allow user1 to telnet out
  20 deny tcp 172.16.2.88 255.255.0.0 any eq telnet out
  30 permit icmp any any
```

Related Commands

Command	Description
deny (IPv4) , on page 13	Sets the deny conditions for an IPv4 access list.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an IPv4 access list
resequence access-list ipv4 , on page 64	Changes the starting entry number of the first statement in an existing IPv4 access list, and the number by which subsequent statements are incremented.
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

remark (IPv6)

To write a helpful comment (remark) for an entry in an IPv6 access list, use the **remark** command in IPv6 access list configuration mode. To remove the remark, use the **no** form of this command.

[*sequence-number*] **remark** *remark*
no *sequence-number*

Syntax Description

sequence-number	(Optional) Number of the **remark** statement in the access list. This number determines the order of the statements in the access list. Range is 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.)
remark	Comment that describes the entry in the access list, up to 255 characters long.

Command Default

The IPv6 access list entries have no remarks.

Command Modes

IPv6 access list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **remark** (IPv6) command is similar to the **remark** (IPv4) command, except that it is IPv6-specific.

Use the **remark** command to write a helpful comment for an entry in an IPv6 access list. To remove the remark, use the **no** form of this command.

The remark can be up to 255 characters; anything longer is truncated.

If you know the sequence number of the remark you want to delete, you can remove it by entering the **no** *sequence-number* command.

Use the **resequence access-list ipv6** command if you want to add statements to an existing access list and the sequence numbers of consecutive entries do not permit additional statements.

Task ID

Task ID	Operations
acl	read, write

Examples

In this example, a remark is added:

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list Internetfilter
RP/0/RP0/CPU0:router(config-ipv6-acl)# 10 permit ipv6 3333:1:2:3::/64 any
RP/0/RP0/CPU0:router(config-ipv6-acl)# 20 permit ipv6 4444:1:2:3::/64 any
RP/0/RP0/CPU0:router(config-ipv6-acl)# 30 permit ipv6 5555:1:2:3::/64 any
RP/0/RP0/CPU0:router(config-ipv6-acl)# 39 remark Block BGP traffic from a given host
RP/0/RP0/CPU0:router(config-ipv6-acl)# 40 deny tcp host 6666:1:2:3::10 eq bgp host
7777:1:2:3::20 range 1300 1400
```

```
RP/0/RP0/CPU0:router# show ipv6 access-list Internetfilter

ipv6 access-list Internetfilter
  10 permit ipv6 3333:1:2:3::/64 any
  20 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
  39 remark Block BGP traffic from a given host
  40 deny tcp host 6666:1:2:3::10 eq bgp host 7777:1:2:3::20 range host 6666:1:2:3::10 eq
bgp host 7777:1:2:3::20 range 1300 1400
```

Related Commands

Command	Description
deny (IPv6) , on page 22	Sets the deny conditions for an IPv6 access list.
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 55	Sets permit conditions for an IPv6 access list
resequence access-list ipv6 , on page 66	Changes the starting entry number of the first statement in an existing IPv6 access list, and the number by which subsequent statements are incremented.

resequence access-list ipv4

To renumber existing statements and increment subsequent statements to allow a new IPv4 access list statement (**permit**, **deny**, or **remark**) to be added, use the **resequence access-list ipv4** command in EXEC mode.

resequence access-list ipv4 *name* [*base* [*increment*]]

Syntax Description

name	Name of an IPv4 access list.
base	(Optional) Number of the first statement in the specified access list, which determines its order in the access list. Maximum value is 2147483644. Default is 10.
increment	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483644. Default is 10.

Command Default

base: 10

increment: 10

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **resequence ipv4 access-list** to **resequence access-list ipv4** . The *increment* maximum value was changed from 2147483646 to 2147483644.

Usage Guidelines

Use the **resequence access-list ipv4** command to add a **permit**, **deny**, or **remark** statement between consecutive entries in an existing IPv4 access list. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software renumbers the existing statements, thereby making room to add new statements with the unused entry numbers.

Task ID

Task ID	Operations
acl	read, write

Examples

In this example, suppose you have an existing access list:

```
ipv4 access-list marketing
  1 permit 10.1.1.1
  2 permit 10.2.0.0 0.0.255.255
  3 permit tcp host 10.2.2.2 255.255.0.0 any eq telnet
```

You want to add additional entries in the access list. First you resequence the entries, renumbering the statements starting with number 20 and an increment of 5, and then you have room for four additional statements between each of the existing statements:

```
RP/0/RP0/CPU0:router# resequence access-list ipv4 marketing 20 5
RP/0/RP0/CPU0:router# show access-lists ipv4 marketing

ipv4 access-list marketing
  20 permit 10.1.1.1
  25 permit 10.2.0.0
  30 permit tcp host 10.2.2.2 255.255.0.0 any eq telnet
```

Now you add your new entries.

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list marketing
RP/0/RP0/CPU0:router(config-ipv4-acl)# 3 remark Do not allow user1 to telnet out
RP/0/RP0/CPU0:router(config-ipv4-acl)# 4 deny tcp host 172.16.2.88 255.255.0.0 any eq telnet
RP/0/RP0/CPU0:router(config-ipv4-acl)# 29 remark Allow user2 to telnet out
RP/0/RP0/CPU0:router# show access-lists ipv4 marketing

ipv4 access-list marketing
  3 remark Do not allow user1 to telnet out
  4 deny tcp host 171.69.2.88 255.255.0.0 any eq telnet
  20 permit 10.1.1.1
  25 permit 10.2.0.0
  29 remark Allow user2 to telnet out
  30 permit tcp host 10.2.2.2 255.255.0.0 any eq telnet
```

Related Commands

Command	Description
deny (IPv4) , on page 13	Sets the deny conditions for an IPv4 access list.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an IPv4 access list
remark (IPv4) , on page 60	Inserts a helpful remark about an IPv4 access list . entry
show access-lists ipv4 , on page 69	Displays the contents of all current IPv4 access lists.

resequence access-list ipv6

To renumber existing statements and increment subsequent statements to allow a new IPv6 access list statement (**permit**, **deny**, or **remark**) to be added, use the **resequence access-list ipv6** command in EXEC mode.

resequence access-list ipv6 *name* [*base* [*increment*]]

Syntax Description

name	Name of an IPv6 access list.
base	(Optional) Number of the first statement in the specified access list, which determines its order in the access list. Maximum value is 2147483646. Default is 10.
increment	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483644. Default is 10.

Command Default

base: 10

increment: 10

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **resequence ipv6 access-list** to **resequence access-list ipv6** . The *increment* maximum value was changed from 2147483646 to 2147483644.

Usage Guidelines

The **resequence access-list ipv6** command is similar to the **resequence access-list ipv4** command, except that it is IPv6 specific.

Use the **resequence access-list ipv6** command to add a **permit**, **deny**, or **remark** statement between consecutive entries in an existing IPv6 access list. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software renumbers the existing statements, thereby making room to add new statements with the unused entry numbers.

Task ID

Task ID	Operations
acl	read, write

Examples

In the following example, suppose you have an existing access list:

```
ipv6 access-list Internetfilter
  10 permit ipv6 3333:1:2:3::/64 any
  20 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
```

You want to add additional entries in the access list. First, you resequence the entries, renumbering the statements starting with number 20 and an increment of 5, and then you have room for four additional statements between each of the existing statements:

```
RP/0/RP0/CPU0:router# resequence access-list ipv6 Internetfilter 20 5
RP/0/RP0/CPU0:router# show access-lists ipv6 Internetfilter

ipv6 access-list Internetfilter
  20 permit ipv6 3333:1:2:3::/64 any
  25 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
```

Now you add your new entries.

```
RP/0/RP0/CPU0:router(config)# ipv6 access-list Internetfilter
RP/0/RP0/CPU0:router(config-ipv6-acl)# 3 remark Block BGP traffic from a given host
RP/0/RP0/CPU0:router(config-ipv6-acl)# 4 deny tcp host 6666:1:2:3::10 eq bgp host
7777:1:2:3::20 range 1300 1400
RP/0/RP0/CPU0:router# show access-lists ipv6 Internetfilter

ipv6 access-list Internetfilter
  3 remark Block BGP traffic from a given host
  4 deny tcp host 6666:1:2:3::10 eq bgp host 7777:1:2:3::20 range 1300 1404 deny tcp host
171.69.2.88 255.255.0.0 any eq telnet
  20 permit ipv6 3333:1:2:3::/64 any
  25 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
```

Related Commands

Command	Description
deny (IPv6) , on page 22	Sets the deny conditions for an IPv6 access list.
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 55	Set permit conditions for an IPv6 access list.
remark (IPv6) , on page 62	Inserts a helpful remark about an IPv6 access list entry.

show access-lists afi-all

To display the contents of current IPv4 and IPv6 access lists, use the **show access-lists afi-all** command in EXEC mode.

show access-lists afi-all

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
acl	read

Examples

This sample output is from the **show access-lists afi-all** command:

```
RP/0/RP0/CPU0:router# show access-lists afi-all

ipv4 access-list crypto-1
 10 permit ipv4 65.21.21.0 0.0.0.255 65.6.6.0 0.0.0.255
 20 permit ipv4 192.168.241.0 0.0.0.255 192.168.65.0 0.0.0.255
```

show access-lists ipv4

To display the contents of current IPv4 access lists, use the **show access-lists ipv4** command in EXEC mode.

show access-lists ipv4 [{*access-list-name* **hardware** {**ingress**|**egress**} [**interface** *type interface-path-id*] {**sequence** *number*|**location** *node-id*}|**summary** [*access-list-name*]|*access-list-name* [*sequence-number*] | **maximum** [**detail interface** *type interface-path-id*] [**usage pfilter** { **location** *node-id* | **all**}]}]

Syntax Description

access-list-name	(Optional) Name of a particular IPv4 access list. The name cannot contain spaces or quotation marks, but can include numbers.
hardware	(Optional) Identifies the access list as an access list for an interface.
ingress	(Optional) Specifies an inbound interface.
egress	(Optional) Specifies an outbound interface.
interface	(Optional) Displays interface statistics.
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.
sequence *number*	(Optional) Sequence number of a particular IPv4 access list. Range is 1 to 2147483644.

location *node-id*	(Optional) Location of a particular IPv4 access list. The *node-id* argument is entered in the *rack/slot/module* notation.
summary	(Optional) Displays a summary of all current IPv4 access lists.
sequence-number	(Optional) Sequence number of a particular IPv4 access list. Range is 1 to 2147483644.
maximum	(Optional) Displays the current maximum number of configurable IPv4 access control lists (ACLs) and access control entries (ACEs).
detail interface *type interface-path-id*	(Optional) Displays detailed configuration of the ternary content addressable memory (TCAM) manager module of this ACL on the specified interface.
usage	(Optional) Displays the usage of the access list on a given line card.
pfilter	(Optional) Displays the packet filtering usage for the specified line card.
all	(Optional) Displays the location of all the line cards.

Command Default

The default displays all IPv4 access lists.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **show ipv4 access-lists** to **show access-lists ipv4** .
Release 3.3.0	The optional keywords **usage** and **pfilter** were added.
Release 3.4.1	Sample output fields were updated to support ACL-based forwarding as an ingress-only feature.
Release 3.5.0	The **interface** keyword was added.
Release 5.3.2	The **detail** keyword requires an interface to be specified.

Usage Guidelines

Use the **show access-lists ipv4** command to display the contents of all IPv4 access lists. To display the contents of a specific IPv4 access list, use the *name* argument. Use the *sequence-number* argument to specify the sequence number of the access list.

Use the **hardware , ingress** or **egress** , and **location** keywords to display the access list hardware contents and counters for all interfaces that use the specified access list in a given direction (ingress or egress). To display the contents of a specific access list entry, use the **sequence** *number* keyword and argument. The access group for an interface must be configured using the **ipv4 access-group** command for access list hardware counters to be enabled.

Use the **show access-lists ipv4 summary** command to display a summary of all current IPv4 access lists. To display a summary of a specific IPv4 access list, use the *name* argument.

Use the **show access-lists ipv4 maximum detail** command to display the OOR details for IPv4 access lists. OOR limits the number of ACLs and ACEs that can be configured in the system. When the limit is reached, configuration of new ACLs or ACEs is rejected.

Use the **show access-list ipv4 usage** command to display a summary of all interfaces and access lists programmed on the specified line card.

Task ID

Task ID	Operations
acl	read

Examples

In the following example, the contents of all IPv4 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4

ipv4 access-list 101
  10 deny udp any any eq ntp
  20 permit tcp any any
  30 permit udp any any eq tftp
  40 permit icmp any any
  50 permit udp any any eq domain
ipv4 access-list Internetfilter
  10 permit tcp any 172.16.0.0 0.0.255.255 eq telnet
  20 deny tcp any any
  30 deny udp any 172.18.0.0 0.0.255.255 lt 1024
  40 deny ipv4 any any log
```

In the following example, the contents of an access list named Internetfilter are displayed to show an example of ACL-based forwarding:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 Internetfilter

ipv4 access-list Internetfilter
  10 permit ipv4 host 50.3.3.3 any nexthop 1.1.1.1 2.2.2.2 3.3.3.3
  20 permit ipv4 host 50.60.1.2 any nexthop 50.70.1.2 50.80.1.2
  25 permit ipv4 host 50.2.2.2 any nexthop 50.70.1.2
  30 permit ipv4 host 50.70.1.2 any nexthop 50.80.1.2
  40 permit ipv4 host 1.1.1.1 any nexthop 50.70.1.2
  50 permit ipv4 host any any
```

In the following example, the contents of an access list named acl_hw_1 are displayed to show an example of ACL-based forwarding for the brief **hardware** option:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 acl_hw_1 hardware ingress location 0/1/cpu0

ipv4 access-list ucode
 10 permit ipv4 host 50.3.3.3 any
 20 permit ipv4 host 50.60.1.2 any (661765 hw matches) (next-hop: 50.70.1.2)
 25 permit ipv4 host 50.2.2.2 any (next-hop: 50.70.1.2)
 30 permit ipv4 host 50.70.1.2 any (next-hop: 50.80.1.2)
 40 permit ipv4 host 1.1.1.1 any (next-hop: 50.70.1.2)
 50 permit ipv4 host 9.9.9.9 any
```

In the following example, the contents of an access list named acl_hw_1 are displayed to show an example of ACL-based forwarding for a specific access list entry for the hardware **detail** option:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 acl_hw_1 hardware ingress sequence 20 detail
location 0/1/CPU0

ACL name: ucode
Sequence Number: 20
Grant: permit
Logging: OFF
Per ace icmp: ON
Next Hop Enable: ON <<<<<<<<< (ABF specific)
Next-hop: 50.70.1.2 <<<<<<<<< (ABF specific)
Default Next Hop: OFF<<<<<<<<< (ABF specific)
Hits: 661765
Statistics pointer: 0x60016
Number of TCAM entries: 1


Entry : 0 for ACE : 20
RAW value  : 0x00000040 0xffffffff 0xffffff11 0x0000007f 0xfdf2ffff 0xffffffff
RAW mask   : 0x000000ff 0xfc000000 0x000000ff 0x00000080 0xffff0000 0000000000
RAW result : 0x00000000 0x00000003 0x00000000 0x01010101

--------------------------------Field Details-----------------------------------
acl_id             : 0x03f
acl_id mask        : 0x3ff
```

In the following example, the contents of an access list named acl_hw_1 are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 acl_hw_1 hardware egress location 0/2/cp0

ipv4 access-list acl_hw_1
  10 permit icmp 192.168.36.0 0.0.0.255 any (251 hw matches)
  20 permit ip 172.16.3.0 0.0.255.255 any (29 hw matches)
  30 deny tcp any any (58 hw matches)
```

This table describes the significant fields shown in the display.

Table 2: show access-lists ipv4 hardware Field Descriptions

Field	Description
hw matches	Number of hardware matches.
ACL name	Name of the ACL programmed in hardware.
Sequence Number	Each ACE sequence number is programmed into hardware with all the fields that are corresponding to the values set in ACE.

Field	Description
Grant	Depending on the ACE rule, the grant is set to deny, permit, or both.
Logging	Logging is set to on if ACE uses a log option to enable logs.
Per ace icmp	If Per ace icmp is set to on in the hardware, ICMP is unreachable, is rate-limited, and is generated. The default is set to on.
Next Hop Enable	When the ABF next hop is configured on an ACE, the Next Hop Enable is set to on.
Default Next Hop	When the ABF default-next-hop is configured in an ACE, the Default Next Hop is set to on.
Hits	Hardware counter for that ACE.

In the following example, a summary of all IPv4 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 summary

ACL Summary:
  Total ACLs configured: 3
  Total ACEs configured: 11
```

This table describes the significant fields shown in the display.

Table 3: show access-lists ipv4 summary Field Descriptions

Field	Description
Total ACLs configured	Number of configured IPv4 ACLs.
Total ACEs configured	Number of configured IPV4 ACEs.

In the following example, the OOR details of the IPv4 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 maximum detail

Default max configurable acls :5000
Default max configurable aces :200000
Current configured acls       :1
Current configured aces       :2
Current max configurable acls :5000
Current max configurable aces :200000
Max configurable acls         :9000
Max configurable aces         :350000
```

This table describes the significant fields shown in the display.

Table 4: show access-lists ipv4 maximum detail Field Descriptions

Field	Description
Default max configurable acls	Default maximum number of configurable IPv4 ACLs allowed.
Default max configurable aces	Default maximum number of configurable IPv4 ACEs allowed.

Field	Description
Current configured acls	Number of configured IPv4 ACLs.
Current configured aces	Number of configured IPv4 ACEs.
Current max configurable acls	Configured maximum number of configurable IPv4 ACLs allowed.
Current max configurable aces	Configured maximum number of configurable IPv4 ACEs allowed.
Max configurable acls	Maximum number of configurable IPv4 ACLs allowed.
Max configurable aces	Maximum number of configurable IPv4 ACEs allowed.

In the following example, the contents of all IPv4 access lists and next-hop configuration are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 v4_acl

ipv4 access-list v4_acl
 10 permit IPv4 any host 172.1.1.1 nexthop1 vrf vrf_A ipv4 1.1.1.1 nexthop2 vrf vrf_B ipv4
 2.2.2.2 nexthop3 vrf vrf_C ipv4 3.3.3.3
```

This example displays the packet filtering usage for the specified line card:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 usage pfilter location 0/3/CPU0

Interface : GigabitEthernet0/3/0/1
    Input Common-ACL : ipv4_c_acl  ACL : ipv4_i_acl_1
    Output ACL : ipv4_i_acl_1
```

Note To display the packet filtering usage for bundle interfaces, use the **show access-lists ipv4 usage pfilter location all** command.

Related Commands

Command	Description
clear access-list ipv4, on page 3	Resets the IPv4 access list match counters.
copy access-list ipv4 , on page 9	Copies an existing IPv4 access list.
deny (IPv4) , on page 13	Sets the deny conditions for an ACE of an IPv4 access list.
ipv4 access-group, on page 27	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list, on page 30	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 43	Sets the permit conditions for an ACE of an IPv4 access list.
remark (IPv4) , on page 60	Inserts a helpful remark about an IPv4 access list entry.

Command	Description
resequence access-list ipv4 , on page 64	Changes the starting entry number of the first statement in an existing IPv4 access list, and the number by which subsequent statements are incremented.

show access-lists ipv4 standby

To display the contents of current IPv4 standby access lists, use the **show access-lists ipv4 standby** command in EXEC mode.

show access-lists ipv4 standby [**access-list name**] [**summary**]

Syntax Description

access-list name	(Optional) Name of a particular IPv4 access list. The name cannot contain spaces or quotation marks, but can include numbers.
summary	(Optional) Displays a summary of all current IPv4 standby access lists.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.8.0	This command was introduced .

Usage Guidelines

Use the **show access-lists ipv4 standby** command to display the contents of current IPv4 standby access lists. To display the contents of a specific IPv4 access list, use the *name* argument.

Use the **show access-lists ipv4 standby summary** command to display a summary of all standby IPv4 access lists.

Task ID

Task ID	Operations
acl	read

Examples

In this example, the contents of all IPv4 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv4 standby summary

ACL Summary:
  Total ACLs configured: 4
  Total ACEs configured: 22
```

show access-lists ipv6

To display the contents of current IPv6 access lists, use the **show access-lists ipv6** command in EXEC mode.

show access-lists ipv6 [{*access-list-name* **hardware** {**ingress** | **egress**} [**interface** *type interface-path-id*] {**sequence** *number* | **location** *node-id*} | **summary** [*access-list-name*] | *access-list-name* [*sequence-number*] | **maximum** [**detail**] [**usage pfilter** { **location** *node-id* | **all**}]}]

Syntax Description

access-list-name	Name of a particular IPv6 access list. The name cannot contain a spaces or quotation marks, but can include numbers.
hardware	Identifies the access list as an access list for an interface.
ingress	Specifies an inbound interface.
egress	Specifies an outbound interface.
sequence *number*	(Optional) Sequence number of a particular IPv6 access list. Range is 1 to 2147483646.
interface	(Optional) Displays interface statistics.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location *node-id*	Location of a particular IPv4 access list. The *node-id* argument is entered in the *rack/slot/module* notation.
all	Displays the location of all the line cards.
summary	Displays a summary of all current IPv6 access lists.
sequence-number	(Optional) Sequence number of a particular IPv6 access list. Range is 1 to 2147483646.
maximum	Displays the current maximum number of configurable IPv6 access control lists (ACLs) and access control entries (ACEs).
detail	(Optional) Displays complete out-of-resource (OOR) details.
usage	(Optional) Displays the usage of the access list on a given line card.
pfilter	Displays the packet filtering usage for the specified line card.

Command Default

Displays all IPv6 access lists.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **show ipv6 access-lists** to **show access-lists ipv6** .
Release 3.3.0	The optional keywords **usage** and **pfilter** were added.
Release 3.5.0	The **interface** keyword was added.

Usage Guidelines

The **show access-lists ipv6** command is similar to the **show access-lists ipv4** command, except that it is IPv6 specific.

Use the **show access-lists ipv6** command to display the contents of all IPv6 access lists. To display the contents of a specific IPv6 access list, use the *name* argument. Use the *sequence-number* argument to specify the sequence number of the access list.

Use the **hardware , ingress** or **egress**, and **location** keywords to display the access list hardware contents and counters for all interfaces that use the specified access list in a given direction (ingress or egress). To display the contents of a specific access list entry, use the **sequence** *number* keyword and argument. The access group for an interface must be configured using the **ipv6 access-group** command for access list hardware counters to be enabled.

Use the **show access-lists ipv6 summary** command to display a summary of all current IPv6 access lists. To display a summary of a specific IPv6 access list, use the *name* argument.

Use the **show access-lists ipv6 maximum detail** command to display the OOR details for IPv6 access lists. OOR limits the number of ACLs and ACEs that can be configured in the system. When the limit is reached, configuration of new ACLs or ACEs is rejected.

Use the **show access-list ipv6 ipv4 usage** command to display a summary of all interfaces and access lists programmed on the specified line card.

Task ID

Task ID	Operations
acl	read

Examples

In the following example, the contents of all IPv6 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6

ipv6 access-list Internetfilter
  3 remark Block BGP traffic from a given host
  4 deny tcp host 6666:1:2:3::10 eq bgp host 7777:1:2:3::20 range 1300 1404 deny tcp host
171.69.2.88 255.255.0.0 any eq telnet
  20 permit ipv6 3333:1:2:3::/64 any
  25 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
ipv6 access-list marketing
  10 permit ipv6 7777:1:2:3::/64 any (51 matches)
  20 permit ipv6 8888:1:2:3::/64 any (26 matches)
  30 permit ipv6 9999:1:2:3::/64 any (5 matches)
```

In the following example, the contents of an access list named Internetfilter is displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 Internetfilter

ipv6 access-list Internetfilter
  3 remark Block BGP traffic from a given host
  4 deny tcp host 6666:1:2:3::10 eq bgp host 7777:1:2:3::20 range 1300 1404 deny tcp host
171.69.2.88 255.255.0.0 any eq telnet
  20 permit ipv6 3333:1:2:3::/64 any
  25 permit ipv6 4444:1:2:3::/64 any
  30 permit ipv6 5555:1:2:3::/64 any
```

In the following example, the contents of an access list named acl_hw_1 is displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 acl_hw_1 hardware egress location 0/2/cp0

ipv6 access-list acl_hw_1
  10 permit icmp any any (251 hw matches)
  20 permit ipv6 3333:1:2:3::/64 any (29 hw matches)
  30 deny tcp any any (58 hw matches)
```

This table describes the significant fields shown in the display.

Table 5: show access-lists ipv6 hardware Field Descriptions

Field	Description
hw matches	Number of hardware matches.

In the following example, a summary of all IPv6 access lists is displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 summary

ACL Summary:
  Total ACLs configured: 3
  Total ACEs configured: 11
```

This table describes the significant fields shown in the display.

Table 6: show access-lists ipv6 summary Field Descriptions

Field	Description
Total ACLs configured	Number of configured IPv6 ACLs.
Total ACEs configured	Number of configured IPV6 ACEs.

In the following example, the OOR details of the IPv6 access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 maximum detail

Default max configurable acls :1000
Default max configurable aces :50000
Current configured acls       :1
Current configured aces       :2
Current max configurable acls :1000
Current max configurable aces :50000
```

```
Max configurable acls          :2000
Max configurable aces          :100000
```

This table describes the significant fields shown in the display.

Table 7: show access-lists pv6 maximum detail Field Descriptions

Field	Description
Default max configurable acls	Default maximum number of configurable IPv6 ACLs allowed.
Default max configurable aces	Default maximum number of configurable IPv6 ACEs allowed.
Current configured acls	Number of configured IPv6 ACLs.
Current configured aces	Number of configured IPv6 ACEs.
Current max configurable acls	Configured maximum number of configurable IPv6 ACLs allowed.
Current max configurable aces	Configured maximum number of configurable IPv6 ACEs allowed.
Max configurable acls	Maximum number of configurable IPv6 ACLs allowed.
Max configurable aces	Maximum number of configurable IPv6 ACEs allowed.

This example displays the packet filtering usage for the specified line card:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 usage pfilter location 0/3/CPU0

Interface : GigabitEthernet0/3/0/1
    Input Common-ACL : ipv6_c_acl  ACL : ipv6_i_acl_1
    Output ACL : ipv6_i_acl_1
```

Related Commands

Command	Description
copy access-list ipv6, on page 11	Copies an existing IPv6 access list.
deny (IPv6) , on page 22	Sets the deny conditions for an IPv6 access list.
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 55	Set permit conditions for an IPv6 access list.
remark (IPv6) , on page 62	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 66	Changes the starting entry number of the first statement in an existing IPv4 access list, and the number by which subsequent statements are incremented.

show access-lists ipv6 standby

To display the contents of current IPv6 standby access lists, use the **show access-lists ipv6 standby** command in EXEC mode.

show access-lists ipv6 standby [**access-list name**] [**summary**]

Syntax Description

access-list name	(Optional) Name of a particular IPv6 access list. The name cannot contain spaces or quotation marks, but can include numbers.
summary	(Optional) Displays a summary of all current IPv6 standby access lists.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

Use the **show access-lists ipv6 standby** command to display the contents of current IPv6 standby access lists. To display the contents of a specific IPv6 access list, use the *name* argument.

Use the **show access-lists ipv6 standby summary** command to display a summary of all standby IPv6 access lists.

Task ID

Task ID	Operations
acl	read

Examples

In this example, the contents of all IPv6 standby access lists are displayed:

```
RP/0/RP0/CPU0:router# show access-lists ipv6 standby summary

ACL Summary:
  Total ACLs configured: 4
  Total ACEs configured: 22
```

This table describes the significant fields shown in the display.

Table 8: show access-lists ipv6 standby summary Field Descriptions

Field	Description
Total ACLs configured	Number of configured standby IPv6 ACLs.
Total ACEs configured	Number of configured standby IPV6 ACEs.

Related Commands

Command	Description
copy access-list ipv6, on page 11	Copies an existing IPv6 access list.
ipv6 access-list, on page 36	Defines an IPv6 access list and enters IPv6 access list configuration mode.

ARP Commands

This chapter describes the commands used to configure and monitor the Address Resolution Protocol (ARP).

For detailed information about ARP concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- arp, on page 84
- arp learning, on page 86
- arp purge-delay, on page 87
- arp timeout, on page 88
- clear arp-cache, on page 90
- local-proxy-arp, on page 92
- proxy-arp, on page 93
- show arp, on page 94
- show arp idb, on page 97
- show arp traffic, on page 99

arp

To add a permanent entry in the Address Resolution Protocol (ARP) cache, use the **arp** command in Global Configuration mode. To remove an entry from the ARP cache, enter the **no** form of this command.

arp [**vrf** *vrf-name*] *ip-address hardware-address encapsulation-type* [**alias**]
no arp [**vrf** *vrf-name*] *ip-address hardware-address encapsulation-type* [**alias**]

Syntax Description

vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF instance that identifies a VPN.
ip-address	IPv4 (network layer) address for which a permanent entry is added to the ARP cache. Enter the IPv4 address in a four-part dotted-decimal format that corresponds to the local data-link address (a 32-bit address).
hardware-address	Hardware (data link layer) address that the IPv4 address is linked to. Enter the local data-link address (a 48-bit address), such as 0800.0900.1834.
encapsulation-type	Encapsulation type. The encapsulation types are: • arpa • srp • srpa • srpb For Ethernet interfaces, this is typically the arpa keyword.
alias	(Optional) Causes the software to respond to ARP requests as if it were the owner of both the specified IP address and hardware address, whether proxy ARP is enabled or not.

Command Default

No entries are permanently installed in the ARP cache.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added. The encapsulation information was added.

Usage Guidelines

The software uses ARP cache entries to translate 32-bit IP addresses into 48-bit hardware addresses.

Because most hosts support dynamic resolution, you generally need not specify static ARP cache entries.

Static entries are permanent entries that map a network layer address (IPv4 address) to a data-link layer address (MAC address). If the **alias** keyword is specified when creating the entry, the interface to which the entry is attached will act as if it is the owner of the specified addresses, that is, it will respond to ARP request packets for this network layer address with the data link layer address in the entry.

The software does not respond to any ARP requests received for the specified IP address unless proxy ARP is enabled on the interface on which the request is received. When proxy ARP is enabled, the software responds to ARP requests with its own local interface hardware address.

To remove all nonstatic entries from the ARP cache, enter the clear arp-cache, on page 90 in EXEC mode.

Task ID

Task ID	Operations
cef	read, write

Examples

The following is an example of a static ARP entry for a typical Ethernet host:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# arp 192.168.7.19 0800.0900.1834 arpa
```

Related Commands

Command	Description
clear arp-cache, on page 90	Deletes all dynamic entries from the ARP cache.
show arp, on page 94	Displays the ARP cache.

arp learning

To enable the dynamic learning of ARP entries for a local subnet or all subnets, use the **arp learning** command.

To disable this command, use the **no** prefix or the **disable** option for this command.

arp learning local
no arp learning local
arp learning disable
no arp learning disable

Syntax Description

local	Enables the dynamic learning of ARP entries for local subnets. When arp learning local is configured on an interface or sub-interface, it learns only the ARP entries from ARP packets on the same subnet.
disable	Disables the dynamic learning of all ARP entries.

Command Default

This command has no keywords or arguments.

Command Modes

Sub-interface configuration mode

```
RP/0/RP0/CPU0:router(config)#interface GigabitEthernet 0/0/0/1
RP/0/RP0/CPU0:router(config-if)# ipv4 address 12.1.3.4 255.255.255.0
RP/0/RP0/CPU0:router(config-if)# arp learning local
RP/0/RP0/CPU0:router(config-if)# no shut
RP/0/RP0/CPU0:router(config-if)# commit
```

```
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/1
RP/0/RP0/CPU0:router(config-if)# ipv4 address 12.1.3.4 255.255.255.0
RP/0/RP0/CPU0:router(config-if)# arp learning disable
RP/0/RP0/CPU0:router(config-if)# commit
```

arp purge-delay

To delay purging Address Resolution Protocol (ARP) entries when an interface goes down, use the **arp purge-delay** command in interface configuration mode. To turn off the purge delay feature, use the **no** form of this command.

arp purge-delay *value*
no arp purge-delay *value*

Syntax Description

v alue	Sets the purge delay time in seconds. Range is 1 to 65535.

Command Default

Default value is off.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Use the **arp purge-delay** command to delay purging ARP entries when an interface goes down. If the interface comes up within the delay time, then the ARP entries are restored to prevent packet loss with Equal Cost Multipath (ECMP) configured.

Task ID

Task ID	Operations
cef	read, write

Examples

The following is an example of setting the purge delay to 50 seconds:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface MgmtEth 0/RP1/CPU0/0
RP/0/RP0/CPU0:router(config-if)# arp purge-delay 50
```

arp timeout

To specify how long dynamic entries learned on an interface remain in the Address Resolution Protocol (ARP) cache, enter the **arp timeout** command in interface configuration mode. To remove the **arp timeout** command from the configuration file and restore the system to its default condition with respect to this command, enter the **no** form of this command.

arp timeout *seconds*
no arp timeout *seconds*

Syntax Description

seconds	Indicates the time, in seconds, for which an entry remains in the ARP cache. Range is 30 to 4294967295.

Command Default

Entries remain in the ARP cache for 14,400 seconds (4 hours).

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

This command is ignored when issued on interfaces that do not use ARP. Also, ARP entries that correspond to the local interface or that are statically configured by the user never time out.

The **arp timeout** command applies only to the interface that is entered. When the timeout is changed for an interface the change applies only to that interface.

The **show interfaces** command displays the ARP timeout value in hours:minutes:seconds, as follows:

```
ARP type: ARPA, ARP Timeout 04:00:00
```

Task ID

Task ID	Operations
cef	read, write

Examples

The following example shows how to set the ARP timeout to 3600 seconds to allow entries to time out more quickly than the default:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface MgmtEth 0/RP1/CPU0/0
RP/0/RP0/CPU0:router(config-if)# arp timeout 3600
```

Related Commands

Command	Description
clear arp-cache, on page 90	Deletes all dynamic entries from the ARP cache.
show arp, on page 94	Displays the ARP cache.
show interfaces	Displays statistics for all interfaces configured on the networking device. For information on using the **show interfaces** command, see Cisco IOS XR software *Interface and Hardware Component Command Reference*.

clear arp-cache

To delete all dynamic entries from the Address Resolution Protocol (ARP) cache, clear the fast-switching cache, and clear the IP route cache; use the **clear arp-cache** command in EXEC mode.

clear arp-cache {**traffic** *type interface-path-id* | **location** *node-id*}

Syntax Description

traffic	(Optional) Deletes statistics on the specified interface.
t ype	Interface type. For more information, use the question mark (?) online help function.

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

location *node-id*	Clears the ARP entries for a specified location. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **location** keyword and *node-id* argument were made mandatory.

Usage Guidelines

When issued without keywords or arguments, the **clear arp-cache** command clears all entries in the ARP cache.

Configuration of the **clear arp-cache drop-adjacency** command on a particular location is not recommended. If the command is used on a bundle interface, then drop adjacencies may be deleted in one of the line cards and not on other line cards. This scenario can result in entry mismatch. You can use the **clear arp-cache drop-adjacency** ***interface location*** **all** to remove drop adjacency that is learned for the interface on all the line cards.

Task ID

Task ID	Operations
cef	execute

Examples

The following example shows how to remove traffic statistic entries from the ARP cache that match the specified interface:

```
Router# clear arp-cache traffic gigabitEthernet 0/1/5/1 location 0/1/CPU0
```

The following example shows how to remove entries from the ARP cache that match the specified location:

```
Router# clear arp-cache location 0/1/CPU0
```

Related Commands

Command	Description
show arp, on page 94	Displays the ARP cache.

local-proxy-arp

To enable local proxy Address Resolution Protocol (ARP) on an interface, enter the **local-proxy-arp** command in interface configuration mode. To disable local proxy ARP on the interface, enter the **no** form of this command.

local-proxy-arp
no local-proxy-arp

Syntax Description

This command has no keywords or arguments.

Command Default

Local proxy ARP is disabled on all interfaces.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

When local proxy ARP is enabled, the networking device responds to ARP requests that meet all the following conditions:

- The target IP address in the ARP request, the IP address of the ARP source, and the IP address of the interface on which the ARP request is received are on the same Layer 3 network.
- The next hop for the target IP address is through the same interface as the request is received.

Typically, local proxy ARP is used to resolve MAC addresses to IP addresses in the same Layer 3 network such as, private VLANs that are Layer 2-separated. Local proxy ARP supports all types of interfaces supported by ARP and unnumbered interfaces.

Using the **no** form of the command removes the specified command from the configuration file and restores the system to its default condition with respect to the command.

Task ID

Task ID	Operations
cef	read, write

Examples

The following example shows how to enable local proxy ARP on TenGigE interface 0/0/0/0:

```
RP/0/RP0/CPU0:router#(config)# interface TenGigE 0/0/0/0
RP/0/RP0/CPU0:router#(config-if)# local-proxy-arp
```

proxy-arp

To enable proxy Address Resolution Protocol (ARP) on an interface, enter the **proxy-arp** command in interface configuration mode. To disable proxy ARP on the interface, enter the **no** form of this command.

proxy-arp
no proxy-arp

Syntax Description

This command has no keywords or arguments.

Command Default

Proxy ARP is disabled on all interfaces.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

When proxy ARP is disabled, the networking device responds to ARP requests received on an interface only if one of the following conditions is met:

- The target IP address in the ARP request is the same as the interface IP address on which the request is received.
- The target IP address in the ARP request has a statically configured ARP alias.

When proxy ARP is enabled, the networking device also responds to ARP requests that meet all of the following conditions:

- The target IP address is not on the same physical network (LAN) on which the request is received.
- The networking device has one or more routes to the target IP address.
- All of the routes to the target IP address go through interfaces other than the one on which the request is received.

Using the **no** form of the command removes the specified command from the configuration file and restores the system to its default condition with respect to the command.

Task ID

Task ID	Operations
cef	read, write

Examples

The following example shows how to enable proxy ARP on MgmtEth interface 0/RP1/CPU0/0:

```
RP/0/RP0/CPU0:router#(config)# interface MgmtEth 0/RP1/CPU0/0
RP/0/RP0/CPU0:router#(config-if)# proxy-arp
```

show arp

To display the Address Resolution Protocol (ARP), enter the **show arp** command in EXEC mode.

show arp `vrf` *vrf-name* **[traffic]** [{*ip-address hardware-address interface-path-id*}] **[traffic] location** *node-id*

Syntax Description

vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF instance that identifies a VPN.
ip-address	(Optional) The ARP entries you want to display.
location *node-id*	(Optional) Displays the ARP entry for a specific location. The *node-id* argument is entered in the *rack/slot/module* notation.
hardware-address	(Optional) The ARP entries that match the 48-bit MAC address are displayed.
traffic	(Optional) Displays ARP traffic statistics.

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

Command Default

The active RP is the default location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

ARP establishes correspondences between network addresses (an IP address, for example) and Ethernet hardware addresses. A record of each correspondence is kept in a cache for a predetermined amount of time. As this time gets over, the records are refreshed after two unicast requests by ARP to the host IP address. If no response is received from the host, then the entry is cleared from the database.

For **show arp** *interface-type interface-instance* form, the **location** and *node-id* keyword and argument is mandatory for Bundle and VLAN-on-Bundle interfaces. These keywords and arguments indicate the location for which the cache entries for the bundle are to be displayed. For physical interfaces, specifying the **location** and *node-id* keyword and argument is optional since the interface can only exist on one node.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show arp** command with no location specified:

```
Router# show arp

-------------------------------------------------------------------------------
0/3/CPU0
-------------------------------------------------------------------------------

Address         Age        Hardware Addr   State      Type  Interface

192.4.1.1       -          000c.cfe6.3336  Interface  ARPA 0/3/1/3

192.4.1.2       01:37:50   0000.c004.0102  Dynamic    ARPA 0/3/1/3

2.1.4.2         - 000c.cfe6.33b5  Interface  ARPA 0/3/3/4

2.1.0.2         - 000c.cfe6.33b1  Interface  ARPA 0/3/3/0

2.1.0.1         00:37:56 000a.8b08.857a  Dynamic    ARPA 0/3/3/0

2.1.4.1         01:37:51 000a.8b08.857e  Dynamic    ARPA 0/3/3/4

211.11.1.1     - 000c.cfe6.32fa  Interface  ARPA FastEthernet0/3/0/6

2.1.5.2         - 000c.cfe6.33b6  Interface  ARPA FastEthernet0/3/3/5

2.1.1.2         - 000c.cfe6.33b2  Interface  ARPA FastEthernet0/3/3/1

2.1.1.1         01:37:51 000a.8b08.857b  Dynamic    ARPA FastEthernet0/3/3/1

2.1.5.1         01:37:50 000a.8b08.857f  Dynamic    ARPA FastEthernet0/3/3/5

-------------------------------------------------------------------------------
0/2/CPU0
-------------------------------------------------------------------------------
Address         Age        Hardware Addr   State      Type  Interface

5.6.9.1 01:11:55   0003.fe4c.0bff  Dynamic    ARPA MgmtEth0/2/CPU0/0

5.6.25.6 01:09:29   000c.cfe6.2000  Dynamic    ARPA MgmtEth0/2/CPU0/0

5.6.5.10 00:39:58   0009.7b49.0bff  Dynamic    ARPA MgmtEth0/2/CPU0/0
```

The following is sample output from the **show arp** command with the *interface-type interface-instance* argument:

```
Router# show arp MgmtEth 0/RP1/CPU0/0

Address         Age        Hardware Addr   State      Type  Interface
10.4.9.2        00:35:55   0030.7131.abfc  Dynamic    ARPA  MgmtEth0/RP1/CPU0/0
10.4.9.1        00:35:55   0000.0c07.ac24  Dynamic    ARPA  MgmtEth0/RP1/CPU0/0
10.4.9.99       00:49:12   0007.ebea.44d0  Dynamic    ARPA  MgmtEth0/RP1/CPU0/0
10.4.9.199      -          0001.c9eb.dffe  Interface  ARPA  MgmtEth0/RP1/CPU0/0
```

The following is sample output from the **show arp** command with the *hardware-address* designation:

```
Router# show arp 0005.5f1d.8100

Address Age Hardware Addr State Type Interface
172.16.7.2 - 0005.5f1d.8100 Interface ARPA 2/0/1/2
```

The following is sample output from the **show arp** command with the **location** keyword and *node-id* argument:

```
Router# show arp location 0/2/CPU0

Address Age Hardware Addr State Type Interface
192.168.15.1 - 00dd.00ee.00ff Alias ARPA
192.168.13.1 - 00aa.00bb.00cc Static ARPA
172.16.7.1 00:35:49 0002.fc0e.9600 Dynamic ARPA 2/0/1/2
172.16.7.2 - 0005.5f1d.8100 Interface ARPA 2/0/1/2
```

show arp idb

To display the ARP database statistics for an interface, use the **show arp idb** command in EXEC mode.

show arp idb *interface-name* **location** *node-id*

Syntax Description

interface-name	Name of the interface
node-id	Location of the interface. LC node for physical interfaces, RP or LC node for virtual interfaces

Command Default

There is no default location, location needs to be provided in the CLI.

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

The **show arp idb** command is useful to verify the IP addresses, Mac address, ARP configuration(s) applied on the interface and the entry statistics.

For **show arp idb** *interface-type interface-instance* form, the **location** *node-id* keyword and argument is mandatory for Bundle and VLAN-on-Bundle interfaces to indicate which location the cache entries for the bundle should be displayed.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show arp idb** command:

```
RP/0/0/CPU0:ios#show arp idb GigabitEthernet 0/0/0/0 location 0/0/CPU0
Mon Jan 30 10:32:15.387 IST
GigabitEthernet0/0/0/0 (0x00000060):
IDB Client: default
IPv4 address 1.1.1.1, Vrf ID 0x60000000
VRF Name default
Dynamic learning: Enable
Dynamic entry timeout: 14400 secs
Drop adjacency timeout: Disable
Purge delay: off
Cache limit: 128000
Incomplete glean count: 1
```

Complete glean count: 0

Complete protocol count: 0

Dropped glean count: 0

Dropped protocol count: 0

IPv4 caps added (state up)

MPLS caps not added

Interface not virtual, not client fwd ref,

Proxy arp not configured, not enabled

Local Proxy arp not configured

Packet IO layer is NetIO

Srg Role : DEFAULT

Idb Flag : 49292

IDB is Complete

IDB Flag Description:

[CAPS | COMPLETE | IPV4_CAPS_CREATED | SPIO_ATTACHED |

SPIO_SUPPORTED]

Idb Flag Ext : 0x0

Idb Oper Progress : NONE

Client Resync Time : Jan 30 10:07:10.736787

Total entries : 9

| Event Name | Time Stamp | S, M

| idb-create | Jan 30 10:07:10.784 | 1, 0

| idb-state-up | Jan 30 10:07:10.784 | 0, 0

| caps-state-update | Jan 30 10:07:10.784 | 0, 1

| address-update | Jan 30 10:07:10.784 | 0, 0

| idb-complete | Jan 30 10:07:10.784 | 0, 0

| idb-entry-create | Jan 30 10:07:10.784 | 0, 0

| idb-caps-add | Jan 30 10:07:10.784 | 0, 0

| idb-caps-add-cb | Jan 30 10:07:10.784 | 0, 0

| idb-last-garp-sent | Jan 30 10:07:11.808 | 0, 0

show arp traffic

To display Address Resolution Protocol (ARP) traffic statistics, enter the **show arp traffic** command in EXEC mode.

show arp traffic [**vrf** *vrf-name*] [*interface-path-id*] [**location** *node-id*]

Syntax Description

vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF instance that identifies a VPN.

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

location *node-id*	(Optional) Displays the ARP entry for a specific location. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

The active RP is the default location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

ARP establishes correspondences between network addresses (an IP address, for example) and Ethernet hardware addresses. A record of each correspondence is kept in a cache for a predetermined amount of time and then discarded.

For **show arp traffic,** *interface-instance*, the **location** *node-id* keyword and argument is mandatory for Bundle and VLAN-on-Bundle interfaces. These keywords and arguments indicate the location for which the cache entries for the bundle are to be displayed. For physical interfaces, specifying the **location** *node-id* keyword and argument is optional because the interface can only exist on one node.

Task ID

Task ID	Operations
cef	read

Examples

The following is sample output from the **show arp traffic** command:

```
Router# show arp traffic

ARP statistics:
  Recv: 2691 requests, 91 replies
  Sent: 67 requests, 2 replies (0 proxy, 1 gratuitous)
  Resolve requests rcvd: 1
  Resolve requests dropped: 0
  Errors: 0 out of memory, 0 no buffers

ARP cache:
  Total ARP entries in cache: 5
  Dynamic: 3, Interface: 1, Standby: 0
  Alias: 0,   Static: 0, DHCP:0, DropAdj: 1

  IP Packet drop count for node 0/0/CPU0: 1
```

The following is sample output from the **show arp traffic** command with the **location** keyword and *node-id* argument:

Related Commands

Command	Description
clear arp-cache, on page 90	Deletes all dynamic entries from the ARP cache.
show arp, on page 94	Displays ARP statistics.

Cisco Express Forwarding Commands

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

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

- cef adjacency route override rib, on page 103
- cef load-balancing algorithm adjust, on page 105
- cef load-balancing fields, on page 106
- clear adjacency statistics, on page 112
- clear cef ipv4 drops, on page 114
- clear cef ipv4 exceptions, on page 116
- clear cef ipv4 interface bgp-policy-statistics, on page 118
- clear cef ipv4 interface rpf-statistics, on page 119
- clear cef ipv6 drops, on page 121
- clear cef ipv6 exceptions, on page 123
- clear cef ipv6 interface bgp-policy-statistics, on page 125
- clear cef ipv6 interface rpf-statistics, on page 126
- ipv4 bgp policy accounting, on page 127
- ipv4 bgp policy propagation, on page 129
- ipv4 verify unicast source reachable-via , on page 131
- ipv6 bgp policy accounting, on page 133
- ipv6 verify unicast source reachable-via, on page 135
- rp mgmtethernet forwarding, on page 137
- show adjacency, on page 138
- show cef, on page 142
- show cef bgp-attribute, on page 145
- show cef external, on page 147
- show cef recursive-nexthop, on page 150
- show cef summary, on page 151
- show cef ipv4, on page 153
- show cef ipv4 adjacency, on page 155
- show cef ipv4 adjacency hardware, on page 157
- show cef ipv4 drops, on page 160
- show cef ipv4 exact-route, on page 162
- show cef ipv4 exceptions, on page 164

- show cef ipv4 hardware, on page 166
- show cef ipv4 interface, on page 167
- show cef ipv4 interface bgp-policy-statistics, on page 169
- show cef ipv4 non-recursive, on page 171
- show cef ipv4 resource, on page 174
- show cef ipv4 summary, on page 176
- show cef ipv4 unresolved, on page 179
- show cef ipv6 , on page 181
- show cef ipv6 adjacency, on page 184
- show cef ipv6 adjacency hardware, on page 187
- show cef ipv6 drops, on page 189
- show cef ipv6 exact-route, on page 192
- show cef ipv6 exceptions, on page 194
- show cef ipv6 hardware, on page 196
- show cef ipv6 interface, on page 198
- show cef ipv6 interface bgp-policy-statistics, on page 199
- show cef ipv6 interface rpf-statistics, on page 200
- show cef ipv6 non-recursive, on page 202
- show cef ipv6 resource, on page 204
- show cef ipv6 summary, on page 206
- show cef ipv6 unresolved, on page 208
- show cef mpls adjacency, on page 210
- show cef mpls adjacency hardware, on page 212
- show cef mpls interface, on page 214
- show cef mpls unresolved, on page 216
- show cef vrf, on page 218

cef adjacency route override rib

To enable the CEF prefer Routing Information Base (RIB) prefixes over Adjacency Information Base (AIB) prefixes in the Global configuration mode. To enable the 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 algorithm adjust

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

cef load-balancing algorithm adjust *value*

Syntax Description

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

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 4.2.3	This command was introduced.

Usage Guidelines

This command has no effect on Layer 3 Multicast IP traffic.

Task ID

Task ID	Operation
config-services	read, write

Example

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# cef load-balancing algorithm adjust 2
```

cef load-balancing fields

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

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

Syntax Description

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

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

Command Default

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

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

You can undo only a Layer 4 configuration.

Per-flow load-balancing allows incoming data traffic on a router to be evenly distributed over multiple equal-cost connections. Per-flow load-balancing is the only load-balancing algorithm that is used to perform Layer 2 and Layer 3 load-balancing decisions on IPv4, IPv6, and Multiprotocol Label Switching (MPLS) flows in the system.

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

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

- Layer 3 information
- Source IP address
- Destination IP address
- Protocol
- Layer 4 information
- Source port
- Destination port
- Cisco CRS router-related information
- Router ID
- Slot Number:Rx UIDB Index
- Ingress interface bundle

Note The treatment is different for IPv4 and IPv6 fragmented packets that are fragmented on the router for various reasons. For example, the fragmented packets can originate at the router or they can arrive at the router with a size larger than the maximum transmission unit (MTU). Therefore, the 7-tuple load balancing is done on the whole packet, and fragmentation is done later so that all fragments can go on the same interface.

- Source IP address
- Destination IP address
- Router ID

Note This command has no effect on Layer 3 Multicast IP traffic.

Task ID

Task ID	Operations
ipv4	read, write

Examples

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

```
RP/0/RP0/CPU0:router# cef load balacing fields
```

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

```
RP/0/RP0/CPU0:router# show cef load-balancing location all

Router ID is 1.1.1.101

IP CEF with switching (Table Version 0) for node0_0_CPU0

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

IP CEF with switching (Table Version 0) for node0_0_CPU1

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

IP CEF with switching (Table Version 0) for node0_1_CPU0

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

```
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 77 adjacencies
  22 incomplete adjacencies

IP CEF with switching (Table Version 0) for node0_2_CPU0

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

IP CEF with switching (Table Version 0) for node0_2_CPU1

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

IP CEF with switching (Table Version 0) for node0_3_CPU0

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

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

  Load balancing: L4
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 286242
  286122 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 20600784 bytes
  11124 load sharing elements, 3014696 bytes, 297064 references
```

```
  8 shared load sharing elements, 3008 bytes
  11116 exclusive load sharing elements, 3011688 bytes
  0 CEF route update drops, 4075013 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  0 prefixes with label imposition, 11032 prefixes with label information Adjacency Table
has 15 adjacencies
  1 incomplete adjacency
```

Related Commands

Command	Description
show cef, on page 142	Displays information about packets forwarded by Cisco Express Forwarding (CEF).
show cef summary, on page 151	Displays summary information for the Cisco Express Forwarding (CEF) table.
show cef ipv4 exact-route, on page 162	Displays an IPv4 Cisco Express Forwarding (CEF) exact route.
show cef ipv4 summary, on page 176	Displays a summary of the IPv4 Cisco Express Forwarding (CEF) table
show cef ipv6 exact-route, on page 192	Displays the path an IPv6 flow comprising a source and destination address would take.
show cef ipv6 summary, on page 206	Displays a summary of the IPv6 Cisco Express Forwarding (CEF) table.

clear adjacency statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

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

Task ID

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

Related Commands

Command	Description
show adjacency, on page 138	Displays the IPv4 CEF adjacency table.

clear cef ipv4 drops

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

clear cef ipv4 drops location *node-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

CEF Drop Statistics
Node: 0/1/CPU0
  Unresolved drops     packets :              0
  Unsupported drops    packets :              0
  Null0 drops          packets :              0
  No route drops       packets :              0
  No Adjacency drops   packets :              0
  Checksum error drops packets :              0
  RPF drops            packets :              0
  RPF suppressed drops packets :              0
  RP destined drops    packets :              0
Node: 0/6/CPU0
  Unresolved drops     packets :              0
  Unsupported drops    packets :              0
  Null0 drops          packets :              0
  No route drops       packets :              0
```

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

RP/0/RP0/CPU0:router# clear cef ipv4 drops location 0/1/CPU0

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

Related Commands

Command	Description
show cef ipv4 drops, on page 160	Displays IPv4 packet drop counters.

clear cef ipv4 exceptions

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

clear cef ipv4 exceptions location *node-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

CEF Exception Statistics
Node: 0/1/CPU0
  Slow encap  packets :              0
  Unsupported packets :              0
  Redirect    packets :              0
  Receive     packets :              0
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :              0
  Fragmented  packets :              0
Node: 0/6/CPU0
  Slow encap  packets :              0
  Unsupported packets :              0
  Redirect    packets :              0
  Receive     packets :              0
  Broadcast   packets :              0
```

```
  IP options  packets :               0
  TTL expired packets :               0
  Fragmented  packets :               0
Node: 0/RP0/CPU0
  Slow encap  packets :               1
  Unsupported packets :               0
  Redirect    packets :               0
  Receive     packets :           71177
  Broadcast   packets :           23648
  IP options  packets :               0
  TTL expired packets :               0
  Fragmented  packets :               0
Node: 0/RP0/CPU0
  Slow encap  packets :               0
  Unsupported packets :               0
  Redirect    packets :               0
  Receive     packets :          167314
  Broadcast   packets :           22656
  IP options  packets :               0
  TTL expired packets :               0
  Fragmented  packets :               0

RP/0/RP0/CPU0:router# clear cef ipv4 exceptions location 0/1/CPU0

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

Related Commands

Command	Description
show cef ipv4 exceptions, on page 164	Displays IPv4 CEF exception packet counters.

clear cef ipv4 interface bgp-policy-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

```
RP/0/RP0/CPU0:router# clear cef ipv4 interface tenGigE 0/4/0/0 bgp-policy-statistics
```

Related Commands

Command	Description
show cef ipv4 interface bgp-policy-statistics, on page 169	Displays IPv4 CEF BGP policy statistics.

clear cef ipv4 interface rpf-statistics

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

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

Syntax Description

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

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# clear cef ipv4 interface tenGigE 0/4/0/0 rpf-statistics
```

clear cef ipv6 drops

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

clear cef ipv6 drops location *node-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

CEF Drop Statistics
Node: 0/1/CPU0
  Unresolved drops     packets :              0
  Unsupported drops    packets :              0
  Null0 drops          packets :              0
  No route drops       packets :              0
  No Adjacency drops   packets :              0
  Checksum error drops packets :              0
  RPF drops            packets :              0
  RPF suppressed drops packets :              0
  RP destined drops    packets :              0
Node: 0/6/CPU0
  Unresolved drops     packets :              0
  Unsupported drops    packets :              0
  Null0 drops          packets :              0
  No route drops       packets :              0
```

```
  No Adjacency drops   packets :               0
  Checksum error drops packets :               0
  RPF drops            packets :               0
  RPF suppressed drops packets :               0
  RP destined drops    packets :               0
Node: 0/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
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

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

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

Related Commands

Command	Description
show cef ipv6 drops, on page 189	Displays IPv6 packet drop counters.

clear cef ipv6 exceptions

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

clear cef ipv6 exceptions location *node-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **location** keyword was made mandatory.

Usage Guidelines

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

Task ID

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

Examples

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

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

CEF Exception Statistics
Node: 0/1/CPU0
  Slow encap  packets :              0
  Unsupported packets :              0
  Redirect    packets :              0
  Receive     packets :              0
  Broadcast   packets :              0
  IP options  packets :              0
  TTL expired packets :              0
  Fragmented  packets :              0
Node: 0/6/CPU0
  Slow encap  packets :              0
  Unsupported packets :              0
  Redirect    packets :              0
```

```
  Receive     packets :               0
  Broadcast   packets :               0
  IP options  packets :               0
  TTL expired packets :               0
  Fragmented  packets :               0
Node: 0/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/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

RP/0/RP0/CPU0:router# clear cef ipv6 exceptions location 0/1/CPU0

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

Related Commands

Command	Description
show cef ipv6 exceptions, on page 194	Displays IPv6 CEF exception packet counters.

clear cef ipv6 interface bgp-policy-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

```
RP/0/RP0/CPU0:router# clear cef ipv6 interface MgmtEth 0/CPU0/0 bgp-policy-statistics
```

clear cef ipv6 interface rpf-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# clear cef ipv6 interface MgmtEth 0/CPU0/0 rpf-statistics
```

ipv4 bgp policy accounting

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

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

Syntax Description

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

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.0	This command was introduced.

Usage Guidelines

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

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

```
RP/0/RP0/CPU0:router(config-if)# ipv4 bgp policy accounting output destination-accounting
```

See the *Routing Configuration Guide for Cisco CRS Routers* for information about configuring a BGP policy. BGP accounting policy is based on community lists, autonomous system numbers, or autonomous system paths.

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

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

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

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to configure BGP policy accounting:

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet pos 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ipv4 bgp policy accounting output source-accounting
```

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy. For more information, see *Routing Command Reference for Cisco CRS Routers*
show bgp policy	Displays information about BGP advertisements under a proposed policy. For more information, see *Routing Command Reference for Cisco CRS Routers*
show cef ipv4 interface bgp-policy-statistics, on page 169	Displays IPv4 CEF BGP policy statistics.
show route	Displays the current routes for BGP in the RIB. For more information, see *Routing Command Reference for Cisco CRS Routers*
table-policy	Applies a routing policy to routes being installed into the routing table. For more information, see *Routing Command Reference for Cisco CRS Routers*

ipv4 bgp policy propagation

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

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

Syntax Description

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

Command Default

The default is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

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

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

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet pos 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 address 192.3.1.1 255.255.255.252
RP/0/RP0/CPU0:router(config-if)# ipv4 bgp policy propagation input ip-precedence destination
```

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy.
show bgp policy	Displays information about BGP advertisements under a proposed policy.
show cef ipv4 interface bgp-policy-statistics, on page 169	Displays IPv4 CEF BGP policy statistics.
show route	Displays the current routes for BGP in the RIB.
table-policy	Applies a routing policy to routes being installed into the routing table. For more information, see *Routing Command Reference for Cisco CRS Routers*

ipv4 verify unicast source reachable-via

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

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

Syntax Description

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

Command Default

IPv4 unicast RPF is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The strict option information was added.

Usage Guidelines

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

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

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

Task ID

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

Examples

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

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ipv4 verify unicast source reachable-via rx
```

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

```
RP/0/RP0/CPU0:routerios(config)# interface gigabitethernet 0/0/0/1
RP/0/RP0/CPU0:routerios(config-if)# ipv4 verify unicast source reachable-via any
```

ipv6 bgp policy accounting

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

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

Syntax Description

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

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

```
RP/0/RP0/CPU0:router(config)# ipv6 bgp policy accounting output destination-accounting
```

See the *Routing Configuration Guide for Cisco CRS Routers* for information about configuring a BGP policy. BGP accounting policy is based on community lists, autonomous system numbers, or autonomous system paths.

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

To specify the accounting policy, the proper route policy configuration must be in place matching specific BGP attributes using the **set traffic-index** command. In BGP router configuration mode, use the **table-policy**

command to modify the accounting buckets when the IP routing table is updated with routes learned from BGP. To display accounting policy information, use the **show cef ipv4 interface bgp-policy-statistics, show bgp policy** , and **show ip route bgp** commands.

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to configure BGP policy accounting:

```
RP/0/
RP0



/
CPU0:router(config)# interface

pos
0/1/0/0
RP/0/
RP0



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

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy. For more information, see *Routing Command Reference for Cisco CRS Routers*
show bgp policy	Displays information about BGP advertisements under a proposed policy. For more information, see *Routing Command Reference for Cisco CRS Routers*
show cef ipv6 interface bgp-policy-statistics, on page 199	Displays IPv6 CEF BGP policy statistics.

ipv6 verify unicast source reachable-via

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

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

Syntax Description

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

Command Default

Loose IPv6 unicast RPF is disabled.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read, write
ipv6	read, write

Examples

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

```
RP/0/RP0/CPU0:router(config)# interface pos 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ipv6 verify unicast source reachable-via any
```

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

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ipv6 verify unicast source reachable-via rx
```

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

```
RP/0/RP0/CPU0:routerios(config)# interface gigabitethernet 0/0/0/1
RP/0/RP0/CPU0:routerios(config-if)# ipv6 verify unicast source reachable-via any
```

Related Commands

Command	Description
ipv4 verify unicast source reachable-via , on page 131	Enables IPv4 unicast RPF checking.

rp mgmtethernet forwarding

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

rp mgmtethernet forwarding
no rp mgmtethernet forwarding

Syntax Description

This command has no keywords or arguments.

Command Default

Switching is disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read, write

Examples

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

```
RP/0/RP0/CPU0:router(config)# rp mgmtethernet forwarding
```

show adjacency

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

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

Syntax Description

ipv4	(Optional) Displays only IPv4 adjacencies.
nexthop *ipv4-address*	(Optional) Displays adjacencies that are destined to the specified IPv4 nexthop.
mpls	(Optional) Displays only MPLS adjacencies.
ipv6	(Optional) Displays only IPv6 adjacencies.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.

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

summary	Displays summary of CEF IPv4, IPv6, MPLS adjacency counts for complete and incomplete entries in the adjacency table.
internal	Displays interfaces with internal HEX adjacencies and their hash values.
remote	(Optional) Displays only remote adjacencies. A remote adjacency is an internal adjacency used to forward packets between line cards.
detail	(Optional) Displays detailed adjacency information, including Layer 2 information.

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	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	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 0/0/CPU0

Interface Address Version  Refcount  Protocol
gigabitethernet0
/0/1/2(src mac only) 6 1 ipv4
gigabitethernet0
/0/1/2 point to point 7 100004
gigabitethernet0
/0/1/2                 (interface)                  3 1
```

The following is sample output from **show adjacency** command with the **ipv4** and **summary** keywords specified:

```
RP/0/RSP0/CPU0:ios#show adjacency ipv4 HundredGigE0/0/0/0 summary
Mon Feb 13 09:00:29.953 UTC
------------------------------------------------------------------------------
0/RSP0/CPU0
------------------------------------------------------------------------------

Adjacency table (version 1) has 1 adjacency:
------------------------------------------------------------------------------
0/0/CPU0
------------------------------------------------------------------------------

Adjacency table (version 4) has 4 adjacencies:
```

The following is sample output from **show adjacency** command with the **ipv4** and **detail** keywords specified:

```
RP/0/RSP0/CPU0:ios#show adjacency ipv4 HundredGigE0/0/0/0 detail
Mon Feb 13 09:05:22.086 UTC
------------------------------------------------------------------------------
0/RSP0/CPU0
------------------------------------------------------------------------------
Interface                  Address                 Version  Refcount Protocol
------------------------------------------------------------------------------
0/0/CPU0
------------------------------------------------------------------------------
Interface                  Address                 Version  Refcount Protocol
```

The following is sample output from **show adjacency** command with the **internal** and **location** keywords specified:

```
RP/0/RSP0/CPU0:ios#show adjacency internal location 0/RSP0/CPU0
Mon Feb 13 09:08:27.292 UTC
Interface                  Address                Entry     Protocol  HashIndex
Mg0/RSP0/CPU0/0            (interface)            0x7791d0a8          4447
```

The following is sample output from **show adjacency** command with the **internaldetail** and **location** keywords specified:

```
RP/0/RSP0/CPU0:ios#show adjacency internal detail location 0/RSP0/CPU0
Mon Feb 13 09:13:05.279 UTC

Mg0/RSP0/CPU0/0, (interface)
        Version: 1, references: 1, transient lock: 0
        MTU: 1500
        Adjacency pointer is: 0x7791d0a8
        Platform adjacency pointer is: 0x79d790a8
        Last updated: Feb 13 08:33:30.765
        Adjacency producer: dot1q (prod_id: 10)
        Flags: interface adjacency, incomplete adj,
                (Base-flag: 0x1, Entry-flag: 0x4, Status-flag: 0x0)
        Netio idb pointer not cached
        Cached interface type: 8
        Adjacency references:
                aib (JID 323, PID 6272), 1 reference
```

This table describes the significant fields shown in the display.

Table 9: show adjacency Command Field Descriptions

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

Field	Description
0f000800 and 000c86f33d330800453a21c10800	Layer 2 encapsulation string.
mtu	Value of the maximum transmission unit (MTU).
flags	Internal field.
packets	Number of packets going through the adjacency.
bytes	Number of bytes going through the adjacency.

Related Commands

Command	Description
clear adjacency statistics, on page 112	Clears the IPv4 CEF adjacency table.

show cef

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

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

Syntax Description

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

Command Default

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

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef 101.1.3.0/24 hardware ingress location 0/3/CPU0
101.1.3.0/24, version 0, internal 0x40000001 (0x598491e8) [1], 0x0 (0x0),
(0x0)
 local adjacency 10.0.101.2
 Prefix Len 24, traffic index 0, precedence routine (0)
 BGP Attribute: id: 8, Local id: 6, Origin AS: 1003, Next Hop AS: 4
```

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


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

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

 FCR  2 TLU Address 0x00210b19 TI 0 AS 6

VPN Label 1 0

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

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

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

The following sample output shows the load information flag from the **show cef 35.35.35.35 hardware ingress location 0/3/cpu0** command:

```
RP/0/RP0/CPU0:router# show cef 35.35.35.35 hardware ingress location 0/3/cpu0
Thu Jan 29 23:59:40.373 UTC
35.35.35.35/32, version 1, internal 0x40000001 (0xa00a6d44) [3], 0x0 (0x9f88f310), 0x0 (0x0)

 Updated Jan 29 22:06:27.315
 remote adjacency to 0/0/1/1
 Prefix Len 32, traffic index 0, precedence routine (0)
   via 121.1.1.2, 0/0/1/1, 6 dependencies, weight 0, class 0
    next hop 121.1.1.2
    remote adjacency   INGRESS PLU
   SW: 0x0401767a 00000010 00200000 017a7700
   HW: 0x0401767a 00000010 00200000 017a7700
  entry_type:         FWD    rpf ptr:     0x0001767a
  prefix len:          32    BGP policy a/c:       0
  QoS group:            0    as number:            0
  num entries:          1    next ptr:    0x00017a77
  label ptr:   0x00000000    Label(0) Ptr(0)     Load info:
    Flag: 0x00410001
    TLU1 0x00017a77
    TLU1 ENTRY        0
     SW: 0x00000000 00017a77 00000000 00000100
     HW: 0x00000000 00017a77 00000000 00000100
    label:            0    num of labels:        0
    PBTS:             0    extra lbe:            0
```

```
   entry type:      FWD    next ptr:     0x00017a77
   num of entries:    1
   Recursive next-hop:   0.0.0.0        TLU2 0x01017a77
      TLU2 ENTRY        0
       SW: 0xfff7e000 05b800ff 00000000 017a0300
       HW: 0xfff7e000 05b800ff 00000000 017a0300
      label1:           0     num of labels:     0
      stats ptr:   0x7ffbf     mtu:            1464
      tos:              0     ttl:             255
      next ptr: 0x00017a03
```

The following sample output shows the load information flag from the **show cef ipv6 1:2::1 hardware ingress detail location 0/1/cpu0** command:

```
RP/0/RP0/CPU0:router# show cef ipv6 1:2::1 hardware ingress detail location 0/1/cpu0
Wed Mar 28 22:12:55.980 UTC
1:2::/120, version 1, internal 0x14004001 (ptr 0x5f20cc8c) [1], 0x0 (0x0), 0x410 (0x5fdf23d0)

 Updated Mar 28 21:58:10.741
 Prefix Len 120, traffic index 0, precedence routine (0), priority 4
  gateway array (0x5ef82abc) reference count 5, flags 0x8070, source rib (5), 0 backups
                [1 type 1 flags 0x90111 (0x5fe246e0) ext 0x0 (0x0)]
  LW-LDI[type=0, refc=0, ptr=0x0, sh-ldi=0x0]
   via ::ffff:1.1.1.1, tunnel id 1, 7 dependencies, recursive [flags 0x6010]
    path-idx 0 [0x602fa050 0x0]
    next hop VRF - 'default', table - 0xe0000000
    next hop ::ffff:1.1.1.1 via ::ffff:1.1.1.1:1
     next hop 51.51.0.1/32 Te0/2/0/5    labels imposed (16000)

 Print Flags: 00400001

  INGRESS PLU
   SW: 0c300000 03e80004 00780000 002a0300
   HW: 0c300000 03e80004 00780000 002a0300
  entry_type:         FWD    rpf ptr:     0x00300000
  prefix len:         120    BGP policy a/c:       0
  QoS group:            0    BAO id:               0
  num entries:          1    next ptr:    0x00002a03
  label:           16000    Label(1) Ptr(0)

    Recursive load info:
    Flag: 0x00000021
    TLU Channel: 1 Addr: 0x00002a03
    ENTRY        0
      SW: 00000010 0041a000 01000000 00000001
      HW: 00000010 0041a000 01000000 00000001
    PBTS:              0    extra l3li:             1
    entry type:      FWD    next ptr:     0x0041a000
    is label:    0    is label ptr:    0
    num of entries:    1
    tunnel_encap_ptr: 0x00000000
    next-hop index:    16777216

    Load distribution: 0 (refcount 1)

    Hash  OK  Interface                Address
    0     Y   Unknown                  ::ffff:1.1.1.1:1
```

show cef bgp-attribute

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

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

Syntax Description

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

Command Default

The default location is active RP.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/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 10: show cef bgp-attribute Command Field Descriptions

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

Related Commands

Command	Description
show cef, on page 142	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef external

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

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

```
RP/0/RP0/CPU0:router#show cef external hardware egress location 0/0/CPU0
Mon Dec 13 11:09:21.041 UTC

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

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


Data identical on all NPs:

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

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



RP/0/RP0/CPU0:router#show cef external hardware egress location 0/0/CPU0
Mon Dec 13 11:22:47.605 UTC

IPV4:
-----
Client Name       : l2fib_mgr (comp-id: 0x7e6d) (0x9f6f70fc)
Protocol          : ipv4
Prefix            : 100.100.100.2 (0x9f13d22c)
Gateway array     : 9e8fb058 (0x201500/1)
Loadinfo          : 9fbd41a8 (0x10181101/1)
Number of notifs  : 2
Interest type     : EOS0 LDI updates
```

```
Table Id          : 0xe0000000
Cookie Value      : 6c326669625f6d67720000000
State             : resolved, cached plat context
Via               : 16006/0
Added to pend list: Dec 13 11:21:23.037

    Load distribution: 0 (refcount 1)

    Hash  OK  Interface                Address
    0     Y   recursive                16006/0

Data identical on all NPs:

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

       BGP Path info #0

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

Related Commands

Command	Description
show cef, on page 142	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef recursive-nexthop

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.5.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Related Commands

Command	Description
show cef, on page 142	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef summary

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

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

Syntax Description

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

Command Default

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

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef summary location 0/1/CPU0

Router ID is 10.1.1.1

IP CEF with switching (Table Version 0) for node0_1_CPU0

  Load balancing: L3
  Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
  Vrfname default, Refcount 318
  170 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 12240 bytes
  183 load sharing elements, 57292 bytes, 184 references
  19 shared load sharing elements, 7036 bytes
  164 exclusive load sharing elements, 50256 bytes
  0 CEF route update drops, 10 revisions of existing leaves
  Resolution Timer: 15s
  0 prefixes modified in place
  0 deleted stale prefixes
  21 prefixes with label imposition, 60 prefixes with label information
Adjacency Table has 49 adjacencies
  25 incomplete adjacencies
```

This table describes the significant fields shown in the display.

Table 11: show cef summary Command Field Descriptions

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

Related Commands

Command	Description
cef load-balancing fields, on page 106	Selects the hashing algorithm that is used for load balancing during forwarding.
show cef, on page 142	Displays information about packets forwarded by Cisco Express Forwarding (CEF).

show cef ipv4

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

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

Syntax Description

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

Command Default

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

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command displays the 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
10.0.0.0/0          10.25.0.1           MgmtEth0/RP0/CPU0/0
10.0.0.0/32         broadcast
10.25.0.0/16        attached            MgmtEth0/RP0/CPU0/0
10.25.12.10/32      receive             MgmtEth0/RP0/CPU0/0
10.25.13.12/32      10.25.13.12         MgmtEth0/RP0/CPU0/0
10.25.16.11/32      10.25.16.11         MgmtEth0/RP0/CPU0/0
10.25.22.10/32      10.25.22.10         MgmtEth0/RP0/CPU0/0
10.25.26.10/32      10.25.26.10         MgmtEth0/RP0/CPU0/0
10.25.41.2/32       10.25.41.2          MgmtEth0/RP0/CPU0/0
10.25.41.5/32       10.25.41.5          MgmtEth0/RP0/CPU0/0
10.25.42.5/32       10.25.42.5          MgmtEth0/RP0/CPU0/0
10.25.44.15/32      10.25.44.15         MgmtEth0/RP0/CPU0/0
10.25.55.2/32       10.25.55.2          MgmtEth0/RP0/CPU0/0
10.25.255.255/32    10.25.255.255       MgmtEth0/RP0/CPU0/0
10.0.0.0/4          0.0.0.0
10.0.0.1/32         0.0.0.0
10.255.255.255/32   broadcast
```

This table describes the significant fields shown in the display.

Table 12: show cef ipv4 Command Field Descriptions

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

show cef ipv4 adjacency

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

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

Syntax Description

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

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

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

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 MgmtEth 0/RSP0/CPU0/0
Display protocol is ipv4
Interface    Address                                          Type    Refcount
Mg0/RP0/CPU0/0Prefix: 10.25.0.3/32                             local   2
             Adjacency: PT:0x782a2900 12.25.0.3/32
             Interface: Mg0/RP0/CPU0/0
             MAC: 00.d0.02.75.ab.fd.00.11.93.ef.e3.50.08.00
             Interface Type: 0x8, Base Flags: 0x1
             Dependent adj type: remote
             Dependent adj intf: Mg0/RP0/CPU0/0
Mg0/
RP0
/CPU0/0Prefix: 10.24.0.32/32                                   remote  6
             Adjacency: PT:0x782a2b58
             Interface: Mg0/RP0/CPU0/0
             MAC: 28.4e.4f.4e.45.29
             Interface Type: 0x8, Base Flags: 0x0
```

This table describes the significant fields shown in the display.

Table 13: show cef ipv4 adjacency Command Field Descriptions

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

show cef ipv4 adjacency hardware

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The following enhancements were added: • The TE flag value was added to the sample output for both **ingress** and **egress** keywords to display the load information flag. • The **protected** keyword was added for IP-FRR.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

Display protocol is ipv4
Interface    Address                                          Type    Refcount

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

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

Te0/2/0/1                                                     special 2
             Interface: Te0/2/0/1 Type:  glean
             Interface Type: 0x1e, Base Flags: 0x4400
             Dependent adj type: remote
             Dependent adj intf: Te0/2/0/1
TLU 3 Unavailable
```

This table describes the significant fields shown in the display.

Table 14: show cef ipv4 adjacency hardware Command Field Descriptions

Field	Description
Interface	Interface associated with the prefix.
Address	Prefix address information.

Field	Description
Type	Type of adjacency, can be either local or remote.
Refcount	Number of times the adjacency is referenced by other routers.

show cef ipv4 drops

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

Table 15: show cef ipv4 drop Command Field Descriptions

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

[1] RPF = Reverse Path Forwarding

Related Commands

Command	Description
clear cef ipv4 drops, on page 114	Clears IPv4 CEF packet drop counters.

show cef ipv4 exact-route

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv4 exact-route 10.1.1.1 10.1.1.2 detail

0.0.0.0/0, version 432, proxy default, internal 0x2000201[1]
 Prefix Len 0, traffic index 0, precedence routine (0)
   via MgmtEth0/RP1/CPU0/0
```

This table describes the significant fields shown in the display.

Table 16: show cef ipv4 exact-route Command Field Descriptions

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

Related Commands

Command	Description
cef load-balancing fields, on page 106	Selects the hashing algorithm that is used for load balancing when forwarding.
show mpls forwarding exact-route	Displays the path an MPLS flow that comprises a source and destination address would take.

show cef ipv4 exceptions

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

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

This table describes the significant fields shown in the display.

Table 17: show cef ipv4 exceptions Command Field Descriptions

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

[2] ICMP = internet control message protocol
[3] TTL = time to live

Related Commands

Command	Description
clear cef ipv4 exceptions, on page 116	Clears IPv4 CEF exception packet counters.

show cef ipv4 hardware

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

show cef ipv4 interface

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

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

Syntax Description

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

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

This table describes the significant fields shown in the display.

Table 18: show cef ipv4 interface Command Field Descriptions

Field	Description
MgmtEth 0/RP0/CPU0/0 is up	Status of the interface.
if_handle	Internal interface handle.
Forwarding is enabled	Indicates that Cisco Express Forwarding (CEF) is enabled.
ICMP redirects are always sent or never sent	Indicates whether ICMP[4] redirect messages should be sent. By default, ICMP redirect messages are always sent.
IP MTU	Value of the IPv4 MTU[5] size set on the interface.
Reference count	Internal reference counter.

[4] ICMP = internet control message protocol
[5] MTU = maximum transmission unit

show cef ipv4 interface bgp-policy-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.0	This command was introduced.
Release 3.6.0	The **location** keyword was added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv4 interface TenGigE 0/2/0/4 bgp-policy-statistics

TenGigE0/2/0/4 is up
Input BGP policy accounting on src IP address enabled
```

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

This table describes the significant fields shown in the display.

Table 19: show cef ipv4 interface bgp-policy-statistics Command Field Descriptions

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

show cef ipv4 non-recursive

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	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 IPv4 CEF nonrecursive routes for the node on which the command is issued.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router#show cef ipv4 non-recursive

Prefix              Next Hop            Interface
0.0.0.0/0           1012.8.0.1
0.0.0.0/32          broadcast
10.8.0.0/16         attached            MgmtEth0/0/CPU0/0
10.8.0.0/32         broadcast           MgmtEth0/0/CPU0/0
10.8.0.1/32         12.8.0.1            MgmtEth0/0/CPU0/0
10.8.0.2/32         12.8.0.2            MgmtEth0/0/CPU0/0
10.8.0.3/32         12.8.0.3            MgmtEth0/0/CPU0/0
10.8.16.10/32       12.8.16.10          MgmtEth0/0/CPU0/0
10.8.16.30/32       12.8.16.30          MgmtEth0/0/CPU0/0
10.8.16.40/32       12.8.16.40          MgmtEth0/0/CPU0/0
10.8.28.8/32        12.8.28.8           MgmtEth0/0/CPU0/0
10.8.28.101/32      12.8.28.101         MgmtEth0/0/CPU0/0
10.8.28.103/32      12.8.28.103         MgmtEth0/0/CPU0/0
10.8.28.104/32      12.8.28.104         MgmtEth0/0/CPU0/0
10.8.28.106/32      receive             MgmtEth0/0/CPU0/0
10.8.29.113/32      12.8.29.113         MgmtEth0/0/CPU0/0
10.8.29.118/32      12.8.29.118         MgmtEth0/0/CPU0/0
10.8.29.140/32      12.8.29.140         MgmtEth0/0/CPU0/0
10.8.33.101/32      12.8.33.101         MgmtEth0/0/CPU0/0
10.8.33.103/32      12.8.33.103         MgmtEth0/0/CPU0/0
10.8.33.105/32      12.8.33.105         MgmtEth0/0/CPU0/0
10.8.33.110/32      12.8.33.110         MgmtEth0/0/CPU0/0
10.8.57.1/32        12.8.57.1           MgmtEth0/0/CPU0/0
10.8.255.255/32     broadcast           MgmtEth0/0/CPU0/0
10.29.31.2/32       12.29.31.2          MgmtEth0/0/CPU0/0
10.255.0.0/16            attached        MgmtEth0/0/CPU0/0
10.255.254.254/32   10223.255.254.254     MgmtEth0/0/CPU0/0
10.0.0.0/4            0.0.0.0
10.0.0.0/24         receive
255.255.255.255/32   broadcast
```

This table describes the significant fields shown in the display.

Table 20: show cef ipv4 non-recursive Command Field Descriptions

Field	Description
Prefix	Nonrecursive prefixes detected on the node.

Field	Description
Next Hop	Routing next hop.
Interface	Interface associated with the nonrecursive prefix.

show cef ipv4 resource

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/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
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 EXEC mode.

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The sample output was modified to display the load-balancing field for either Layer 3 or Layer 4.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/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 21: show cef ipv4 summary Command Field Descriptions

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

Related Commands

Command	Description
bundle-hash	Displays the path a bundle flow that comprises a source and destination address would take.

Command	Description
cef load-balancing fields, on page 106	Selects the hashing algorithm that is used for load balancing when forwarding.

show cef ipv4 unresolved

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	Both the **detail** and **hardware** keywords were added.

Usage Guidelines

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

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 22: show cef ipv4 unresolved Command Field Descriptions

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

show cef ipv6

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

::/0

::/128
  drop
::1/128
  loopback
```

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

This table describes the significant fields shown in the display.

Table 23: 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
  flags: source_rib
  Loadinfo owner: <this route>
  fast adj: glean
  path 1:
```

```
    flags     :
    next hop  : ::
    interface :
/0/0/0

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

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

66::4/128
  flags: receive, source_rib
  Loadinfo owner: <this route>
  fast adj: receive
  path 1:
    flags     : point-to-point
    next hop  : ::
    interface : Loopback0
```

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

Table 24: 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: • flags–Properties of the path. • next hop–Next-hop prefix if the packet is being forwarded. • interface–Next-hop interface if the packet is being forwarded.

show cef ipv6 adjacency

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

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

Syntax Description

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

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

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

Task ID

Task ID	Operations
cef	read

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

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

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 0/3/CPU0

Display protocol is ipv6
Interface    Address                                          Type    Refcount

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


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


tt2993       Ifhandle: 0xf9a0                                 remote  1
             no next-hop adj
             Interface: NULLIFHNDL
             tunnel adjacency
             Interface Type: 0x24, Base Flags: 0x200 (0xa65634f0)
             Nhinfo PT: 0xa65634f0, Idb PT: 0xa2d94a58, If Handle: 0xf9a0
             Ancestor If Handle: 0x0


tt2994       Ifhandle: 0xf9e0                                 remote  1
             no next-hop adj
             Interface: NULLIFHNDL
```

```
                tunnel adjacency
                Interface Type: 0x24, Base Flags: 0x200 (0xa65641e0)
                Nhinfo PT: 0xa65641e0, Idb PT: 0xa2d94a98, If Handle: 0xf9e0
                Ancestor If Handle: 0x0


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

show cef ipv6 adjacency hardware

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

show cef ipv6 drops

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 drops location 0/2/CPU0

 IPv6 CEF Drop Statistics
  Line status down      ingress :              0 egress :  Not Applicable
  Packet sanity fail    ingress :              0 egress :               0
  PLU set to drop       ingress :              0 egress :               0
  Unknown type,plu drop ingress :              0 egress :               0
```

```
  Packet length err     ingress :               0 egress :               0
  TCAM src-comp err     ingress :               0 egress :               0
```

This table describes the significant fields shown in the display.

Table 25: show cef ipv6 drop Command Field Descriptions

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

```
RP/0/RP0/CPU0:router# show cef ipv6 drops location 0/RSP0/CPU0

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

Table 26: 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].

Field	Description
RPF suppressed drops	Drops suppressed due to IPv4 unicast RPF.
RP destined drops	Drops destined for the router.
Discard drops	Drops that were discarded.
GRE lookup drops	
GRE processing drops	

[6] RPF = Reverse Path Forwarding

Related Commands

Command	Description
clear cef ipv6 drops, on page 121	Clears IPv6 CEF packet drop counters.

show cef ipv6 exact-route

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 exact-route 222::2 9999::6751 location

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

Related Commands

Command	Description
cef load-balancing fields, on page 106	Selects the hashing algorithm that is used for load balancing when forwarding.

show cef ipv6 exceptions

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 exceptions location 0/3/CPU0

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

This table describes the significant fields shown in the display.

Table 27: show cef ipv6 exceptions Command Field Descriptions

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

[7] TTL = time to live
[8] MTU = maximum transmission unit

Related Commands

Command	Description
clear cef ipv6 exceptions, on page 123	Clears IPv6 CEF exception packet counters.

show cef ipv6 hardware

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

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


    Load distribution: 0 (refcount 0)
```

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

show cef ipv6 interface

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

show cef ipv6 interface bgp-policy-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 interface bgp-policy-statistics
```

show cef ipv6 interface rpf-statistics

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

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

Syntax Description

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

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef ipv6 interface POS 0/1/0/0 rpf-statistics
```

show cef ipv6 non-recursive

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	Both the **hardware** and **detail** keywords were added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

::/0
```

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

This table describes the significant fields shown in the display.

Table 28: show cef ipv6 non-recursive Command Field Descriptions

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

show cef ipv6 resource

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/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 EXEC mode.

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/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 29: show cef ipv6 summary Command Field Descriptions

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

Related Commands

Command	Description
bundle-hash	Displays the path a bundle flow that comprises a source and destination address would take. For more information, see *Interface and Hardware Component Command Reference for Cisco CRS Routers*
cef load-balancing fields, on page 106	Selects the hashing algorithm that is used for load balancing when forwarding.

show cef ipv6 unresolved

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.
Release 3.6.0	Both the **hardware** and **detail** keywords were added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

9999::/64
  unresolved
```

This table describes the significant fields shown in the display.

Table 30: show cef ipv6 unresolved Command Field Descriptions

Field	Description
xxxx::/*xx*	Detected unresolved route.

show cef mpls adjacency

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

Related Commands

Command	Description
show cef mpls adjacency hardware, on page 212	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls interface, on page 214	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 216	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls adjacency hardware

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef mpls adjacency hardware
```

Related Commands

Command	Description
show cef mpls adjacency, on page 210	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls interface, on page 214	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 216	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls interface

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

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

Syntax Description

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

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/RP0/CPU0:router# show cef mpls interface
```

Related Commands

Command	Description
show cef mpls adjacency, on page 210	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 212	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls unresolved, on page 216	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls unresolved

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

The following sample output is from the **show cef 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 31: show cef mpls unresolved Command Field Descriptions

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

Related Commands

Command	Description
show cef mpls adjacency, on page 210	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 212	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls interface, on page 214	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.

show cef vrf

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

show cef vrf [*vrf-name*]

Syntax Description

vrf-name	Name of the VRF instance.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

This table describes the significant fields shown in the display.

Table 32: show cef vrf 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.

This following example is sample output from **show cef vrf vpn 100 40.40.40.40/32 hardware ingress location 0/3/cpu0** command:

```
RP/0/RP0/CPU0:router# show cef vrf vpn100 40.40.40.40/32 hardware ingress location 0/3/cpu0

Thu Jan 29 23:59:15.918 UTC
40.40.40.40/32, version 1, internal 0x40040001 (0x9f8f27b4) [1], 0x0 (0x0), 0x4100
(0xa031a4c8)
 Updated Jan 29 23:06:57.753
 Prefix Len 32, traffic index 16, precedence routine (0)
   via 35.35.35.35, tunnel id 1, 3 dependencies, recursive
    next hop 35.35.35.35 via 35.35.35.35:1

   labels imposed (23304)

   INGRESS PLU
   SW: 0x06017600 016c2010 08200000 017e0000
   HW: 0x06017600 016c2010 08200000 017e0000
  entry_type:          FWD    rpf ptr:     0x00017600
  prefix len:           32    BGP policy a/c:      16
  QoS group:             0    as number:            0
  num entries:           1    next ptr:    0x00017e00
  label:             23304    Label(1) Ptr(0)     Recursive load info:
    Flag: 0x00000021
    TLU1 0x00017e00
    TLU1 ENTRY        0
     SW: 0x015a0002 00017a77 23232323 08190100
     HW: 0x015a0002 00017a77 23232323 08190100
    PBTS:               0    extra lbe:             0
    entry type:IP-TUNNEL    next ptr:     0x00017a77
    src pool:           0    cookie len:            8
    src addr msb:   0x19    biscuit ptr:  0x00015a00
    num of entries:     1
    BGP next-hop:   35.35.35.35
        TunnelEndpoint 0x00015a00
       TunnelEndpoint ENTRY        0
        SW: 0x111f4312 b95a8061 45be9be7 19191900
        HW: 0x111f4312 b95a8061 45be9be7 19191900
        session id:    0x111f4312
        cookie0_3:     0xb95a8061
        cookie4_7:     0x45be9be7
        src addr lsb:    0x191919
```

DHCP Commands

This chapter describes the Cisco IOS XR software commands used to configure and monitor Dynamic Host Configuration Protocol (DHCP).

For detailed information about DHCP concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- allow-hint, on page 223
- broadcast-flag policy check , on page 224
- clear dhcp ipv6 binding, on page 226
- database, on page 227
- destination (DHCP IPv6), on page 229
- dhcp ipv4 , on page 231
- show dhcp ipv4 client, on page 232
- show dhcp ipv4 client statistics, on page 234
- clear dhcp ipv4 client, on page 236
- clear dhcp ipv4 client statistics, on page 237
- show tech support dhcp ipv4 client, on page 239
- dhcp ipv6 , on page 241
- distance, on page 242
- dns-server , on page 243
- domain-name (DHCP IPv6 pool), on page 244
- duid, on page 245
- giaddr policy, on page 246
- helper-address , on page 248
- interface (DHCP), on page 250
- interface (relay profile), on page 251
- pd (prefix-delegation - DHCP IPv6 pool), on page 253
- pd (prefix-delegation - DHCP IPv6 interface), on page 255
- pool (DHCP IPv6), on page 257
- preference, on page 259
- profile relay, on page 260
- rapid-commit, on page 262
- relay information check , on page 263
- relay information option , on page 265
- relay information option allow-untrusted , on page 267

- relay information policy , on page 269
- secure-arp, on page 271
- show dhcp ipv4 relay profile, on page 272
- show dhcp ipv4 relay profile name, on page 273
- show dhcp ipv4 relay statistics, on page 274
- show dhcp ipv6, on page 276
- show dhcp ipv6 binding, on page 277
- show dhcp ipv6 database , on page 279
- show dhcp ipv6 interface, on page 281
- show dhcp ipv6 pool, on page 283
- sip address, on page 285
- sip domain-name, on page 286
- vrf (relay profile), on page 287

allow-hint

To allow the server to delegate a valid client-suggested prefix in the solicit and request messages, use the **allow-hint** command in Dynamic Host Configuration Protocol (DHCP) IPv6 interface server configuration mode. To disable the delegation of a valid client-suggested prefix, use the **no** form of the command.

allow-hint
no allow-hint

Syntax Description

This command has no keywords or arguments.

Command Default

DHCPv6 service on an interface is disabled.

Command Modes

DHCP IPv6 interface server configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **allow-hint** command enables the server to delegate a client-suggested prefix in the solicit and request messages if the prefix in the associated local prefix pool is a valid prefix and it is not assigned to any other solicit and request messages. Otherwise, the hint is ignored, and a prefix is delegated from the free list in the pool.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of the **allow-hint** command:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# dhcp ipv6 interface pos 0/5/0/0 server
RP/0/RP0/CPU0:router(config-dhcpv6-if)# allow-hint
```

broadcast-flag policy check

To configure Dynamic Host Configuration Protocol (DHCP) IPv4 Relay to broadcast only BOOTREPLY packets if the DHCP IPv4 broadacst flag is set in the DHCP IPv4 header, use the **broadcast-flag policy check** command in DHCP IPv4 relay profile configuration submode . By default, the DHCP IPv4 Relay always broadcasts BOOTREPLY packets. To restore the default, use the **no** form of this command.

broadcast-flag policy { **check** }

Syntax Description

check	Checks the broadcast flag in packets.
unicast-always	Sets the broadcast-flag policy to unicast-always.

Command Default

Relay agent always broadcasts DHCP IPv4 packets to a client.

Command Modes

DHCP IPv4 relay profile configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.
Release 4.2.0	This command was supported for BNG.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

This an example of the **broadcast-flag policy check** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# broadcast-flag policy check
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP server.

Command	Description
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.

clear dhcp ipv6 binding

To delete automatic client bindings from the Dynamic Host Configuration Protocol (DHCP) for IPv6 binding table, use the **clear ipv6 dhcp binding** command in EXEC mode.

clear dhcp ipv6 binding [*ipv6-address*]

Syntax Description

ipv6-address	(Optional) Address of a DHCP for an IPv6 client. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **clear ipv6 dhcp binding** command is used as a server function.

A binding table entry on the DHCP for IPv6 server is automatically:

- Created whenever a prefix is delegated to a client from the configuration information pool
- Updated when the client renews, rebinds, or confirms the prefix delegation
- Deleted when the client releases all the prefixes in the binding voluntarily, all prefixes' valid lifetimes have expired, or an administrator runs the **clear ipv6 dhcp binding** command.

If the **clear ipv6 dhcp binding** command is used with the optional *ipv6-address* argument specified, only the binding for the specified client is deleted. If the **clear ipv6 dhcp binding** command is used without the *ipv6-address* argument, then all automatic client bindings are deleted from the DHCP for IPv6 binding table.

Task ID

Task ID	Operations
ip-services	execute

Examples

The following example specifies DHCP for IPv6 binding database agent parameters:

```
RP/0/RP0/CPU0:router# clear dhcp ipv6 binding
```

Related Commands

Command	Description
show dhcp ipv6 database , on page 279	Displays the DHCP for the IPv6 binding database information.

database

To configure a Dynamic Host Configuration Protocol (DHCP) for IPv6 binding database agent, use the **database** command in DHCP IPv6 configuration mode. To delete the database agent, use the **no** form of this command.

database *agent-URL* [**write-delay** *seconds*] [**timeout** *seconds*]
no database *agent-URL*

Syntax Description

agent-URL	A Flash, NVRAM, FTP, TFTP, or Remote Copy Protocol (RCP) uniform resource locator.
write-delay *seconds*	(Optional) How often (in seconds) DHCP for IPv6 sends database updates. The default is 300 seconds. The minimum write delay is 60 seconds.
timeout *seconds*	(Optional) Length of time, in seconds, the router waits for a database transfer.

Command Default

Write-delay default is 300 seconds.

Timeout default is 300 seconds.

Command Modes

DHCP IPv6 configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **database** command specifies DHCP for IPv6 binding database agent parameters. The user may configure multiple database agents.

The **write-delay** keyword specifies how often, in seconds, that DHCP sends database updates. By default, DHCP for IPv6 server waits 300 seconds before sending any database changes.

The **timeout** keyword specifies how long, in seconds, the router waits for a database transfer. Infinity is defined as 0 seconds, and transfers that exceed the timeout period are aborted. By default, the DHCP for IPv6 server waits 300 seconds before aborting a database transfer. When the system is going to reload, there is no transfer timeout so that the binding table can be stored completely.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example specifies DHCP for IPv6 binding database agent parameters:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# database tftp://10.0.0.1/dhcp-binding
```

Related Commands

Command	Description
dhcp ipv6 , on page 241	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.
interface (DHCP), on page 250	Enables DHCP for IPv6 on an interface.
show dhcp ipv6 database , on page 279	Displays the DHCP for the IPv6 binding database information.

destination (DHCP IPv6)

To specify a destination address to which client messages are forwarded and to enable Dynamic Host Configuration Protocol (DHCP) for IPv6 relay service on the interface, use the **destination** command in DHCP IPv6 interface relay configuration mode. To remove a relay destination on the interface or delete an output interface for a destination, use the **no** form of this command.

destination *ipv6 address interface-path-id*
no destination *ipv6 address*

Syntax Description

ipv6 address address	IPv6 address in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.

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

Command Default

Relay function is disabled and there is no relay destination on the interface.

Command Modes

DHCP IPv6 interface relay configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 4.1.0	Support for DHCP IPv6 relay service.

Usage Guidelines

The **destination** command specifies a destination address to which client messages are forwarded and enables DHCP for IPv6 relay service on the interface. When relay service is enabled on an interface, a DHCP for IPv6 message received on that interface is forwarded to all configured relay destinations. The incoming DHCP for IPv6 message may have come from a client on that interface, or it may have been relayed by another relay agent.

The relay destination can be a unicast address of a server or another relay agent, or it may be a multicast address. There are the following two types of relay destination addresses:

- A link-scoped unicast or multicast IPv6 address, for which a user must specify an output interface
- A global unicast IPv6 address, for which a user can specify an output interface for this kind of address.
- A global or site-scope multicast IPv6 address, for which a user can specify an output interface for this kind of address if 'mhost ipv6 default-interface' is specified.

If no output interface is configured for a destination, the output interface is determined by routing tables. In this case, it is recommended that a unicast or multicast routing protocol be running on the router.

Multiple destinations can be configured on one interface, and multiple output interfaces can be configured for one destination. When the relay agent relays messages to a multicast address, it sets the hop limit field in the IPv6 packet header to 32.

Unspecified, loopback, and node-local multicast addresses are not acceptable as the relay destination. If any one of them is configured, the message "Invalid destination address" is displayed.

Note that it is not necessary to enable the relay function on an interface for it to accept and forward an incoming relay reply message from servers. By default, the relay function is disabled, and there is no relay destination on an interface. The **no** form of the command removes a relay destination on an interface or deletes an output interface for a destination. If all relay destinations are removed, the relay service is disabled on the interface.

The DHCP for IPv6 client, server, and relay functions is mutually exclusive on an interface. When one of these functions is already enabled and a user tries to configure a different function on the same interface, one of the following messages is displayed: “Interface is in DHCP client mode,” “Interface is in DHCP server mode,” or “Interface is in DHCP relay mode.”

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of the **destination** command on an interface:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# interface tenGigE 0/5/0/0 relay
RP/0/RP0/CPU0:router(config-dhcpv6-if)# destination 10:10::10
```

dhcp ipv4

To enable Dynamic Host Configuration Protocol (DHCP) for IPv4 and to enter DHCP IPv4 configuration mode, use the **dhcp ipv4** command in Global Configuration mode. To disable DHCP for IPv4 and exit the DHCP IPv4 configuration mode, use the **no** form of this command.

dhcp ipv4

Syntax Description

This command has no keywords or arguments.

Command Modes

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

Use the **dhcp ipv4** command to enter DHCP IPv4 configuration mode.

Task ID

Task ID	Operations
ip-services	read, write

Examples

This example shows how to enable DHCP for IPv4:

```
RP/0/RP0/CPU0:router# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)#
```

show dhcp ipv4 client

To display DHCP client binding information, use the **show dhcp ipv4 client** command in EXEC mode.

show dhcp ipv4 client <*interfaceName*> [**detail**] [**debug**]

Syntax Description

interfaceName	Displays the DHCP IPv4 address of the specified interface.
detail	(Optional) Specifies detailed results.
debug	(Optional) Displays internal debugging information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

Use the **show dhcp ipv4 client** command to display the DHCP IPv4 for the specified client.

Task ID

Task ID	Operations
IP-Services	read

Examples

The following example shows how to display DHCP IPv4 binding information:

```
Router#show dhcp ipv4  client
Mon May  6 16:35:32.581 UTC

    Interface name             IP Address         Binding State         Lease Time Rem
----------------------     ----------------      ---------------    ----------------------
MgmtEth0_0_CPU0_0          192.168.190.130         BOUND             1688 secs (00:28:08)

Router#
Router# show dhcp ipv4  client binding ?
  MgmtEth          Ethernet/IEEE 802.3 interface(s)
  detail           Show detailed client binding information
  |                Output Modifiers
  <cr>
Router# show dhcp ipv4  client   detail
Mon May  6 16:35:56.579 UTC

-----------------------------------------------------
Client Interface name         : MgmtEth0_0_CPU0_0
Client Interface handle       : 0x1280
Client Interface VRF name     : default
Client ChAddr                 : 000c.292f.950e
Client ID                     : MgmtEth0_0_CPU0_0
Client State                  : BOUND
Client IP Address (Dhcp)      : 192.168.190.130
Client IP Address Mask        : 255.255.255.0
```

```
Client Lease Time Allocated   : 1800 secs (00:30:00)
Client Lease Time Remaining   : 1664 secs (00:27:44)
Client Selected Server Addr   : 192.168.190.254
-------------------------------------------------------

Router#
Router# show dhcp ipv4  client binding detail ?
  MgmtEth          Ethernet/IEEE 802.3 interface(s)
  debug            Show detailed debug level client binding information
  |                Output Modifiers
  <cr>
Router# show dhcp ipv4  client detail debug
Mon May  6 16:36:43.836 UTC

-------------------------------------------------------
Client Interface name         : MgmtEth0_0_CPU0_0
Client Interface handle       : 0x1280
Client Interface VRF name     : default
Client ChAddr                 : 000c.292f.950e
Client ID                     : MgmtEth0_0_CPU0_0
Client State                  : BOUND
Client IP Address (Dhcp)      : 192.168.190.130
Client IP Address Mask        : 255.255.255.0
Client Lease Time Allocated   : 1800 secs (00:30:00)
Client Lease Time Remaining   : 1617 secs (00:26:57)
Client Selected Server Addr   : 192.168.190.254
Client Interface VRF id       : 0x60000000
Client Interface VRF Table id : 0xe0000000
Client XID                    : 0xa7f
Client Timers Running         : 0x2 (T1_RENEW_TIMER)
Client Renew Time Allocated   : 900 secs (00:15:00)
Client Renew Time Adjusted    : 900 secs (00:15:00)
Client Rebind Time Allocated  : 1575 secs (00:26:15)
Client Rebind Time Adjusted   : 1575 secs (00:26:15)
Client Checkpoint object id   : 0x80002fd8
Client IPv4 MA configured     : TRUE
-------------------------------------------------------

Router#
Router# show dhcp ipv4 client  mgmtEth 0/0/CPU0/0
Mon May  6 16:49:54.382 UTC

    Interface name         IP Address      Binding State         Lease Time Rem
----------------------    ------------    ---------------    ----------------------
MgmtEth0_0_CPU0_0          192.168.190.130  BOUND             1727 secs (00:28:47)
RP/0/0/CPU0:ios#
```

show dhcp ipv4 client statistics

To display DHCP client statistical information, use the **show dhcp ipv4 client statistics** command in EXEC mode.

show dhcp ipv4 client <*interfaceName*> **statistics**

Syntax Description

interfaceName	Displays the DHCP IPv4 statistical information of the specified interface.
statistics	Applies a statistics template and enable statistics collection.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

Use the **show dhcp ipv4 client statistics** command to display the DHCP IPv4 statistical information for the specified client.

Task ID

Task ID	Operations
IP-Services	read

Examples

The following example shows how to display the DHCP IPv4 statistics information:

```
RP/0/0/CPU0:ios#show dhcp ipv4 client binding mgmtEth 0/0/CPU0/0 statistics
Mon May  6 16:49:46.402 UTC

-----------------------------------------------------
Client Interface name         : MgmtEth0_0_CPU0_0
Client State                  : BOUND
-----------------------------------------------------
               TOTAL STATISTICS
-----------------------------------------------------
DISCOVERS SENT                : 1
OFFERS    SENT                : 1
OFFERS    RECEIVED            : 1
ACKS      RECEIVED            : 1
RELEASE   SENT                : 1
RESYNC    SENT TO IM          : 1
IPV4_MA   CFG SENT            : 1
IPV4_MA   CFG SUCCESS         : 1
INIT      TIMER STARTED       : x
T1-RENEW  TIMER STARTED       : x
T2_REBIND TIMER STARTED       : x
LEASE     TIMER STARTED       : x
INIT      TIMER STOPPED       : x
T1-RENEW  TIMER STOPPED       : x
T2_REBIND TIMER STOPPED       : x
```

```
LEASE     TIMER STOPPED       : x

-----------------------------------------------------
               ERROR COUNTERS
-----------------------------------------------------
OFFERS    IGNORED             : 1
ACK       IGNORED             : 1
DECLINE   SENT                : 1
NACK      RECEIVED            : 1
INVALID   OFFERS RECEIVED     : 1
INVALID   ACKS RECEIVED       : 1
IPV4_MA   CFG FAILED          : 0
IPV4_MA   CFG FAILED REASON   : "..."
IM        RESYNC ERROR REASON : "..."
```

clear dhcp ipv4 client

To clear the DHCP client binding information configured on a given interface and set the binding information again, use the **clear dhcp ipv4 client** command in EXEC mode.

This is a test.

clear dhcp ipv4 client *<interfaceName>*

Syntax Description

interfaceName	Clears and restarts the DHCP IPv4 information of the specified interface.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

Use the **clear dhcp ipv4 client** command to clear the DHCP client binding information for the specified interface.

Task ID

Task ID	Operations
IP-Services	Execution

Examples

The following example shows how to clear the DHCP client binding information:

```
Router# clear dhcp ipv4 client mgmtEth 0/0/CPU0/0
Fri Jun  6 08:24:14.558 UTC
Router# show dhcp ipv4 client
Fri Jun  6 08:24:17.377 UTC

    Interface name         IP Address      Binding State         Lease Time Rem
----------------------    ------------    ---------------    ----------------------
MgmtEth0/0/CPU0/0          11.11.11.5       BOUND             3598 secs (00:59:58)

Router# show dhcp ipv4 client mgmtEth 0/0/CPU0/0 statistics
Fri Jun  6 08:24:19.397 UTC

Client Interface name           : MgmtEth0/0/CPU0/0
-------------------------------------------------
     CLIENT COUNTER(s)          |        VALUE
-------------------------------------------------
Num discovers sent              :          1
Num requests sent               :          1
Num releases sent               :          1
Num offers received             :          1
Num acks received               :          1
-------------------------------------------------
```

clear dhcp ipv4 client statistics

To clear DHCP client binding statistics information for a given interface, use the **clear dhcp ipv4 client statistics** command in EXEC mode.

clear dhcp ipv4 client <*interfaceName*> **statistics**

Syntax Description

interfaceName	DHCP IPv4 client enabled interface.
statistics	Clears DHCP IPv4 statistical information for the specified interface.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

Use the **clear dhcp ipv4 client statistics** command to clear the DHCP client binding statistics information for the specified interface.

Task ID

Task ID	Operations
IP-Services	Execution

Examples

The following example shows how to clear the DHCP client binding statistics information:

```
RP/0/0/CPU0:ios#show dhcp ipv4 client mgmtEth 0/0/CPU0/0 statistics
Fri Jun  6 08:23:04.822 UTC

Client Interface name           : MgmtEth0/0/CPU0/0
-------------------------------------------------
     CLIENT COUNTER(s)          |        VALUE
-------------------------------------------------
Num discovers sent              :         11
Num requests sent               :          3
Num releases sent               :          2
Num offers received             :          3
Num acks received               :          3
-------------------------------------------------

RP/0/0/CPU0:ios#clear dhcp ipv4 client mgmtEth 0/0/CPU0/0 statistics
Fri Jun  6 08:23:11.852 UTC
RP/0/0/CPU0:ios#show dhcp ipv4 client mgmtEth 0/0/CPU0/0 statistics
Fri Jun  6 08:23:13.682 UTC

Client Interface name           : MgmtEth0/0/CPU0/0
-------------------------------------------------
     CLIENT COUNTER(s)          |        VALUE
-------------------------------------------------
-------------------------------------------------
```

```
RP/0/0/CPU0:ios#show dhcp ipv4 client
Fri Jun  6 08:23:16.862 UTC

    Interface name          IP Address      Binding State         Lease Time Rem
----------------------    ------------    ---------------    ----------------------
MgmtEth0/0/CPU0/0           11.11.11.5       BOUND             3562 secs (00:59:22)
```

Related Commands

Command	Description
show dhcp ipv4 client statistics, on page 234	Displays the statistics of the DHCP client.
show dhcp ipv4 client, on page 232	Displays DHCP IPv4 client information.

show tech support dhcp ipv4 client

To retrieve the DHCP client show tech support information, use the **show tech dhcp ipv4 client** command in EXEC mode.

show tech-support dhcp ipv4 client <show-tech-options>

Syntax Description

show-tech-options	Displays the DHCP IPv4 client show tech-support options.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.2.0	This command was introduced.

Usage Guidelines

Use the **show tech-support dhcp ipv4 client** command to retrieve the DHCP show-tech options for the specified interface.

Task ID

Task ID	Operations
IP-Services	Execution

Examples

The following example shows how to clear the DHCP client binding statistics information:

```
Router# show tech-support dhcp ipv4 client ?
  file      Specify a valid file name (e.g. disk0:tmp.log)(cisco-support)
  terminal  Send output to terminal(cisco-support)
Router# show tech-support dhcp ipv4 client file ?
  WORD        Send to file
  bootflash:  Send to bootflash: file system(cisco-support)
  disk0:      Send to disk0: file system(cisco-support)
  disk0a:     Send to disk0a: file system(cisco-support)
  disk1:      Send to disk1: file system(cisco-support)
  disk1a:     Send to disk1a: file system(cisco-support)
  ftp:        Send to ftp: file system(cisco-support)
  nvram:      Send to nvram: file system(cisco-support)
  rcp:        Send to rcp: file system(cisco-support)
  tftp:       Send to tftp: file system(cisco-support)
Router# show tech-support dhcp ipv4 client file disk0?
WORD  disk0:  disk0a:
Router# show tech-support dhcp ipv4 client file disk0:/dhcpv4-client-showtech.tgz
Fri Jun  6 08:25:24.793 UTC
Router# dir disk0:
Fri Jun  6 08:25:47.321 UTC

Directory of disk0:

2           drwx  1024        Thu Mar 13 06:12:03 2014  .boot
…
3           -rw-  83337       Fri Jun  6 08:25:26 2014  dhcpv4-client-showtech.tgz
```

```
1911537664 bytes total (1838081024 bytes free)
Router#
```

Related Commands

Command	Description
show dhcp ipv4 client, on page 232	Displays DHCP IPv4 client information.
show dhcp ipv4 client statistics, on page 234	Displays the statistics of the DHCP client.

dhcp ipv6

To enable Dynamic Host Configuration Protocol (DHCP) for IPv6 and to enter DHCP IPv6 configuration mode, use the **dhcp ipv6** command in Global Configuration mode. To disable the DHCP for IPv6, use the **no** form of this command.

dhcp ipv6

Syntax Description

This command has no keywords or arguments.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.
Release 4.3.0	This command was supported for BNG.

Task ID

Task ID	Operations
ip-services	read, write

Examples

This example shows how to enable DHCP for IPv6:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)#
```

Related Commands

Command	Description
database, on page 227	Configures a Dynamic Host Configuration Protocol (DHCP) for IPv6 binding database agent.
distance, on page 242	Specifies an administrative distance for Dynamic Host Configuration Protocol (DHCP) for IPv6 Prefix Delegation.
pool (DHCP IPv6), on page 257	Configures a Dynamic Host Configuration Protocol (DHCP) for the IPv6 server configuration information pool and enters DHCP for IPv6 pool configuration mode.

distance

To specify an administrative distance for Dynamic Host Configuration Protocol (DHCP) for IPv6 Prefix Delegation, use the **distance** command in DHCP IPv6 configuration mode. To delete an administrative distance, use the **no** form of this command.

distance *administrative distance*
no distance *administrative distance*

Syntax Description

administrative distanc e	User defined distance. The range is 1 to 255.

Command Default

administrative distance : 1

Command Modes

DHCP IPv6 configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of setting the DHCP administrative distance to 200 using the **distance** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# distance 200
```

Related Commands

Command	Description
dhcp ipv6 , on page 241	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.

dns-server

To specify the Domain Name System (DNS) IPv6 servers available to a Dynamic Host Configuration Protocol (DHCP) for IPv6 client, use the **dns-server** command in an appropriate configuration mode. To remove the DNS server list, use the **no** form of this command.

dns-server *ipv6-address*

Syntax Description

ipv6-address	IPv6 address of a DNS server. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.

Command Default

When a DHCP for IPv6 pool is first created, no DNS IPv6 servers are configured.

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Multiple Domain Name System (DNS) server addresses can be configured by issuing this command multiple times. New addresses do not overwrite old addresses.

Task ID

Task ID	Operations
ip-services	read, write

Examples

This is an example of setting the DNS server name using the **dns-server** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)# dns-server 10:10::10
```

domain-name (DHCP IPv6 pool)

To configure a domain name for a Dynamic Host Configuration Protocol (DHCP) for IPv6 client, use the **domain-name** command in an appropriate configuration mode. To remove the domain name, use the **no** form of this command.

domain-name *domain*

Syntax Description

domain	Specifies the domain name string to be used by the client.

Command Default

When a DHCP for IPv6 pool is first created, no domain name for clients is configured.

Usage Guidelines

Multiple Domain Name System (DNS) domain names can be configured by issuing the **domain-name** command multiple times. The new domain name does not overwrite existing domain names.

The domain name is defined in DHCP IPv6 server profile and DHCP IPv6 server profile class configuration. If the same parameters are defined in the class scope, then the values defined in the class scope takes precedence.

Task ID

Task ID	Operations
ip-services	read, write

Examples

duid

To define the Dynamic Host Configuration Protocol (DHCP) the unique identification (DUID) on a specified device, use the **duid** command in DHCP IPv6 configuration mode. To delete an administrative distance, use the **no** form of this command.

duid *duid name*
no duid *duid name*

Syntax Description

duid name	IPv6 DHCP unique identifier (DUID) in hex format. The length of DUID word should be even.

Command Default

DUID-LL as defined in Section 9.4 of RFC3315

Command Modes

DHCP IPv6 configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Use the **duid** command to configure the DHCP unique identifier on a specified device. Use the **no** form of this command to restore the default.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of how to create an IPv6 DHCP unique identifier (DUID) of 0002000000090CC084D303000912 using the **duid** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# duid 0002000000090CC084D303000912
```

Related Commands

Command	Description
dhcp ipv6 , on page 241	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.

giaddr policy

To configure how Dynamic Host Configuration Protocol (DHCP) IPv4 Relay processes BOOTREQUEST packets that already contain a nonzero giaddr attribute, use the **giaddr policy** command in DHCP IPv4 profile relay configuration submode. To restore the default giaddr policy, use the **no** form of this command.

giaddr policy {**replace** | **drop**}
no giaddr policy {**replace** | **drop**}

Syntax Description

replace	Replaces the existing giaddr value with a value that it generates.
drop	Drops the packet that has an existing nonzero giaddr value.

Command Default

DHCP IPv4 relay retains the existing nonzero giaddr value in the DHCP IPv4 packet received from a client value.

Command Modes

DHCP IPv4 profile relay configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

The **giaddr policy** command affects only the packets that are received from a DHCP IPv4 client that have a nonzero giaddr attribute.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to use the **giaddr policy** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# giaddr policy drop
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
interface (relay profile), on page 251	Specifies a relay profile on an interface.

Command	Description
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.

helper-address

To configure the Dynamic Host Configuration Protocol (DHCP) IPv4 relay agent to relay DHCP packets to a specific DHCP server, use the **helper-address** command in an appropriate configuration mode. Use the **no** form of this command to clear the address.

helper-address [**vrf** *vrf-name*] [*address*] [**giaddr** *gateway-address*]

Syntax Description

vrf-name	(Optional) Specifies the name of a particular VRF.
address	IPv4 and Pv6 address in four part, dotted decimal format.
giaddr *gateway-address*	(Optional) Specifies the gateway address to use in packets relayed to server. This keyword is applicable for IPv4 helper address.

Command Default

Helper address is not configured.

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

A maximum of upto eight helper addresses can be configured.

Task ID

Task ID	Operations
ip-services	read, write

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables Dynamic Host Configuration Protocol (DHCP) for IPv4 and enters DHCP IPv4 configuration mode.
interface (relay profile), on page 251	Specifies a relay profile on an interface.
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.

Command	Description
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.

interface (DHCP)

To enable Dynamic Host Configuration Protocol (DHCP) for IPv4 on an interface, use the **interface** command in the appropriate configuration mode. To disable DHCPv4 on an interface, use the **no** form of the command.

interface *type interface-path-id* {**server** | **relay**}
interface *type interface-path-id* { **base** | **relay** | **server** }

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
server	Enables service on the specified interface using the pool for prefix delegation.
relay	Attaches a relay profile for the specified interface.

Command Default

None

Command Modes

DHCP IPv6 configuration

DHCP IPv4 configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Task ID

Task ID	Operations
ip-services	read, write

Examples

interface (relay profile)

To configure a relay profile on an interface, use the **interface (relay profile)** command in Dynamic Host Configuration Protocol (DHCP) IPv4 configuration mode. To disable this feature, use the **no** form of the command.

interface interface-type interface-path-id {**none** | **relay**}
no interface interface-type interface-path-id {**none** | **relay**}

Syntax Description

interface-type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Either a physical interface instance or a virtual interface instance.
none	Disables DHCP at the specified interface.
relay	Specifies a relay profile for the interface.

Command Modes

DHCP IPv4 configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure a relay profile on an interface:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# interface pos 0/1/4/1
RP/0/RP0/CPU0:router(config-dhcpv4)# interface pos 0/1/4/1 relay profile client
```

Related Commands

Command	Description
broadcast-flag policy check , on page 224	Configures a relay agent to only broadcast DHCP IPv4 BOOTREPLY messages to a client, if the DHCP IPv4 broadcast flag is set in the DHCP IPv4 header.
dhcp ipv4 , on page 231	Enables Dynamic Host Configuration Protocol (DHCP) for IPv4 and enters DHCP IPv4 configuration mode.

Command	Description
relay information policy	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.
vrf (relay profile), on page 287	Specifies a relay profile on a VRF.

pd (prefix-delegation - DHCP IPv6 pool)

To specify a manually configured numeric prefix to be delegated to a specified client (and optionally a specified identity association for prefix delegation [IAPD] for that client), use the **pd** command in Dynamic Host Configuration Protocol (DHCP) IPv6 pool configuration mode. To remove the prefix, use the **no** form of this command.

pd *ipv6 prefix prefix-length client -DUID* [iaid *iaid*][**lifetime**]

Syntax Description

ipv6-prefix	(Optional) Specified IPv6 prefix. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons
/prefix-length	Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address).
client-DUID	The DHCP unique identifier (DUID) of the client to which the prefix is delegated.
iaid *iaid*	(Optional) Identity association identifier (IAID), which uniquely identifies an IAPD on the client.
lifetime	(Optional) Sets a length of time during which the requesting router is allowed to use the prefix. The following values can be used: • valid-seconds—Length of time, in seconds, that the prefix remains valid for the requesting router to use. • valid-seconds preferred-seconds—Length of time, in seconds, that the prefix remains valid for the requesting router to use, plus the length of time after which client should re-check that it still has the prefix. • at—Absolute point in time where the prefix is no longer valid and no longer preferred. • preferred-seconds—Length of time, in seconds, that the prefix remains preferred for the requesting router to use. • infinite—Unlimited lifetime. This value can be used in place of valid-seconds or preferred-seconds value. • valid-month valid-date valid-year valid-time—Fixed duration of time for hosts to remember router advertisements. The format used can be oct 24 2003 11:45 or 24 oct 2003 11:45. • preferred-month preferred-date preferred-year preferred-time—Fixed duration of time for hosts to remember router advertisements. The format used can be oct 24 2003 11:45 or 24 oct 2003 11:45. • at valid-timestamp—Absolute point in time (rather than duration) for the valid-timestamp.The prefix is valid up to valid-timestamp. • at valid-timestamp preferred-timestamp—Absolute point in time (rather than duration) for the valid-timestamp and preferred time-stamp. The client should confirm that it has the prefix after preferred-timestamp; however, the time-stamp is still valid up to valid-timestamp.

Command Default

No manually configured prefix delegations exist.

Command Modes

DHCP IPv6 pool configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of the **pd** command in DHCP IPv6 pool configuration mode:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)# pd 2001:420:10::/48 0002000000090CC084D303000912
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 257	Configures a Dynamic Host Configuration Protocol (DHCP) for the IPv6 server configuration information pool and enters DHCP for IPv6 pool configuration mode.

pd (prefix-delegation - DHCP IPv6 interface)

To allow the identification of a client based on client connection to a specific interface, use the **pd** command in DHCP IPv6 interface server configuration mode. To remove the prefix, use the **no** form of this command.

pd ipv6 *prefix prefix -length*[**lifetime**]
nopd ipv6 *prefix prefix -length*[**lifetime**]

Syntax Description

ipv6-prefix	(Optional) Specified IPv6 prefix. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons
/prefix-length	Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address).
lifetime	(Optional) Sets a length of time over which the requesting router is allowed to use the prefix. The following values can be used: • valid-lifetime—The length of time, in seconds, that the prefix remains valid for the requesting router to use. • at—Specifies absolute points in time where the prefix is no longer valid and no longer preferred. • infinite—Indicates an unlimited lifetime. • preferred-lifetime—The length of time, in seconds, that the prefix remains preferred for the requesting router to use. • valid-month valid-date valid-year valid-time—A fixed duration of time for hosts to remember router advertisements. The format used can be oct 24 2003 11:45 or 24 oct 2003 11:45. • preferred-month preferred-date preferred-year preferred-time—A fixed duration of time for hosts to remember router advertisements. The format used can be oct 24 2003 11:45 or 24 oct 2003 11:45.

Command Default

No manually configured prefix delegations exist.

Command Modes

DHCP IPv6 interface server configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of the **pd** command in DHCP IPv6 pool configuration mode:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)# exit
RP/0/RP0/CPU0:router(config-dhcpv6)# interface POS 0/5/0/0 server
RP/0/RP0/CPU0:router(config-dhcpv6-if)# pd 2001:420:10::/48
RP/0/RP0/CPU0:router(config-dhcpv6-if)# pool pool1
```

Related Commands

Command	Description
interface (DHCP), on page 250	Enables DHCP for IPv6 on an interface.

pool (DHCP IPv6)

To configure a Dynamic Host Configuration Protocol (DHCP) for the IPv6 server configuration information pool and enter DHCP for IPv6 pool configuration mode, use the **pool** command in either DHCP IPv6 configuration mode or DHCP IPv6 interface relay configuration mode. To delete a DHCP for IPv6 pool, use the **no** form of this command.

pool *poolname*
no pool *poolname*

Syntax Description

poolname	User-defined name for the local prefix pool. The pool name can be a symbolic string (such as "Engineering") or an integer (such as 0).

Command Default

No DHCP for IPv6 pools are configured.

Command Modes

DHCP IPv4
IPv6 configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Use the **pool** command to create a DHCP for IPv6 server configuration information pool. When the **pool** command is enabled, the configuration mode changes to DHCP for IPv6 pool configuration mode. In this mode, the administrator can configure pool parameters, such as prefixes to be delegated and Domain Name System (DNS) servers.

Once the DHCP for IPv6 configuration information pool has been created, use the **server** command to associate the pool with a server on an interface.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example show how to enter pool configuration mode using the **pool** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)#
```

Related Commands

Command	Description
dhcp ipv6 , on page 241	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.

Command	Description
show dhcp ipv6 pool, on page 283	Displays DHCP for IPv6 configuration information pool information.

preference

To configure the preference value, use the **preference** command in DHCP IPv6 interface server configuration mode. To disable the preference value, use the **no** form of the command.

preference *preference value*
no preference

Syntax Description

preference value	Preference value carried in the preference option in the advertise message sent by the server. The range is from 0 to 255.

Command Default

The preference value defaults to zero.

Command Modes

DHCP IPv6 interface server configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **preference** command configures a preference value. If the preference value is configured and it is not 0, the server adds a preference option to carry the preference value for the advertise message to a client to affect the selection of a server by client.

Task ID

Task ID	Operations
ip-services	read, write

The following is an example of the **preference** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# interface pos 0/5/0/0 server
RP/0/RP0/CPU0:router(config-dhcpv6-if)# preference 1
```

profile relay

To configure a relay profile for the Dynamic Host Configuration Protocol (DHCP) IPv4 component and to enter the profile relay mode, use the **profile relay** command in DHCP IPv4 configuration mode. To disable this feature and exit the profile relay mode, use the **no** form of this command.

profile *profile name* **relay**
no profile *profile name* **relay**

Syntax Description

profile name	Name that uniquely identifies the relay profile.

Command Modes

DHCP IPv4 configuration

W3

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to use the **profile relay** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
```

Related Commands

Command	Description
broadcast-flag policy check , on page 224	Configures a relay agent to only broadcast DHCP IPv4 BOOTREPLY messages to a client, if the DHCP IPv4 broadcast flag is set in the DHCP IPv4 header.
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
relay information policy	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
interface (relay profile), on page 251	Specifies a relay profile on an interface.

Command	Description
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.
vrf (relay profile), on page 287	Specifies a relay profile on a VRF.

rapid-commit

To enable clients that specify the Rapid Commit option in their Solicit messages to receive immediate address assignment Reply messages, use the **rapid-commit** command in Dynamic Host Configuration Protocol (DHCP) IPv6 interface server mode. To disable DHCP for IPv6 service on an interface, use the **no** form of this command.

rapid-commit
no rapid-commit

Command Default

Rapid commit is disabled.

Command Modes

DHCP IPv6 interface server configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **rapid-commit** command enables or disables rapid commit. If enabled, the DHCPv6 server uses the two-message exchange for prefix delegation and other configuration. If a client has included a rapid commit option in the solicit message and rapid-commit is enabled for the server, the server responds to the solicit message with a reply message. If rapid-commit is not enabled, then normal four-message exchange is done even if the clients specifies the rapid commit option.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following is an example of the **rapid-commit** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6
RP/0/RP0/CPU0:router(config-dhcpv6)# interface pos 0/5/0/0 server
RP/0/RP0/CPU0:router(config-dhcpv6-if)# rapid-commit
```

Related Commands

Command	Description
interface (DHCP), on page 250	Enables DHCP for IPv6 on an interface.

relay information check

To configure a Dynamic Host Configuration Protocol (DHCP) IPv4 Relay to validate the relay agent information option in forwarded BOOTREPLY messages, use the **relay information check** command in DHCP IPv4 relay profile configuration submode. To disable this feature, use the **no** form of this command.

relay information check

Syntax Description

This command has no keywords or arguments.

Command Default

DHCP validates the relay agent information option.

Command Modes

DHCP IPv4 relay profile configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

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

This example shows how to use the **relay information check** command:

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# relay information check
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.

Command	Description
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.

relay information option

To configure Dynamic Host Configuration Protocol (DHCP) IPv4 relay or DHCP snooping Relay to insert relay agent information option in forwarded BOOTREQUEST messages to a DHCP server, use the **relay information option** command in DHCP IPv4 relay profile relay configuration or DHCP IPv4 profile snoop submode. To disable inserting relay information into forwarded BOOTREQUEST messages, use the **no** form of this command.

relay information option

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

DHCP IPv4
relay
profile
relay
configuration

DHCP IPv4 profile snoop configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

The **relay information option** command automatically adds the circuit identifier suboption and the remote ID suboption to the DHCP relay agent information option.

The **relay information option** command enables a DHCP server to identify the user (for example, cable access router) sending the request and initiate appropriate action based on this information. By default, DHCP does not insert relay information.

If the **information option** command is enabled, DHCP snooping mode does not set the giaddr field in the DHCP packet.

The upstream DHCP server or DHCP relay interface must be configured to accept this type of packet using the **relay information option allow-untrusted** configuration. This configuration prevents the server or relay from dropping the DHCP message.

Task ID

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

This example shows how to use the **relay information option** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# relay information option
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.

relay information option allow-untrusted

To configure the Dynamic Host Configuration Protocol (DHCP) IPv4 relay or DHCP snooping Relay not to drop discard BOOTREQUEST packets that have the relay information option set and the giaddr set to zero, use the **relay information option allow-untrusted** command in DHCP IPv4 relay profile configuration submode or DHCP IPv4 profile snoop configuration submode. To restore the default behavior, which is to discard the BOOTREQUEST packets that have the relay information option and set the giaddr set to zero, use the **no** form of this command.

relay information option allow-untrusted

Syntax Description

This command has no keywords or arguments.

Command Default

The packet is dropped if the relay information is set and the giaddr is set to zero.

Command Modes

DHCP IPv4
relay
profile
relay
configuration

DHCP IPv4 profile snoop configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

According to RFC 3046, relay agents (and servers) receiving a DHCP packet from an untrusted circuit with giaddr set to zero but with a relay agent information option already present in the packet shall discard the packet and increment an error count. This configuration prevents the server or relay from dropping the DHCP message.

Task ID

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

Examples

This example shows how to use the **relay information option allow-untrusted** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# relay information option allow-untrusted
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.

relay information policy

To configure how the Dynamic Host Configuration Protocol (DHCP) IPv4 relay processes BOOTREQUEST packets that already contain a relay information option, use the **relay information policy** command in DHCP IPv4 relay profile configuration submode. To restore the default relay information policy, use the **no** form of this command.

relay information policy {**drop** | **keep**}

Syntax Description

drop	Directs the DHCP IPv4 Relay to discard BOOTREQUEST packets with the existing relay information option.
keep	Directs the DHCP IPv4 Relay not to discard a BOOTREQUEST packet that is received with an existing relay information option and to keep the existing relay information option value.

Command Default

The DHCP IPv4 Relay does not discard a BOOTREQUEST packet that has an existing relay information option. The option and the existing relay information option value is replaced.

Command Modes

DHCP IPv4 relay profile configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Task ID

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

Examples

This is sample output from executing the **relay information policy** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/RP0/CPU0:router(config-dhcpv4-relay-profile)# relay information policy keep
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address	Configures the DHCP relay agent to relay packets to a specific DHCP Server.

Command	Description
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
interface (relay profile), on page 251	Specifies a relay profile on an interface.

secure-arp

To allow DHCP to add an ARP cache entry when DHCP assigns an IP address to a client in IP subscriber sessions, use the **secure-arp** command in DHCP IPv4 profile proxy configuration or DHCP IPv4 server profile mode. To disallow DHCP to add an ARP cache entry when DHCP assigns an IP address to a client, use the **no** form of this command.

secure-arp
no secure-arp

Syntax Description

This command has no keywords or arguments.

Command Default

By default, secure ARP support is disabled.

Command Modes

DHCP IPv4 proxy profile configuration

DHCP IPv4 Server Profile

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

In standalone DHCP sessions, the DHCP server adds an ARP entry when it assigns an IP address to a client. However, for IP subscriber sessions, DHCP server does not add an ARP entry. Although ARP establishes correspondences between network addresses, an untrusted device can spoof IP an address not assigned to it posing a security threat for IP subscriber sessions.

Secure ARP allows DHCP to add an ARP cache entry when DHCP assigns an IP address to a client in IP subscriber sessions. This is to prevent untrusted devices from spoofing IP addresses not assigned to them. Secure ARP is disabled by default.

Task ID

Task ID	Operation
ip-services	read, write

Example

This examples shows how to allow DHCP to add an ARP cache entry when DHCP assigns an IP address to a client using the **secure-arp** command in DHCP IPv4 server profile configuration:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# profile profile1 server
RP/0/RP0/CPU0:router(config-dhcpv4-server-profile)# secure-arp
RP/0/RP0/CPU0:router(config-dhcpv4-server-profile)#
```

show dhcp ipv4 relay profile

To display Dynamic Host Configuration Protocol (DHCP) relay agent status, use the **show dhcp ipv4 relay profile** command in EXEC mode.

show dhcp ipv4 relay profile

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

This command displays the relay profiles created for DHCP IPv4.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv4 relay profile** command:

```
RP/0/RP0/CPU0:router# show dhcp ipv4 relay profile

DHCP IPv4 Relay Profiles
--------------------------
r1
r2
```

Related Commands

Command	Description
show dhcp ipv4 relay profile name	Displays Dynamic Host Configuration Protocol (DHCP) relay agent status, specific to a relay profile.

show dhcp ipv4 relay profile name

To display Dynamic Host Configuration Protocol (DHCP) relay agent status, specific to a relay profile, use the **show dhcp ipv4 relay profile name** command in EXEC mode.

show dhcp ipv4 relay profile [**name**]

Syntax Description

name	(Optional) Name that uniquely identifies the relay profile.

Command Default

If *name* is not specified, displays a list of configured DHCP profile names.

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv4 relay profile name** command:

```
RP/0/RP0/CPU0:router# show dhcp ipv4 relay profile name r1

DHCP IPv4 Relay Profile r1:

Helper Addresses:
10.10.10.1, vrf default
Information Option: Disabled
Information Option Allow Untrusted: Disabled
Information Option Policy: Replace
Information Option Check: Disabled
Giaddr Policy: Keep
Broadcast-flag Policy: Ignore

VRF References:
default
Interface References:
FINT0_RP0_CPU0
MgmtEth0_RP0_CPU0_0
```

show dhcp ipv4 relay statistics

To display the Dynamic Host Configuration Protocol (DHCP) IPv4 relay agent packet statistics information for VPN routing and forwarding (VRF) instances, use the **show dhcp ipv4 relay statistics** command in EXEC mode.

show dhcp [**vrf** {*vrf-name* | **default**}] **ipv4 relay statistics**

Syntax Description

vrf *vrf-name*	(Optional) Name that uniquely identifies the VRF.
default	(Optional) Displays the relay statistics information for the default VRF.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv4 relay statistics** command when none of the optional keywords or arguments are used command :

```
RP/0/RP0/CPU0:router# show dhcp ipv4 relay statistics

                  Bridge               |       RX        |       TX        |        DR       |
-------------------------------------------------------------------------------------------------
 default                               |             0   |             0   |             0   |
```

The following is sample output from the show dhcp ipv4 relay statistics command using the **vrf** and **default** keywords:

```
RP/0/RP0/CPU0:router# show dhcp vrf default ipv4 relay statistics
Sun Apr 6 07:10:35.873 UTC

DHCP IPv4 Relay Statistics for VRF default:

     TYPE          |    RECEIVE     |    TRANSMIT    |      DROP       |
-------------------------------------------------------------------------
DISCOVER           |              0   |              0   |              0   |
OFFER              |              0   |              0   |              0   |
REQUEST            |              0   |              0   |              0   |
DECLINE            |              0   |              0   |              0   |
ACK                |              0   |              0   |              0   |
NAK                |              0   |              0   |              0   |
```

```
RELEASE           |            0  |            0  |            0  |
INFORM            |            0  |            0  |            0  |
LEASEQUERY        |            0  |            0  |            0  |
LEASEUNASSIGNED   |            0  |            0  |            0  |
LEASEUNKNOWN      |            0  |            0  |            0  |
LEASEACTIVE       |            0  |            0  |            0  |
BOOTP-REQUEST     |            0  |            0  |            0  |
BOOTP-REPLY       |            0  |            0  |            0  |
BOOTP-INVALID     |            0  |            0  |            0  |
```

show dhcp ipv6

To display the Dynamic Host Configuration Protocol (DHCP) unique identifier (DUID) on a specified device, use the **show dhcp ipv6** command in EXEC mode.

show dhcp ipv6

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

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

Task ID

Task ID	Operations
ip-services	read

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

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

This device's DHCPv6 unique identifier(DUID): 000300010002FCA5DC1C
```

show dhcp ipv6 binding

To display automatic client bindings from the Dynamic Host Configuration Protocol (DHCP) for IPv6 server binding table, use the **show ipv6 dhcp binding** command in EXEC mode.

show dhcp ipv6 binding [*ipv6-address*]

Syntax Description

ipv6-address	(optional) IPv6 address. The *ipv6-address* argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

The **show dhcp ipv6 binding** command displays all automatic client bindings from the DHCP for IPv6 server binding table if the *ipv6-address* argument is not specified. When the *ipv6-address* argument is specified, only the binding for the specified client is displayed.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv6 binding** displaying all automatic client bindings from the DHCPv6 database. The *ipv6 address* argument is not specified:

```
RP/0/RP0/CPU0:router# show dhcp ipv6 binding

  Client: FE80::202:FCFF:FEA5:DC39 (Ethernet2/1)
    DUID: 000300010002FCA5DC1C
    IA PD: IA ID 0x00040001, T1 0, T2 0
      Prefix: 3FFE:C00:C18:11::/68
              preferred lifetime 180, valid lifetime 12345
              expires at Nov 08 2002 02:24 PM (12320 seconds)
  Client: FE80::202:FCFF:FEA5:C039 (Ethernet2/1)
    DUID: 000300010002FCA5C01C
    IA PD: IA ID 0x00040001, T1 0, T2 0
      Prefix: 3FFE:C00:C18:1::/72
              preferred lifetime 240, valid lifetime 54321
              expires at Nov 09 2002 02:02 AM (54246 seconds)
      Prefix: 3FFE:C00:C18:2::/72
              preferred lifetime 300, valid lifetime 54333
              expires at Nov 09 2002 02:03 AM (54258 seconds)
      Prefix: 3FFE:C00:C18:3::/72
              preferred lifetime 280, valid lifetime 51111
              expires at Nov 09 2002 01:09 AM (51036 seconds)
```

This table describes the significant fields shown in the display.

Table 33: show dhcp ipv6 binding Command Field Descriptions

Field	Description
DUID	DHCP IPv6 unique identifier
IA PD	Identity Association for Prefix Delegation
Prefix	Prefixes delegated to the IAPD on the specified client

show dhcp ipv6 database

To display the Dynamic Host Configuration Protocol (DHCP) for IPv6 binding database information, use the **show dhcp ipv6 database** command in EXEC mode.

show dhcp ipv6 database *[agent-URL]*

Syntax Description

agent-URL	(Optional) Flash, NVRAM, FTP, TFTP, or Remote Copy Protocol (RCP) uniform resource locator.
location	Displays the database information of the DHCPv6 node.
location	Name of the DHCPv6 node.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Each permanent storage to which the binding database is saved is called the *database agent*. An agent can be configured using the **dhcp ipv6 database** command. Supported database agents include FTP and TFTP servers, RCP, Flash file system, and NVRAM.

The **show dhcp ipv6 database** command displays DHCP for IPv6 binding database agent information. If the *agent-URL* argument is specified, only the specified agent is displayed. If the *agent-URL* argument is not specified, all database agents are shown.

Task ID

Task ID	Operation
ip-services	read

Examples

This is a sample output from the **show dhcp ipv6 database** command:

```
RP/0/RP0/CPU0:router# show dhcp ipv6 database

  Database agent tftp://172.19.216.133/db.tftp:
    write delay: 69 seconds, transfer timeout: 300 seconds
    last written at Jan 09 2003 01:54 PM,
        write timer expires in 56 seconds
    last read at Jan 06 2003 05:41 PM
    successful read times 1
    failed read times 0
    successful write times 3172
    failed write times 2
  Database agent nvram:/dhcpv6-binding:
```

```
  write delay: 60 seconds, transfer timeout: 300 seconds
  last written at Jan 09 2003 01:54 PM,
      write timer expires in 37 seconds
  last read at never
  successful read times 0
  failed read times 0
  successful write times 3325
  failed write times 0
Database agent flash:/dhcpv6-db:
  write delay: 82 seconds, transfer timeout: 3 seconds
  last written at Jan 09 2003 01:54 PM,
      write timer expires in 50 seconds
  last read at never
  successful read times 0
  failed read times 0
  successful write times 2220
  failed write times 614
```

show dhcp ipv6 interface

To display Dynamic Host Configuration Protocol (DHCP) for IPv6 interface information, use the **show dhcp ipv6 interface** command in EXEC mode.

show dhcp ipv6 interface *interface-type interface-instance*

Syntax Description

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

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

If no interfaces are specified, all interfaces on which DHCP for IPv6 (client or server) is enabled are shown. If an interface is specified, only information about the specified interface is displayed.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv6 interface** command when an interface is not specified:

```
RP/0/RP0/CPU0:router
# show dhcp ipv6 interface

POS 0/5/0/0 is in server mode
  Using pool: svr-p1
  Preference value: 20
  Hint from client: ignored
  Rapid-Commit: ignored
```

This table describes the significant fields shown in the display.

Table 34: show dhcp ipv6 interface Command Field Descriptions

Field	Description
POS 0/5/0/0 is in server/relay mode	Displays whether the specified interface is in server or relay mode.
Using pool	Name of the pool used by the interface.
Preference value	Advertised (or default of 0) preference value for the indicated server.
Hint from client	Displays whether the allow-hint has been enabled on the interface.
Rapid-Commit	Displays whether the rapid-commit keyword has been enabled on the interface.

Related Commands

Command	Description
interface (DHCP), on page 250	Enables DHCP for IPv6 on an interface.

show dhcp ipv6 pool

To display Dynamic Host Configuration Protocol (DHCP) for IPv6 configuration information pool information, use the **show ipv6 dhcp pool** command in EXEC mode.

show dhcp ipv6 pool [*pool-name*]

Syntax Description

pool-name	(Optional) User-defined name for the local prefix pool. The pool name can be a symbolic string (such as "Engineering") or an integer (such as 0).

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Use the **dhcp ipv6 pool** command to create a configuration information pool, and use the **dhcp ipv6 server** command to associate the configuration information pool with a server on an interface.

The **show dhcp ipv6 pool** command displays DHCP for IPv6 configuration information pool information. If the *poolname* argument is specified, only information on the specified pool is displayed. If the *poolname* argument is not specified, all pools are shown.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show dhcp ipv6 pool** command. If *pool-name* is not specified, all pools are shown; otherwise, only the named pool is displayed.

```
RP/0/RP0/CPU0:router# show dhcp ipv6 pool

  DHCPv6 pool: svr-p1
    Static bindings:
      Binding for client 000300010002FCA5C01C
        IA PD: IA ID 00040002,
          Prefix: 3FFE:C00:C18:3::/72
                  preferred lifetime 604800, valid lifetime 2592000
        IA PD: IA ID not specified; being used by 00040001
          Prefix: 3FFE:C00:C18:1::/72
                  preferred lifetime 240, valid lifetime 54321
          Prefix: 3FFE:C00:C18:2::/72
                  preferred lifetime 300, valid lifetime 54333
          Prefix: 3FFE:C00:C18:3::/72
                  preferred lifetime 280, valid lifetime 51111
DNS server: 1001::1
    DNS server: 1001::2
    Domain name: domain1.net
    Domain name: domain2.net
```

```
 Domain name: domain3.net
Active clients: 2
```

This table describes the significant fields shown in the display.

Table 35: show ipv6 dhcp pool Command Field Descriptions

Field	Description
DHCPv6 pool	The name of the pool.
IA PD	Identity association for prefix delegation (IA PD), which is a collection of prefixes assigned to a client.
Prefix	Prefixes to be delegated to the indicated IAPD on the specified client.
preferred lifetime, valid lifetime	Lifetimes associated with the prefix statically assigned to the specified client.
DNS server	IPv6 addresses of the DNS servers.
Domain name	Displays the DNS domain search list.
Active clients	Total number of active clients.

sip address

To configure a Session Initiation Protocol (SIP) server IPv6 address to be returned in the SIP server's IPv6 address list option to clients, use the **sip address** command in Dynamic Host Configuration Protocol (DHCP) IPv6 pool configuration mode. To disable this feature, use the **no** form of this command.

sip address *ipv6 address*
no sip address *ipv6 address*

Syntax Description

ipv6-address	IPv6 address. The *ipv6-address* argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.

Command Default

No default behavior or values

Command Modes

DHCP IPv6 pool configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

For the Dynamic Host Configuration Protocol (DHCP) for IPv6 server to obtain prefixes from RADIUS servers, the user must also configure the authorization, authentication, and accounting (AAA) client and PPP on the router. For information on how to configure the AAA client and PPP, see the "Implementing ADSL and Deploying Dial Access for IPv6" module of the *Cisco IOS XR System Security Command Reference*.

The **sip address** command configures a SIP server IPv6 address to be returned in the SIP server's IPv6 address list option to clients. To configure multiple SIP server addresses, issue this command multiple times. The new addresses do not overwrite old ones.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the SIP address using the **sip-address** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)# sip address 10:10::10
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 257	Configures a Dynamic Host Configuration Protocol (DHCP) for the IPv6 server configuration information pool and enters DHCP for IPv6 pool configuration mode.

sip domain-name

To configure a Session Initiation Protocol (SIP) server domain name to be returned in the SIP server's domain name list option to clients, use the **sip domain-name** command in Dynamic Host Configuration Protocol (DHCP) IPv6 pool configuration mode. To disable this feature, use the **no** form of this command.

sip domain-name *domain-name*
no sip domain-name *domain-name*

Syntax Description

domain-name	Domain name for a DHCP for IPv6 client.

Command Default

No default behavior or values

Command Modes

DHCP IPv6 pool configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

For the Dynamic Host Configuration Protocol (DHCP) for IPv6 server to obtain prefixes from RADIUS servers, the user must also configure the authorization, authentication, and accounting (AAA) client and PPP on the router. For information on how to configure the AAA client and PPP, see the "Implementing ADSL and Deploying Dial Access for IPv6" module of the *Cisco IOS XR System Security Command Reference*.

The **sip domain-name** command configures a SIP server domain name to be returned in the SIP server's domain name list option to clients. To configure multiple SIP server domain names, issue this command multiple times. The new domain names do not overwrite old ones.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the SIP address using the **sip domain-name** command:

```
RP/0/RP0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/RP0/CPU0:router(config-dhcpv6-pool)# sip domain-name domain1.com
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 257	Configures a Dynamic Host Configuration Protocol (DHCP) for the IPv6 server configuration information pool and enters DHCP for IPv6 pool configuration mode.

vrf (relay profile)

To configure a relay profile on a VPN routing and forwarding (VRF) instance, use the **vrf (relay profile)** command in Dynamic Host Configuration Protocol (DHCP) IPv4 configuration mode. To disable this feature, use the **no** form of this command.

vrf {*vrf-name* { **relay** } *profile-name* | **default** | **all**}
no vrf {*vrf-name* { **relay** } *profile-name* | **default** | **all**}

Syntax Description

vrf-name	User-defined name for the VRF.
relay	Specifies a relay profile.
profile-name	Specifies a name for the profile.
default	Specifies a profile for the default VRF.
all	Specifies a profile for all VRFs.

Command Default

If **default** is selected, then the configuration defaults to VRF.

Command Modes

DHCP IPv4 configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to set the relay profile for all VRFs:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# dhcp ipv4
RP/0/RP0/CPU0:router(config-dhcpv4)# vrf all
```

Related Commands

Command	Description
dhcp ipv4 , on page 231	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
giaddr policy, on page 246	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.

Command	Description
helper-address , on page 248	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 263	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 265	Enables the system to insert a DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.
relay information option allow-untrusted , on page 267	Configures the DHCP component to not drop BOOTREQUEST messages that have the relay information option set and the giaddr set to zero.
relay information policy , on page 269	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.

Excessive Punt Flow Trap Commands

This module describes the Cisco IOS XR software commands used to configure the Excessive Punt Flow Trap commands on the Cisco CRS Router. For details regarding the related configurations, refer to the *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco CRS Router*.

- lpts punt excessive-flow-trap non-subscriber-interfaces, on page 290
- lpts punt excessive-flow-trap penalty-rate, on page 291
- lpts punt excessive-flow-trap penalty-timeout, on page 292
- lpts punt excessive-flow-trap exclude interface, on page 293
- show lpts punt excessive-flow-trap, on page 294
- show lpts punt excessive-flow-trap information, on page 296
- show lpts punt excessive-flow-trap interface, on page 298
- clear lpts punt excessive-flow-trap, on page 300
- clear lpts punt excessive-flow-trap interface, on page 301

lpts punt excessive-flow-trap non-subscriber-interfaces

To enable the Excessive Punt Flow Trap feature on non-subscriber interfaces, use the **lpts punt excessive-flow-trap non-subscriber-interfaces** command in Global Configuration mode. To disable the Excessive Punt Flow Trap feature on subscriber interfaces, use the **no** form of this command.

lpts punt excessive-flow-trap non-subscriber-interfaces
no lpts punt excessive-flow-trap non-subscriber-interfaces

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to enable the Excessive Punt Flow Trap feature on the non-subscriber interfaces in the Global Configuration mode:

```
RP/0/RP0/CPU0:router(config)# lpts punt excessive-flow-trap non-subscriber-interfaces
```

lpts punt excessive-flow-trap penalty-rate

To set the penalty policing rate for a protocol, use the **lpts punt excessive-flow-trap penalty-rate** command in Global Configuration mode. To restore the default penalty-rate, use the **no** form of this command.

lpts punt excessive-flow-trap penalty-rate{**default** | **arp**} *penalty_rate*
no punt excessive-flow-trap penalty-rate{**default** | **arp**}

Syntax Description

default	Sets the default penalty policing rate for all protocols.
arp	Sets the penalty policing rate for the ARP protocol.
penalty_rate	Penalty rate in packets per second (pps). The range, in pps, is from 2 to 100; default is 10.

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to set the penalty policing rate of 4 pps for the ARP protocol in the Global Configuration mode:

```
RP/0/RP0/CPU0:router(config)# lpts punt excessive-flow-trap penalty-rate arp 4
```

lpts punt excessive-flow-trap penalty-timeout

To set the penalty timeout value for a protocol, use the **lpts punt excessive-flow-trap penalty-timeout** command in Global Configuration mode. To restore the default penalty timeout value, use the **no** form of this command.

lpts punt excessive-flow-trap penalty-timeout{**default** | **arp**} *timeout*
no lpts punt excessive-flow-trap penalty-timeout{**default** | **arp**}

Syntax Description

default	Sets the default penalty timeout for all protocols.
arp	Sets the penalty timeout for the ARP protocol.

Command Default

The default value in *minutes* is 15.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to set the penalty timeout value of 70 minutes for the ARP protocol in the Global Configuration mode:

```
RP/0/RP0/CPU0:router(config)# lpts punt excessive-flow-trap penalty-timeout arp 70
```

lpts punt excessive-flow-trap exclude interface

To exclude a specific interface from Excessive Punt Flow Trap processing, use the **lpts punt excessive-flow-trap exclude interface**command in Global Configuration mode. To re-enable Excessive Punt Flow Trap processing on the excluded interface, use the **no** form of this command.

lpts punt excessive-flow-trap exclude interface *interface-name*
no lpts punt excessive-flow-trap exclude interface *interface-name*

Syntax Description

exclude interface	Excludes a specific interface from Excessive Punt Flow Trap processing.
interface-name	Name of the interface to be excluded from Excessive Punt Flow Trap processing.

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
config-services	read, write

Examples

This example shows how to exclude a specific interface from Excessive Punt Flow Trap processing in the Global Configuration mode:

```
RP/0/RP0/CPU0:router(config)# lpts punt excessive-flow-trap exclude interface
GigabitEthernet0/6/0/6.111
RP/0/RP0/CPU0:router(config-control-plane-policer)#
```

show lpts punt excessive-flow-trap

To display the bad actor flows trapped by Excessive Punt Flow Trap (EPFT), use the **show lpts punt excessive-flow-trap** command in the EXEC mode.

show lpts punt excessive-flow-trap {*protocol* | **interface** *interface-type interface-path-id* | **information**} **[location]**

Syntax Description

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

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
lpts	read
basic-services	read, write

The **show running-config** output for the above **show lpts punt excessive-flow-trap** command is:

```
RP/0/RP0/CPU0:router# show running-config lpts punt excessive-flow-trap
lpts punt excessive-flow-trap
 penalty-rate arp 15
 penalty-timeout arp 2
```

show lpts punt excessive-flow-trap information

To display the Excessive Punt Flow Trap feature information, use the **show lpts punt excessive-flow-trap information** command in the EXEC mode.

show lpts punt excessive-flow-trap information

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
lpts	read
basic-services	read, write

This is an example of **show lpts punt excessive-flow-trap information** command with ARP configured with non-default values:

```
RP/0/RP0/CPU0:router# show lpts punt excessive-flow-trap information

------------------------------------------------------------
              Police         Penalty
              Rate (pps)     Timeout (mins)
 Protocol   Default Config   Default Config   Punt Reasons
 --------   --------------   --------------   ----------------
 ARP           10     15        15      2     ARP
                                              Reverse ARP
```

The corresponding **show running-config** output for the above **show lpts punt excessive-flow-trap information** command is:

```
RP/0/RP0/CPU0:router# show running-config lpts punt excessive-flow-trap information
lpts punt excessive-flow-trap
 penalty-rate arp 15
 penalty-timeout arp 2
```

This table describes the significant fields shown in the display.

Table 36: show lpts punt excessive-flow-trap information Field Descriptions

Field	Description
penalty-rate	The penalty policing rate for a protocol. For ARP the value is 15.
penalty-timeout	The penalty timeout value for a protocol. For ARP the value is 2.

show lpts punt excessive-flow-trap interface

To display the penalty status of an interface for one or all protocols, use the **show lpts punt excessive-flow-trap interface** command in the EXEC mode.

show lpts punt excessive-flow-trap interface *type interface-path-id* [*protocol*]

Syntax Description

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

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

protocol	Specifies the protocol type. arp—Displays ARP bad actors.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
lpts	read

Task ID	Operation
basic-services	read, write

The sample output for the **show lpts punt excessive-flow-trap ip** command is:

```
RP/0/RP0/CPU0:router# show lpts punt excessive-flow-trap arp
Interface: TenGigE0/2/0/4
         Intf Handle: 0x01280600                    Location: 0/2/CPU0
            Protocol: ARP                           Punt Reason: ARP
        Penalty Rate: 10 pps                        Penalty Timeout: 15 mins

      Time Remaining: 14 mins 46 secs
```

This table describes the significant fields shown in the display.

Table 37: show lpts punt excessive-flow-trap interface Field Descriptions

Field	Description
Intf Handle	The interface handler for the Bundle Ether interface.
location	The location of the interface.
protocol	Specifies the protocol.
punt reason	The reason to punt the excessive flow trap.
penalty-rate	The penalty policing rate for a protocol in pps.
penalty-timeout	The penalty timeout value for a protocol in minutes.

clear lpts punt excessive-flow-trap

To remove all bad actors that are trapped for "penalty box" policing during Excessive Punt Flow Trap (EPFT) processing, use the **clear lpts punt excessive-flow-trap** command in the EXEC mode.

clear lpts punt excessive-flow-trap

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
lpts	read
basic-services	read, write

This is an example of how to remove all bad actors from penalty box policing:

```
RP/0/RP0/CPU0:router# clear lpts punt excessive-flow-trap
```

clear lpts punt excessive-flow-trap interface

To remove a specific interface that is trapped for "penalty box" policing during Excessive Punt Flow Trap (EPFT) processing, use the **clear lpts punt excessive-flow-trap interface** command in the EXEC mode.

clear lpts punt excessive-flow-trap interface *interface-name*

Syntax Description

interface	Removes a specific interface from penalty box policing.
interface-name	Name of the interface to be removed from penalty box policing.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
lpts	read
basic-services	read, write

This is an example of how to remove a specific interface from penalty box policing:

```
RP/0/RP0/CPU0:router# clear lpts punt excessive-flow-trap interface GigabitEthernet0/6/0/6.111
```

Host Services and Applications Commands

This chapter describes the commands used to configure and monitor host services and applications, such as Domain Name System (DNS), Telnet, File Transfer Protocol (FTP), and Trivial File Transfer Protocol (TFTP), and Remote Copy Protocol (RCP).

For detailed information about host services and applications concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- cinetd rate-limit, on page 305
- clear host, on page 306
- destination address(ipsla), on page 307
- domain ipv4 host, on page 308
- domain ipv6 host, on page 309
- domain list, on page 310
- domain lookup disable, on page 312
- domain name (IPAddr), on page 313
- domain name-server, on page 314
- ftp client anonymous-password, on page 315
- ftp client passive, on page 316
- ftp client password, on page 317
- ftp client source-interface, on page 319
- ftp client username, on page 321
- logging source-interface vrf, on page 322
- ping (network), on page 323
- ping bulk (network), on page 326
- rcp client source-interface, on page 328
- rcp client username, on page 329
- scp, on page 331
- show cinetd services, on page 333
- show hosts, on page 335
- source address(ipsla), on page 337
- telnet, on page 338
- telnet client source-interface, on page 341
- telnet dscp, on page 343
- telnet server, on page 345
- telnet transparent, on page 347

- tftp client source-interface, on page 348
- tftp server, on page 349
- traceroute, on page 351

cinetd rate-limit

To configure the rate limit at which service requests are accepted by Cisco inetd (Cinetd), use the **cinetd rate-limit** command in Global Configuration mode. To restore the default, use the **no** form of this command.

cinetd rate-limit *value*
no cinetd rate-limit *value*

Syntax Description

value	Number of service requests that are accepted per second. Range is 1 to 100. Default is 1.

Command Default

One service request per second is accepted.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Any service request that exceeds the rate limit is rejected. The rate limit is applied to individual applications.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows the **cinetd rate-limit** being set to 10:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# cinetd rate-limit 10
```

clear host

To delete temporary entries from the hostname-to-address cache, use the **clear host** command in EXEC mode.

clear host {*host-name* | *****}

Syntax Description

host-name	Name of host to be deleted.
*	Specifies that all entries in the local cache be deleted.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The dynamic host entries in the cache are cleared.

The temporary entries in the cache are cleared; the permanent entries that were entered with the domain ipv4 host, on page 308 or the domain ipv6 host, on page 309 command are not cleared.

By default, no static mapping is configured.

Task ID

Task ID	Operations
ip-services	execute

Examples

The following example shows how to clear all temporary entries from the hostname-and-address cache:

```
RP/0/RP0/CPU0:router# clear host *
```

Related Commands

Command	Description
domain ipv4 host, on page 308	Defines a static IPv4 hostname-to-address mapping in the host cache.
domain ipv6 host, on page 309	Defines a static IPv6 hostname-to-address mapping in the host cache.
show hosts, on page 335	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses.

destination address(ipsla)

To configure the address of the destination device, use the **destination address** command in the ipsla echo configuration mode. To restore the default, use the **no** form of this command.

destination address *address*
no destination address *address*

Syntax Description

address	IPv4/IPv6 address of the destination device.

Command Default

None

Command Modes

ipsla echo configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
monitor	read, write

Example

This example shows how to configure 10.10.10.20 as the destination address of a device.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipsla
RP/0/RP0/CPU0:router(config-ipsla)# operation 500
RP/0/RP0/CPU0:router(config-ipsla-op)# type icmp echo
RP/0/RP0/CPU0:router(config-ipsla-echo)# timeout 5000
RP/0/RP0/CPU0:router(config-ipsla-echo)# destination address 10.10.10.20
```

Related Commands

Command	Description
source address(ipsla), on page 337	Configures the address of the source device

domain ipv4 host

To define a static hostname-to-address mapping in the host cache using IPv4, use the **domain ipv4 host** command in Global Configuration mode. To remove the **domain ipv4 host** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

domain ipv4 host *host-name v4address2.....v4address8*
no domain ipv4 host *host-name v4address1*

Syntax Description

host-name	Name of the host. The first character can be either a letter or a number.
v4address1	Associated IP address.
v4address2...v4address8	(Optional) Additional associated IP address. You can bind up to eight addresses to a hostname.

Command Default

No static mapping is configured.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The first character can be either a letter or a number. If you use a number, the operations you can perform (such as **ping**) are limited.

Task ID

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

Examples

The following example shows how to define two IPv4 static mappings:

```
RP/0/RP0/CPU0:router(config)# domain ipv4 host host1 192.168.7.18
RP/0/RP0/CPU0:router(config)# domain ipv4 host bost2 10.2.0.2 192.168.7.33
```

domain ipv6 host

To define a static hostname-to-address mapping in the host cache using IPv6, use the **domain ipv6 host** command in Global Configuration mode. To remove the **domain ipv6 host** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

domain ipv6 host *host-name v6address1 [v6address2 .....v6address4]*
no domain ipv6 host *host-name v6address1*

Syntax Description

host-name	Name of the host. The first character can be either a letter or a number.
v6address1	Associated IP address.
v6address2...v6address4	(Optional) Additional associated IP address. You can bind up to four addresses to a hostname.

Command Default

No static mapping is configured. IPv6 address prefixes are not enabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The first character can be either a letter or a number. If you use a number, the operations you can perform (such as **ping**) are limited.

Task ID

Task ID	Operations
ip services	read, write

Examples

The following example shows how to define two IPv6 static mappings:

```
RP/0/RP0/CPU0:router(config)# domain ipv6 host host1 ff02::2
RP/0/RP0/CPU0:router(config)# domain ipv6 host host2 ff02::1
```

domain list

To define a list of default domain names to complete unqualified hostnames, use the **domain list** command in Global Configuration mode. To delete a name from a list, use the **no** form of this command.

domain list *domain-name*
no domain list *domain-name*

Syntax Description

domain-name	Domain name. Do not include the initial period that separates an unqualified name from the domain name.

Command Default

No domain names are defined.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If there is no domain list, the domain name that you specified with the domain name (IPAddr), on page 313 command is used to complete unqualified hostnames. If there is a domain list, the default domain name is not used. The **domain list** command is similar to the domain name (IPAddr), on page 313 command, except that you can use the **domain list** command to define a list of domains, each to be tried in turn.

Task ID

Task ID	Operations
ip-service	read, write

Examples

The following example shows how to add several domain names to a list:

```
RP/0/RP0/CPU0:router(config)# domain list domain1.com
RP/0/RP0/CPU0:router(config)# domain list domain2.edu
```

The following example shows how to add a name to and then delete a name from the list:

```
RP/0/RP0/CPU0:router(config)# domain list domain3.edu
RP/0/RP0/CPU0:router(config)# no domain list domain2.edu
```

Related Commands

Command	Description
domain name (IPAddr), on page 313	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).

Command	Description
show hosts, on page 335	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses.

domain lookup disable

To disable the IP Domain Name System (DNS)-based hostname-to-address translation, use the **domain lookup disable** command in Global Configuration mode. To remove the specified command from the configuration file and restore the system to its default condition, use the **no** form of this command.

domain lookup disable
no domain lookup disable

Syntax Description

This command has no keywords or arguments.

Command Default

The IP DNS-based host-to-address translation is enabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Using the **no** command removes the specified command from the configuration file and restores the system to its default condition. The **no** form of this command is not stored in the configuration file.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to enable the IP DNS-based hostname-to-address translation:

```
RP/0/RP0/CPU0:router(config)# domain lookup disable
```

Related Commands

Command	Description
domain name (IPAddr), on page 313	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).
domain name-server, on page 314	Specifies the address of one or more name servers to use for name and address resolution.
show hosts, on page 335	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses.

domain name (IPAddr)

To define a default domain name that the software uses to complete unqualified hostnames, use the **domain name** command in the appropriate mode. To remove the name, use the **no** form of this command.

domain name *domain-name*
no domain name *domain-name*

Syntax Description

domain-name	Default domain name used to complete unqualified hostnames. Do not include the initial period that separates an unqualified name from the domain name.

Command Default

There is no default domain name.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

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

If a hostname does not contain a domain name, then a dot and the domain name configured by the **domain name** command are appended to the hostname before it is added to the host table.

If no domain name is configured by the **domain name** command and the user provides only the hostname, then the request is not looked up.

Task ID

Task ID	Operations
ip-services	read, write

Related Commands

Command	Description
domain list, on page 310	Defines a list of default domain names to complete unqualified hostnames.
domain name-server, on page 314	Specifies the address of one or more name servers to use for name and address resolution.
show hosts, on page 335	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses.

domain name-server

To specify the address of one or more name servers to use for name and address resolution, use the **domain name-server** command in Global Configuration mode. To remove the address specified, use the **no** form of this command.

domain name-server *server-address*
no domain name-server *server-address*

Syntax Description

server-address	IP address of a name server.

Command Default

If no name server address is specified, the default name server is 255.255.255.255. IPv4 and IPv6 address prefixes are not enabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

You can enter up to six addresses, but only one for each command.

If no name server address is specified, the default name server is 255.255.255.255 so that the DNS lookup can be broadcast to the local network segment. If a DNS server is in the local network, it replies. If not, there might be a server that knows how to forward the DNS request to the correct DNS server.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to specify host 192.168.1.111 as the primary name server and host 192.168.1.2 as the secondary server:

```
RP/0/RP0/CPU0:router(config)# domain name-server 192.168.1.111
RP/0/RP0/CPU0:router(config)# domain name-server 192.168.1.2
```

Related Commands

Command	Description
domain lookup disable, on page 312	Disables the domain lookup.
domain name (IPAddr), on page 313	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).

ftp client anonymous-password

To assign a password for anonymous users, use the **ftp client anonymous-password** command in Global Configuration mode. To remove the **ftp client anonymous-password** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

ftp client anonymous-password *password*
no ftp client anonymous-password

Syntax Description

password	Password for the anonymous user.

Command Default

No default behavior or values

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **ftp client anonymous-password** command is File Transfer Protocol (FTP) server dependent.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to set the anonymous password to *xxxx*:

```
RP/0/RP0/CPU0:router(config)# ftp client anonymous-password xxxx
```

Related Commands

Command	Description
ftp client passive, on page 316	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client password, on page 317	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client source-interface, on page 319	Specifies the source IP address for File Transfer Protocol (FTP) connections.
ftp client username, on page 321	Specifies the username for File Transfer Protocol (FTP) connections.

ftp client passive

To configure the software to use only passive File Transfer Protocol (FTP) connections, use the **ftp client passive** command in Global Configuration mode. To remove the **ftp client passive** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

ftp client passive
no ftp client passive

Syntax Description

This command has no keywords or arguments.

Command Default

FTP data connections are active.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Using the **ftp client passive** command allows you to make only passive-mode FTP connections. To specify the source IP address for FTP connections, use the **ftp client source-interface** command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the networking device to use only passive FTP connections:

```
RP/0/RP0/CPU0:router(config)# ftp client passive

1d:3h:54:47: ftp_fs[16437]: FTP: verifying tuple passive (SET).
1d:3h:54:47: ftp_fs[16437]: FTP: applying tuple passive (SET).
1d:3h:54:47: ftp_fs[16437]: FTP: passive mode has been enabled.
```

Related Commands

Command	Description
ftp client anonymous-password, on page 315	Assigns a password for anonymous users.
ftp client password, on page 317	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client source-interface, on page 319	Specifies the source IP address for File Transfer Protocol (FTP) connections.
ftp client username, on page 321	Specifies the username for File Transfer Protocol (FTP) connections.

ftp client password

To specify the password for the File Transfer Protocol (FTP) connections, use the **ftp client password** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

ftp client password {*clear-text-password* | **clear** *clear-text password* | **encrypted** *encrypted-text password*}
no ftp client password {*clear-text-password* | **clear** *clear-text password* | **encrypted** *encrypted-text password*}

Syntax Description

clear-text-password	Specifies an unencrypted (cleartext) user password
clear *clear-text password*	Specifies an unencrypted (cleartext) shared password.
encrypted *encrypted-text password*	Specifies an encrypted shared password.

Command Default

No default behavior or values

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to specify the password for the File Transfer Protocol (FTP) connections:

```
RP/0/RP0/CPU0:router(config)# ftp client password lab
```

Related Commands

Command	Description
ftp client anonymous-password, on page 315	Assigns a password for anonymous users.
ftp client passive, on page 316	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client source-interface, on page 319	Specifies the source IP address for File Transfer Protocol (FTP) connections.

Command	Description
ftp client username, on page 321	Specifies the username for File Transfer Protocol (FTP) connections.

ftp client source-interface

To specify the source IP address for File Transfer Protocol (FTP) connections, use the **ftp client source-interface** command in Global Configuration mode . To remove the **ftp client source-interface** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

ftp client source-interface *type interface-path-id*
no ftp client source-interface *type interface-path-id*

Syntax Description

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

Command Default

The FTP source address is the IP address of the interface used by the FTP packets to leave the networking device.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use this command to set the same source address for all FTP connections. To configure the software to use only passive FTP connections, use the **ftp client passive** command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the IP address associated with Packet over Sonet (POS)interface 0/1/2/1 as the source address on all FTP packets, regardless of which interface is actually used to send the packet:

```
RP/0/RP0/CPU0:router(config)# ftp client source-interface POS 0/1/2/1
```

Related Commands

Command	Description
ftp client anonymous-password, on page 315	Assigns a password for anonymous users.
ftp client passive, on page 316	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client password, on page 317	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client username, on page 321	Specifies the username for File Transfer Protocol (FTP) connections.

ftp client username

To specify the username for File Transfer Protocol (FTP) connections, use the **ftp client username** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

ftp client username *username*
no ftp client username *username*

Syntax Description

username	Name for FTP user.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to specify the username for FTP connections:

```
RP/0/RP0/CPU0:router(config)# ftp client username brownfox
```

Related Commands

Command	Description
ftp client anonymous-password, on page 315	Assigns a password for anonymous users.
ftp client passive, on page 316	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client password, on page 317	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client source-interface, on page 319	Specifies the source IP address for File Transfer Protocol (FTP) connections

logging source-interface vrf

To configure the logging source interface in order to identify the syslog traffic that originates in a VRF from a particular router, as coming from a single device, use the **logging source-interface vrf**in Global Configuration mode. To remove the source-interface logging configuration for the given VRF, use the **no** form of this command.

logging source-interface *interface* **vrf** *vrf-name*
no logging source-interface *interface* **vrf** *vrf-name*

Syntax Description

interface	Interface number of the source
vrf-name	Name that identifies the VRF

Command Default

If *vrf-name* is not specified, the source interface is configured for the default VRF.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 4.2.3	This command was introduced.

Usage Guidelines

Normally, a syslog message contains the IPv4 or IPv6 address of the interface used to exit the router. The **logging source-interface** command configures the syslog packets to contain the IPv4 or IPv6 address of a particular interface for a VRF, regardless of which interface the packet uses to exit the router.

Task ID

Task ID	Operation
logging	read, write

Example

This example shows how to configure interface loopback 0 to be the logging source interface for VRF vrf1.

```
RP/0/RP0/CPU0:router#logging source-interface loopback 0 vrf vrf1
RP/0/RP0/CPU0:router#logging source-interface loopback 1 vrf default
```

This sample output shows a logging source interface that is correctly configured for the VRF.

```
RP/0/RP0/CPU0:router#show running configuration logging

logging trap debugging
logging 223.255.254.249 vrf vrf1
logging 223.255.254.248 vrf default
logging source-interface Loopback0 vrf vrf1
logging source-interface Loopback1
```

ping (network)

To check host reachability and network connectivity on IP networks, use the **ping** command in EXEC mode.

ping [{**ipv4** | **ipv6** | **vrf** *vrf-name*}] [{*host-nameip-address*}] [**count** *number*] [**size** *number*] [**source** {*ip-addressinterface-name* | **type** *number*}] [**timeout** *seconds*] [**pattern** *number*] [**type** *number*] [**priority** *number*] [**verbose**] [**donnotfrag**] [**validate**] [**sweep**]

Syntax Description

ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF name of the system to ping.
host-name	(Optional) Hostname of the system to ping.
ip-address	(Optional) IP address of the system to ping.
count *number*	(Optional) Sets the repeat count. Range is 0 to 2147483647.
size *number*	(Optional) Sets the datagram size. Range is 36 to 18024
source	(Optional) Identifies the source address or source interface.
type *number*	(Optional) Sets the type of service. Range is 0 to 255. Available when the **ipv4** keyword is specified.
timeout *seconds*	(Optional) Sets the timeout in seconds. Range is 0 to 3600.
priority *number*	(Optional) Sets the packet priority. Range is 0 to 15. Available when the **ipv6** keyword is specified.
pattern *number*	(Optional) Sets the data pattern. Range is 0 to 65535.
verbose	(Optional) Sets verbose output.
donnotfrag	(Optional) Sets the Don't Fragment (DF) bit in the IP header.
validate	(Optional) Validates the return packet.
sweep	(Optional) Sets the sweep ping.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Release	Modification
Release 3.2	The **ipv4** and **ipv6** keywords were added.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added. A range was added for the **size** keyword.

Usage Guidelines

The default value for the **ping** command refers only to the target IP address. No default value is available for the target IP address.

The ping program sends an echo request packet to an address and then waits for a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

Note The **ping** (EXEC) command is supported only on IP networks.

If you enter the command without specifying either a hostname or an IP address, the system prompts you to specify the target IP address and several other command parameters. After specifying the target IP address, you can specify alternate values for the remaining parameters or accept the displayed default for each parameter.

If the system cannot map an address for a hostname, it returns an "%Unrecognized host or address, or protocol not running" error message.

To abnormally terminate a ping session, enter the escape sequence, which is, by default, Ctrl-C. Simultaneously press and release the Ctrl and C keys.

This table describes the test characters sent by the ping facility.

Table 38: ping Test Characters

Character	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates that the network server timed out while waiting for a reply.
?	Unknown packet type.
U	A "destination unreachable" error protocol data unit (PDU) was received.
C	A "congestion experienced" packet was received.
M	Fragmentation is needed, but the "don't fragment" bit in the IP header is set. When this bit is set, the IP layer does not fragment the packet and returns an Internet Control Message Protocol (ICMP) error message to the source if the packet size is larger than the maximum transmission size. When this bit is not set, the IP layer fragments the packet to forward it to the next hop.
Q	A source quench packet was received.

Task ID

Task ID	Operations
basic-services	read, write, execute

Examples

Although the precise dialog varies somewhat between IPv4 and IPv6, all are similar to the ping session, using default values shown in the following output:

```
RP/0/RP0/CPU0:router# ping

Protocol [ipv4]:
Target IP address: 10.0.0.1
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands? [no]: yes
Source address or interface: 10.0.0.2
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]: yes
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes? [no]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.25.58.21, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/11/49 ms
```

If you enter a hostname or an address on the same line as the **ping** command, the command performs the default actions appropriate for the protocol type of that hostname or address, as shown in the following output:

```
RP/0/RP0/CPU0:router# ping server01

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/8/9 ms
```

ping bulk (network)

To check reachability and network connectivity to multiple hosts on IP networks, use the **ping bulk** command in EXEC mode.

ping bulk ipv4 [**input cli** [{**batch** | **inline**}]]
[**vrf** *vrf-name*] [{**ip-address** | **domain-name**}]

Syntax Description

ipv4	Specifies IPv4 address prefixes.
input	Specifies input mode.
cli	Specifies input via CLI.
batch	Pings after all destinations are input.
inline	Pings after each destination is input.
vrf *vrf-name ip-address domain-name*	(Optional) Specifies a particular VRF. IP address of the system to ping. (Optional) Domain name of the system to ping. **Note** You must hit the Enter button and then specify one destination address per line.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.1.2	This command was introduced.

Usage Guidelines

You must hit the Enter button and then specify one destination address per line.

Maximum number of destinations you can specify in the cli or batch mode is 2000.

Task ID

Task ID	Operation
basic-services	read, write, execute

Example

The following example shows how to ping many hosts by the input via CLI method:

```
RP/0/RP0/CPU0:router# ping bulk ipv4 input cli batch
```

```
Please enter input via CLI with one destination per line and when done Ctrl-D/(exit)
to initiate pings:
1: vrf myvrf1 10.2.1.16
2:
Starting pings...
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.2.1.16, vrf is myvrf1, timeout is 2
seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/7/9 ms



RP/0/RP0/CPU0:router# ping bulk ipv4 input cli

Please enter input via CLI with one destination per line:
vrf myvrf1 1.1.1.1
vrf myvrf2 2.2.2.2
vrf myvrf1 myvrf1.cisco.com
vrf myvrf2 myvrf2.cisco.com

Starting pings...
Type escape sequence to abort.
Sending 1, 100-byte ICMP Echos to 1.1.1.1, vrf is myvrf1:
!
Success rate is 100 percent (1/1), round-trip min/avg/max = 1/1/1 ms
Sending 2, 100-byte ICMP Echos to 2.2.2.2, vrf is myvrf2:
!!
Success rate is 100 percent (2/2), round-trip min/avg/max = 1/1/1 ms
Sending 1, 100-byte ICMP Echos to 1.1.1.1, vrf is myvrf1:
!
Success rate is 100 percent (1/1), round-trip min/avg/max = 1/4/1 ms
Sending 2, 100-byte ICMP Echos to 2.2.2.2, vrf is myvrf2:
!!
Success rate is 100 percent (2/2), round-trip min/avg/max = 1/3/1 ms
```

Related Commands

Command	Description
ping (network), on page 323	Checks host reachability and network connectivity on IP networks.

rcp client source-interface

To specify the source IP address for remote copy protocol (rcp) connections, use the **rcp client source-interface** command in Global Configuration mode. To remove the **rcp client source-interface** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

rcp client source-interface *type interface-path-id*
no rcp client source-interface *type interface-path-id*

Syntax Description

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

Command Default

The rcp source address is the IP address of the interface used by the rcp packets to leave the networking device.

Command Modes

Global configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **rcp client source-interface** command to set the IP address of an interface as the source for all rcp connections. To configure the remote username to be used when a remote copy using rcp is requested, use the **rcp client username** command.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to set the IP address for Packet-over-SONET (POS) interface 1/0/2/1 as the source address for rcp connections:

```
RP/0/RP0/CPU0:router(config)# rcp client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
rcp client username, on page 329	Configures the remote username to be used when a remote copy using rcp is requested.

rcp client username

To configure the local user on the client side to be used when requesting a remote copy using remote copy protocol (rcp), use the **rcp client username** command in Global Configuration mode. To restore the system to its default condition, use the **no** form of this command.

rcp client username *username*
no rcp client username *username*

Syntax Description

username	Name of the remote user on the rcp server. This name is used for rcp copy requests. If the rcp server has a directory structure, all files and images to be copied are searched for or written relative to the directory in the remote user account.

Command Default

If you do not issue this command, the software sends the remote username associated with the current tty process, if that name is valid, for rcp copy commands. For example, if the user is connected to the networking device through Telnet and the user was authenticated through the **username** command, the software sends that username as the remote username.

If the username for the current tty process is not valid, the software sends the hostname as the remote username. For rcp boot commands, the software sends the network server hostname by default.

Note For Cisco, tty lines are commonly used for access services. The concept of tty originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called tty devices (tty stands for teletype, the original UNIX terminal).

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

The rcp protocol requires that a client send the remote username on an rcp request to the network server. Use the **rcp client username** command to specify the remote username to be sent to the network server for an rcp copy request. If the network server has a directory structure, as do UNIX systems, all files and images to be copied are searched for or written relative to the directory in the remote user account. To specify a source address for rcp connections, use the **rcp client source-interface** command.

Note The remote username must be associated with an account on the destination server.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the remote username to netadmin1:

```
RP/0/RP0/CPU0:router(config)# rcp client username netadmin1
```

Related Commands

Command	Description
rcp client source-interface, on page 328	Specifies the source IP address for rcp connections.

scp

To securely transfer a file from a local directory to a remote directory or from a remote directory to a local directory, use the **scp** command in EXEC mode.

scp {*local-directory username@location/directory*} */filename* {*username@location/directory local-directory*} */filename*

Syntax Description

local-directory	Specifies the local directory on the device.
username@location/directory	Specifies the remote directory where *location* is the IP address of the remote device.
filename	Specifies the file name to be transferred.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

Secure Copy Protocol (SCP) is a file transfer protocol which provides a secure and authenticated method for transferring files. SCP relies on SSHv2 to transfer files from a remote location to a local location or from local location to a remote location.

Use the **scp** command to copy a file from the local device to a destination device or from a destination device to the local device.

Using SCP, you can only transfer individual files. You cannot transfer a file from a remote device to another remote device.

SSH server process must be running on the remote device.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to copy a file using the **scp** command from a local directory to a remote directory:

```
RP/0/RP0/CPU0:router# scp /usr/file1.txt root@209.165.200.1:/root/file3.txt

Connecting to 209.165.200.1...
Password:
  Transferred 553065 Bytes
  553065 bytes copied in 0 sec (7576232)bytes/sec
```

The following example shows how to copy a file using the **scp** command from a remote directory to a local directory:

```
RP/0/RP0/CPU0:router# scp root@209.165.200.1:/root/file4.txt /usr/file.txt

Connecting to 209.165.200.1...
Password:
  Transferred 553065 Bytes
  553065 bytes copied in 0 sec (7576232)bytes/sec
```

show cinetd services

To display the services whose processes are spawned by Cinetd when a request is received, use the **show cinetd services** command in EXEC mode.

show cinetd services

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample is output from the **show cinetd services** command:

```
RP/0/RP0/CPU0:router# show cinetd services

Family Service   Proto   Port   ACL  max_cnt  curr_cnt wait  Program Option
=============================================================================
v4     telnet    tcp       23 unlimited  0        nowait       telnet
v4     tftp      udp       69 unlimited  0        wait          tftpd   disk0
```

This table describes the significant fields shown in the display.

Table 39: show cinetd services Command Field Descriptions

Field	Description
Family	Version of the network layer (IPv4 or IPv6).
Service	Network service (for example, FTP, Telnet, and so on).
Proto	Transport protocol used by the service (tcp or udp).
Port	Port number used by the service.
ACL	Access list used to limit the service from some hosts.
max_cnt	Maximum number of concurrent servers allowed for a service.
curr_cnt	Current number of concurrent servers for a service.

Field	Description
wait	Status of whether Cinetd has to wait for a service to finish before serving the next request.
Program	Name of the program for a service.
Option	Service-specific options.

Related Commands

Command	Description
telnet server, on page 345	Enables Telnet services on a networking device.
tftp server, on page 349	Enables or disables the TFTP server or a feature running on the TFTP server.

show hosts

To display the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses, use the **show hosts** command in EXEC mode.

show hosts [*host-name*]

Syntax Description

host-name	(Optional) Name of the host about which to display information. If omitted, all entries in the local cache are displayed.

Command Default

Unicast address prefixes are the default when IPv4 address prefixes are configured.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip-services	read

Examples

The following is sample output from the **show hosts** command:

```
RP/0/RP0/CPU0:router# show hosts

Default domain is cisco.com
Name/address lookup uses domain service
Name servers are 255.255.255.255
Host              Flags        Age(hr)    Type       Address(es)
host1.cisco.com   (temp, OK)    1          IP         192.168.4.10
abc              (perm, OK)    0          IP         10.0.0.0 10.0.0.2 10.0.0.3
```

This table describes the significant fields shown in the display.

Table 40: show hosts Command Field Descriptions

Field	Description
Default domain	Default domain used to complete the unqualified hostnames.
Name/address lookup	Lookup is disabled or uses domain services.
Name servers	List of configured name servers.
Host	Hostname.

Field	Description
Flags	Indicates the status of an entry. • temp—Temporary entry entered by a name server; the software removes the entry after 72 hours of inactivity. • perm—Permanent entry entered by a configuration command; does not time out. • OK—Entry is believed to be valid. • ??—Entry is considered suspect and subject to revalidation. • EX—Entry has expired.
Age(hr)	Number of hours since the software most recently referred to the cache entry.
Type	Type of address (IPv4 or IPv6).
Address(es)	Address of the host. One host may have up to eight addresses.

Related Commands

Command	Description
clear host, on page 306	Deletes entries from the host-name-and-address cache.
domain list, on page 310	Defines a list of default domain names to complete unqualified hostnames.
domain lookup disable, on page 312	Disables the IP DNS-based hostname-to-address translation.
domain name (IPAddr), on page 313	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).
domain name-server, on page 314	Specifies the address of one or more name servers to use for name and address resolution.

source address(ipsla)

To configure the address of the source device, use the **source address** command in the ipsla echo configuration mode. To restore the default, use the **no** form of this command.

source address *address*
no source address *address*

Syntax Description

address	IPv4/IPv6 address of the source device.

Command Default

None

Command Modes

ipsla echo configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
monitor	read, write

Example

This example shows how to configure 10.10.10.5 as the source address of a device.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipsla
RP/0/RP0/CPU0:router(config-ipsla)# operation 500
RP/0/RP0/CPU0:router(config-ipsla-op)# type icmp echo
RP/0/RP0/CPU0:router(config-ipsla-echo)# timeout 5000
RP/0/RP0/CPU0:router(config-ipsla-echo)# source address 10.10.10.5
```

Related Commands

Command	Description
destination address(ipsla), on page 307	Configures the address of the destination device

telnet

To log in to a host that supports Telnet, use the **telnet** command in EXEC mode.

telnet [**vrf** {*vrf-name* | **default**}] {*ip-addresshost-name*} [*options*]

Syntax Description

vrf	(Optional) Specifies a VPN routing and forwarding (VRF) instance
vrf-name	VRF name of the system to ping.
default	Specifies the default VRF instance.
ip-address	IP address of a specific host on a network. • IPv4 address format—Must be entered in the (*x.x.x.x*) format. • IPv6 address format— Must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
host-name	Name of a specific host on a network.
options	(Optional) Telnet connection options. See Table 41: Telnet Connection Options, on page 339for a list of supported options.

Command Default

Telnet client is in Telnet connection options nostream mode.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If the Telnet server is enabled, you should be able to start a Telnet session as long as you have a valid username and password.

This table lists the supported Telnet connection options.

Table 41: Telnet Connection Options

Option	Description
/stream	Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and can be appropriate for connections to ports running UNIX-to-UNIX copy program (UUCP) and other non-Telnet protocols.
/nostream	Turns off stream processing.
port number	Port number. Range is 0 to 65535.
/source-interface	Specifies source interface.

To display a list of the available hosts, use the **show hosts** command. To display the status of all TCP connections, use the **show tcp** command.

The software assigns a logical name to each connection, and several commands use these names to identify connections. The logical name is the same as the hostname, unless that name is already in use or you change the connection name with the **name-connection** EXEC command. If the name is already in use, the software assigns a null name to the connection.

The Telnet software supports special Telnet commands in the form of Telnet sequences that map generic terminal control functions to operating system-specific functions. To issue a special Telnet command, enter the escape sequence and then a command character. The default escape sequence is Ctrl-^ (press and hold the Control and Shift keys and the 6 key). You can enter the command character as you hold down Ctrl or with Ctrl released; you can use either uppercase or lowercase letters. Table 42: Special Telnet Escape Sequences, on page 339 lists the special Telnet escape sequences.

Table 42: Special Telnet Escape Sequences

Escape Sequence[9]	Purpose
Ctrl-^ c	Interrupt Process (IP).
Ctrl-^ o	Terminate Output (AO).
Ctrl-^ u	Erase Line (EL).

[9] The caret (^) symbol refers to Shift-6 on your keyboard.

At any time during an active Telnet session, you can list the Telnet commands by pressing the escape sequence keys followed by a question mark at the system prompt:

ctrl-^?

A sample of this list follows. In this sample output, the first caret (^) symbol represents the Control key, and the second caret represents Shift-6 on your keyboard:

```
RP/0/RP0/CPU0:router# ^^?
```

```
[Special telnet escape help]
^^B  sends telnet BREAK
^^C  sends telnet IP
^^H  sends telnet EC
^^O  sends telnet AO
^^T  sends telnet AYT
^^U  sends telnet EL
```

You can have several concurrent Telnet sessions open and switch among them. To open a subsequent session, first suspend the current connection by pressing the escape sequence (Ctrl-Shift-6 and then x [Ctrl^x] by default) to return to the system command prompt. Then open a new connection with the **telnet** command.

To terminate an active Telnet session, issue any of the following commands at the prompt of the device to which you are connecting:

- close
- disconnect
- exit
- logout
- quit

Task ID

Task ID	Operations
basic-services	read, write, execute

Examples

The following example shows how to establish a Telnet session to a remote host named host1:

```
RP/0/RP0/CPU0:router# telnet host1
```

Related Commands

Command	Description
aaa authentication login default local	Sets AAA authentication at login. For more information, see *System Management Command Reference for Cisco CRS Routers* .
telnet server, on page 345	Enables Telnet services on a networking device.
terminal length	Sets the number of lines on the current terminal screen for the current session. For more information, see *System Management Command Reference for Cisco CRS Routers* .
terminal width	Sets the number of character columns on the terminal screen for the current session. For more information, see *System Management Command Reference for Cisco CRS Routers* .

telnet client source-interface

To specify the source IP address for a Telnet connection, use the **telnet client source-interface** command in Global Configuration mode. To remove the **telnet client source-interface** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

telnet {**ipv4** | **ipv6**} **client source-interface** *type interface-path-id*
no telnet client source-interface *type interface-path-id*

Syntax Description

ipv4	Specifies IPv4 address prefixes.
ipv6	Specifies IPv6 address prefixes.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

The IP address of the best route to the destination is used as the source IP address.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

Use the **telnet client source-interface** command to set the IP address of an interface as the source for all Telnet connections.

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

The following example shows how to set the IP address for Packet-over-SONET (POS) interface 1/0/2/1 as the source address for Telnet connections:

```
RP/0/RP0/CPU0:router(config)# telnet ipv4 client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
telnet server, on page 345	Enables Telnet services on a networking device.

telnet dscp

To define the differentiated services code point (DSCP) value and IPv4 precedence to specifically set the quality-of-service (QoS) marking for Telnet traffic on a networking device, use the **telnet dscp** command in Global Configuration mode. To disable DSCP, use the **no** form of this command.

telnet [**vrf** {*vrf-name* | **default**}] **ipv4 dscp** *dscp-value*
no telnet [**vrf** {*vrf-name* | **default**}] **ipv4 dscp** *dscp-value*

Syntax Description

vrf	(Optional) Specifies a VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF name of the system to ping.
default	(Optional) Specifies the default VRF instance.
ipv4	Specifies IPv4 address prefixes.
dscp-value	Value for DSCP. The range is from 0 to 63. The default value is 0.

Command Default

If DSCP is disabled or not configured, the following default values are listed:

- The default value for the server 16.
- The default value for the client is 0.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.5.0	This command was introduced.

Usage Guidelines

IPv4 is the supported protocol for defining a DSCP value for locally originated Telnet traffic.

DSCP can impact both server and client behavior of the specific VRF.

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

The following example shows how to define the DSCP value and IPv4 precedence:

```
RP/0/RP0/CPU0:router(config)# telnet vrf default ipv4 dscp 40
RP/0/RP0/CPU0:router(config)# telnet vrf default ipv4 dscp 10
```

Related Commands

Command	Description
telnet, on page 338	Logs in to a host that supports Telnet.

telnet server

To enable Telnet services on a networking device, use the **telnet server** command in Global Configuration mode. To disable Telnet services, use the **no** form of this command.

telnet [**vrf** {*vrf-name* | **default**}] {**ipv4** | **ipv6**} **server max-servers** {**no-limit***limit*} [**access-list** *list-name*]
no telnet [**vrf** {*vrf-name* | **default**}] {**ipv4** | **ipv6**} **server max-servers** {**no-limit***limit*} [**access-list** *list-name*]

Syntax Description

vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF name of the system to ping.
default	(Optional) Specifies the default VRF instance.
ipv4	Specifies IPv4 address prefixes.
ipv6	Specifies IPv6 address prefixes.
max-servers	Sets the number of allowable Telnet servers.
no-limit	Specifies that there is no maximum number of allowable Telnet servers.
limit	Specifies the maximum number of allowable Telnet servers. Range is 1 to 200.
access-list	(Optional) Specifies an access list.
list-name	(Optional) Access list name.

Command Default

Telnet services are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.4.0	The **vrf** and **default** keywords and *vrf-name* argument were added.

Usage Guidelines

Disable Telnet services to prevent inbound Telnet connections from being accepted into a networking device using the **telnet** command. After Telnet services are disabled, no new inbound connections are accepted, and the Cisco Internet services daemon (Cinetd) stops listening on the Telnet port.

Enable Telnet services by setting the **max-servers** keyword to a value of one or greater. This allows inbound Telnet connections into a networking device.

This command affects only inbound Telnet connections to a networking device. Outgoing Telnet connections can be made regardless of whether Telnet services are enabled.

Using the **no** form of the command disables the telnet connection and restores the system to its default condition.

Note Before establishing communications with the router through a telnet session, configure the telnet server and vty-pool functions (see System Management Command Reference Guide, System Management Configuration Guide, and IP Addresses and Services Configuration Guide).

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

The following example shows how to enable Telnet services for one server:

```
RP/0/RP0/CPU0:router(config)# telnet ipv4 server max-servers 1
```

Related Commands

Command	Description
telnet, on page 338	Logs in to a host that supports Telnet.

telnet transparent

To send a Carriage Return (CR) as a CR-NULL rather than a Carriage Return-Line Feed (CR-LF) for virtual terminal sessions, use the **telnet transparent** command in line template submode. To remove the **telnet transparent** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

telnet transparent
no telnet transparent

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

Line console

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **telnet transparent** command is useful for coping with different interpretations of end-of-line handling in the Telnet protocol specification.

Task ID

Task ID	Operations
tty-access	read, write

Examples

The following example shows how to configure the vty line to operate in Telnet transparent mode so that when the carriage return key is pressed the system sends the signal as a CR-NULL key combination rather than a CR-LF key combination:

```
RP/0/RP0/CPU0:router(config)# line console
RP/0/RP0/CPU0:router(config-line)# telnet transparent
```

Related Commands

Command	Description
telnet, on page 338	Logs in to a host that supports Telnet.

tftp client source-interface

To specify the source IP address for a TFTP connection, use the **tftp client source-interface** command in Global Configuration mode. To remove the **tftp client source-interface** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

tftp client source-interface *type interface-path-id*
no tftp client source-interface *type interface-path-id*

Syntax Description

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

Command Default

The IP address of the best route to the destination is used as the source IP address.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **tftp client source-interface** command to set the IP address of an interface as the source for all TFTP connections.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to set the IP address for Packet-over-SONET (POS) interface 1/0/2/1 as the source address for TFTP connections:

```
RP/0/RP0/CPU0:router(config)# tftp client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
tftp server, on page 349	Enables or disables the TFTP server or a feature running on the TFTP server.

tftp server

To enable or disable the TFTP server or a feature running on the TFTP server, use the **tftp server** command in Global Configuration mode. To restore the system to its default condition, use the **no** form of this command.

tftp {**ipv4** | **ipv6**} **server homedir** *tftp-home-directory* [**max-servers** [{*number* | **no-limit**}]] [**access-list** *name*]
no tftp {**ipv4** | **ipv6**} **server homedir** *tftp-home-directory* [**max-servers** [{*number* | **no-limit**}]] [**access-list** *name*]

Syntax Description

ipv4	Specifies IPv4 address prefixes.
ipv6	Specifies IPv6 address prefixes.
homedir *tftp-home-directory*	Specifies the home directory.
max-servers *number*	(Optional) Sets the maximum number of concurrent TFTP servers. The range is from 1 to 2147483647.
max-servers no-limit	(Optional) Sets no limit to process a number of allowable TFTP server.
access-list *name*	(Optional) Specifies the name of the access list associated with the TFTP server.

Command Default

The TFTP server is disabled by default. When not specified, the default value for the **max-servers** keyword is unlimited.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The **max-servers** *number* keyword and argument are now optional.
Release 3.6.0	The **no-limit** keyword was added for the **max-servers** keyword.

Usage Guidelines

Using the **no** form of the **tftp server** command removes the specified command from the configuration file and restores the system to its default condition. The **no** form of the command is not stored in the configuration file.

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

The following example shows that the TFTP server is enabled for the access list named test:

```
RP/0/RP0/CPU0:router(config)# tftp ipv4 server access-list test homedir disk0
```

traceroute

To discover the routes that packets actually take when traveling to their destination across an IP network, use the **traceroute** command in EXEC mode.

traceroute [{**ipv4** | **ipv6** | **vrf** *vrf-name*}] [{*host-nameip-address*}] [**source** {*ip-addressinterface-name* }] [**numeric**] [**timeout** *seconds*] [**probe** *count*] [**minttl** *seconds*] [**maxttl** *seconds*] [**port** *number*] [**priority** *number*] [**verbose**]

Syntax Description

ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
vrf	(Optional) Specifies VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) VRF name of the system to ping.
host-name	(Optional) Hostname of system to use as the destination of the trace attempt.
ip-address	(Optional) Address of system to use as the destination of the trace attempt.
source	
ip-address-name	(Optional) IP address A.B.C.D or hostname.
numeric	(Optional) Numeric display only.
timeout *seconds*	(Optional) Timeout value. Range is 0 to 3600.
probe *count*	(Optional) Probe count. Range is 0 to 65535.
minttl *seconds*	(Optional) Minimum time to live. Range is 0 to 255.
maxttl *seconds*	(Optional) Maximum time to live. Range is 0 to 255.
port *number*	(Optional) Port number. Range is 0 to 65535.
priority *number*	(Optional) Packet priority. Range is 0 to 15. Available when the **ipv6** keyword is specified.
verbose	(Optional) Verbose output.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

The default value for the **traceroute** command refers only to the destination. No default value is available for the destination address.

The **traceroute** command works by taking advantage of the error messages generated by networking devices when a datagram exceeds its time-to-live (TTL) value.

The **traceroute** command starts by sending probe datagrams with a TTL value of 1, which causes the first networking device to discard the probe datagram and send back an error message. The **traceroute** command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A "time-exceeded" error message indicates that an intermediate networking device has seen and discarded the probe. A "destination-unreachable" error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, the **traceroute** command prints an asterisk (*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence, which is, by default, Ctrl-C. Simultaneously press and release the Ctrl and C keys.

To use nondefault parameters and invoke an extended **traceroute** test, enter the command without a *host-name* or *ip- address* argument. You are stepped through a dialog to select the desired parameter values for the **traceroute** test.

Because of how IP is implemented on various networking devices, the IP **traceroute** command may behave in unexpected ways.

Not all destinations respond correctly to a probe message by sending back an "ICMP port unreachable" message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL has been reached, may indicate this problem.

There is a known problem with the way some hosts handle an "ICMP TTL exceeded" message. Some hosts generate an "ICMP" message, but they reuse the TTL of the incoming packet. Because this value is zero, the ICMP packets do not succeed in returning. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually the TTL is raised high enough that the "ICMP" message can get back. For example, if the host is six hops away, **traceroute** times out on responses 6 through 11.

Task ID

Task ID	Operations
basic-services	read, write, execute

Examples

The following output shows a sample **traceroute** session when a destination hostname has been specified:

```
RP/0/RP0/CPU0:router# traceroute host8-sun

Type escape sequence to abort.
Tracing the route to 192.168.0.73
 1 192.168.1.6 (192.168.1.6) 10 msec 0 msec 10 msec
 2 gateway01-gw.gateway.cisco.com (192.168.16.2) 0 msec 10 msec 0 msec
 3 host8-sun.cisco.com (192.168.0.73) 10 msec * 0 msec
```

The following display shows a sample extended **traceroute** session when a destination hostname is not specified:

```
traceroute# traceroute

Protocol [ipv4]:
Target IP address: ena-view3
Source address or interface: 10.0.58.29
Numeric display? [no]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose[none]:

Type escape sequence to abort.
Tracing the route to 171.71.164.199
 1  sjc-jpxlnock-vpn.cisco.com (10.25.0.1) 30 msec  4 msec  4 msec
 2  15lab-vlan725-gx1.cisco.com (173.19.72.2) 7 msec  5 msec  5 msec
 3  stc15-00lab-gw1.cisco.com (173.24.114.33) 5 msec  6 msec  6 msec
 4  stc5-lab4-gw1.cisco.com (173.24.114.89) 5 msec  5 msec  5 msec
 5  stc5-sbb4-gw1.cisco.com (172.71.241.162) 5 msec  6 msec  6 msec
 6  stc5-dc5-gw1.cisco.com (172.71.241.10) 6 msec  6 msec  5 msec
 7  stc5-dc1-gw1.cisco.com (172.71.243.2) 7 msec  8 msec  8 msec
 8  ena-view3.cisco.com (172.71.164.199) 6 msec  *  8 msec
```

This table describes the characters that can appear in traceroute output.

Table 43: traceroute Text Characters

Character	Description
xx msec	For each node, the round-trip time in milliseconds for the specified number of probes.
*	Probe time out.
?	Unknown packet type.
A	Administratively unreachable. This output usually indicates that an access list is blocking traffic.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

HSRP Commands

This chapter describes the Cisco IOS XR software commands used to configure and monitor the Hot Standby Router Protocol (HSRP).

For detailed information about HSRP concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- address (hsrp), on page 357
- address global (HSRP), on page 359
- address global subordinate (HSRP), on page 360
- address linklocal (HSRP), on page 361
- address secondary (hsrp), on page 363
- authentication (hsrp), on page 365
- bfd fast-detect (hsrp), on page 367
- clear hsrp statistics, on page 369
- hsrp authentication, on page 370
- hsrp bfd fast-detect, on page 372
- hsrp bfd minimum-interval, on page 373
- hsrp bfd multiplier, on page 374
- hsrp delay, on page 375
- hsrp ipv4, on page 377
- hsrp mac-address, on page 379
- hsrp preempt, on page 381
- hsrp priority, on page 383
- hsrp redirects, on page 385
- hsrp timers, on page 386
- hsrp track, on page 388
- hsrp use-bia, on page 390
- interface (HSRP), on page 391
- preempt (hsrp), on page 392
- priority (hsrp), on page 394
- router hsrp, on page 396
- session name, on page 397
- show hsrp, on page 399
- show hsrp bfd, on page 402
- show hsrp mgo, on page 404

- show hsrp statistics, on page 406
- show hsrp summary, on page 408
- hsrp slave follow, on page 409
- subordinate primary virtual IPv4 address, on page 410
- subordinate secondary virtual IPv4 address, on page 411
- subordinate virtual mac address, on page 412
- timers (hsrp), on page 413
- track (hsrp), on page 415
- track(object), on page 417

address (hsrp)

To enable hot standby protocol for IP, use the **address (hsrp)** command in the HSRP group submode. To disable hot standby protocol for IP, use the **no** form of this command.

address {**learn***address*}
no address {**learn***address*}

Syntax Description

learn	Learns virtual IP address from peer.
address	Hot standby IP address.

Command Default

None

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to enable a group to learn the primary virtual IPv4 address from received HSRP control packets:

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# address learn
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
```

```
RP/0/RP0/CPU0:router(config-hsrp-gp)# address learn
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
address secondary (hsrp), on page 363	Configures the secondary virtual IPv4 address for a virtual router.

address global (HSRP)

To configure the global virtual IPv6 address for the HSRP group, use the **address global** command in the virtual router submode. To deconfigure the global virtual IPv6 address for the HSRP group, use the **no** form of this command.

address global *ipv6-address*

no address global *ipv6-address*

Syntax Description

ipv6-address	Global HSRP IPv6 address.

Command Default

None

Command Modes

HSRP Group Submode, under the IPv6 address-family

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read,write

Example

This example shows how to add a global virtual IPv6 address for the HSRP group:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv6
RP/0/RP0/CPU0:router(config-hsrp-address-family)# hsrp 3
RP/0/RP0/CPU0:router(config-hsrp-virtual-router)# address global 4000::1000
RP/0/RP0/CPU0:router(config-hsrp-virtual-router)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

address global subordinate (HSRP)

To configure the global virtual IPv6 address for the subordinate group, use the **address global** command in the HSRP slave submode. To deconfigure the global virtual IPv6 address for the subordinate group, use the **no** form of this command.

address global *ipv6-address*

no address global *ipv6-address*

Syntax Description

ipv6-address	Global VRRP IPv6 address.

Command Default

None

Command Modes

HSRP Slave Submode, under the IPv6 address-family

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read,write

Example

This example shows how to add a global virtual IPv6 address for the subordinate group:

```
Router# configure
Router(config)# router hsrp
Router(config-hsrp)# interface tenGigE 0/4/0/4
Router(config-hsrp-if)# address-family ipv6
Router(config-hsrp-address-family)# hsrp 3 slave
Router(config-hsrp-virtual-router)# address global 4000::1000
Router(config-hsrp-virtual-router)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

address linklocal (HSRP)

To either configure the virtual link-local IPv6 address for the subordinate group or to specify that the virtual link-local IPv6 address should be enabled and calculated automatically from the virtual router virtual Media Access Control (MAC) address, use the **address linklocal** command in the virtual router submode. To deconfigure the virtual link-local IPv6 address for the subordinate group, use the **no** form of this command.

address linklocal
ipv6-address | **autoconfig**

no address linklocal
ipv6-address | **autoconfig**

Syntax Description

ipv6-address	HSRP IPv6 link-local address.
autoconfig	Autoconfigures the HSRP IPv6 link-local address.

Command Default

None

Command Modes

HSRP Slave Submode, under the IPv6 address-family

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

When you configure HSRP for IPv6, you must also configure the linklocal IPv6 address using either the *ipv6-address* argument or the **autoconfig** keyword. If you configure only the global IPv6 address and commit the changes using the **commit** keyword, the router does not accept the configuration and displays an error message.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to autoconfigure the HSRP IPv6 link-local address:

```
Router#configure
Router(config)#router hsrp
Router(config-hsrp)#interface tenGigE 0/4/0/4
Router(config-hsrp-if)#address-family ipv6
Router(config-hsrp-address-family)#hsrp 3 slave
Router(config-hsrp-virtual-router)#address linklocal autoconfig
Router(config-hsrp-virtual-router)#
```

This example shows how to configure the virtual link-local IPv6 address for the subordinate group:

```
Router#configure
Router(config)#router hsrp
Router(config-hsrp)#interface tenGigE 0/4/0/4
Router(config-hsrp-if)#address-family ipv6
Router(config-hsrp-address-family)#hsrp 3 slave
Router(config-hsrp-virtual-router)#address linklocal FE80::260:3EFF:FE11:6770
Router(config-hsrp-virtual-router)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

address secondary (hsrp)

To configure the secondary virtual IPv4 address for a virtual router, use the **address secondary** command in the Hot Standby Router Protocol (HSRP) virtual router submode. To deconfigure the secondary virtual IPv4 address for a virtual router, use the **no** form of this command.

address *address* **secondary**
no address *address* **secondary**

Syntax Description

secondary	Sets the secondary HSRP IP address.
address	HSRP IPv4 address.

Command Default

None

Command Modes

HSRP virtual router

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to set the secondary virtual IPv4 address for the virtual router:

```
(applicable for Cisco IOS XR Releases 4.2.x and below)
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 3
RP/0/RP0/CPU0:router(config-hsrp-gp)# address 10.20.30.1 secondary
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 3 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# address 10.20.30.1 secondary
```

```
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
address (hsrp), on page 357	Enables hot standby protocol for IP.

authentication (hsrp)

To configure an authentication string for the Hot Standby Router Protocol (HSRP), use the **hsrp authentication** command in HSRP group submode. To delete an authentication string, use the **no** form of this command.

authentication *string*
no authentication [*string*]

Syntax Description

string	Authentication string. It can be up to eight characters long. The default is 'cisco'.

Command Default

The default authentication string is cisco.

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced. This command replaces the **hsrp authentication** command.

Usage Guidelines

The authentication string is sent unencrypted in all HSRP messages. The same authentication string must be configured on all routers and access servers on a LAN to ensure interoperation. Authentication mismatch prevents a device from learning the designated Hot Standby IP address and the Hot Standby timer values from other routers configured with HSRP.

The **hsrp authentication** command is available for version 1 groups only

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to configure “company1” as the authentication string required to allow Hot Standby routers in group 1 on tenGigE interface 0/4/0/4 to interoperate:

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# authentication company1
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
```

```
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# authentication company1
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

bfd fast-detect (hsrp)

To enable bidirectional forwarding(BFD) fast-detection on a HSRP interface, use the **hsrp bfd fast-detect** command in HSRP group submode. This creates a BFD session between the HSRP router and its peer, and if the session goes down while HSRP is in backup state, this will initiate a HSRP failover. To disable BFD fast-detection, use the **no** form of this command.

bfd fast-detect [**peer ipv4** *ipv4-address interface-type interface-path-id*]

Syntax Description

peer ipv4 *ipv4-address*	(Optional) BFD peer interface IPv4 address.
interface-type 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.

Command Default

BFD is disabled.

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced. This command replaced the **hsrp bfd-fast detect** command.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to enable bfd fast-detect:

```
(applicable for Cisco IOS XR Releases 4.2.x and below)
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# bfd fast-detect
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

```
(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# bfd fast-detect
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp bfd multiplier, on page 374	Configures the multiplier value for BFD.
hsrp bfd minimum-interval, on page 373	Configures the BFD minimum interval to be used for all HSRP BFD sessions on a given interface

clear hsrp statistics

To reset the Hot Standby Routing Protocol Statistics (HSRP) statistics to zero, use the **clear hsrp statistics** command in EXEC mode.

clear hsrp statistics [**interface** *interface-type interface-path-id group*]

Syntax Description

interface *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.
group	Group number.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This sample output is from the **clear hsrp statistics** command:

```
RP/0/RP0/CPU0:router# clear hsrp statistics
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp authentication

To configure an authentication string for the Hot Standby Router Protocol (HSRP), use the **hsrp authentication** command in HSRP interface configuration mode. To delete an authentication string, use the **no** form of this command.

hsrp [*group-number*] **authentication** *string*
no hsrp [*group-number*] **authentication** [*string*]

Syntax Description

group-number	(Optional) Group number on the interface to which this authentication string applies. Default is 0.
string	Authentication string. It can be up to eight characters long. The default is 'cisco'.

Command Default

The default group number is 0.

The default authentication string is cisco.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **authentication hsrp** command.

Usage Guidelines

The authentication string is sent unencrypted in all HSRP messages. The same authentication string must be configured on all routers and access servers on a LAN to ensure interoperation. Authentication mismatch prevents a device from learning the designated Hot Standby IP address and the Hot Standby timer values from other routers configured with HSRP.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to configure “company1” as the authentication string required to allow Hot Standby routers in group 1 on Ten Gigabit Ethernet interface 0/2/0/1 to interoperate:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 authentication company1
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp bfd fast-detect

To enable bidirectional forwarding(BFD) fast-detection on a HSRP interface, use the **hsrp bfd fast-detect** command in interface configuration mode. This creates a BFD session between the HSRP router and its peer, and if the session goes down while HSRP is in backup state, this will initiate a HSRP failover. To disable BFD fast-detection, use the **no** form of this command.

hsrp [**group number**] **bfd fast-detect**
no hsrp [**group number**] **bfd fast-detect**

Syntax Description

group number	(Optional) HSRP group number. Range is 0 to 255.

Command Default

BFD is disabled.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **bfd fast-detect (hsrp)** command.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to enable bfd fast-detect:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 bfd fast-detect
```

Related Commands

Command	Description
hsrp bfd multiplier, on page 374	Configures the multiplier value for BFD.

hsrp bfd minimum-interval

To configure the BFD minimum interval to be used for all HSRP BFD sessions on a given interface, use the **hsrp bfd minimum-interval** command in the interface configuration mode. To remove the configured minimum-interval period and set the minimum-interval period to the default period, use the **no** form of this command.

hsrp bfd minimum-interval *interval*
no hsrp bfd minimum-interval *interval*

Syntax Description

interval	Specify the minimum-interval in milliseconds. Range is 15 to 30000.

Command Default

Default minimum interval is 15 ms.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Minimum interval determines the frequency of sending BFD packets to BFD peers. It is the time between successive BFD packets sent for the session. Minimum interval is defined in milliseconds. The configured minimum interval applies to all BFD sessions on the interface.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to configure a minimum interval of 100 milliseconds:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp bfd minimum-interval 100
```

Related Commands

Command	Description
hsrp bfd fast-detect	Enables BFD fast-detection on a HSRP interface.
hsrp bfd multiplier, on page 374	Configures the multiplier value for BFD.

hsrp bfd multiplier

To set the BFD multiplier value, use the **hsrp bfd multiplier** command in the interface configuration mode. To remove the configured multiplier value and set the multiplier to the default value, use the **no** form of this command.

hsrp bfd multiplier *multiplier*
no hsrp bfd multiplier *multiplier*

Syntax Description

multiplier	Specifies the BFD multiplier value. Range is 2 to 50.

Command Default

Default value is 3.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The multiplier value specifies the number of consecutive BFD packets that, if not received as expected, cause a BFD session to go down. The BFD multiplier applies to all configured BFD sessions on the interface.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to configure a BFD multiplier with multiplier value of 10:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp bfd multiplier 10
```

Related Commands

Command	Description
hsrp bfd fast-detect	Enables BFD fast-detection on a HSRP interface.

hsrp delay

To configure the activation delay for the Hot Standby Router Protocol (HSRP), use the **hsrp delay** command in HSRP interface configuration mode. To delete the activation delay, use the **no** form of this command.

hsrp delay minimum *value* **reload** *value*
no hsrp delay

Syntax Description

minimum *value*	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload *value*	Sets the reload delay in seconds for first interface up event. Range is 0 to 10000.

Command Default

minimum *value* : 1

reload *value* : 5

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.6.0	The range was changed from 1 to 10000 to 0 to 10000.

Usage Guidelines

The **hsrp delay** command delays the start of the HSRP finite state machine (FSM) on an interface up event to ensure that the interface is ready to pass traffic. This ensures that there are no mistaken state changes due to loss of hello packets. The minimum delay is applied on all interface up events and the reload delay is applied on the first interface event.

The values of zero must be explicitly configured to turn this feature off.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to configure a minimum delay of 10 seconds with a reload delay of 100 seconds:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface mgmtEth  0/RP0/CPU0/0
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp delay minimum 10 reload 100
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp ipv4

To activate the Hot Standby Router Protocol (HSRP), use the **hsrp ipv4** command in HSRP interface configuration mode. To disable HSRP, use the **no** form of this command.

hsrp [*group-number*] **ipv4** [*ip-address* [**secondary**]]
no hsrp [*group-number*] **ipv4** [*ip-address* [**secondary**]]

Syntax Description

group-number	(Optional) Group number on the interface for which HSRP is being activated. Range is 0 to 255. Default is 0.
ip-address	(Optional) IP address of the Hot Standby router interface.
secondary	(Optional) Indicates that the IP address is a secondary Hot Standby router interface. Useful on interfaces with primary and secondary addresses; you can configure primary and secondary HSRP addresses.

Command Default

group-number : 0

HSRP is disabled by default.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **hsrp ipv4** command activates HSRP on the configured interface. If an IP address is specified, that address is used as the designated address for the Hot Standby group. If no IP address is specified, the virtual address is learned from the active router. For HSRP to elect a designated router, at least one router in the Hot Standby group must have been configured with, or must have learned, the designated address. Configuring the designated address on the active router always overrides a designated address that is currently in use.

When the **hsrp ipv4** command is enabled on an interface, the handling of proxy Address Resolution Protocol (ARP) requests is changed (unless proxy ARP was disabled). If the Hot Standby state group has been configured with or has learned the designated address, the proxy ARP requests are answered using the MAC address of the Hot Standby group. Otherwise, proxy ARP responses are suppressed.

Configuring secondary Hot Standby router IP addresses is necessary when the interface has secondary IP addresses configured and redundancy must be provided for the networks of these addresses also.

A primary address must be configured before a secondary address. Likewise, a secondary address must be unconfigured before unconfiguring a primary address. All IP addresses can be unconfigured using the **no hsrp ipv4** command.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to activate HSRP for group 1 on tenGigE interface 0/2/0/1. The IP address used by the Hot Standby group is learned using HSRP.

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:routerrouter(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
```

Related Commands

Command	Description
hsrp redirects, on page 385	Configures ICMP redirect messages to be sent when the HSRP is configured on an interface.
show hsrp, on page 399	Displays HSRP information.

hsrp mac-address

To specify a virtual MAC address for the Hot Standby Router Protocol (HSRP), use the **hsrp mac-address** command in HSRP interface configuration mode. To revert to the standard virtual MAC address (0000.0C07.AC*n)*, use the **no** form of this command.

hsrp [*group-number*] **mac-address** *address*
no hsrp [*group-number*] **mac-address**

Syntax Description

group-number	(Optional) Group number on the interface for which HSRP is being activated. Default is 0.
address	MAC address.

Command Default

group-number: 0

If this command is not configured, and the **hsrp use-bia** command is not configured, the standard virtual MAC address is used: 0000.0C07.AC*n*, where *n* is the group number in hexadecimal. This address is specified in RFC 2281, *Cisco Hot Standby Router Protocol (HSRP)*.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **mac-address hsrp** command.

Usage Guidelines

The **hsrp mac-address** command is not recommended except for IBM networking environments in which first-hop redundancy is based on being able to use a virtual MAC address and in which you cannot change the first-hop addresses in the PCs that are connected to an Ethernet switch.

HSRP is used to help end stations locate the first-hop gateway for IP routing. The end stations are configured with a default gateway. However, HSRP can provide first-hop redundancy for other protocols. Some protocols, such as Advanced Peer-to-Peer Networking (APPN), use the MAC address to identify the first-hop for routing purposes. In this case, it is often necessary to specify the virtual MAC address; the virtual IP address is unimportant for these protocols.

Use the **hsrp mac-address** command to specify the virtual MAC address. The MAC address specified is used as the virtual MAC address when the router is active. This command is intended for certain APPN configurations.

This table shows the parallel terms between APPN and IP.

Table 44: APPN and IP Parallel Terms

APPN	IP
end node	host

APPN	IP
network node	router or gateway

Note In an APPN network, an end node is typically configured with the MAC address of the adjacent network node. Use the **hsrp mac-address** command in the routers to set the virtual MAC address to the value used in the end nodes.

Task ID

Task ID	Operations
hsrp	read, write

Examples

If the end nodes are configured to use 4000.1000.1060 as the MAC address of the network node, the command to configure the virtual MAC address is as follows:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 5 mac-address 4000.1000.1060
```

Related Commands

Command	Description
hsrp use-bia, on page 390	Configures HSRP to use the burned-in address of the interface as its virtual MAC address, instead of the preassigned MAC address.
show hsrp, on page 399	Displays HSRP information.

hsrp preempt

To configure Hot Standby Router Protocol (HSRP) preemption and preemption delay, use the **hsrp preempt** command in HSRP interface configuration mode. To restore the default values, use the **no** form of this command.

hsrp [*group-number*] **preempt** [**delay** *seconds*]
no hsrp [*group-number*] **preempt** [**delay** *seconds*]

Syntax Description

group-number	(Optional) Group number on the interface to which the other arguments in this command apply. Default is 0.
delay *seconds*	(Optional) Time in seconds. The *seconds* argument causes the local router to postpone taking over the active role for the specified preempt delay *seconds* value. Range is 0 to 3600 seconds (1 hour). Default is 0 seconds (no delay).

Command Default

group-number: 0

seconds: 0 seconds (if the router wants to preempt, it does immediately)

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **preempt hsrp** command.

Usage Guidelines

When the **hsrp preempt** command is configured, the local router should attempt to assume control as the active router if it has a hot standby priority higher than the current active router. If the hsrp preempt command is not configured, the local router assumes control as the active router only if no other router is currently in the active state.

When a router first comes up, it does not have a complete routing table. If HSRP is configured to preempt, the local HSRP group may become the active router, yet it is unable to provide adequate routing services. This problem can be solved by configuring a delay before the preempting router actually preempts the currently active router.

The preempt delay *seconds* value does not apply if there is no router currently in the active state. In this case, the local router becomes active after the appropriate timeouts (see the **hsrp timers** command), regardless of the preempt *delay seconds* value.

Task ID

Task ID	Operations
hsrp	read, write

Examples

In the following example, the router waits for 300 seconds (5 minutes) after having determined that it should preempt before attempting to preempt the active router. The router might become the active router in a shorter span of time despite the configured delay if no active router is present. Only preempting the active router is delayed.

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.168.18.1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp preempt delay 300
```

Related Commands

Command	Description
hsrp priority	Configures HSRP priority.
hsrp track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 399	Displays HSRP information.

hsrp priority

To configure Hot Standby Router Protocol (HSRP) priority, use the **hsrp priority** command in HSRP interface configuration mode. To restore the default values, use the **no** form of this command.

hsrp [*group-number*] **priority** *priority*
no hsrp [*group-number*] **priority** *priority*

Syntax Description

group-number	(Optional) Group number on the interface to which the priority applies. Default is 0.
priority	Priority value that prioritizes a potential Hot Standby router. Range is 1 to 255. Default is 100.

Command Default

group-number: 0

priority: 100

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **preempt hsrp** command.

Usage Guidelines

The assigned priority is used to help select the active and standby routers. Assuming that preemption is enabled, the router with the highest priority becomes the designated active router. In case of ties, the interface IP addresses are compared, and the interface with the higher IP address has priority.

The priority of the device can change dynamically if an interface is configured with the **hsrp track** command and another interface on the device goes down.

If preemption is not enabled, the router may not become active even though it might have a higher priority than other HSRP routers.

Task ID

Task ID	Operations
hsrp	read, write

Examples

In the following example, the router has a priority of 120:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.168.18.1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp priority 120
```

Related Commands

Command	Description
hsrp preempt	Configures HSRP preemption and preemption delay.
hsrp track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 399	Displays HSRP information.

hsrp redirects

To configure Internet Control Message Protocol (ICMP) redirect messages to be sent when the Hot Standby Router Protocol (HSRP) is configured on an interface, use the **hsrp redirects** command in HSRP interface configuration mode. To revert to the default, which is that ICMP messages are enabled, use the **no** form of this command.

hsrp redirects disable
no hsrp redirects disable

Syntax Description

disable	Disables the filtering of ICMP redirect messages on interfaces configured with HSRP.

Command Default

HSRP ICMP redirects are enabled by default.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **disable** keyword was made mandatory.

Usage Guidelines

The **hsrp redirects** command can be configured on a per-interface basis. When HSRP is first configured on an interface, the setting for that interface inherits the global value. With the **hsrp redirects** command is enabled, ICMP redirects messages are filtered by replacing the real IP address in the next-hop address of the redirect packet with a virtual IP address if it is known to HSRP.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to allow HSRP to filter redirect messages on tenGigE interface 0/2/0/1:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4 192.168.18.1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp redirects disable
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp timers

To configure the time between hello packets and the time before other routers declare the active Hot Standby or standby router to be down, use the **hsrp timers** command in HSRP interface configuration mode. To restore the timers to their default values, use the **no** form of this command.

hsrp [*group-number*] **timers** {*hello-seconds* | **msec** *hello-milliseconds*} {*hold-seconds* | **msec** *hold-milliseconds*}
no hsrp [*group-number*] **timers**

Syntax Description

group-number	(Optional) Group number on the interface to which the timers apply. Default is 0.
hello-seconds	Hello interval in seconds. Range is 1 to 255. Default is 3 seconds.
msec *hello-milliseconds*	Hello interval in milliseconds. Range is 100 to 3000 milliseconds.
hold-seconds	Time in seconds before the active or standby router is declared to be down. Range is 1 to 255. Default is 10 seconds.
msec *hold-milliseconds*	Time in milliseconds before the active or standby router is declared to be down. Range is 100 to 3000 milliseconds.

Command Default

group-number: 0

hello-seconds: 3 seconds (If the **msec** keyword is specified, there is no default value.)

hold-seconds: 10 seconds (If the **msec** keyword is specified, there is no default value.)

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **timers (hsrp)**command.

Usage Guidelines

Nonactive routers learn timer values from the active router, unless millisecond timer values are being used. If millisecond timer values are being used, all routers must be configured with the millisecond timer values. This rule applies if either the hello time or the hold time is specified in milliseconds.

The timers configured on the active router always override any other timer settings. All routers in a Hot Standby group should use the same timer values. Normally, the hold time is greater than or equal to three times the hello time (holdtime > 3 * hellotime).

You must specify either the *hello-seconds* argument or the **msec** keyword and *hello-milliseconds* argument, depending on whether you want the hello time in seconds or milliseconds. You must also specify either the *hold-seconds* argument or **msec** keyword and *hold-milliseconds* argument, depending on whether you want the hold time in seconds or milliseconds.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to set, for group number 1 on Ten Gigabit Ethernet interface 0/2/0/1, the time between hello packets to 5 seconds and the time after which a router is considered to be down to 15 seconds. The configured timer values are used only if the router is active (or before they have been learned).

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 timers 5 15
```

The following example shows how to set, for group number 1 on Ten Gigabit Ethernet interface 0/2/0/1, the time between hello packets to 200 milliseconds and the time after which a router is considered to be down to 1000 milliseconds. The configured timer values are always used because milliseconds have been specified.

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 timers msec 200 msec 1000
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp track

To configure an interface so that the Hot Standby priority changes on the basis of the availability of other interfaces, use the **hsrp track** command in HSRP interface configuration mode. To remove the tracking, use the **no** form of this command.

hsrp [*group-number*] **track** *type interface-path-id* [*priority-decrement*]
no hsrp [*group-number*] **track** *type interface-path-id* [*priority-decrement*]

Syntax Description

group-number	(Optional) Group number on the interface to which the tracking applies. Default is 0.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
priority-decrement	(Optional) Amount by which the Hot Standby priority for the router is decremented (or incremented) when the interface goes down (or comes back up). Range is 1 to 255.

Command Default

group-number: 0

priority-decrement: 10

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.2.0	This command has been deprecated. This command was replaced with the **track (hsrp)**command.

Usage Guidelines

The **hsrp track** command ties the Hot Standby priority of the router to the availability of its interfaces. It is useful for tracking interfaces that are not configured for the Hot Standby Router Protocol (HSRP). Only IP interfaces are tracked. A tracked interface is up if IP on that interface is up. Otherwise, the tracked interface is down.

When a tracked interface goes down, the Hot Standby priority decreases by 10. If an interface is not tracked, its state changes do not affect the Hot Standby priority. For each group configured for Hot Standby, you can configure a separate list of interfaces to be tracked.

The optional *priority-decrement* argument specifies by how much to decrement the Hot Standby priority when a tracked interface goes down. When the tracked interface comes back up, the priority is incremented by the same amount.

When multiple tracked interfaces are down and *priority-decrement* values have been configured, these configured priority decrements are cumulative. If tracked interfaces are down, but none of them were configured with priority decrements, the default decrement is 10 and it is cumulative.

The **hsrp preempt** command must be used in conjunction with this command on all routers in the group whenever the best available router should be used to forward packets. If the **hsrp preempt** command is not used, then the active router stays active, regardless of the current priorities of the other HSRP routers.

Task ID

Task ID	Operations
hsrp	read, write

Examples

In the following example, Ten Gigabit Ethernet interface 0/2/0/1 tracks interface 0/1/0/1 and 0/3/0/1. If one or both of these two interfaces go down, the Hot Standby priority of the router decreases by 10. Because the default Hot Standby priority is 100, the priority becomes 90 when one of the tracked interfaces goes down and the priority becomes 80 when both go down.

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp track TenGigE 0/1/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp track TenGigE 0/3/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp preempt
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.92.72.46
```

Related Commands

Command	Description
hsrp preempt	Configures HSRP preemption and preemption delay.
hsrp priority	Configures HSRP priority.
show hsrp, on page 399	Displays HSRP information.

hsrp use-bia

To configure the Hot Standby Router Protocol (HSRP) to use the burned-in address of the interface as its virtual MAC address, instead of the preassigned MAC address or the functional address, use the **hsrp use-bia** command in HSRP interface configuration mode. To restore the default virtual MAC address, use the **no** form of this command.

hsrp use-bia
no hsrp use-bia

Command Default

HSRP uses the preassigned MAC address on Ethernet.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

It is desirable to configure the **hsrp use-bia** command on an interface if there are devices that reject Address Resolution Protocol (ARP) replies with source hardware addresses set to a functional address.

Task ID

Task ID	Operations
hsrp	read, write

Examples

In the following example, the burned-in address of tenGigE interface 0/2/0/1 will be the virtual MAC address mapped to the virtual IP address for all Hot Standby groups configured on tenGigE interface 0/1/0/1:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp use-bia
```

Related Commands

Command	Description
hsrp mac-address	Specifies a virtual MAC address for HSRP.
show hsrp, on page 399	Displays HSRP information.

interface (HSRP)

To enable Hot Standby Router Protocol (HSRP) interface configuration command mode, use the **interface** command in router configuration mode. To terminate interface mode, use the **no** form of this command.

interface *type interface-path-id*
no interface *type interface-path-id*

Syntax Description

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

Command Default

HSRP is disabled.

Command Modes

Router HSRP configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

All the commands used to configure HSRP are used in HSRP interface configuration mode.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example show how to enable HSRP interface configuration mode on tenGigE 0/2/0/1:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)#
```

Related Commands

Command	Description
router hsrp, on page 396	Enables HSRP.

preempt (hsrp)

To configure Hot Standby Router Protocol (HSRP) preemption and preemption delay, use the **hsrp preempt** command in HSRP group submode. To restore the default values, use the **no** form of this command.

preempt [**delay** *seconds*]
no preempt [**delay** *seconds*]

Syntax Description

delay *seconds*	(Optional) Time in seconds. The *seconds* argument causes the local router to postpone the taking over the active role for the specified preempt delay *seconds* value. Range is from 0 to 3600 (1 hour). Default is 0 (no delay).

Command Default

The default delay is 0.

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced. This command replaced the **hsrp preempt** command.

Usage Guidelines

When the **hsrp preempt** command is configured, the local router should attempt to assume control as the active router, if it has a hot standby priority higher than the current active router. If the hsrp preempt command is not configured, the local router assumes control as the active router only if no other router is currently in the active state.

When a router first comes up, it does not have a complete routing table. If HSRP is configured to preempt, the local HSRP group may become the active router, yet it is unable to provide adequate routing services. This problem can be solved by configuring a delay before the preempting router actually preempts the currently active router.

The preempt delay *seconds* value does not apply if there is no router currently in the active state. In this case, the local router becomes active after the appropriate timeouts (see the **hsrp timers** command), regardless of the preempt *delay seconds* value.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example, the router waits for 300 seconds (5 minutes) after having determined that it should preempt before attempting to preempt the active router. The router might become the active router in a shorter span of time despite the configured delay, if no active router is present. Only preempting the active router is delayed.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
```

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# preempt delay 300
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# preempt delay 300
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp priority	Configures HSRP priority.
hsrp track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 399	Displays HSRP information.

priority (hsrp)

To configure Hot Standby Router Protocol (HSRP) priority, use the **priority** command in HSRP group submode. To restore the default values, use the **no** form of this command.

priority *priority*
no priority *priority*

Syntax Description

priority	Priority value that prioritizes a potential Hot Standby router. Range is from 1 to 255. Default is 100.

Command Default

The default priority is 100.

Command Modes

HSRP interface configuration

Command History

Release	Modification
Release 4.2.0	This command was introduced. This command replaced the **hsrp priority** command

Usage Guidelines

The assigned priority is used to help select the active and standby routers. Assuming that preemption is enabled, the router with the highest priority becomes the designated active router. In case of ties, the interface IP addresses are compared, and the interface with the higher IP address has priority.

The priority of the device can change dynamically if an interface is configured with the **hsrp track** command and another interface on the device goes down.

If preemption is not enabled, the router may not become active even though it might have a higher priority than other HSRP routers.

Task ID

Task ID	Operations
hsrp	read, write

Examples

In this example, the router has a priority of 120:

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# priority 120
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
```

```
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# priority 120
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp preempt	Configures HSRP preemption and preemption delay.
hsrp track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 399	Displays HSRP information.

router hsrp

To enable the Hot Standby Router Protocol (HSRP), use the **router hsrp** command in Global Configuration mode. To disable HSRP, use the **no** form of this command.

router hsrp
no router hsrp

Syntax Description

This command has no keywords or arguments.

Command Default

HSRP is disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

HSRP configuration commands must be configured in the HSRP interface configuration mode.

Task ID

Task ID	Operations
hsrp	read, write

Examples

The following example shows how to configure an HSRP redundancy process that contains a virtual router group 1 on Ten Gigabit Ethernet 0/2/0/1:

```
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-hsrp-if)# hsrp 1 priority 254
```

session name

To configure an HSRP session name, use the **session name** command in the HSRP group submode. To deconfigure an HSRP session name, use the **no** form of this command.

name *name*

Syntax Description

name	MGO session name

Command Default

None

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read

Example

This example shows how to configure an HSRP session name.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# name s1
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# name s1
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp mac-address	Configures a virtual MAC address for the Hot Standby Router Protocol (HSRP).

show hsrp

To display Hot Standby Router Protocol (HSRP) information, use the **show hsrp** command in EXEC mode mode.

show hsrp [**interface** *interface-type interface-path-id*] [*group-number*] [{**brief** | **detail**}]

Syntax Description

interface*interface-type*	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
group-number	(Optional) Group number on the interface for which output is displayed.
brief	(Optional) A single line of output summarizes each standby group. The **brief** keyword is the default if **detail** is not specified.
detail	(Optional) This keyword has the same effect as not specifying **brief**; more output is provided.
	(Optional) After this vertical bar (|), specify one of these output modifiers and a keyword from the output: • **begin** —Begins the output from the word that you specify. • **exclude** —Excludes lines that match the word that you specify. • **include** —Includes lines that match the word that you specify.

Command Default

By default, a single line of output summarizing each standby group is displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **show hsrp** command to display HSRP information.

If you want to specify a value for the *group-number* argument, you must also specify an interface *type* and *number*.

Task ID

Task ID	Operations
hsrp	read

Examples

This is sample output from the **show hsrp detail** command:

```
RP/0/RP0/CPU0:router# show hsrp detail

 0/4/0/0 - Group 1
  Local state is Active, priority 100
  Hellotime 3 sec holdtime 10 sec
  Next hello sent in 0.539
  Minimum delay 1 sec, reload delay 5 sec
BFD enabled: state none, interval 15 ms multiplier 3
  Hot standby IP address is 4.0.0.100 configured
  Active router is local
  Standby router is unknown expired
  Standby virtual mac address is 0000.0c07.ac01
  2 state changes, last state change 00:05:20
```

This table describes the significant fields shown in the display.

Table 45: show hsrp Command Field Descriptions

Field	Description
TenGigE E0/2/0/4	Interface type and number and Hot Standby group number for the interface.
Local state is	State of local networking device; can be one of the following: • Active—Current Hot Standby router. • Standby—Router next in line to be the Hot Standby router. • Speak—Router is sending packets to claim the active or standby role. • Listen—Router is neither active nor standby, but if no messages are received from the active or standby router, it will start to "speak." • Learn—Router is neither active nor standby, nor does it have enough information to attempt to claim the active or standby roles. • Init—Router is not yet ready to participate in HSRP, possibly because the associated interface is not up.
Hellotime	Current time (in seconds) between sending of hello packets, learned dynamically from the hello packets received from the active Hot Standby router.
holdtime	Current time (in seconds) before other routers declare the active or standby router to be down, learned dynamically from the hello packets received from the active Hot Standby router.
Next hello sent in	Time in which the software will send the next hello packet (in hours:minutes:seconds).
BFD enabled	Displays BFD related information (with multiplier and minimum interval details)

Field	Description
Hot standby IP address is configured	IP address of the current Hot Standby router. The word "configured" indicates that this address is known through the **hsrp ip** command. Otherwise, the address was learned dynamically through HSRP hello packets from other routers that do have the HSRP IP address configured.
Active router is	Value can be "local" or an IP address. Address of the current active Hot Standby router.
Standby router is	Value can be "local" or an IP address of the standby router (the router that is next in line to be the Hot Standby router).
Standby virtual mac address is	MAC address associated with the standby group address.
state changes	Number of times the router changed the standby state.
last state change	Time (in hours:minutes:seconds) expired since the last state change.
Tracking interface states for	List of interfaces that are being tracked and their corresponding states. Based on the **hsrp track** command.
Priority decrement	Value by which the standby priority is decremented or incremented when the tracked interface goes down or up, respectively. Default is 10.

Related Commands

Command	Description
hsrp authentication	Configures an authentication string for HSRP.
hsrp ipv4	Activates the HSRP.
hsrp mac-address	Specifies a virtual MAC address for HSRP.
hsrp preempt	Configures HSRP preemption and preemption delay.
hsrp priority	Configures HSRP priority.
hsrp timers	Configures the time between hello packets and the time before other routers declare the active Hot Standby or standby router to be down.
hsrp track	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
hsrp use-bia, on page 390	Configures HSRP to use the burned-in address of the interface as its virtual MAC address, instead of the preassigned MAC address.

show hsrp bfd

To display Hot Standby Router Protocol (HSRP) bfd information across all interfaces, use the **show hsrp bfd** command in EXEC mode mode.

show hsrp bfd [*interface-type interface-path-id ip-address*]

Syntax Description

interface-type *interface-path-id*	(Optional) 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.
ip-address	(Optional) Destination IP address for BFD session.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read

Example

This example shows Hot Standby Router Protocol (HSRP) bfd information across all interfaces.

```
RP/0/RP0/CPU0:router# show hsrp bfd

BFD Interface    Destination IP  State    Intv Mult HSRP Interface   Grp
-------------    --------------  -----    ---- ---- --------------   ---
Gi0/3/0/2        10.0.0.2              up  100    3 Gi0/3/0/2          1
                                                    Gi0/3/0/2          2
Gi0/3/0/2        10.0.0.3        inactive  100    3 Gi0/3/0/2          3
                                                    Gi0/3/0/2          6
Gi0/3/0/3.1      10.0.1.2             down   15    3 Gi0/3/0/2          4
```

This example shows Hot Standby Router Protocol (HSRP) bfd information for the 0/3/0/2 interface.

```
RP/0/RP0/CPU0:router# show hsrp bfd gigabitethernet  0/3/0/2 10.0.0.2

BFD Interface    Destination IP  State    Intv Mult HSRP Interface   Grp
-------------    --------------  -----    ---- ---- --------------   ---
Gi0/3/0/2        10.0.0.2              up  100    3 Gi0/3/0/2          1
                                                    Gi0/3/0/2          2
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

show hsrp mgo

To display Hot Standby Router Protocol (HSRP) mgo information across all interfaces, use the **show hsrp mgo** command in EXEC mode.

show hsrp mgo [{**brief** *session-name*}]

Syntax Description

brief	(Optional) Displays information in a brief format.
session-name	(Optional) Display information for a single MGO Session.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read

Example

This example shows Hot Standby Router Protocol (HSRP) mgo information for interface HSRP3.

```
RP/0/RP0/CPU0:router# show hsrp mgo HSRP3

HSRP3
  Primary group Bundle-Ether1.1 IPv4 group 1
  State is Active
  Slave groups:
    Interface                Grp
    Bundle-Ether1.2            2
    Bundle-Ether1.3            3
    Bundle-Ether1.4            4
    Bundle-Ether1.5            5
```

This example shows Hot Standby Router Protocol (HSRP) mgo information across all interfaces in a brief format.

```
RP/0/RP0/CPU0:router# show hsrp mgo brief
```

```
Name            Interface      AF   Grp    State Slaves
HSRP1           Gi0/0/0/1       IPv4   1   Active    100
HSRP2           Te0/1/0/0.1     IPv4   2  Standby     50
HSRP3           BE1             IPv4   1   Active      4
HSRP4           BE1             IPv6  10   Active     11
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

show hsrp statistics

To display Hot Standby Router Protocol (HSRP) statistics information across all interfaces, use the **show hsrp statistics** command in EXEC mode.

show hsrp [{*interface-type interface-path-idgroup-number*}] **statistics**

Syntax Description

interface-type 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.
group-number	(Optional) Group number of the interface.

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read

Example

This sample output is from the **show hsrp statistics** command:

```
 RP/0/RP0/CPU0:router# show hsrp statistics
Protocol:
  Transitions to Active                2
  Transitions to Standby               2
  Transitions to Speak                 0
  Transitions to Listen                2
  Transitions to Learn                 0
  Transitions to Init                  0

Packets Sent:                         12
  Hello:                               7
  Resign:                              0
  Coup:                                2
  Adver:                               3

Valid Packets Received:                13
```

```
  Hello:                                8
  Resign:                               2
  Coup:                                 0
  Adver:                                3

Invalid packets received:               0
  Too long:                             0
  Too short:                            0
  Mismatching/unsupported versions:     0
  Invalid opcode:                       0
  Unknown group:                        0
  Inoperational group:                  0
  Conflicting Source IP:                0
  Failed Authentication:                2
  Invalid Hello Time:                   0
  Mismatching Virtual IP:               0
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

show hsrp summary

To display Hot Standby Router Protocol (HSRP) summary information across all interfaces, use the **show hsrp summary** command in EXEC mode mode.

show hsrp summary

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read

Example

This sample output is from the **show hsrp summary** command:

```
RP/0/RP0/CPU0:router# show hsrp summary
                Groups                VIPs
State  Sessions Slaves Total     Up  Down  Total
-----   ---------------------   -----------------
ALL          60    900    960    860  2020   2880

ACTIVE       10    190    200    200   300    500
STANDBY      15    235    250    250   600    850
SPEAK        10    190    200    200   400    600
LISTEN       10    190    200    200   400    600
LEARN         5      5     10     10    20     30
INIT         10     90    100      0   300    300

48   HSRP IPv4 interfaces    (43   up, 5   down)
5   Tracked IPv4 interfaces (4    up, 1    down)
5    BFD sessions       (3    up, 2    down)
```

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

hsrp slave follow

To instruct the subordinate group to inherit its state from a specified group, use the **hsrp slave follow** command in HSRP slave submode.

follow *mgo-session-name*

Syntax Description

mgo-session-name	Name of the MGO session from which the subordinate group will inherit the state.

Command Default

None

Command Modes

HSRP Slave Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to instruct the subordinate group to inherit its state from a specified group.

```
Router# configure
Router(config)# router hsrp
Router(config-hsrp)# interface tenGigE 0/4/0/4
Router(config-hsrp-if)# address-family ipv4
Router(config-hsrp-ipv4)# hsrp slave
Router(config-hsrp-slave)# follow m1
```

Related Commands

Command	Description
subordinate virtual mac address, on page 412	Configures the virtual MAC address for the subordinate group.

subordinate primary virtual IPv4 address

To configure the primary virtual IPv4 address for the subordinate group, use the **subordinate primary virtual IPv4 address** command in the HSRP slave submode.

address *ip-address*

Syntax Description

ip-address	IP address of the Hot Standby router interface.

Command Default

None

Command Modes

HSRP Slave Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to configure the primary virtual IPv4 address for the subordinate group.

```
Router# configure
Router(config)# router hsrp
Router(config-hsrp)# interface tenGigE 0/4/0/4
Router(config-hsrp-if)# address-family ipv4
Router(config-hsrp-ipv4)# hsrp slave
Router(config-hsrp-slave)# address 10.2.1.4
```

Related Commands

Command	Description
hsrp slave follow, on page 409	Instructs the subordinate group to inherit its state from a specified group.
subordinate virtual mac address, on page 412	Configures the virtual MAC address for the subordinate group.

subordinate secondary virtual IPv4 address

To configure the secondary virtual IPv4 address for the subordinate group, use the **subordinate secondary virtual IPv4 address** command in the HSRP slave submode.

address *ip-address* **secondary**

Syntax Description

ip-address	IP address of the Hot Standby router interface.
secondary	Sets the secondary hot standby IP address.

Command Default

None

Command Modes

HSRP Slave Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to configure the secondary virtual IPv4 address for the subordinate group.

```
Router# configure
Router(config)# router hsrp
Router(config-hsrp)# interface tenGigE 0/4/0/4
Router(config-hsrp-if)# address-family ipv4
Router(config-hsrp-ipv4)# hsrp slave
Router(config-hsrp-slave)# address 10.2.1.4 secondary
```

Related Commands

Command	Description
hsrp slave follow, on page 409	Instructs the subordinate group to inherit its state from a specified group.
subordinate virtual mac address, on page 412	Configures the virtual MAC address for the subordinate group.

subordinate virtual mac address

To configure the virtual MAC address for the subordinate group, use the **subordinate virtual mac address** command in the HSRP slave submode.

mac-address *address*

Syntax Description

address	48-bit hardware address of ARP entry.

Command Default

None

Command Modes

HSRP Slave Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
hsrp	read, write

Example

This example shows how to configure the virtual MAC address for the subordinate group.

```
Router# configure
Router(config)# router hsrp
Router(config-hsrp)# interface tenGigE 0/4/0/4
Router(config-hsrp-if)# address-family ipv4
Router(config-hsrp-ipv4)# hsrp slave
Router(config-hsrp-slave)# mac-address 10.2.4
```

Related Commands

Command	Description
hsrp slave follow, on page 409	Instructs the subordinate group to inherit its state from a specified group.

timers (hsrp)

To configure the time between hello packets and the time before other routers declare the active Hot Standby or standby router to be down, use the **hsrp timers** command in HSRP group submode. To restore the timers to their default values, use the **no** form of this command.

timers {*hello-seconds* | **msec** *hello-milliseconds*} {*hold-seconds* | **msec** *hold-milliseconds*}
no timers

Syntax Description

hello-seconds	Hello interval in seconds. Range is from 1 to 255. Default is 3.
msec *hello-milliseconds*	Hello interval in milliseconds. Range is from 100 to 3000.
hold-seconds	Time in seconds before the active or standby router is declared to be down. Range is from 1 to 255. Default is 10.
msec *hold-milliseconds*	Time in milliseconds before the active or standby router is declared to be down. Range is from 100 to 3000.

Command Default

The default hello-seconds is 3. (If the **msec** keyword is specified, there is no default value.)

The default hold-seconds is 10. (If the **msec** keyword is specified, there is no default value.)

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

Nonactive routers learn timer values from the active router, unless millisecond timer values are being used. If millisecond timer values are being used, all routers must be configured with the millisecond timer values. This rule applies if either the hello time or the hold time is specified in milliseconds.

The timers configured on the active router always override any other timer settings. All routers in a Hot Standby group should use the same timer values. Normally, the hold time is greater than or equal to three times the hello time (holdtime > 3 * hellotime).

You must specify either the *hello-seconds* argument or the **msec** keyword and *hello-milliseconds* argument, depending on whether you want the hello time in seconds or milliseconds. You must also specify either the *hold-seconds* argument or **msec** keyword and *hold-milliseconds* argument, depending on whether you want the hold time in seconds or milliseconds.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to set, for group number 1 on Ten Gigabit Ethernet interface 0/2/0/1, the time between hello packets to 5 seconds and the time after which a router is considered to be down to 15 seconds. The configured timer values are used only if the router is active (or before they have been learned).

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# timers 5 15
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

This example shows how to set, for group number 1 on Ten Gigabit Ethernet interface 0/2/0/1, the time between hello packets to 200 milliseconds and the time after which a router is considered to be down to 1000 milliseconds. The configured timer values are always used because milliseconds have been specified.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# timers msec 200 msec 1000
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# timers msec 200 msec 1000
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
show hsrp, on page 399	Displays HSRP information.

track (hsrp)

To configure an interface so that the Hot Standby priority changes on the basis of the availability of other interfaces, use the **hsrp track** command in HSRP group submode. To remove the tracking, use the **no** form of this command.

track *type interface-path-id* [*priority-decrement*]
no track *type interface-path-id* [*priority-decrement*]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
priority-decrement	(Optional) Amount by which the Hot Standby priority for the router is decremented (or incremented) when the interface goes down (or comes back up). Range is 1 to 255.

Command Default

The default priority-decrement is 10.

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.0	This command was introduced. This command replaced the **hsrp track** command.

Usage Guidelines

The **hsrp track** command ties the Hot Standby priority of the router to the availability of its interfaces. It is useful for tracking interfaces that are not configured for the Hot Standby Router Protocol (HSRP). Only IP interfaces are tracked. A tracked interface is up if IP on that interface is up. Otherwise, the tracked interface is down.

When a tracked interface goes down, the Hot Standby priority decreases by 10. If an interface is not tracked, its state changes do not affect the Hot Standby priority. For each group configured for Hot Standby, you can configure a separate list of interfaces to be tracked.

The optional *priority-decrement* argument specifies by how much to decrement the Hot Standby priority when a tracked interface goes down. When the tracked interface comes back up, the priority is incremented by the same amount.

When multiple tracked interfaces are down and *priority-decrement* values have been configured, these configured priority decrements are cumulative. If tracked interfaces are down, but none of them were configured with priority decrements, the default decrement is 10 and it is cumulative.

The **hsrp preempt** command must be used in conjunction with this command on all routers in the group whenever the best available router should be used to forward packets. If the **hsrp preempt** command is not used, then the active router stays active, regardless of the current priorities of the other HSRP routers.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to configure an interface so that the Hot Standby priority changes on the basis of the availability of other interfaces.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# track tenGigE 0/4/0/4 2
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# track tenGigE 0/4/0/4 2
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp preempt, on page 381	Configures HSRP preemption and preemption delay.
hsrp priority, on page 383	Configures HSRP priority.
show hsrp, on page 399	Displays HSRP information.

track(object)

To enable tracking of a named object with the specified decrement, use the **track (object)** command in HSRP group submode. To remove the tracking, use the **no** form of this command.

track object *name*[*priority-decrement*]
no track object *name*[*priority-decrement*]

Syntax Description

object *name*	Object tracking. Name of the object to be tracked.
priority-decrement	(Optional) Amount by which the Hot Standby priority for the router is decremented (or incremented) when the interface goes down (or comes back up). Range is 1 to 255.

Command Default

The default priority-decrement is 10.

Command Modes

HSRP Group Submode

Command History

Release	Modification
Release 4.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
hsrp	read, write

Examples

This example shows how to configure object tracking under the HSRP group submode.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/RP0/CPU0:router(config-hsrp-gp)# track object t1 2
RP/0/RP0/CPU0:router(config-hsrp-gp)#


(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router hsrp
RP/0/RP0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/RP0/CPU0:router(config-hsrp-gp)# track object t1 2
```

```
RP/0/RP0/CPU0:router(config-hsrp-gp)#
```

Note

- The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 2 for IPv6 address families.
- HSRP version 2 provides an extended group range of 0-4095.

Related Commands

Command	Description
hsrp preempt, on page 381	Configures HSRP preemption and preemption delay.
hsrp priority, on page 383	Configures HSRP priority.
show hsrp, on page 399	Displays HSRP information.

LPTS Commands

This chapter describes the Cisco IOS XR software commands used to monitor Local Packet Transport Services (LPTS).

For detailed information about LPTS concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear lpts ifib statistics, on page 420
- clear lpts pifib hardware statistics, on page 421
- clear lpts pifib statistics , on page 422
- flow (LPTS), on page 423
- lpts pifib hardware police, on page 427
- show lpts bindings, on page 429
- show lpts clients, on page 433
- show lpts flows, on page 435
- show lpts ifib , on page 438
- show lpts ifib slices, on page 441
- show lpts ifib statistics, on page 444
- show lpts ifib times, on page 446
- show lpts mpa groups, on page 448
- show lpts pifib , on page 450
- show lpts pifib hardware context, on page 455
- show lpts pifib hardware entry, on page 457
- show lpts pifib hardware police, on page 460
- show lpts pifib hardware usage, on page 468
- show lpts pifib statistics, on page 470
- show lpts port-arbitrator statistics, on page 472
- show lpts vrf, on page 473

clear lpts ifib statistics

To clear the Internal Forwarding Information Base (IFIB) statistics, use the **clear lpts ifib statistics** command in EXEC mode.

clear lpts ifib statistics [**location** *node-id*]

Syntax Description

location *node-id*	(Optional) Clears the IFIB statistics for the designated node. The *node-id* argument is entered in standard *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, the **clear lpts ifib statistics** command clears the IFIB statistics for the node on which the command is run.

Task ID

Task ID	Operations
lpts	execute

Examples

The following example shows how to clear the IFIB statistics for the RP:

```
RP/0/RP0/CPU0:router# clear lpts ifib statistics
```

Related Commands

Command	Description
show lpts ifib statistics, on page 444	Displays the LPTS IFIB statistics.

clear lpts pifib hardware statistics

To clear the Pre-Internal Forwarding Information Base (Pre-IFIB) hardware statistics, use the **clear lpts pifib hardware statistics** command in EXEC mode.

clear lpts pifib hardware statistics location *node-id*

Syntax Description

location *node-id*	Clears the Pre-IFIB hardware statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command clears the Pre-IFIB hardware statistics for the node on which the command is run.

Task ID

Task ID	Operations
lpts	execute

Examples

Related Commands

Command	Description
show lpts pifib hardware police, on page 460	Displays the policer configuration value set.

clear lpts pifib statistics

To clear the Pre-Internal Forwarding Information Base (Pre-IFIB) statistics, use the **clear lpts pifib statistics** command in EXEC mode.

clear lpts pifib statistics [**location** *node-id*]

Syntax Description

location *node-id*	Clears the Pre-IFIB statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command clears the Pre-IFIB statistics for the node on which the command is run.

Task ID

Task ID	Operations
lpts	execute

Examples

The following example shows how to clear the Pre-IFIB statistics for the RP:

```
RP/0/RP0/CPU0:router# clear lpts pifib statistics
```

Related Commands

Command	Description
show lpts pifib statistics, on page 470	Displays the LPTS PIFIB statistics.

flow (LPTS)

To configure the policer for the Local Packet Transport Services (LPTS) flow type, use the **flow** command in pifib policer global configuration mode or pifib policer per-node configuration mode. To disable this feature, use the **no** form of this command.

flow *flow-type* **rate** *rate*
no flow *flow-type* **rate** *rate*

Syntax Description

flow-type	List of supported flow types.
rate *rate*	Specifies the rate in packets per seconds (PPS). The range is from 0 to 4294967295.

Command Default

The default behavior is to load the policer values from the static configuration file that is platform dependant.

Command Modes

Pifib policer global configuration

Pifib policer per-node configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The table lists the supported flow types and the parameters that are used to define a policer.

Table 46: List of Supported Flow Types

Flow Type	Description	Default Packet Rate (Recommended)
all-routers	Packets sent to all-routers multicast addresses, which include multicast LDP UDP packet.	10000
bgp-cfg-peer	Packets from a configured BGP peer.	10000
bgp-default	Packets from unconfigured, newly configured, or wildcard BGP peers.	10000
bgp-known	Packets from established BGP peering sessions.	25000
css-default	Packets from a new or newly established CSS session.	1000
css-known	Packets from an established CSS session.	1000
default-flow	Default flow type.	500
eigrp	EIGRP packets for configured interfaces.	20000
fragment	Fragmented packets.	1000
http-default	Packets from a new or newly established HTTP session.	1000

Flow Type	Description	Default Packet Rate (Recommended)
http-known	Packets from an established HTTP session.	1000
icmp-app	ICMP or ICMPv6 packets of interest to applications.	2500
icmp-control	ICPMv6 control packets.	2500
icmp-default	Other ICMP or ICMPv6 packets.	2500
icmp-local	ICMP or ICMPv6 packets with local interest.	2500
igmp	IGMP packets.	3500
ike	IKE packets.	1000
ipsec-default	AH or ESP packets with unknown or newly configured SPIs.	1000
ipsec-known	AH or ESP packets with known SPIs.	3000
isis-default	IS-IS packets for unconfigured (or newly, configured) interfaces.	5000
isis-known	IS-IS packets for configured interfaces.	20000
ldp-tcp-cfg-peer	Packets from a configured LDP TCP peer (SYNs or newly, established sessions).	10000
ldp-tcp-default	Packets from an unconfigured, newly configured, or wildcard LDP TCP peer.	10000
ldp-tcp-known	Packets from an established LDP peering session.	25000
ldp-udp	Unicast LDP UPD packets.	500
lmp-tcp-cfg-peer	Packets from a configured LMP TCP peer (SYNs or newly established sessions).	10000
lmp-tcp-default	Packets from an unconfigured, newly configured, or wild-card LMP TCP peer.	10000
lmp-tcp-known	Packets from an established LMP peering session.	25000
lmp-udp	Unicast LMP UDP packets.	500
msdp-cfg-peer	Packets from a configured MSDP peer.	1000
msdp-default	Packets from an unconfigured, newly configured, or wildcard MSDP peer.	1000
msdp-known	Packets from an established MSDP session.	1000
multicast-default	Packets for unconfigured or newly configured multicast groups.	500
multicast-known	Packets for configured multicast groups.	25000

Flow Type	Description	Default Packet Rate (Recommended)
ntp-known	Packets from an established NTP session.	500
ntp-default	Packets from a new or newly established NTP session.	500
ospf-mc_default	OSPF multicast packets for unconfigured (or newly configured) interfaces.	5000
ospf-mc-known	OSPF multicast packets for configured interfaces.	20000
ospf-uc-default	OSPF unicast packets for unconfigured (or newly configured) interfaces.	1000
ospf-uc-known	OSPF unicast packets for configured interfaces.	5000
pim-multicast	PIM multicast packets.	23000
pim-unicast	PIM unicast packets.	10000
rip	RIP packets.	20000
rsh-default	Packets from a new or newly established RSH session.	1000
rsh-known	Packets from an established RSH session.	1000
rsvp	RSVP packets.	7000
rsvp-udp	RSVP UDP packets.	7000
raw-default	Packets for unconfigured or newly configured IPv4 or IPv6 protocols.	500
raw-listen	Packets for configured IP protocols.	500
shttp-default	Packets from a new or newly established SSHTP session.	1000
shttp-known	Packets from an established SHTTP session.	1000
snmp	SNMP packets.	2000
ssh-default	Packets from a new or newly established SSH session.	1000
ssh-known	Packets from an established SSH session.	1000
tcp-cfg-peer	Packets for configured TCP peers.	25000
tcp-default	Packets for unconfigured or newly configured TCP services.	500
tcp-known	Packets for established TCP sessions.	25000
tcp-listen	Packets for configured TCP services.	25000
telnet-default	Packets from a new or newly established Telnet session.	1000

Flow Type	Description	Default Packet Rate (Recommended)
telnet-known	Packets from an established Telnet session.	1000
udp-cfg-peer	Packets for configured UDP-based protocol sessions.	4000
udp-default	Packets for unconfigured or newly configured UDP services.	500
udp-known	Packets for established UDP sessions.	25000
udp-listen	Packets for configured UDP services.	4000

Task ID

Task ID	Operations
config-services	read, write

Examples

The following example shows how to configure the LPTS policer for the bgp-known flow type for all line cards:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# lpts pifib hardware police
RP/0/RP0/CPU0:router(config-pifib-policer-global)# flow bgp-known rate 20000
```

The following example shows how to configure LPTS policer for the Intermediate System-to-Intermediate System (IS-IS)-known flow type for a specific line card:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:routerconfig)# lpts pifib hardware police location 0/2/CPU0
RP/0/RP0/CPU0:router(config-pifib-policer-per-node)# flow isis-known rate 22222
```

lpts pifib hardware police

To configure the ingress policers and to enter pifib policer global configuration mode or pifib policer per-node configuration mode, use the **lpts pifib hardware police** command in Global Configuration mode. To set the policer to the default value, use the **no** form of this command.

To map the LPTS policer with an ACL, use the **lpts pifib hardware police acl**

command in Global Configuration mode.

lpts pifib hardware police [**location** *node-id*] [**flow** *flow-type* **rate** *rate*]
no lpts pifib hardware police [**location** *node-id*] [**flow** *flow-type* **rate** *rate*]

Syntax Description

location *node-id*	(Optional) Designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
flow *flow-type* **rate** *rate*	LPTS flow type and the policer rate in packets per second (PPS).

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.
Release 4.2.0	New flow types such as dns, radius, tacacs, ntp known, rsvp known and pim multicast known flow types were added.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read, write
config-services	read, write

Examples

This example shows how to configure the **lpts pifib hardware police** command for all line cards:

```
RP/0/RP0/CPU0:router(config)# lpts pifib hardware police
RP/0/RP0/CPU0:router(config-pifib-policer-global)#
```

This example shows how to configure the **lpts pifib hardware police** command for a specific line card:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# lpts pifib hardware police location 0/2/CPU0 flow dns rate
10
```

This example shows how to configure the TOS precedence for the 0/2/CPU0 location using the **lpts pifib hardware police** command:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# lpts pifib hardware police location 0/2/CPU0 flow telnet
default precedence 5 3 6
```

Related Commands

Command	Description
flow (LPTS), on page 423	Configures the policer for the LPTS flow type.
show lpts pifib hardware police, on page 460	Displays the policer configuration value set.

show lpts bindings

To display the binding information in the Port Arbitrator, use the **show lpts bindings** command in EXEC mode.

show lpts bindings [**location** *node-id*] [**client-id** {**clnl** | **ipsec** | **ipv4-io** | **ipv6-io** | **mpa** | **tcp** | **test** | **udp** | **raw**}] [**brief**] [**vrf** *vrf-name*]

Syntax Description

location *node-id*	(Optional) Displays information for the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.
client-id	(Optional) Type of client. It can be one of the following values: • **clnl** —ISO connectionless protocol (used by IS-IS) • **ipsec** —Secure IP • **ipv4-io** —Traffic processed by the IPv4 stack • **ipv6-io** —Traffic processed by the IPv6 stack • **mpa** —Multicast Port Arbitrator (multicast group joins) • **tcp** —Transmission Control Protocol • **test** —Test applications • **udp** —User Datagram Protocol • **raw** —Raw IP
brief	(Optional) Displays summary output.
vrf *vrf-name*	(Optional) Name of assigned VRF.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **vrf** keyword was added.

Usage Guidelines

The **show lpts bindings** command displays the Local Packet Transport Services (LPTS) bindings (requests to receive traffic of a particular type). Bindings are aggregated into flows by the LPTS Port Arbitrator; flows are then programmed into the Internal Forwarding Information Base (IFIB) and Pre-IFIB to direct packets to applications.

If you specify the optional **client-id** keyword and type of client, only bindings from that client are shown. If you specify the optional **location** keyword and *node-id* argument, only bindings from clients on that node are displayed.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts bindings** command, displaying bindings for all client ID types:

```
RP/0/RP0/CPU0:router# show lpts bindings

@ - Indirect binding; Sc - Scope

-----------------------------------------
Location   :0/1/CPU0
Client ID  :IPV4_IO
Cookie     :0x00000001
Clnt Flags :
Layer 3    :IPV4
Layer 4    :ICMP
Local Addr :any
Remote Addr:any
Local Port :any
Remote Port:any
Filters    :Type / Intf or Pkt Type / Source Addr / Location
 INCLUDE_TYPE / type 8
 INCLUDE_TYPE / type 13
 INCLUDE_TYPE / type 17
-----------------------------------------
Location   :0/2/CPU0
Client ID  :IPV4_IO
Cookie     :0x00000001
Clnt Flags :
Layer 3    :IPV4
Layer 4    :ICMP
Local Addr :any
Remote Addr:any
Local Port :any
Remote Port:any
Filters    :Type / Intf or Pkt Type / Source Addr / Location
 INCLUDE_TYPE / type 8
 INCLUDE_TYPE / type 13
 INCLUDE_TYPE / type 17
-----------------------------------------
Location   :0/RP1/CPU0
Client ID  :TCP
Cookie     :0x4826f1f8
Clnt Flags :REUSEPORT
Layer 3    :IPV4
Layer 4    :TCP
Local Addr :any
Remote Addr:any
Local Port :7
Remote Port:any
-----------------------------------------
Location   :0/RP1/CPU0
Client ID  :TCP
Cookie     :0x4826fa0c
Clnt Flags :REUSEPORT
Layer 3    :IPV4
Layer 4    :TCP
```

```
Local Addr :any
Remote Addr:any
Local Port :9
Remote Port:any
-----------------------------------------
Location   :0/RP1/CPU0
Client ID  :TCP
Cookie     :0x482700d0
Clnt Flags :REUSEPORT
Layer 3    :IPV4
Layer 4    :TCP
Local Addr :any
Remote Addr:any
Local Port :19
Remote Port:any
-----------------------------------------
Location   :0/RP1/CPU0
Client ID  :IPV4_IO
Cookie     :0x00000001
Clnt Flags :
Layer 3    :IPV4
Layer 4    :ICMP
Local Addr :any
Remote Addr:any
Local Port :any
Remote Port:any
Filters    :Type / Intf or Pkt Type / Source Addr / Location
 INCLUDE_TYPE / type 8
 INCLUDE_TYPE / type 13
 INCLUDE_TYPE / type 17
```

This table describes the significant fields shown in the display.

Table 47: show lpts bindings Command Field Descriptions

Field	Description
Location	Node location, in the format of *rack/slot/module*.
Client ID	LPTS client type.
Cookie	Client's unique tag for the binding.
Clnt Flags	REUSEPORT -- client has set the SO_REUSEPORT or SO_REUSEADDR socket option.
Layer 3	Layer 3 protocol (IPv4, IPv6, CLNL).
Layer 4	Layer 4 protocol (TCP, UDP).
Local Addr	Local (destination) address.
Remote Addr	Remote (source) address.
Local Port	Local (destination) TCP or UDP port, or ICMP/IGMP packet type, or IPsec SPI.
Remote Port	Remote (source) TCP or UDP port.

The following sample output is from the **show lpts bindings brief** command:

```
RP/0/RP0/CPU0:router# show lpts bindings brief

@ - Indirect binding; Sc - Scope

 Location   Clnt Sc L3   L4    VRF-ID   Local,Remote Address.Port  Interface
 ---------- ---- -- ---- ----- -------- -------------------------- ------------
 0/1/CPU0   IPV4 LO IPV4 ICMP  *        any.ECHO any               any
 0/1/CPU0   IPV4 LO IPV4 ICMP  *        any.TSTAMP any             any
 0/1/CPU0   IPV4 LO IPV4 ICMP  *        any.MASKREQ any            any
 0/1/CPU0   IPV6 LO IPV6 ICMP6 *        any.ECHOREQ any            any
 0/3/CPU0   IPV4 LO IPV4 ICMP  *        any.ECHO any               any
 0/3/CPU0   IPV4 LO IPV4 ICMP  *        any.TSTAMP any             any
```

This table describes the significant fields shown in the display.

Table 48: show lpts bindings brief Command Field Descriptions

Field	Description
Location	Node location, in the format of *rack/slot/module*.
Clnt ID	LPTS client type.
Sc	Scope (LR = Logical-Router, LO = Local).
Layer 3	Layer 3 protocol.
Layer 4	Layer 4 protocol.
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local,Remote Address.Port	Local (destination) and Remote (source) addresses and ports or packet types.
Interface	Inbound interface.

Related Commands

Command	Description
show lpts clients, on page 433	Displays the client information for the Port Arbitrator.
show lpts flows, on page 435	Displays information about LPTS flows.

show lpts clients

To display the client information for the Port Arbitrator, use the **show lpts clients** command in EXEC mode.

show lpts clients [**times**]

Syntax Description

times	(Optional) Displays information about binding request rates and service times.

Command Default

No default behavior or values

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **show lpts clients** command displays the clients connected to the local packet transport services (LPTS) port arbitrator (PA).

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts clients** command:

```
RP/0/RP0/CPU0:router# show lpts clients

o_flgs - open flags ; clid - client id
clid            loc             flags   o_flgs
RAW(3)          0/RP1/CPU0      0x1     0x2
TCP(1)          0/RP1/CPU0      0x1     0x2
IPV4_IO(5)      0/1/CPU0        0x3     0x2
IPV4_IO(5)      0/2/CPU0        0x3     0x2
IPV4_IO(5)      0/RP1/CPU0      0x3     0x2
MPA(7)          0/RP1/CPU0      0x3     0x0
```

This table describes the significant fields shown in the display.

Table 49: show lpts clients Command Field Descriptions

Field	Description
Clid	LPTS client ID.
Loc	Node location, in the format *rack/slot/module*.
Flags	Client flags. **Note** The client flags are used only for debugging purposes.

Field	Description
o_flags	Open flags. **Note** The open flags are used only for debugging purposes.

The following sample output is from the **show lpts clients times** command. The output shows samples for the last 30 seconds, 1 minute, 5 minutes, 10 minutes, and a total (if nonzero). The number of transactions, number of updates, and the minimum/average/maximum time in milliseconds to process each transaction is shown.

```
RP/0/RP0/CPU0:router# show lpts clients times

o_flgs - open flags ; clid - client id
clid            loc     flags   o_flgs
RAW(3)          0/RP1/CPU0      0x1     0x2
   30s:2 tx 2 upd 2/2/3ms/tx
    1m:2 tx 2 upd 2/2/3ms/tx
    5m:2 tx 2 upd 2/2/3ms/tx
   10m:2 tx 2 upd 2/2/3ms/tx
 total:2 tx 2 upd 2/-/3ms/tx
TCP(1)          0/RP1/CPU0      0x1     0x2
 total:3 tx 3 upd 1/-/1ms/tx
IPV4_IO(5)      0/1/CPU0        0x3     0x2
 total:1 tx 1 upd 0/-/0ms/tx
IPV4_IO(5)      0/2/CPU0        0x3     0x2
 total:1 tx 1 upd 1/-/1ms/tx
IPV4_IO(5)      0/RP1/CPU0      0x3     0x2
 total:1 tx 1 upd 3/-/3ms/tx
MPA(7)          0/RP1/CPU0      0x3     0x0
```

Related Commands

Command	Description
show lpts bindings, on page 429	Displays the binding information in the port arbitrator.
show lpts flows, on page 435	Displays information about LPTS flows.

show lpts flows

To display information about Local Packet Transport Services (LPTS) flows, use the **show lpts flows** command in EXEC mode.

show lpts flows [**brief**]

Syntax Description

brief	(Optional) Displays summary output.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **show lpts flows** command is used to display LPTS flows, which are aggregations of identical binding requests from multiple clients and are used to program the LPTS Internal Forwarding Information Base (IFIB) and Pre-IFIB.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts flows** command:

```
RP/0/RP0/CPU0:router# show lpts flows

-----------------------------------------
L3-proto    : IPV4(2)
L4-proto    : ICMP(1)
VRF-ID      : * (000000000)
Local-IP    : any
Remote-IP   : any
Pkt-Type    : 8
Remote-Port : any
Interface   : any (0x0)
Flow-type   : ICMP-local
Min-TTL     : 0
Slice       : RAWIP4_FM
Flags       : 0x20 (in Pre-IFIB)
Location    : (drop)
Element References
location / count / scope
* / 3 / LOCAL
```

This table describes the significant fields shown in the display.

Table 50: show lpts flows Command Field Descriptions

Field	Description
L3-proto	Layer 3 protocol (IPv4, IPv6, CLNL).
L4-proto	Layer 4 protocol (TCP, UDP, and so on.).
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local-IP	Local (destination) IP address.
Remote-IP	Remote (source) IP address.
Pkt-Type	ICMP or IGMP packet type.
Remote-Port	Remote (source) TCP or UDP port.
Interface	Ingress interface.
Flow-type	Flow classification for hardware packet policing.
Min-TTL	Minimum time-to-live value expected from in the incoming packet. Ant packet received with a lower TTL value will be dropped.
Slice	IFIB slice.
Flags	• Has FGID: delivered to multiple destinations • No IFIB entry: IFIB entry suppressed • Retrying FGID allocation • In Pre-IFIB: entry is in Pre-IFIB as well • Deliver to one: if multiple bindings, will deliver to only one
Location	*rack/slot/module* to deliver to
Element References	• location: *rack/slot/module* of client. • count: number of clients at that location. • scope: binding scope (LR:Logical Router, LOCAL:Local)

The following sample output is from the **show lpts flows brief** command:

```
RP/0/RP0/CPU0:router# show lpts flows brief

+ - Additional delivery destination; L - Local interest; P - In Pre-IFIB

 L3   L4    VRF-ID   Local, Remote Address.Port      Interface    Location    LP
 ---- ----- -------- ------------------------------- ------------ ----------- --
 IPV4 ICMP  *        any.ECHO any                    any          (drop)      LP
 IPV4 ICMP  *        any.TSTAMP any                  any          (drop)      LP
 IPV4 ICMP  *        any.MASKREQ any                 any          (drop)      LP
 IPV6 ICMP6 *        any.ECHOREQ any                 any          (drop)      LP
 IPV4 any   default  224.0.0.2 any                   Gi0/1/0/1    0/5/CPU0     P
```

This table describes the significant fields shown in the display.

Table 51: show lpts flows brief Command Field Descriptions

Field	Description
L3	Layer 3 protocol (IPv4, IPv6, CLNL).
L4	Layer 4 protocol.
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local, Remote Address.Port	Local (destination) and remote (source) IP addresses and TCP or UDP ports, or ICMP/IGMP packet types, or IPSec Security Parameters Indices.
Interface	Ingress interface.
Location	Delivery location: • *rack/slot/module*— individual location • [0xNNNNN]— multiple locations (platform-dependent value) • (drop)— do not deliver to any application
LP	Local interest (to be processed by IPv4 or IPv6 stack directly) or entry is resident in Pre-IFIB.

Related Commands

Command	Description
show lpts bindings, on page 429	Displays the binding information in the port arbitrator.
show lpts clients, on page 433	Displays the client information for the port arbitrator.

show lpts ifib

To display the entries in the Internal Forwarding Information Base (IFIB), use the **show lpts ifib** command in EXEC mode.

show lpts ifib [**entry**] [{**type** {**bgp4** | **bgp6** | **isis** | **mcast4** | **mcast6** | **ospf-mc4** | **ospf-mc6** | **ospf4** | **ospf6** | **raw4** | **raw6** | **tcp4** | **tcp6** | **udp4** | **udp6**} | **all**}] [**brief** [**statistics**]] [**slices**] [**times**] [**location** *node-id*]

Syntax Description

entry	(Optional) Displays the IFIB entries.
type	(Optional) Displays the following protocol types. • **bgp4** —IPv4 Border Gateway Protocol (BGP) slice • **bgp6** —IPv6 BGP slice • **isis** —Intermediate System-to-Intermediate System (IS-IS) slice • **mcast4** —IPv4 multicast slice • **mcast6** —IPv6 multicast slice • **ospf-mc4** —IPv4 Open Shortest Path First (OSPF) multicast slice • **ospf-mc6** —IPv6 OSPF multicast slice • **ospf4** —IPv4 OSPF slice • **ospf6** —IPv6 OSPF slice • **raw4** —IPv4 raw IP • **raw6** —IPv6 raw IP • **tcp4** —IPv4 Transmission Control Protocol (TCP) slice • **tcp6** —IPv6 TCP slice • **udp4** —IPv4 UDP slice • **udp6** —IPv6 UDP slice
all	Displays all IFIB types.
brief	(Optional) Displays the IFIB entries in brief format.
statistics	(Optional) Displays the IFIB table with statistics information.
slices	(Optional) Displays IFIB slices.
times	(Optional) Displays the IFIB update transaction times.
location *node-id*	(Optional) Specifies the location of the Flow Manager. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Release	Modification
Release 3.6.0	The **slices** and **times** keywords were added.

Usage Guidelines

Use this command to display detailed information about the entries in an IFIB slice. This command is useful for debugging problems with delivering packets to applications.

When the **statistics** keyword is used, detailed statistics are displayed for packet count, number of entries in each slice, and a total entries count.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib** command:

```
RP/0/RP0/CPU0:router# show lpts ifib

O - Opcode; A - Accept Counter; D - Drop Counter; F - Flow Type; L - Listener Tag;
I - Local Flag; Y - SYN; T - Min TTL; DV - Deliver; DP - Drop; RE - Reassemble; na - Not
Applicable
------------------------------------------------------
VRF-ID           : default (0x60000000)
Port/Type        : any
Source Port      : any
Dest IP          : any
Source IP        : any
Layer 4          : 88 (88)
Interface        : any (0x0)
O/A/D/F/L/I/Y/T  : DELIVER/0/0/EIGRP/IPv4_STACK/0/0/0
Deliver List     : 0/5/CPU0
------------------------------------------------------
```

This table describes the significant fields shown in the display.

Table 52: show lpts ifib entries Command Field Descriptions

Field	Description
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Port/Type	Destination (local) TCP or UDP port number, or ICMP/IGMP packet type, or IPSec Security Parameters Index.t2222
Source Port	Source (remote) TCP or UDP port.
Dest IP	Destination (local) IP address.
Source IP	Source (remote) IP address.
Layer 4	Layer 4 protocol number (6 = TCP). **Note** Only the common Layer 4 protocol names are displayed.

Field	Description
Interface	Ingress interface name.
O/S/P/R/L/I/Y	• O: Opcode (DELIVER, DROP, or REASSEMBLE • S: Stats counter • P: Packet forwarding priority (LO, MED, or HIGH) • R: Rate limit (LO, MED, or HIGH) • L: Listener tag (IPv4_STACK, IPv6_STACK, or CLNL_STACK) • I: Local-interest flag (0 or 1) • Y: TCP SYN flag (0 or 1)
Deliver List	• (drop)—Drop packet • *rack/slot/module*—Deliver to single destination • [0xNNNN]—Deliver to multiple destinations (platform-dependent format)

The following sample output is from the **show lpts ifib brief** command:

```
RP/0/RP0/CPU0:router# show lpts ifib brief

 Slice    Local, Remote Address.Port            L4    Interface    Dlvr
 -------- ------------------------------------ ----- ------------ -----------
 TCP4     any.7 any                            TCP   any          0/RP1/CPU0
 TCP4     any.9 any                            TCP   any          0/RP1/CPU0
```

The following sample output is from the **show lpts ifib brief statistics** command:

```
RP/0/RP0/CPU0:router# show lpts ifib brief statistics

 Slice    Local, Remote Address.Port            L4    Interface    Accept/Drop
 -------- ------------------------------------ ----- ------------ -----------
 TCP4     any.7 any                            TCP   any          0/0
 TCP4     any.9 any                            TCP   any          0/0
 TCP4     any.19 any                           TCP   any          0/0

 Slice    Num. Entries Accepts/Drops
 -------- ------------ -------------
TCP4     3            0/0
Total    3            0/0
```

Related Commands

Command	Description
show lpts ifib slices, on page 441	Displays IFIB slice information.

show lpts ifib slices

To display Internal Forwarding Information Base (IFIB) slice information, use the **show lpts ifib slices** command in EXEC mode.

show lpts ifib slices [**type** {**bgp4** | **bgp6** | **isis** | **mcast4** | **mcast6** | **ospf-mc4** | **ospf-mc6** | **ospf4** | **ospf6** | **raw4** | **raw6** | **tcp4** | **tcp6** | **udp4** | **udp6**}] [**all**] [**statistics**] [**times**]

Syntax Description

type	(Optional) Enter protocol types. • **bgp4** —IPv4 Border Gateway Protocol (BGP) slice • **bgp6** —IPv6 BGP slice • **isis** —Intermediate System-to-Intermediate System (IS-IS) slice • **mcast4** —IPv4 multicast slice • **mcast6** —IPv6 multicast slice • **ospf-mc4** —IPv4 Open Shortest Path First (OSPF) multicast slice • **ospf-mc6** —IPv6 OSPF multicast slice • **ospf4** —IPv4 OSPF slice • **ospf6** —IPv6 OSPF slice • **raw4** —IPv4 raw IP • **raw6** —IPv6 raw IP • **tcp4** —IPv4 Transmission Control Protocol (TCP) slice • **tcp6** —IPv6 TCP slice • **udp4** —IPv4 UDP slice • **udp6** —IPv6 UDP slice
all	(Optional) Displays all entries.
statistics	(Optional) Displays the statistics for slice lookups.
times	(Optional) Displays the IFIB update transaction times.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **show lpts ifib slices** command when troubleshooting IFIB entries and slice assignments. This command is especially useful when troubleshooting problems with delivering packets to applications.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib slices** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices

Slice    L3   L4     Port  Location
-------- ---- ------ ----- --------
RAWIP4   IPV4 any    any   0/RP1/CPU0
RAWIP6   IPV6 any    any   0/RP1/CPU0
OSPF4    IPV4 OSPF   any   0/RP1/CPU0
OSPF6    IPV6 OSPF   any   0/RP1/CPU0
OSPF_MC4 IPV4 any    any   0/RP1/CPU0
OSPF_MC6 IPV6 any    any   0/RP1/CPU0
BGP4     IPV4 TCP    179   0/RP1/CPU0
BGP6     IPV6 TCP    179   0/RP1/CPU0

UDP4     IPV4 UDP    any   0/RP1/CPU0
UDP6     IPV6 UDP    any   0/RP1/CPU0
TCP4     IPV4 TCP    any   0/RP1/CPU0
TCP6     IPV6 TCP    any   0/RP1/CPU0
ISIS     CLNS -      any   0/RP1/CPU0
MCAST4   IPV4 any    any   0/RP1/CPU0
MCAST6   IPV6 any    any   0/RP1/CPU0
```

The following sample output is from the **show lpts ifib slices times** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices times

Slice    L3   L4     Port  Location
-------- ---- ------ ----- --------
RAWIP4   IPV4 any    any   0/RP1/CPU0
RAWIP6   IPV6 any    any   0/RP1/CPU0
OSPF4    IPV4 OSPF   any   0/RP1/CPU0
OSPF6    IPV6 OSPF   any   0/RP1/CPU0
OSPF_MC4 IPV4 any    any   0/RP1/CPU0
OSPF_MC6 IPV6 any    any   0/RP1/CPU0
BGP4     IPV4 TCP    179   0/RP1/CPU0
BGP6     IPV6 TCP    179   0/RP1/CPU0

UDP4     IPV4 UDP    any   0/RP1/CPU0
UDP6     IPV6 UDP    any   0/RP1/CPU0
TCP4     IPV4 TCP    any   0/RP1/CPU0
TCP6     IPV6 TCP    any   0/RP1/CPU0
ISIS     CLNS -      any   0/RP1/CPU0
MCAST4   IPV4 any    any   0/RP1/CPU0
MCAST6   IPV6 any    any   0/RP1/CPU0
  Flow Manager 0/RP1/CPU0:
   total:5 tx 13 upd 1/-/1ms/tx
```

The following sample output is from the **show lpts ifib slices statistics** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices all statistics

Slice    L3   L4     Port  Location   Lookups RmtDlvr Rejects RLDrops NoEntry
```

```
-------- ---- ------ ----- ---------- -------- -------- -------- -------- --------
RAWIP4   IPV4 any    any   0/0/CPU0   5        0        0        0        0
RAWIP6   IPV6 any    any   0/0/CPU0   0        0        0        0        0
OSPF4    IPV4 OSPF   any   0/0/CPU0   0        0        0        0        0
OSPF6    IPV6 OSPF   any   0/0/CPU0   0        0        0        0        0
OSPF_MC4 IPV4 any    any   0/0/CPU0   0        0        0        0        0
OSPF_MC6 IPV6 any    any   0/0/CPU0   0        0        0        0        0
BGP4     IPV4 TCP    179   0/0/CPU0   0        0        0        0        0
BGP6     IPV6 TCP    179   0/0/CPU0   0        0        0        0        0

UDP4     IPV4 UDP    any   0/0/CPU0   3704     0        979      0        0
UDP6     IPV6 UDP    any   0/0/CPU0   0        0        0        0        0
TCP4     IPV4 TCP    any   0/0/CPU0   0        0        0        0        0
TCP6     IPV6 TCP    any   0/0/CPU0   0        0        0        0        0
ISIS     CLNS -      any   0/0/CPU0   0        0        0        0        0
MCAST4   IPV4 any    any   0/0/CPU0   0        0        0        0        0
MCAST6   IPV6 any    any   0/0/CPU0   0        0        0        0        0
  Flow Manager 0/0/CPU0:
   Packets in: 3792
   Packets delivered locally without lookups: 83
   Slice lookups: 3709
     Rejects: 979
```

This table describes the significant fields shown in the display.

Table 53: show lpts ifib slices statistics Command Field Descriptions

Field	Description
Slice	Slice number.
L3-proto	Layer 3 protocol (IPv4, IPv6, CLNL).
L4-proto	Layer 4 protocol (TCP, UDP, and others).
Port	Local (destination) TCP or UDP port.
Location	Node location, in the format *rack/slot/module*.

Related Commands

Command	Description
show lpts ifib , on page 438	Displays entries in the IFIB.

show lpts ifib statistics

To display Internal Forwarding Information Base (IFIB) statistics, use the **show lpts ifib statistics** command in EXEC mode.

show lpts ifib statistics [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib statistics** command:

```
RP/0/RP0/CPU0:router# show lpts ifib statistics

Flow Manager 0/RP1/CPU0:
   Packets in:254
   Packets delivered locally without lookups:0
   Slice lookups:254
     Post-lookup error drops:
      Failed ipv4_netio_input:1
     Rejects:254
    Packets delivered locally:0
    Packets delivered remotely:0
```

This table describes the significant fields shown in the display.

Table 54: show lpts ifib statistics Command Field Descriptions

Field	Description
Packets in	Packets presented to the LPTS decaps node in netio.
Packets delivered locally without lookups	Packets previously resolved on a LC delivered directly to L3.
Slice lookups	Packets requiring slice lookups.

Field	Description
Post-lookup error drops	Packets dropped after a slice lookup.
Rejects	Packets that caused a TCP RST or ICMP Port/Protocol Unreachable.
Packets delivered locally	Packets delivered to local applications after slice lookups.
Packets delivered remotely	Packets delivered to applications on remote RPs.

Note The sample output is an example only and displays only those fields showing a value. No display exists for nonzero values. This command may show other values depending on your router configuration.

Related Commands

Command	Description
show lpts ifib , on page 438	Displays the entries in an IFIB slice.

show lpts ifib times

To display Internal Forwarding Information Base (IFIB) update transaction times, use the **show lpts ifib times** command in EXEC mode.

show lpts ifib times [**location** *node-id*]

Syntax Description

location *node-id*	(Optional) Displays IFIB update transaction times for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib times** command:

```
RP/0/RP0/CPU0:router# show lpts ifib times

Slice    L3   L4     Port  Location
-------- ---- ------ ----- --------
RAWIP4   IPV4 any    any   0/RP1/CPU0
RAWIP6   IPV6 any    any   0/RP1/CPU0
OSPF4    IPV4 OSPF   any   0/RP1/CPU0
OSPF6    IPV6 OSPF   any   0/RP1/CPU0
OSPF_MC4 IPV4 any    any   0/RP1/CPU0
OSPF_MC6 IPV6 any    any   0/RP1/CPU0
BGP4     IPV4 TCP    179   0/RP1/CPU0
BGP6     IPV6 TCP    179   0/RP1/CPU0
UDP4     IPV4 UDP    any   0/RP1/CPU0
UDP6     IPV6 UDP    any   0/RP1/CPU0
TCP4     IPV4 TCP    any   0/RP1/CPU0
TCP6     IPV6 TCP    any   0/RP1/CPU0
ISIS     CLNS -      any   0/RP1/CPU0
MCAST4   IPV4 any    any   0/RP1/CPU0
MCAST6   IPV6 any    any   0/RP1/CPU0
Flow Manager 0/RP1/CPU0:
 total:5 tx 13 upd 1/-/1ms/tx
```

This table describes the significant fields shown in the display.

Table 55: show lpts ifib times Command Field Descriptions

Field	Description
Slice	Slice number.
L3 Protocol	Layer 3 protocol (IPv4, IPV6, CLNL).
L4 Protocol	Layer 4 protocol (TCP, UDP, and so on).
Port	Local (destination) TCP or UDP port.
Location	Node location, in the format *rack/slot/module*.

Related Commands

Command	Description
show lpts ifib , on page 438	Displays detailed information about entries in an IFIB slice.

show lpts mpa groups

To display aggregate information about multicast bindings for groups, use the **show lpts mpa groups** command in EXEC mode.

show lpts mpa groups *type interface-path-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **show lpts mpa groups** command is used to aggregate information about the multicast groups joined on a specified interface. This command also displays the filter mode and source list associated with the groups joined on a specified interface.

Task ID

Task ID	Operations
lpts	read
network	read

Examples

The following sample output is from the **show lpts mpa groups** command:

```
RP/0/RP0/CPU0:router# show lpts mpa groups POS 0/0/0/0

  224.0.0.2 : includes 0, excludes 1, mode EXCLUDE
    <no source filter>
  224.0.0.13 : includes 0, excludes 1, mode EXCLUDE
    <no source filter>
  224.0.0.22 : includes 0, excludes 1, mode EXCLUDE
    <no source filter>
```

This table describes the significant fields shown in the display.

Table 56: show lpts mpa groups Command Field Descriptions

Field	Description
Includes	Displays the number of sockets that have set up an INCLUDE mode filter for that group and if there are any source-specific filters.
Excludes	Displays the number of sockets that have set up an EXCLUDE mode filter for that group and if there are any source-specific filters.

show lpts pifib

To display Pre-Internal Forwarding Information Base (Pre-IFIB) entries, use the **show lpts pifib** command in EXEC mode.

show lpts pifib [entry] [hardware {**entry | police**}**[type {isis | ipv4 | ipv6}**{**frag | ixmp | mcast | tcp | udp | ipsec | raw | all**}[**entry**] **brief [statistics][location** *node-id*]

Syntax Description

entry	(Optional) Pre-IFIB entry.
hardware	(Optional) Displays hardware for Pre-IFIB.
entry	Displays the entries for Pre-IFIB.
police	Displays the policer values that are being use.
type	(Optional) Protocol type.
isis	Intermediate System-to-Intermediate System (IS-IS) sub Pre-IFIB type.
ipv4	IPv4 sub Pre-IFIB type. Possible values include **frag** , **ixmp** , **mcast** , **tcp** , **udp** , **ipsec** , and **raw** .
ipv6	IPv6 sub Pre-IFIB type. Possible values include **frag** , **icmp** , **ixmp** , **mcast** , **tcp** , **udp** , **ipsec, and raw** .
frag	IPv4 or IPv6 fragment.
icmp	IPv4 or IPv6 IXMP and Internet Group Management Protocol (IGMP).
ixmp	IPv4 or IPv6 IXMP (ICMP and Internet Group Management Protocol [IGMP]).
mcast	IPv4 or IPv6 Multicast.
tcp	IPv4 or IPv6 Transmission Control Protocol (TCP).
udp	IPv4 or IPv6 User Datagram Protocol (UDP).
ipsec	Secure IP.
raw	IPv4 orIPv6 raw IP.
all	All sub Pre-IFIBs.
brief	(Optional) Pre-IFIB entries in brief format.
statistics	(Optional) Pre-IFIB table with statistics information.
location *node-id*	(Optional) The *node-id* argument is entered in the *rack/slot/module* notation (for example, 0/7/CPU0).

Command Default

By default, all entries are displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **hardware** keyword was added.

Usage Guidelines

Use the **show lpts pifib** command with the **brief** keyword to perform the following functions:

- Display entries of all or part of a Pre-IFIB.
- Display a short description of each entry in the LPTS Pre-IFIB, optionally displaying packet counts for each entry.

Note These statistics are used only for packets that are processed by a line card, route processor, or distributed route processor.

Pre-IFIB statistics for packets processed by line card hardware are counted separately.

By default, all the defaults are displayed.

Task ID

Task ID	Operations
lpts	read

Examples

The following is sample output for the **show lpts pifib** command:

```
RP/0/RP0/CPU0:router# show lpts pifib

O - Opcode; F - Flow Type; L - Listener Tag; I - Local Flag; T - Min TTL;
na - Not Applicable
-----------------------------------------------------
L3 Protocol       : CLNS
L4 Protocol       : -
VRF-ID            : default (0x60000000)
Destination IP    : any
Source IP         : any
Port/Type         : any
Source Port       : any
Is Fragment       : 0
Is SYN            : 0
Interface         : any (0x0)
O/F/L/I/T         : DELIVER/ISIS-default/CLNS_STACK/0/0
Deliver List      : FGID 11935
Accepts/Drops     : 0/0
Is Stale          : 0
```

The following is sample output for the **show lpts pifib type** command using the **ipv4** and **tcp** keywords.

```
RP/0/RP0/CPU0:router# show lpts pifib type ipv4 tcp

O - Opcode; F - Flow Type; L - Listener Tag; I - Local Flag; T - Min TTL;
na - Not Applicable
-----------------------------------------------------
L3 Protocol       : IPV4
L4 Protocol       : TCP
VRF-ID            : default (0x60000000)
Destination IP    : any
Source IP         : any
Port/Type         : Port:23
Source Port       : any
Is Fragment       : 0
Is SYN            : 0
Interface         : any (0x0)
O/F/L/I/T         : DELIVER/TELNET-default/IPv4_LISTENER/0/0
Deliver List      : 0/
RP0
/CPU0
Accepts/Drops     : 0/0
Is Stale          : 0
-----------------------------------------------------
```

The following is sample output from the **show lpts pifib entry brief** command:

```
RP/0/RP0/CPU0:router# show lpts pifib entry brief

* - Critical Flow; I - Local Interest;
X - Drop; R - Reassemble;

 Type       VRF-ID   Local, Remote Address.Port L4    Interface    Deliver
 ---------- -------- ------------------------- ----- ------------ -------------

 ISIS       *        - -                       -     any          0/0/CPU0
 IPv4_frag  *        any any                   any   any          R
 IPv4_IXMP  *        any.ECHO any              ICMP  any          XI
 IPv4_IXMP  *        any.TSTAMP any            ICMP  any          XI
 IPv4_IXMP  *        any.MASKREQ any           ICMP  any          XI
 IPv4_IXMP  *        any any                   ICMP  any          0/0/CPU0
 IPv4_IXMP  *        any any                   IGMP  any          0/0/CPU0
 IPv4_mcast *        224.0.0.5 any             any   any          0/0/CPU0
 IPv4_mcast *        224.0.0.6 any             any   any          0/0/CPU0
 IPv4_mcast *        224.0.0.0/4 any           any   any          0/0/CPU0

 IPv4_TCP   *        any.179 any               TCP   any          0/0/CPU0
 IPv4_TCP   *        any any.179               TCP   any          0/0/CPU0
 IPv4_TCP   *        any any                   TCP   any          0/0/CPU0
 IPv4_UDP   *        any any                   UDP   any          0/0/CPU0
 IPv4_IPsec *        any any                   ESP   any          0/0/CPU0
 IPv4_IPsec *        any any                   AH    any          0/0/CPU0
 IPv4_rawIP *        any any                   OSPF  any          0/0/CPU0
 IPv4_rawIP *        any any                   any   any          0/0/CPU0
 IPv6_frag  *        any any                   any   any          R
 IPv6_ICMP  *        any.na any                ICMP6 any          XI
 IPv6_ICMP  *        any any                   ICMP6 any          0/0/CPU0
 IPv6_mcast *        ff02::5 any               any   any          0/0/CPU0
 IPv6_mcast *        ff02::6 any               any   any          0/0/CPU0
 IPv6_mcast *        ff00::/8 any              any   any          0/0/CPU0
 IPv6_TCP   *        any.179 any               TCP   any          0/0/CPU0
 IPv6_TCP   *        any any.179               TCP   any          0/0/CPU0
 IPv6_TCP   *        any any                   TCP   any          0/0/CPU0
 IPv6_UDP   *        any any                   UDP   any          0/0/CPU0
```

```
 IPv6_IPsec *        any any                    ESP   any          0/0/CPU0
 IPv6_IPsec *        any any                    AH    any          0/0/CPU0
 IPv6_rawIP *        any any                    OSPF  any          0/0/CPU0
 IPv6_rawIP *        any any                    any   any          0/0/CPU0
```

The following sample output is from the **show lpts pifib entry brief statistics** command:

```
RP/0/RP0/CPU0:router# show lpts pifib entry brief statistics

* - Critical Flow; I - Local Interest;
X - Drop; R - Reassemble;

 Type       VRF-ID   Local, Remote Address.Port L4    Interface    Accepts/Drops

 ---------- -------- -------------------------- ----- ------------ -------------

 ISIS       *        - -                        -     any          0/0
 IPv4_frag  *        any any                    any   any          0/0
 IPv4_IXMP  *        any.ECHO any               ICMP  any          0/0
 IPv4_IXMP  *        any.TSTAMP any             ICMP  any          0/0
 IPv4_IXMP  *        any.MASKREQ any            ICMP  any          0/0
 IPv4_IXMP  *        any any                    ICMP  any          5/0
 IPv4_IXMP  *        any any                    IGMP  any          0/0
 IPv4_mcast *        224.0.0.5 any              any   any          0/0
 IPv4_mcast *        224.0.0.6 any              any   any          0/0
 IPv4_mcast *        224.0.0.0/4 any            any   any          0/0
 IPv4_TCP   *        any.179 any                TCP   any          0/0
 IPv4_TCP   *        any any.179                TCP   any          0/0
 IPv4_TCP   *        any any                    TCP   any          0/0
 IPv4_UDP   *        any any                    UDP   any          4152/0
 IPv4_IPsec *        any any                    ESP   any          0/0
 IPv4_IPsec *        any any                    AH    any          0/0
 IPv4_rawIP *        any any                    OSPF  any          0/0


----------------------


statistics:

Type            Num. Entries         Accepts/Drops

------          ------------         -------------
ISIS            1                    0/0
IPv4_frag       1                    0/0
IPv4_IXMP       5                    5/0
IPv4_mcast      3                    0/0
IPv4_TCP        3                    0/0
IPv4_UDP        1                    4175/0
IPv4_IPsec      2                    0/0
IPv4_rawIP      2                    0/0
IPv6_frag       1                    0/0
IPv6_ICMP       2                    0/0
IPv6_mcast      3                    0/0
IPv6_TCP        3                    0/0
IPv6_UDP        1                    0/0
IPv6_IPsec      2                    0/0
IPv6_rawIP      2                    0/0
Total           32

Packets into Pre-IFIB: 4263
Lookups: 4263
Packets delivered locally: 4263
```

```
Packets delivered remotely: 0
```

This table describes the significant fields shown in the display for the **show lpts pifib brief statistics** command.

Table 57: show lpts pifib Command Field Descriptions

Field	Description
Type	Hardware entry type.
VRF ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local, Remote Address. Port	Indicates local address (in the form of local port and type) and remote address (remote port).
L4	Layer 4 protocol of the entry.
Interface	Interface for this entry.
Accepts/Drops	Number of packets sent to DestAddr/Number of packets dropped due to policing.
Num. Entries	Number of pre-ifib entries of the listed type.
Packets into Pre-IFIB	Packets presented for pre-IFIB lookups.
Lookups	Packets looked up.
Packets delivered locally	Packets delivered to local applications or the local stack (*n* duplicated) packets duplicated for delivery to applications and the local stack.
Packets delivered remotely	Packets delivered to applications or for lookup on other RPs.

show lpts pifib hardware context

To display the context for the Local Packet Transport Services (LPTS) pre-IFIB hardware-related data structures, use the **show lpts pifib hardware context** command in EXEC mode.

show lpts pifib hardware context [**location** {**all** | *node_id* }]

Syntax Description

location *node-id*	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
all	Specifies all locations.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts pifib hardware context** command with the **location** keyword:

```
RP/0/RP0/CPU0:router# show lpts pifib hardware context location 0/1/0

Node: 0/1/CPU0:
----------------------------------------
ACL ID for block 0: 3
Batching mode: No batching
TCAM Mgr ready: Yes
Mstats Mgr ready: Yes
Metro Driver ready: Yes
Resource sync: Yes
Sweep invoked: Yes
Initialization phase: Done
Queue for TCAM Batching:
    Size: 0 Head ptr: 0x0
Queue for Entry Processing:
    Size: 0 Head ptr: 0x0
Queue for Resources Releasing:
    Size: 0 Head ptr: 0x0
--------
IPv4 Region:
Block [0]:
```

```
    # of TCAM entries: 56 block created: Yes
    first entry in the block: 0x482a055c
Last non mandatory entry: 0x482c1a08
Queue for Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
Queue for Non Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
1st entry to be programmed: 0x0
Max. of entries: 15999
# of entries in shadow list: 54
1st entry in shadow list: 0x482a055c
last entry in shadow list: 0x48303534
--------
IPv6 Region:
Block [0]:
    # of TCAM entries: 20 block created: Yes
    first entry in the block: 0x482c1720
Last non mandatory entry: 0x482c1b00
Queue for Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
Queue for Non Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
1st entry to be programmed: 0x0
Max. of entries: 15999
# of entries in shadow list: 20
1st entry in shadow list: 0x482c1720
last entry in shadow list: 0x482e2344
--------
ISIS Region:
Block [0]:
    # of TCAM entries: 1 block created: Yes
    first entry in the block: 0x482e2cf4
Last non mandatory entry: 0xfd30d088
Queue for Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
Queue for Non Mandatory entries not in TCAM:
    Size: 0 Head ptr: 0x0
1st entry to be programmed: 0x0
Max. of entries: 15999
# of entries in shadow list: 1
1st entry in shadow list: 0x482e2cf4
last entry in shadow list: 0x482e2cf4
# of TCAM Insert: 0
# of TCAM Delete: 0
# of TCAM Update: 0
# of resource leaks: 0
```

show lpts pifib hardware entry

To display entries in the Local Packet Transport Services (LPTS) pre-IFIB hardware table, use the **show lpts pifib hardware entry** command in EXEC mode.

show lpts pifib hardware entry [**acl** *acl-name*] [**type** {**ipv4** | **ipv6** | **isis**}] [**start-index** *number* **num-entries** *number*] [{**brief** | **statistics**}] [**location** {**all***node_id*}]

Syntax Description

type	(Optional) Specifies the hardware entry type. Enter one of the following types: • **ipv4** —Specifies IPv4 entries. • **ipv6** —Specifies IPv6 entries. • **isis** —Specifies ISIS entries.
start-index *number*	(Optional) Starting index number.
num-entries *number*	(Optional) Maximum entries permitted.
brief	(Optional) Displays summary hardware entry information.
statistics	(Optional) Displays hardware entry accept or drop statistics for each summary entry.
all	Specifies all locations.

Command Default

Displays hardware entry information in brief.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **all** keyword was added.

Usage Guidelines

No specific guidelines impact the use of this command.

SNMP is not supported on ASR 9000 4th Generation Line Cards, Therefore, the ACLs that are configured on ASR 9000 4th Generation Line Cards are not displayed by running this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts pifib hardware entry** command with the **location** keyword:

```
RP/0/RP0/CPU0:router# show lpts pifib hardware entry location 0/1/CPU0
```

```
Node: 0/0/CPU0:
----------------------------------------
M - Fabric Multicast;
L - Listener Tag; T - Min TTL;
F - Flow Type;
DestNode - Destination Node;
DestAddr - Destination Fabric queue;
SID - Stream ID;
Po - Policer; Ct - Stats Counter;
Lp - Lookup priority; Sp - Storage Priority;
Ar - Average rate limit; Bu - Burst;
HAr - Hardware Average rate limit; HBu - Hardware Burst;
Cir - Committed Information rate in HAL
Rsp - Relative sorting position;
Rtp - Relative TCAM position;
na - Not Applicable or Not Available
----------------------------------------------------
VRF ID            : any
Destination IP    : any
Source IP         : any
Is Fragment       : 0
Interface         : any
M/L/T/F           : 0/ISIS_FM/0/ISIS-default
DestNode          : 48
DestAddr          : 48
SID               : 9
L4 Protocol       : -
Source port       : any
Destination Port  : any
Ct                : 0xd84da
Accepted/Dropped  : 0/0
Lp/Sp             : 0/0
# of TCAM entries : 1
HPo/HAr/HBu/Cir   : 1879638/2000pps/2000ms/2000pps
State             : Entry in TCAM
Rsp/Rtp           : 0/2

             Node: 0/1/CPU0:
----------------------------------------
V - Vital; M - Fabric Multicast;
C - Moose Congestion Flag; L - Listener Tag; T - Min TTL;
F - Flow Type;
DestNode - Destination Node;
DestAddr - Destination Fabric Address;
Sq - Ingress Shaping Queue; Dq - Destination Queue;
Po - Policer; Ct - Stats Counter;
Lp - Lookup priority; Sp - Storage Priority;
Ar - Average rate limit; Bu - Burst;
Rsp - Relative sorting position;
----------------------------------------------------
L4 Protocol       : any
VRF ID            : any
Source IP         : any
Port/Type         : any
Source Port       : any
Is Fragment       : 1
Is SYN            : any
Interface         : any
V/M/C/L/T/F       : 0/0/0/IPv4_REASS/0/Fragment
DestNode          : Local
DestAddr          : Punt
Sq/Dq/Ct          : 4/na/0x24400
Accepted/Dropped  : 0/0
Lp/Sp             : 0/0
```

```
# of TCAM entries : 1
Po/Ar/Bu          : 101/1000pps/100ms
State             : Entry in TCAM
Rsp/Rtp           : 0/0
-----------------------------------------------------
```

This table describes the significant fields shown in the display.

Table 58: show lpts pifib hardware entry Command Field Descriptions

Field	Description
L4 Protocol	Layer 4 protocol of the entry.
VRF ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Source IP	Source IP address for this entry.
Port/Type	Port or ICMP1 type for this entry.
Source Port	Source port for this entry.
Is Fragment	Indicates if this entry applies to IP fragments.
Is SYN	Indicates if this entry applies to TCP SYNs.
Interface	Interface for this entry.
V/M/C/L/T/F	• V—vital • M—fabric multicast • C—moose congestion flag • L—listener tag • T—minimum time-to-live • F—flow type
DestNode	Destination node to which to send the packet.
DestAddr	Destination address to which to send the packet.
Sq/Dq/Ct	• Sq—Ingress Shaping Queue • Dq—Destination Queue • Ct—Stats Counter.
Accepted/Dropped	Number of packets sent to DestAddr/Number of packets dropped due to policing.

[10]

[10] 1. Internet Control Message Protocol

show lpts pifib hardware police

Displays all the LPTS policer entries from the pre-Internal Forwarding Information Base (PIFIB).

show lpts pifib hardware police [**location** {*node_id* }]

Syntax Description

location *node-id*	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If no policer is configured, the default value is the configured rate.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

To retrieve command outputs, the **flow monitor-map** and **sampler-map** statements must be configured and applied to the respective interface, as shown in the following example:

```
!
flow monitor-map fmm
record ipv4
cache entries 10000
cache timeout active 15
cache timeout inactive 5
!
sampler-map fsm
random 1 out-of 1
!
interface MgmtEth0/RSP0/CPU0/0
ipv4 address 10.20.10.10 255.255.0.0
!
interface TenGigE0/3/0/0
ipv4 address 192.168.1.1 255.255.255.0
flow ipv4 monitor fmm sampler fsm ingress
flow ipv4 monitor fmm sampler fsm egress
ipv4 access-group SLMN-DPI ingress
!
```

Task ID

Task ID	Operations
lpts	read

Examples

This sample output is from the **show lpts pifib hardware police** command with the **location** keyword for 0/2/CPU0:

```
RP/0/RP0/CPU0:router# show lpts pifib hardware police location 0/2/CPU0

------------------------------------------------------------
```

```
                Node 0/2/CPU0:
------------------------------------------------------------
 Burst = 100ms for all flow types
------------------------------------------------------------
FlowType               Policer Type    Cur. Rate  Def. Rate  Accepted             Dropped
            TOS Value
---------------------- -------- -------- ---------- ---------- --------------------
-------------------- ----------
unconfigured-default   0        Static  2500       2500       0                    0
            01234567
L2TPv2-fragment        85       Static  10000      10000      0                    0
            01234567
Fragment               1        Static  2500       2500       0                    0
            01234567
OSPF-mc-known          2        Static  2000       2000       0                    0
            01234567
OSPF-mc-default        3        Static  1500       1500       0                    0
            01234567
OSPF-uc-known          4        Static  2000       2000       0                    0
            01234567
OSPF-uc-default        5        Static  1000       1000       0                    0
            01234567
ISIS-known             43       Static  2000       2000       0                    0
            01234567
ISIS-default           44       Static  1500       1500       0                    0
            01234567
BFD-known              50       Static  9600       9600       0                    0
            01234567
BFD-default            60       Static  45340      9600       0                    0
            01234567
BFD-MP-known           78       Static  11520      11520      0                    0
            01234567
BFD-MP-0               79       Static  128        128        0                    0
            01234567
BFD-BLB-known          83       Static  11520      11520      0                    0
            01234567
BFD-BLB-0              84       Static  128        128        0                    0
            01234567
BFD-SP-0               82       Static  512        512        0                    0
            01234567
BGP-known              6        Static  2500       2500       0                    0
            01234567
BGP-cfg-peer           7        Static  2000       2000       0                    0
            01234567
BGP-default            8        Static  1500       1500       0                    0
            01234567
PIM-mcast-default      9        Static  2000       2000       0                    0
            01234567
PIM-mcast-known        76       Static  2000       2000       0                    0
            01234567
PIM-ucast              10       Static  1500       1500       0                    0
            01234567
IGMP                   11       Static  3000       3000       0                    0
            01234567
ICMP-local             12       Static  1500       1500       0                    0
            01234567
ICMP-app               52       Static  1500       1500       0                    0
            01234567
ICMP-control           40       Static  1000       1000       0                    0
            01234567
ICMP-default           53       Static  1500       1500       0                    0
            01234567
ICMP-app-default       90       Static  1500       1500       0                    0
            01234567
```

```
LDP-TCP-known           13      Static  2500        2500        0                   0
             01234567
LDP-TCP-cfg-peer        14      Static  2000        2000        0                   0
             01234567
LDP-TCP-default         15      Static  1500        1500        0                   0
             01234567
LDP-UDP                 16      Static  2000        2000        0                   0
             01234567
All-routers             17      Static  1000        1000        0                   0
             01234567
LMP-TCP-known           68      Static  2500        2500        0                   0
             01234567
LMP-TCP-cfg-peer        69      Static  2000        2000        0                   0
             01234567
LMP-TCP-default         70      Static  1500        1500        0                   0
             01234567
LMP-UDP                 71      Static  2000        2000        0                   0
             01234567
RSVP-UDP                18      Static  2000        2000        0                   0
             01234567
RSVP-default            54      Static  500         500         0                   0
             01234567
RSVP-known              77      Static  7000        7000        0                   0
             01234567
IKE                     19      Static  1000        1000        0                   0
             01234567
IPSEC-known             20      Static  400         400         0                   0
             01234567
IPSEC-default           21      Static  100         100         0                   0
             01234567
IPSEC-fragment          94      Static  10000       10000       0                   0
             01234567
MSDP-known              22      Static  300         300         0                   0
             01234567
MSDP-cfg-peer           23      Static  200         200         0                   0
             01234567
MSDP-default            24      Static  100         100         0                   0
             01234567
SNMP                    25      Static  300         300         0                   0
             01234567
SSH-known               27      Static  300         300         0                   0
             01234567
SSH-default             28      Static  200         200         0                   0
             01234567
HTTP-known              29      Static  400         400         0                   0
             01234567
HTTP-default            30      Static  200         200         0                   0
             01234567
SHTTP-known             61      Static  400         400         0                   0
             01234567
SHTTP-default           62      Static  200         200         0                   0
             01234567
TELNET-known            31      Static  200         200         0                   0
             01234567
TELNET-default          32      Static  200         200         0                   0
             01234567
CSS-known               33      Static  200         200         0                   0
             01234567
CSS-default             34      Static  200         200         0                   0
             01234567
RSH-known               35      Static  200         200         0                   0
             01234567
RSH-default             36      Static  200         200         0                   0
             01234567
```

```
UDP-known              37      Static  2500        2500        0                   0
            01234567
UDP-listen             38      Static  2500        2500        0                   0
            01234567
UDP-cfg-peer           55      Static  2500        2500        0                   0
            01234567
UDP-default            63      Static  3500        3500        0                   0
            01234567
TCP-known              56      Static  2500        2500        0                   0
            01234567
TCP-listen             57      Static  2500        2500        0                   0
            01234567
TCP-cfg-peer           58      Static  2000        2000        0                   0
            01234567
TCP-default            64      Static  2000        2000        0                   0
            01234567
Mcast-known            59      Static  2500        2500        0                   0
            01234567
Mcast-default          65      Static  2000        2000        0                   0
            01234567
Raw-listen             66      Static  2500        2500        0                   0
            01234567
Raw-default            67      Static  2500        2500        0                   0
            01234567
ip-sla                 39      Static  1000        1000        0                   0
            01234567
EIGRP                  45      Static  1500        1500        0                   0
            01234567
RIP                    46      Static  1500        1500        0                   0
            01234567
L2TPv3                 41      Static  400         400         0                   0
            01234567
PCEP                   42      Static  200         200         0                   0
            01234567
GRE                    47      Static  10000       10000       0                   0
            01234567
VRRP                   48      Static  1000        1000        0                   0
            01234567
HSRP                   49      Static  400         400         0                   0
            01234567
MPLS-oam               51      Static  250         250         0                   0
            01234567
L2TPv2-default         72      Static  2000        2000        0                   0
            01234567
L2TPv2-known           81      Static  2500        2500        0                   0
            01234567
DNS                    73      Static  2000        2000        0                   0
            01234567
RADIUS                 74      Static  2000        2000        0                   0
            01234567
TACACS                 75      Static  2000        2000        0                   0
            01234567
NTP-default            26      Static  200         200         0                   0
            01234567
NTP-known              80      Static  200         200         0                   0
            01234567
MIPv6                  88      Static  5000        5000        0                   0
            01234567
AMT                    86      Static  4000        4000        0                   0
            01234567
SDAC-TCP               87      Static  5000        5000        0                   0
            01234567
RADIUS-COA             89      Static  400         400         0                   0
            01234567
```

```
REL-UDP                91      Static  50000      50000      0                    0
             01234567
DHCPv4                 92      Static  4000       4000       0                    0
             01234567
DHCPv6                 93      Static  4000       4000       0                    0
             01234567
ONEPK                  95      Static  2500       2500       0                    0
             01234567
TPA                    96      Static  2500       2500       0                    0
             01234567

------------------------
statistics:
Packets accepted by deleted entries: 0
Packets dropped by deleted entries: 0
Run out of statistics counter errors: 0
```

The XML form of the output can be retrieved as follows:

```
RP/0/RP0/CPU0:router# show operational platformLPTSPIfib
NodeTable node/NodeName/Rack=0;Slot=2;Instance=CPU0 Police xml
...
<?xml version="1.0"?>
<Response MajorVersion="1" MinorVersion="0">
    <Get>
        <Operational>
            <PlatformLPTSPIfib MajorVersion="0" MinorVersion="0">
                <NodeTable>
                    <Node>
                        <Naming>
                            <NodeName>
                                <Rack>
                                    0
                                </Rack>
                                <Slot>
                                    2
                                </Slot>
                                <Instance>
                                    CPU0
                                </Instance>
                            </NodeName>
                        </Naming>
                        <Police>
                            <police_info>
                                <Entry>
                                    <avgrate>
                                        2500
                                    </avgrate>
                                    <burst>
                                        1250
                                    </burst>
                                    <static_avgrate>
                                        2500
                                    </static_avgrate>
                                    <avgrate_type>
                                        Static
                                    </avgrate_type>
                                    <flow_type>
                                        unconfigured-default
                                    </flow_type>
                                    <accepted_stats>
                                        0
                                    </accepted_stats>
```

```
    <dropped_stats>
        0
    </dropped_stats>
    <policer>
        0
    </policer>
    <iptos_value>
        0
    </iptos_value>
    <change_type>
        0
    </change_type>
    <acl_config>
        0
    </acl_config>
    <acl_str>

    </acl_str>
    <np>
        0
    </np>
</Entry>
<Entry>
    <avgrate>
        10000
    </avgrate>
    <burst>
        5000
    </burst>
    <static_avgrate>
        10000
    </static_avgrate>
    <avgrate_type>
        Static
    </avgrate_type>
    <flow_type>
        L2TPv2-fragment
    </flow_type>
    <accepted_stats>
        0
    </accepted_stats>
    <dropped_stats>
        0
    </dropped_stats>
    <policer>
        85
    </policer>
    <iptos_value>
        0
    </iptos_value>
    <change_type>
        0
    </change_type>
    <acl_config>
        0
    </acl_config>
    <acl_str>

    </acl_str>
    <np>
        0
    </np>
</Entry>
<Entry>
```

```
                <avgrate>
                    2500
                </avgrate>
                <burst>
                    1250
                </burst>
                <static_avgrate>
                    2500
                </static_avgrate>
                <avgrate_type>
                    Static
                </avgrate_type>
                <flow_type>
                    Fragment
                </flow_type>
                <accepted_stats>
                    0
                </accepted_stats>
                <dropped_stats>
                    0
                </dropped_stats>
                <policer>
                    1
                </policer>
                <iptos_value>
                    0
                </iptos_value>
                <change_type>
                    0
                </change_type>
                <acl_config>
                    0
                </acl_config>
                <acl_str>

                </acl_str>
                <np>
                    0
                </np>
            </Entry>
...
```

The following table describes the significant fields shown in the display.

Table 59: show lpts pifib hardware police Command Field Descriptions

FIeld	Description
FlowType	Type of flow that is binding between a tuple and a destination.
Rate (PPS)	Policer rate in packets per second (PPS).
Accept	Number of packets that are accepted by this policer.
Drop	Number of packets that are dropped by this policer.

Related Commands

Command	Description
flow (LPTS), on page 423	Configures the policer for the LPTS flow type.

Command	Description
lpts pifib hardware police, on page 427	Configures the ingress policers and enters pifib policer global configuration mode.

show lpts pifib hardware usage

To display hardware table usage, use the **show lpts pifib hardware usage** command in EXEC mode.

show lpts pifib hardware usage [**type** {**ipv4** | **ipv6** | **isis**}] [**location** {*node-id* | **all**}]

Syntax Description

type	(Optional) Specifies the hardware entry type. Enter one of the following types: • **ipv4** —Specifies IPv4 entries. • **ipv6** —Specifies IPv6 entries. • **isis** —Specifies ISIS entries.
location *node-id*	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
a ll	(Optional) Specifies all locations.

Command Default

Without the optional parameters, the **show lpts pifib hardware usage** command displays a brief summary of hardware entry information.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **all** keyword was added.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts pifib hardware usage** command with the **location** keyword:

```
RP/0/RP0/CPU0:router# show lpts pifib hardware usage location 0/1/cpu0

Type       Size            Used            Used(%)
---------- --------------- --------------- -------
ipv4       6000            21              0.35
ipv6       4000            15              0.38
isis       4000            1               0.03
```

This table describes the significant fields shown in the display.

Table 60: show lpts pifib hardware usage Command Field Descriptions

Field	Description
Type	Type of pre-IFIB entry.
Size	Maximum number of entries (72-bits) allowed for the type.
Used	Number of entries in use.
Used(%)	Percentage of total entries in use.

show lpts pifib statistics

To display Pre-Internal Forwarding Information Base (Pre-IFIB) statistics, use the **show lpts ifib statistics** command in EXEC mode.

show lpts pifib statistics [**location** *node-id*]

Syntax Description

location *node-id*	(Optional) Displays Pre-IFIB statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced .

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts pifib statistics** command:

```
RP/0/RP0/CPU0:router# show lpts pifib statistics

Packets into Pre-IFIB:80
Lookups:80
Packets delivered locally:80
Packets delivered remotely:0
```

This table describes the significant fields shown in the display.

Table 61: show lpts pifib statistics Command Field Descriptions

Field	Description
Packets into Pre-IFIB	Packets presented for pre-IFIB lookups.
Lookups	Packets looked up.
Packets delivered locally	Packets delivered to local applications or the local stack (*n* duplicated) packets duplicated for delivery to applications and the local stack.
Packets delivered remotely	Packets delivered to applications or for lookup on other RPs.

Related Commands

Command	Description
show lpts pifib , on page 450	Displays information about pre-IFIB entries.

show lpts port-arbitrator statistics

To display local packet transport services (LPTS) port arbitrator statistics, use the **show lpts port-arbitrator statistics** command in EXEC mode.

show lpts port-arbitrator statistics

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts port-arbitrator statistics** command:

```
RP/0/RP0/CPU0:router# show lpts port-arbitrator statistics

LPTS Port Arbitrator statistics:
 PA FGID-DB library statistics:
  0 FGIDs in use, 512 cached, 0 pending retries
  0 free allocation slots, 0 internal errors, 0 retry attempts
  1 FGID-DB notify callback, 0 FGID-DB errors returned
  FGID-DB permit mask: 0x7 (alloc mark rack0)
  PA API calls:
            1 init              1 realloc_done
            8 alloc             8 free
           16 join             16 leave
            8 detach
  FGID-DB API calls:
            1 register          1 clear_old
            1 alloc             0 free
           16 join             16 leave
            0 mark              1 mark_done
```

show lpts vrf

To display the Local Packet Transport Services (LPTS) VPN routing and forwarding (VRF) instance identification numbers and names, use the **show lpts vrf** command in EXEC mode.

show lpts vrf

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts vrf** command:

```
RP/0/RP0/CPU0:router# show lpts vrf

VRF-ID      VRF-NAME
0x00000000  *
0x60000000  default
```

This table describes the significant fields shown in the display.

Table 62: show lpts vrf Command Field Descriptions

Field	Description
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
VRF-NAME	Name given to the VRF.

Network Stack IPv4 and IPv6 Commands

This chapter describes the commands available on the Cisco IOS XR software to configure and monitor features related to IP Version 4 (IPv4) and IP Version 6 (IPv6).

For detailed information about network stack concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear ipv6 duplicate address, on page 477
- clear ipv6 neighbors , on page 478
- icmp ipv4 rate-limit unreachable, on page 479
- icmp source, on page 480
- ipv4 address (network), on page 481
- ipv4 assembler max-packets, on page 483
- ipv4 assembler timeout, on page 484
- ipv4 conflict-policy, on page 485
- ipv4 directed-broadcast, on page 486
- ipv4 helper-address, on page 487
- ipv4 mask-reply, on page 489
- ipv4 mtu , on page 490
- ipv4 redirects, on page 492
- ipv4 source-route, on page 493
- ipv4 unnumbered (point-to-point), on page 494
- ipv4 unreachables disable , on page 496
- ipv4 virtual address, on page 498
- ipv6 address, on page 500
- ipv6 address link-local, on page 502
- ipv6 assembler, on page 504
- ipv6 conflict-policy, on page 505
- ipv6 enable , on page 506
- ipv6 hop-limit, on page 508
- ipv6 icmp error-interval, on page 509
- ipv6 mtu , on page 511
- ipv6 nd, on page 513
- ipv6 nd dad attempts , on page 514
- ipv6 nd managed-config-flag , on page 517
- ipv6 nd ns-interval , on page 518

- ipv6 nd other-config-flag , on page 519
- ipv6 nd prefix, on page 521
- ipv6 nd ra-interval , on page 523
- ipv6 nd ra-lifetime , on page 525
- ipv6 nd reachable-time , on page 527
- ipv6 nd redirects, on page 529
- ipv6 nd suppress-ra , on page 530
- ipv6 neighbor, on page 531
- ipv6 source-route, on page 533
- ipv6 unreachables disable , on page 534
- ipv6 virtual address, on page 536
- local pool, on page 538
- show arm conflicts, on page 541
- show arm database, on page 543
- show arm router-ids, on page 546
- show arm registrations producers, on page 547
- show arm summary, on page 549
- show arm vrf-summary, on page 550
- show clns statistics, on page 551
- show ipv4 interface , on page 553
- show local pool, on page 556
- show ipv4 traffic , on page 558
- show ipv6 interface , on page 560
- show ipv6 neighbors , on page 564
- show ipv6 neighbors summary , on page 566
- show ipv6 traffic , on page 567
- show mpa client, on page 570
- show mpa groups, on page 572
- show mpa ipv4, on page 574
- show mpa ipv6, on page 576
- show vrf, on page 578
- vrf, on page 580
- vrf(address-family), on page 581
- vrf (description), on page 582
- vrf (mhost), on page 583

clear ipv6 duplicate address

To trigger a Duplicate Address Detection (DAD) request for addresses that are found in DUPLICATE status, use the **clear ipv6 duplicate address** command. If a request is already triggered , then the **clear ipv6 duplicate address** command clears the DUPLICATE status of an address and makes it usable.

clear ipv6 duplicate address [*interface-type interface-path-id*]

Syntax Description

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

Command Default

None

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

If none of the optional keywords is specified, the command iterates through all the duplicate addresses and retriggers a DAD request for each of these addresses.

Task ID

Task ID	Operations
network	read, write
IPv6	execute

Examples

The following example shows how to use the **clear ipv6 duplicate address** command:

```
RP/0/RP0/CPU0:router# clear ipv6 duplicate address
```

clear ipv6 neighbors

To delete all entries in the IPv6 neighbor discovery cache, except static entries, use the **clear ipv6 neighbors** command in EXEC mode.

clear ipv6 neighbors [**location** *node-id*]

Syntax Description

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

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If the location option is specified, only the neighbor entries specified in the **location** *node-id* keyword and argument are cleared.

Task ID

Task ID	Operations
network	read, write
IPv6	execute

Examples

In the following example, only the highlighted entry is deleted:

```
RP/0/RP0/CPU0:router# clear ipv6 neighbors ?
location specify a node name

RP/0/RP0/CPU0:router# show ipv6 neighbor

IPv6 Address Age Link-layer Addr State Interface
8888::3 - 1234.2345.9877 REACH POS0/0/0/0
8888::8 - 1234.2345.9877 REACH POS/0/0/0
fe80::205:1ff:fe9f:6400 1335 0005.019f.6400 STALE POS0/0/0/0
fe80::206:d6ff:fece:3808 1482 0006.d6ce.3808 STALE POS0/0/0/0
fe80::200:11ff:fe11:1112 1533 0000.1111.1112 STALE POS0/2/0/2

RP/0/RP0/CPU0:router# clear ipv6 neighbors location 0/2/0
RP/0/RP0/CPU0:router# show ipv6 neighbor

IPv6 Address Age Link-layer Addr State Interface
8888::3 - 1234.2345.9877 REACH POS0/0/0/0
8888::8 - 1234.2345.9877 REACH POS0/0/0/0
fe80::205:1ff:fe9f:6400 1387 0005.019f.6400 STALE POS0/0/0/0
fe80::206:d6ff:fece:3808 1534 0006.d6ce.3808 STALE POS0/0/0/0
```

icmp ipv4 rate-limit unreachable

To limit the rate that IPv4 Internet Control Message Protocol (ICMP) destination unreachable messages are generated, use the **icmp ipv4 rate-limit unreachable** command in Global Configuration mode. To remove the rate limit, use the **no** form of this command.

icmp ipv4 rate-limit unreachable [**DF**] *milliseconds*
no icmp ipv4 rate-limit unreachable [**DF**] *milliseconds*

Syntax Description

DF	(Optional) Limits the rate at which ICMP destination unreachable messages are sent when code 4 fragmentation is needed and data fragmentation is (DF) set, as specified in the IP header of the ICMP destination unreachable message.
milliseconds	Time period (in milliseconds) between the sending of ICMP destination unreachable messages. Range is 1 to 4294967295.

Command Default

The default value is one ICMP destination unreachable message every 500 milliseconds.

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The Cisco IOS XR softwaremaintains two timers: one for general destination unreachable messages and one for DF destination unreachable messages. Both share the same time limits and defaults. If the **DF** option is not configured, the **icmp ipv4 rate-limit unreachable** command sets the time values for DF destination unreachable messages. If the **DF** option is configured, its time values remain independent from those of general destination unreachable messages.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to set the time interval for the ICMP destination unreachable message to be generated at a minimum interval of 10 ms:

```
RP/0/RP0/CPU0:router(config)# icmp ipv4 rate-limit unreachable 10
```

icmp source

To allow for flexible source IP address selection in the Internet Control Message Protocol (ICMP) response packet in response to a failure, use the **icmp source** command in the Global Configuration mode mode. To disallow flexible source IP address selection in the Internet Control Message Protocol (ICMP) response packet, use the **no** form of this command.

icmp [{**ipv4** | **ipv6**}] **source** [{**vrf** | **rfc**}]
no icmp [{**ipv4** | **ipv6**}] **source** [{**vrf** | **rfc**}]

Syntax Description

ipv4	IPv4 specific.
ipv6	IPv6 specific.
source	Enables source address selection policy.
vrf	Enable Strict VRF source address selection.
rfc	Enable RFC compliance for source address selection.

Command Default

None

Command History

Release	Modification
Release 4.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
network	read, write

Example

This example shows how to allow flexible source IP address corresponding to strict vrf in outgoing IPv6 ICMP packets.

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# icmp ipv6 source vrf
```

Related Commands

Command	Description
icmp ipv4 rate-limit unreachable, on page 479	Limits the rate that IPv4 Internet Control Message Protocol (ICMP) destination unreachable messages are generated.

ipv4 address (network)

To set a primary or secondary IPv4 address for an interface, use the **ipv4 address** command in interface configuration mode. To remove an IPv4 address, use the **no** form of this command.

ipv4 address *ipv4-address mask* [**secondary**] [**route-tag** *route-tag value*]
no ipv4 address *ipv4-address mask* [**secondary**] [**route-tag** *route-tag value*]

Syntax Description

ipv4-address	IPv4 address.
mask	Mask for the associated IP subnet. The network mask can be specified in either of two ways: • The network mask can be a four-part dotted decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit belongs to the network address. • The network mask can be indicated as a slash (/) and number. For example, /8 indicates that the first 8 bits of the mask are ones, and the corresponding bits of the address are network address.
secondary	(Optional) Specifies that the configured address is a secondary IPv4 address. If this keyword is omitted, the configured address is the primary IPv4 address.
route-tag	(Optional) Specifies that the configured address has a route tag to be associated with it.
route-tag value	(Optional) Value of the route tag. Range is 1 to 4294967295.

Command Default

No IPv4 address is defined for the interface.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.8.0	The **route-tag** keyword was added.

Usage Guidelines

An interface can have one primary IPv4 address and multiple secondary IPv4 addresses. Packets generated by the software always use the primary IPv4 address. Therefore, all networking devices on a segment should share the same primary network number.

Note The same IPv4 address configured on two different interfaces causes an error message to display that indicates the conflict. The interface located in the highest rack, slot, module, instance, and port is disabled.

Hosts can determine subnet masks using the IPv4 Internet Control Message Protocol (ICMP) mask request message. Networking devices respond to this request with an ICMP mask reply message.

You can disable IPv4 processing on a particular interface by removing its IPv4 address with the **no ipv4 address** command. If the software detects another host using one of its IPv4 addresses, it will display an error message on the console.

The optional **secondary** keyword allows you to specify an unlimited number of secondary addresses. Secondary addresses are treated like primary addresses, except that the system never generates datagrams other than routing updates with secondary source addresses. IPv4 broadcasts and Address Resolution Protocol (ARP) requests are handled properly, as are interface routes in the IP routing table.

Secondary IPv4 addresses can be used in a variety of situations. The following are the most common applications:

- There may not be enough host addresses for a particular network segment. For example, your subnetting allows up to 254 hosts per logical subnet, but on one physical subnet you need to have 300 host addresses. Using secondary IPv4 addresses on the networking devices allows you to have two logical subnets using one physical subnet.
- Many older networks were built using Level 2 bridges. The judicious use of secondary addresses can aid in the transition to a subnetted, router-based network. Routers on an older, bridged segment can be easily made aware that there are many subnets on that segment.

The route-tag feature attaches a tag to all IPv4 addresses. The tag is propagated from the Management Agents (MA) to the Address Repository Managers (RPM) to routing protocols, thus enabling the user to control the redistribution of connected routes by looking at the route tags via RPL scripts.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to set 192.168.1.27 as the primary address and 192.168.7.17 and 192.168.8.17 as the secondary addresses on interface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet  0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 address 192.168.1.27 255.255.255.0
RP/0/RP0/CPU0:router(config-if)# ipv4 address 192.168.7.17 255.255.255.0 secondary
RP/0/RP0/CPU0:router(config-if)# ipv4 address 192.168.8.17 255.255.255.0 secondary
```

Related Commands

Command	Description
show ipv4 interface , on page 553	Lists a summary of IPv4 information and status for the interface.

ipv4 assembler max-packets

To configure the maximum number of packets that are allowed in assembly queues, use the **ipv4 assembler max-packets** command in Global Configuration mode. To disable this feature, use the **no** from of this command.

ipv4 assembler max-packets *percentage value*
no ipv4 assembler max-packets *percentage value*

Syntax Description

percentage value	Percentage of total packets available in the system. The range is from 1 to 50.

Command Default

None

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to configure the maximum number of packets for the assembly queue:

```
RP/0/RP0/CPU0:router(config)# ipv4 assembler max-packets 35
```

Related Commands

Command	Description
ipv4 assembler timeout, on page 484	Configures the number of seconds an assembly queue can hold before a timeout occurs.

ipv4 assembler timeout

To configure the number of seconds an assembly queue can hold before a timeout occurs, use the **ipv4 assembler timeout** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

ipv4 assembler timeout *seconds*
no ipv4 assembler timeout *seconds*

Syntax Description

seconds	Number of seconds an assembly queue can hold before a timeout occurs. The range is from 1 to 120.

Command Default

None

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to configure an assembly queue before a timeout occurs:

```
RP/0/RP0/CPU0:router(config)# ipv4 assembler timeout 88
```

Related Commands

Command	Description
ipv4 assembler max-packets, on page 483	Configures the maximum number of packets that are allowed in assembly queues.

ipv4 conflict-policy

To enable IP Address Repository Manager (IPARM) conflict resolution, use the **ipv4 conflict-policy** command in Global Configuration mode. To disable the IPARM conflict resolution, use the **no** form of the command.

ipv4 conflict-policy {**highest-ip** | **longest-prefix** | **static**}
no ipv4 conflict-policy {**highest-ip** | **longest-prefix** | **static**}

Syntax Description

highest-ip	Keeps the highest ip address in the conflict set.
longest-prefix	Keeps the longest prefix match in the conflict set.
static	Keeps the existing interface running across new address configurations.

Command Default

The precedence rule adopted is loopback > physical > other virtual interfaces. Within virtual interfaces, there is an alphabetical preference, for example, loopback1 > loopback2 and bundle-ether > bundle-pos > tunnel. Among physical interfaces, the lower rack or slot takes control.

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

Use **ipv4 conflict-policy** command to set an IPARM policy that resolves a conflict in the configured addresses. The policy tells IPARM what address to select from the addresses in conflict. The policy then forces the address in conflict to become inactive.

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

The following example shows how to enable the static policy for conflict resolution:

```
RP/0/RP0/CPU0:router(config)# ipv6 conflict-policy static
```

Related Commands

Command	Description
show arm conflicts, on page 541	Displays the IPv4 or IPv6 address conflict information.

ipv4 directed-broadcast

To enable forwarding of IPv4 directed broadcasts on an interface, use the **ipv4 directed-broadcast** command in interface configuration mode. To disable forwarding of IPv4 directed broadcast on an interface, use the **no** form of this command.

ipv4 directed-broadcast
no ipv4 directed-broadcast

Syntax Description

This command has no keywords or arguments.

Command Default

By default, directed broadcasts are dropped.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

A directed broadcast is a packet sent to a specific network. IPv4 directed broadcasts are dropped and not forwarded. Dropping IPv4 directed broadcasts makes routers less susceptible to denial-of-service (DoS) attacks.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to enable the forwarding of IPv4 directed broadcasts on interface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface gigabitethernet  0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 directed-broadcast
```

Related Commands

Command	Description
ipv4 unnumbered point-to-point	Enables IP processing on a point-to-point interface without assigning an explicit IP address to the interface.
show ipv4 interface , on page 553	Lists a summary of IPv4 information and status for the interface.

ipv4 helper-address

To configure the address to which the software forwards User Datagram Protocol (UDP) broadcasts, including BOOTP, received on an interface, use the **ipv4 helper-address** command in interface configuration mode. To remove an IPv4 helper address, use the **no** form of this command.

{**ipv4 helper-address** [**vrf** *vrf-name*][*destination-address*]}
{**no ipv4 helper-address** [**vrf** *vrf-name*][*destination-address*]}

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
destination-address	Destination broadcast or host address to be used when UDP broadcasts are forwarded. There can be more than one helper address per interface.

Command Default

IPv4 helper addresses are disabled. Default VRF is assumed if the VRF is not specified.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

Use this command with the **forward-protocol udp** command in global configuration mode, which specifies by port number the broadcast packets that are forwarded. UDP is enabled by default for well-known ports. The **ipv4 helper-address** command specifies the destination to which the UDP packets are forwarded.

One common application that requires IPv4 helper addresses is Dynamic Host Configuration Protocol (DHCP), which is defined in RFC 1531. DHCP protocol information is carried inside of BOOTP packets. To enable BOOTP broadcast forwarding for a set of clients, configure an IPv4 helper address on the networking device interface physically closest to the client. The IPv4 helper address should specify the address of the DHCP server. If you have multiple servers, you can configure one IPv4 helper address for each server. Because BOOTP packets are forwarded by default, DHCP information can now be forwarded by the networking device. The DHCP server now receives broadcasts from the DHCP clients.

A DHCP relay profile must be configured to perform DHCP Relay. The **ip helper-address** command is used to forward broadcast UDP (non-DHCP) packets.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to specify that all UDP broadcast packets received on POSinterface 0/1/1/0 are forwarded to 192.168.1.0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 helper-address 192.168.1.0
```

Related Commands

Command	Description
forward-protocol udp	Specifies which ports the networking device forwards to when forwarding broadcast packets.

ipv4 mask-reply

To enable the Cisco IOS XR softwareto respond to IPv4 Internet Control Message Protocol (ICMP) mask requests by sending ICMP mask reply messages, use the **ipv4 mask-reply** command in interface configuration mode. To restore the default, use the **no** form of this command.

ipv4 mask-reply
no ipv4 mask-reply

Syntax Description

This command has no keywords or arguments.

Command Default

IPv4 mask replies are not sent.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

This command enables the Cisco IOS XR softwareto respond to IPv4 ICMP mask requests by sending ICMP mask reply messages.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example enables the sending of ICMP mask reply messages on POSinterface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 mask-reply
```

ipv4 mtu

To set the maximum transmission unit (MTU) size of IPv4 packets sent on an interface, use the **ipv4 mtu** command in an appropriate configuration mode. To restore the default MTU size, use the **no** form of this command.

ipv4 mtu *bytes*

Syntax Description

bytes	MTU in bytes. Range is 68 to 65535 bytes for IPv4 packets. The maximum MTU size that can be set on an interface depends on the interface medium.

Command Default

If no MTU size is configured for IPv4 packets sent on an interface, the interface derives the MTU from the Layer 2 MTU.

Command Modes

Interface configuration (for releases prior to R4.2.0)

Dynamic template configuration (for releases R4.2.0 onward)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The maximum MTU size that can be set on an interface depends on the interface medium. If the Layer 2 MTU is smaller than the Layer 3 MTU, the Cisco IOS XR software uses the Layer 2 MTU value for the Layer 3 MTU. Conversely, if the Layer 3 MTU is smaller than the Layer 2 MTU, the software uses Layer 3 MTU value. In other words the Cisco IOS XR software uses the lower of the two values for the MTU.

All devices on a physical medium must have the same protocol MTU to operate.

For releases R4.2.0 onward, to enter the dynamic template configuration mode, run the **dynamic-template** command in the Global Configuration mode.

Note Changing the MTU value (with the **mtu** interface configuration command) can affect the IPv4 MTU value. If the current IPv4 MTU value is the same as the MTU value, and you change the MTU value, the IPv4 MTU value will be modified automatically to match the new MTU. However, the reverse is not true; changing the IPv4 MTU value has no effect on the value for the **mtu** command.

Task ID

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

Examples

For releases prior to R4.2.0, this example shows how to set the maximum IPv4 packet size for POS interface 0/1/1/0 to 300 bytes:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 mtu 300
```

For releases R4.2.0 onward, this example shows how to set the maximum IPv4 packet size to 300 bytes in dynamic template configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv4 mtu 300
```

Related Commands

Command	Description
show ipv4 interface , on page 553	Displays the MTU status of interfaces configured for IPv4.

ipv4 redirects

To enable the sending of IPv4 Internet Control Message Protocol (ICMP) redirect messages if the software is forced to resend a packet through the same interface on which it was received, use the **ipv4 redirects** command in interface configuration mode. To restore the default, use the **no** form of this command.

ipv4 redirects
no ipv4 redirects

Syntax Description

This command has no keywords or arguments.

Command Default

ICMP redirect messages are disabled by default on the interface unless the Hot Standby Router Protocol (HSRP) is configured.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

ICMP redirect messages are disabled by default on the interface unless the Hot Standby Router Protocol (HSRP) is configured.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to disable the sending of ICMP IPv4 redirect messages on POS interface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 redirects
```

ipv4 source-route

To allow the processing of any IPv4 datagrams containing a source-route header option, use the **ipv4 source-route** command in Global Configuration mode. To have the software discard any IP datagram that contains a source-route option, use the **no** form of this command.

ipv4 source-route
no ipv4 source-route

Syntax Description

This command has no keywords or arguments.

Command Default

The software discards any IPv4 datagrams containing a source-route header option.

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.5.0	The following sections were modified: • Command description • Defaults • Usage Guidelines

Usage Guidelines

By default, any IPv4 datagram which contains a source-route header option is discarded.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to allow the processing of any IPv4 datagrams containing a source-route header option:

```
RP/0/RP0/CPU0:router(config)# ipv4 source-route
```

ipv4 unnumbered (point-to-point)

To enable IPv4 processing on a point-to-point interface without assigning an explicit IPv4 address to that interface, use the **ipv4 unnumbered** command in an appropriate configuration mode. To disable this feature, use the **no** form of this command.

ipv4 unnumbered *interface-type interface-instance*

Syntax Description

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

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

Command Default

IPv4 processing on a point-to-point interface is disabled unless an IPv4 address is assigned explicitly to that interface.

Command Modes

Interface configuration (for releases prior to R4.2.0)

Dynamic template configuration (for releases R4.2.0 onward)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

For releases R4.2.0 onward, to enter the dynamic template configuration mode, run the **dynamic-template** command in the Global Configuration mode.

Whenever the unnumbered interface generates a packet (for example, for a routing update), it uses the address of the specified interface as the source address of the IPv4 packet. It also uses the IPv4 address of the specified interface in determining which routing processes are sending updates over the unnumbered interface. Restrictions include the following:

- Packet-over-SONET (POS) interfaces using High-Level Data Link Control (HDLC), PPP, and tunnel interfaces can be unnumbered.
- You cannot use the **ping** EXEC command to determine whether the interface is up because the interface has no address. Simple Network Management Protocol (SNMP) can be used to remotely monitor interface status.

The interface you specify by the *interface-type* and *interface-number* arguments must be enabled (listed as "up" in the **show interfaces** command display).

If you are configuring Intermediate System-to-Intermediate System (IS-IS) across a POS interface, you should configure the POS interface as unnumbered. This strategy allows you to conform to RFC 1195, which states that IP addresses are not required on each interface.

Task ID

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

Examples

For releases prior to R4.2.0, this example shows how the GigabitEthernet interface 0/1/1/0 is assigned the loopback interface address 5:

```
RP/0/RP0/CPU0:router(config)# interface loopback 5
RP/0/RP0/CPU0:router(config-if)# ipv4 address 192.168.6.6 255.255.255.0
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 unnumbered loopback 5
```

For releases R4.2.0 onward, this example shows how the Bundle-Ether interface is assigned address 100.10 in the dynamic template configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv4 unnumbered Bundle-Ether100.10
```

ipv4 unreachables disable

To disable the generation of IPv4 Internet Control Message Protocol (ICMP) unreachable messages, use the **ipv4 unreachables disable** command in an appropriate configuration mode. To re-enable the generation of ICMP unreachable messages, use the **no** form of this command.

ipv4 unreachables disable

Syntax Description

This command has no keywords or arguments.

Command Default

IPv4 ICMP unreachables messages are generated.

Command Modes

Interface configuration (for releases prior to R4.2.0)

Dynamic template configuration (for releases R4.2.0 onward)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If the software receives a nonbroadcast packet destined for itself that uses a protocol it does not recognize, it sends an ICMP protocol unreachable message to the source.

If the software receives a datagram that it cannot deliver to its ultimate destination because it knows of no route to the destination address, it replies to the originator of that datagram with an ICMP host unreachable message.

This command affects a number of ICMP unreachable messages.

For releases R4.2.0 onward, to enter the dynamic template configuration mode, run the **dynamic-template** command in the Global Configuration mode.

Task ID

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

Examples

For releases prior to R4.2.0, this example shows how to disable the generation of ICMP unreachable messages on POSinterface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv4 unreachables disable
```

For releases R4.2.0 onward, this example shows how to disable the generation of ICMP unreachable messages on dynamic template configuration mode:

```
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv4 unreachables disable
```

ipv4 virtual address

To define an IPv4 virtual address for a network of management Ethernet interfaces, use the **ipv4 virtual interface** command in Global Configuration mode. To remove an IPv4 virtual address from the configuration, use the **no** form of this command.

ipv4 virtual address {[**vrf** *vrf-name*] *ipv4-address/mask* | **use-as-src-addr**}
no ipv4 virtual address {[**vrf** *vrf-name*] *ipv4-address/mask* | **use-as-src-addr**}

Syntax Description

vrf *vrf-name*	(Optional) Configures the virtual address on a per VPN routing and forwarding (VRF) basis for the management interfaces The *vrf-name* argument specifies the name of the VRF.
ipv4 address	Virtual IPv4 address and the mask that is to be unconfigured.
mask	Mask for the associated IP subnet. The network mask can be specified in either of two ways: • The network mask can be a four-part dotted-decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit belongs to the network address. • The network mask can be indicated as a slash (/) and number. For example, /8 indicates that the first 8 bits of the mask are ones, and the corresponding bits of the address are network address. A slash between numbers is required as part of the notation.
use-as-src-addr	Enables the virtual address to be used as the default SRC address on sourced packets.

Command Default

No IPv4 virtual address is defined for the configuration.

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **vrf** keyword was added to support virtual addresses on a per VRF basis.
Release 3.8.0	The **use-as-src-addr** keyword was added.

Usage Guidelines

Configuring an IPv4 virtual address enables you to access the router from a single virtual address with a management network. An IPv4 virtual address persists across route processor (RP) failover situations.

Configuring an IPv4 virtual address enables you to access a dual RP router from a single address without prior knowledge of which RP is active. An IPv4 virtual address persists across RP failovers. For this to happen, the virtual IPv4 address must share a common IPv4 subnet with a Management Ethernet interface on both RPs.

If you disable the **ipv4 virtual address** command with the **vrf** keyword, the virtual IP address is unconfigured for the corresponding VRF or for the default if no VRF is specified. This results in the removal of the entry for the virtual IP address in the VRF table and in the ARP cache.

The default VRF is chosen when no VRF is specified. The virtual IP address is activated on a management interface that is attached to a default VRF.

The **use-as-src-addr** keyword eliminates the need for configuring a loopback interface as the source interface (that is, update source) for management applications. When an update source is not configured, management applications allow the transport processes (TCP, UDP, raw_ip) to pick a suitable source address. The transport processes, in turn, consult the FIB to do so. If a Management Ethernet's IP address is picked as the source address and if the **use-as-src-addr keyword** is configured, then the transport processes replace the Management Ethernet's IP address with a relevant virtual IP address. This functionality works across RP switchovers.

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

The following example shows how to define an IPv4 virtual address:

```
RP/0/RP0/CPU0:router(config)# ipv4 virtual address 10.3.32.154/8
```

The following example show how to configure the virtual IP addresses for management interfaces on a per VRF basis:

```
RP/0/RP0/CPU0:router(config)# ipv4 virtual address vrf ppp 12.26.3.4/16
```

ipv6 address

To configure an IPv6 address for an interface and enable IPv6 processing on the interface using an EUI-64 interface ID in the low-order 64 bits of the address, use the **ipv6 address** command in interface configuration mode. To remove the address from the interface, use the **no** form of this command.

ipv6 address *ipv6-prefix/prefix-length* [**eui-64**] [**route-tag** *route-tag value*]
no ipv6 address *ipv6-prefix/prefix-length* [**eui-64**] [**route-tag** *route-tag value*]

Syntax Description

ipv6-prefix	The IPv6 network assigned to the interface. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
/ *prefix-length*	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash (/) must precede the decimal value.
eui-64	(Optional) Specifies an interface ID in the low-order 64 bits of the IPv6 address.
route-tag	(Optional) Specifies that the configured address has a route tag to be associated with it.
route-tag value	(Optional) Value of the route tag. Range is 1 to 4294967295.

Command Default

No IPv6 address is defined for the interface.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.8.0	The **route-tag** keyword was added.

Usage Guidelines

If the value specified for the / *prefix-length* argument is greater than 64 bits, the prefix bits have precedence over the interface ID.

Using the **no ipv6 address** command without arguments removes all manually configured IPv6 addresses from an interface.

If the Cisco IOS XR software detects another host using one of its IPv6 addresses, it displays an error message on the console.

The route-tag feature attaches a tag to all IPv6 addresses. The tag is propagated from the Management Agents (MA) to the Address Repository Managers (RPM) to routing protocols, thus enabling the user to control the redistribution of connected routes by looking at the route tags via RPL scripts.

Task ID

Task ID	Operations
ipv6	read, write

Task ID	Operations
network	read, write

Examples

The following example assigns IPv6 address 2001:0DB8:0:1::/64 to POS interface 0/1/1/0 and specifies an EUI-64 interface ID in the low-order 64 bits of the address:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv6 address 2001:0DB8:0:1::/64 eui-64
```

Related Commands

Command	Description
ipv6 address link-local, on page 502	Configures an IPv6 link-local address for an interface and enables IPv6 processing on the interface.
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 address link-local

To configure an IPv6 link-local address for an interface and enable IPv6 processing on the interface, use the **ipv6 address link-local** command in interface configuration mode. To remove the address from the interface, use the **no** form of this command.

ipv6 address *ipv6-address* **link-local** [**route-tag** *route-tag value*]
no ipv6 address *ipv6-address* **link-local** [**route-tag** *route-tag value*]

Syntax Description

ipv6-address	The IPv6 address assigned to the interface. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
link-local	Specifies a link-local address. The *ipv6-address* value specified with this command overrides the link-local address that is automatically generated for the interface.
route-tag	(Optional) Specifies that the configured address has a route-tag to be associated with it.
route-tag value	(Optional) Displays the route-tag value. Range is 1 to 4294967295.

Command Default

No IPv6 address is defined for the interface.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.8.0	The **route-tag** keyword was added.

Usage Guidelines

If the Cisco IOS XR software detects another host using one of its IPv6 addresses, the software displays an error message on the console.

The system automatically generates a link-local address for an interface when IPv6 processing is enabled on the interface, typically when an IPv6 address is configured on the interface. To manually specify a link-local address to be used by an interface, use the **ipv6 address link-local** command.

A double colon may be used as part of the *ipv6-address* argument when consecutive 16-bit values are denoted as zero. You can configure multiple IPv6 addresses per interfaces, but only one link-local address.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows how to assign FE80::260:3EFF:FE11:6770 as the link-local address for POS interface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv6 address FE80::260:3EFF:FE11:6770 link-local
```

Related Commands

Command	Description
ipv6 address, on page 500	Configures an IPv6 address and enables IPv6 processing on an interface using an EUI-64 interface ID in the low-order 64 bits of the address.
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 assembler

To configure the maximum number of packets that are allowed in assembly queues or to configure the number of seconds an assembly queue will hold before timeout , use the **ipv6 assembler** command in the appropriate configuration mode. To disable this feature, use the **no** form of this command.

ipv6 assembler {**max-packets** *value* | **timeout** *seconds*}
no ipv6 assembler {**max-packets** *value* | **timeout** *seconds*}

Syntax Description

max-packets	Maximum packets allowed in assembly queues.
timeout	Number of seconds an assembly queue will hold before timeout.

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 4.2.0	This command was introduced.
	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ipv6	read, write

Example

The following example shows how to configure the maximum number of packets that are allowed in assembly queues:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# ipv6 assembler max-packets 100
```

Related Commands

Command	Description
ipv4 assembler max-packets, on page 483	Configures the maximum number of packets that are allowed in assembly queues

ipv6 conflict-policy

To enable IP Address Repository Manager (IPARM) conflict resolution, use the **ipv6 conflict-policy** command in Global Configuration mode mode. To disable the IPARM conflict resolution, use the **no** form of the command.

ipv6 conflict-policy {**highest-ip** | **longest-prefix** | **static**}
no ipv6 conflict-policy {**highest-ip** | **longest-prefix** | **static**}

Syntax Description

highest-ip	Keeps the highest IP address in the conflict set.
longest-prefix	Keeps the longest prefix match in the conflict set.
static	Keeps the existing interface running across new address configurations.

Command Default

Default is the lowest rack/slot if no conflict policy is configured.

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv6	read, write
ip-services	read, write

Examples

The following example shows how to enable the longest prefix policy for conflict resolution:

```
RP/0/RP0/CPU0:router(config)# ipv6 conflict-policy longest-prefix
```

ipv6 enable

To enable IPv6 processing on an interface that has not been configured with an explicit IPv6 address, use the **ipv6 enable** command in an appropriate configuration mode. To disable IPv6 processing on an interface that has not been configured with an explicit IPv6 address, use the **no** form of this command.

ipv6 enable

Syntax Description

This command has no keywords or arguments.

Command Default

IPv6 is disabled.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **ipv6 enable** command automatically configures an IPv6 link-local unicast address on the interface while also enabling the interface for IPv6 processing. The **no ipv6 enable** command does not disable IPv6 processing on an interface that is configured with an explicit IPv6 address.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to enable IPv6 processing on POS interface 0/1/1/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv6 enable
```

For BNG, this example show how to enable IPv6 processing on dynamic template configuration mode:

```
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv6 enable
```

Related Commands

Command	Description
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 hop-limit

To configure the maximum number of hops used in router advertisements and all IPv6 packets that are originated by the router, use the **ipv6 hop-limit** command in Global Configuration mode mode. To return the hop limit to its default value, use the **no** form of this command.

ipv6 hop-limit *hops*
no ipv6 hop-limit *hops*

Syntax Description

hops	Maximum number of hops. Range is 1 to 255.

Command Default

hops : 64 hops

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows how to configure a maximum number of 15 hops for router advertisements and all IPv6 packets that are originated from the router:

```
RP/0/RP0/CPU0:router(config)# ipv6 hop-limit 15
```

ipv6 icmp error-interval

To configure the interval and bucket size for IPv6 Internet Control Message Protocol (ICMP) error messages on all nodes, use the **ipv6 icmp error-interval** command in Global Configuration mode mode. To return the interval to its default setting, use the **no** form of this command.

ipv6 icmp error-interval *milliseconds* [*bucketsize*]
no ipv6 icmp error-interval

Syntax Description

milliseconds	Time interval (in milliseconds) between tokens being placed in the bucket. Range is 0 to 2147483647.
bucketsize	(Optional) The maximum number of tokens stored in the bucket. The acceptable range is 1 to 200 with a default of 10 tokens.

Command Default

ICMP rate limiting is enabled by default. To disable ICMP rate limiting, set the interval to zero.

milliseconds : 100 milliseconds

bucketsize : 10 tokens

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **ipv6 icmp error-interval** command in Global Configuration mode mode to limit the rate at which IPv6 ICMP error messages are sent for each node. A token bucket algorithm is used with one token representing one IPv6 ICMP error message. Tokens are placed in the virtual bucket at a specified interval until the maximum number of tokens allowed in the bucket is reached.

The *milliseconds* argument specifies the time interval between tokens being placed in the bucket. The optional *bucketsize* argument is used to define the maximum number of tokens stored in the bucket. Tokens are removed from the bucket when IPv6 ICMP error messages are sent, which means that if the *bucketsize* argument is set to 20, a rapid succession of 20 IPv6 ICMP error messages can be sent. When the bucket is empty of tokens, IPv6 ICMP error messages are not sent until a new token is placed in the bucket.

Use the **show ipv6 traffic** EXEC command to display IPv6 ICMP rate-limited counters.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows an interval of 50 milliseconds and a bucket size of 20 tokens being configured for IPv6 ICMP error messages:

```
RP/0/RP0/CPU0:router(config)# ipv6 icmp error-interval 50 20
```

Related Commands

Command	Description
show ipv6 neighbors , on page 564	Displays IPv6 neighbors discovery cache information.

ipv6 mtu

To set the maximum transmission unit (MTU) size of IPv6 packets sent on an interface, use the **ipv6 mtu** command in an appropriate configuration mode. To restore the default MTU size, use the **no** form of this command.

ipv6 mtu *bytes*

Syntax Description

bytes	MTU in bytes. Range is 1280 to 65535 for IPv6 packets. The maximum MTU size that can be set on an interface depends on the interface medium.

Command Default

If no MTU size is configured for IPv6 packets sent on an interface, the interface derives the MTU from the Layer 2 MTU.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If an IPv6 packet exceeds the MTU set for the interface, only the source router of the packet can fragment it.

The maximum MTU size that can be set on an interface depends on the interface medium. If the Layer 2 MTU is smaller than the Layer 3 MTU, the Cisco IOS XR software uses the Layer 2 MTU value for the Layer 3 MTU. Conversely, If the Layer 3 MTU is smaller than the Layer 2 MTU, the software uses Layer 3 MTU value. In other words the Cisco IOS XR software uses the lower of the two values for the MTU.

All devices on a physical medium must have the same protocol MTU to operate.

Note Changing the MTU value (with the **mtu** interface configuration command) can affect the IPv6 MTU value. If the current IPv6 MTU value is the same as the MTU value, and you change the MTU value, the IPv6 MTU value will be modified automatically to match the new MTU. However, the reverse is not true; changing the IPv6 MTU value has no effect on the value for the **mtu** command.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to set the maximum IPv6 packet size for POS interface 0/1/1/0 to 1350 bytes:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/RP0/CPU0:router(config-if)# ipv6 mtu 1350
```

For BNG, this example shows how to set the maximum IPv6 packet size to 1350 bytes in the dynamic template configuration mode:

```
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv6 mtu 1350
```

Related Commands

Command	Description
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 nd

To configure Neighbor Discovery (ND) subcommands, use the **ipv6 nd** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

ipv6 nd { **scavenge-timeout** *seconds* }

Syntax Description

scavenge-timeout *seconds*	Configures the lifetime of stale ipv6 ne

Command Default

No default behavior or values

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

When the scavenge-timer for a neighbor entry expires, the entry is cleared.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

This example shows how to configure the timer to keep the neighbor in stale state in the cache:

```
Router(config)# ipv6 nd scavenge-timeout 3000
```

ipv6 nd dad attempts

To configure the number of consecutive neighbor solicitation messages that are sent on an interface while duplicate address detection is performed on the unicast IPv6 addresses of the interface, use the **ipv6 nd dad attempts** command in an appropriate configuration mode. To return the number of messages to the default value, use the **no** form of this command.

ipv6 nd dad attempts *value*

Syntax Description

value	Number of neighbor solicitation messages. Range is 0 to 600. Configuring a value of 0 disables duplicate address detection processing on the specified interface; a value of 1 configures a single transmission without follow-up transmissions.

Command Default

Duplicate address detection on unicast IPv6 addresses with the sending of one neighbor solicitation message is enabled. The default is one message.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Duplicate address detection verifies the uniqueness of new unicast IPv6 addresses before the addresses are assigned to interfaces (the new addresses remain in a tentative state while duplicate address detection is performed). Duplicate address detection uses neighbor solicitation messages to verify the uniqueness of unicast IPv6 addresses.

The DupAddrDetectTransmits node configuration variable (as specified in RFC 2462, *IPv6 Stateless Address Autoconfiguration*) is used to automatically determine the number of consecutive neighbor solicitation messages that are sent on an interface while duplicate address detection is performed on a tentative unicast IPv6 address.

The interval between the sending of duplicate address detection neighbor solicitation messages (the duplicate address detection timeout interval) is specified by the neighbor discovery-related variable RetransTimer (as specified in RFC 2461, *Neighbor Discovery for IP Version 6 [IPv6]*), which is used to determine the time between retransmissions of neighbor solicitation messages to a neighbor when the address is being resolved or when the reachability of a neighbor is being probed. This is the same management variable used to specify the interval for neighbor solicitation messages during address resolution and neighbor unreachability detection. Use the **ipv6 nd ns-interval** command to configure the interval between neighbor solicitation messages that are sent during duplicate address detection.

Duplicate address detection is suspended on interfaces that are administratively down. While an interface is administratively down, the unicast IPv6 addresses assigned to the interface are set to a pending state. Duplicate address detection is automatically restarted on an interface when the interface returns to being administratively up.

Note An interface returning to administratively up restarts duplicate address detection for all of the unicast IPv6 addresses on the interface. While duplicate address detection is performed on the link-local address of an interface, the state for the other IPv6 addresses is still set to tentative. When duplicate address detection is completed on the link-local address, duplicate address detection is performed on the remaining IPv6 addresses.

When duplicate address detection identifies a duplicate address, the state of the address is set to duplicate and the address is not used. If the duplicate address is the link-local address of the interface, the processing of IPv6 packets is disabled on the interface and an error message similar to the following is issued:

```
ipv6_nd[145]: %IPV6_ND-3-ADDRESS_DUPLICATE : Duplicate address 111::1 has been detected
```

If the duplicate address is a global address of the interface, the address is not used and an error message similar to the following is issued:

```
%IPV6-4-DUPLICATE: Duplicate address 3000::4 on POS
```

All configuration commands associated with the duplicate address remain as configured while the state of the address is set to duplicate.

If the link-local address for an interface changes, duplicate address detection is performed on the new link-local address and all of the other IPv6 address associated with the interface are regenerated (duplicate address detection is performed only on the new link-local address).

Duplicate address detection is performed on all multicast-enabled IPv6 interfaces, including the following interface types:

- Cisco High-Level Data Link Control (HDLC)
- Ethernet, FastEthernet, and GigabitEthernet
- PPP

Task ID

Task ID	Operations
ipv6	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to set the number of consecutive neighbor solicitation messages for interface 0/2/0/1 to 1 and then display the state (tentative or duplicate) of the unicast IPv6 address configured for an interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface POS 0/2/0/1
RP/0/RP0/CPU0:router(config-if)# ipv6 nd dad attempts 1
RP/0/RP0/CPU0:router(config-if)# Uncommitted changes found, commit them before
exiting(yes/no/cancel)? [cancel]:y

RP/0/RP0/CPU0:router# show ipv6 interface
POS2/2/0/0 is Up, line protocol is Up
```

```
  IPv6 is disabled, link-local address unassigned
  No global unicast address is configured
POS2/2/0/1 is Up, line protocol is Up
  IPv6 is enabled, link-local address is fe80::203:fdff:fe1b:4501
  Global unicast address(es):
    1:4::1, subnet is 1:4::/64 [DUPLICATE]
  MTU is 1514 (1500 is available to IPv6)
  ICMP redirects are disabled
  ND DAD is enabled, number of DAD attempts 1
  ND reachable time is 0 milliseconds
  ND advertised retransmit interval is 0 milliseconds
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  Hosts use stateless autoconfig for addresses.
POS2/2/0/2 is Shutdown, line protocol is Down
  IPv6 is enabled, link-local address is fe80::200:11ff:fe11:1111 [TENTATIVE]
  Global unicast address(es):
    111::2, subnet is 111::/64 [TENTATIVE]
  MTU is 1514 (1500 is available to IPv6)
  ICMP redirects are enabled
  ND DAD is enabled, number of DAD attempts 1
  ND reachable time is 0 milliseconds
  ND advertised retransmit interval is 0 milliseconds
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  Hosts use stateless autoconfig for addresses.
```

For BNG, this example shows how to display the state (tentative or duplicate) of the unicast IPv6 address on the dynamic template configuration mode:

```
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv6 nd dad attempts 1
```

Related Commands

Command	Description
ipv6 nd ns-interval , on page 518	Configures the interval between IPv6 neighbor solicitation transmissions on an interface.

ipv6 nd managed-config-flag

To set the managed address configuration flag in IPv6 router advertisements, use the **ipv6 nd managed-config-flag** command in an appropriate configuration mode. To clear the flag from IPv6 router advertisements, use the **no** form of this command.

ipv6 nd managed-config-flag

Syntax Description

This command has no keywords or arguments.

Command Default

The managed address configuration flag is not set in IPv6 router advertisements.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Setting the managed address configuration flag in IPv6 router advertisements indicates to attached hosts whether they should use stateful autoconfiguration to obtain addresses. If the flag is set, the attached hosts should use stateful autoconfiguration to obtain addresses. If the flag is not set, the attached hosts should not use stateful autoconfiguration to obtain addresses.

Hosts may use stateful and stateless address autoconfiguration simultaneously.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to configure the managed address configuration flag in IPv6 router advertisements on POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd managed-config-flag
```

For BNG, this example shows how to configure the managed address configuration flag in IPv6 router advertisements on dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd managed-config-flag
```

ipv6 nd ns-interval

To configure the interval between IPv6 neighbor solicitation retransmissions on an interface, use the **ipv6 nd ns-interval** command in an appropriate configuration mode. To restore the default interval, use the **no** form of this command.

ipv6 nd ns-interval *milliseconds*

Syntax Description

milliseconds	Interval (in milliseconds) between IPv6 neighbor solicit transmissions. Range is 1000 to 3600000 (BNG) .

Command Default

0 milliseconds (unspecified) is advertised in router advertisements, and the value 1000 is used for the neighbor discovery activity of the router itself.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

This value is included in all IPv6 router advertisements sent out from this interface. Very short intervals are not recommended in normal IPv6 operation. When a nondefault value is configured, the configured time is both advertised and used by the router itself.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) configures an IPv6 neighbor solicit transmission interval of 9000 milliseconds for POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd ns-interval 9000
```

For BNG, this example configures an IPv6 neighbor solicit transmission interval of 9000 milliseconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd ns-interval 9000
```

ipv6 nd other-config-flag

To set the other stateful configuration flag in IPv6 router advertisements, use the **ipv6 nd other-config-flag** command in an appropriate configuration mode. To clear the flag from IPv6 router advertisements, use the **no** form of this command.

ipv6 nd other-config-flag

Syntax Description

This command has no keywords or arguments.

Command Default

The other stateful configuration flag is not set in IPv6 router advertisements.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The setting of the other stateful configuration flag in IPv6 router advertisements indicates to attached hosts how they can obtain autoconfiguration information other than addresses. If the flag is set, the attached hosts should use stateful autoconfiguration to obtain the other (nonaddress) information.

Note If the managed address configuration flag is set using the **ipv6 nd managed-config-flag** command, then an attached host can use stateful autoconfiguration to obtain the other (nonaddress) information regardless of the setting of the other stateful configuration flag.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) configures the “other stateful configuration” flag in IPv6 router advertisements on POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd other-config-flag
```

For BNG, this example configures the other stateful configuration flag for IPv6 router advertisements in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd other-config-flag
```

Related Commands

Command	Description
ipv6 nd managed-config-flag , on page 517	Sets the managed address configuration flag in IPv6 router advertisements.

ipv6 nd prefix

To configure how IPv6 prefixes are advertised in IPv6 router advertisements, use the **ipv6 nd prefix** command in interface configuration mode. To advertise a prefix with default parameter values, use the **no** form of this command. To prevent a prefix (or prefixes) from being advertised, use the **no- advertise**keyword.

ipv6 nd prefix {*ipv6prefix/prefix-length* | **default** [{**valid life** | **at** | **infinite** | **no-adv** | **no-autoconfig** | **off-link**}]}
no ipv6 nd prefix {*ipv6prefix/prefix-length* | **default** [{**valid life** | **at** | **infinite** | **no-adv** | **no-autoconfig** | **off-link**}]}

Syntax Description

ipv6-prefix	The IPv6 network number to include in router advertisements. This keyword must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
/prefix-length	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash (/) must precede the decimal value.
default	Specifies all prefixes.
valid-lifetime	The amount of time (in seconds) that the specified IPv6 prefix is advertised as being valid.
at	The date and time at which the lifetime and preference expire. The prefix is valid until this specified date and time are reached. Dates are expressed in the form *date-valid-expire month-valid-expire hh:mm-valid-expire date-prefer-expire month-prefer-expire hh:mm-prefer-expire.*
infinite	The valid lifetime does not expire.
no-adv	The prefix is not advertised.
no-autoconfig	Indicates to hosts on the local link that the specified prefix cannot be used for IPv6 autoconfiguration.
off-link	Indicates that the specified prefix is assigned to the link. Nodes sending traffic to such addresses that contain the specified prefix consider the destination to be locally reachable on the link. This prefix should not be used for *onlink* determination.

Command Default

All prefixes configured on interfaces that originate IPv6 router advertisements are advertised with a valid lifetime of 2592000 seconds (30 days) and a preferred lifetime of 604800 seconds (7 days), and with both the "onlink" and "autoconfig" flags set.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

This command allows control over the individual parameters per prefix, including whether or not the prefix should be advertised.

To control how prefixes are advertised, use the **ipv6 nd prefix** command. By default, prefixes configured as addresses on an interface using the **ipv6 address** command are advertised with default values. If you configure prefixes for advertisement using the **ipv6 nd prefix** command, only the specified prefixes are advertised with the configured values, all other prefixes are advertised with default values.

The default keyword can be used to set default parameters for all prefixes.

A date can be set to specify the expiration of a prefix. The valid and preferred lifetimes are counted down in real time. When the expiration date is reached, the prefix is no longer advertised.

When onlink is "on" (by default), the specified prefix is assigned to the link. Nodes sending traffic to such addresses that contain the specified prefix consider the destination to be locally reachable on the link.

When autoconfig is "on" (by default), it indicates to hosts on the local link that the specified prefix can be used for IPv6 autoconfiguration.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example includes the IPv6 prefix 2001:0DB8::/35 in router advertisements sent out POS interface 0/1/0/0 with a valid lifetime of 1000 seconds and a preferred lifetime of 900 seconds:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ipv6 nd prefix 2001:0DB8::/35 1000 900
```

Related Commands

Command	Description
ipv6 address, on page 500	Configures an IPv6 address and enables IPv6 processing on an interface using an EUI-64 interface ID in the low-order 64 bits of the address.
ipv6 address link-local, on page 502	Configures an IPv6 link-local address for an interface and enables IPv6 processing on the interface.
ipv6 nd managed-config-flag , on page 517	Sets the managed address configuration flag in IPv6 router advertisements.
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 nd ra-interval

To configure the interval between IPv6 router advertisement transmissions on an interface, use the **ipv6 nd ra-interval** command in an appropriate configuration mode. To restore the default interval, use the **no** form of this command.

ipv6 nd ra-interval *seconds*

Syntax Description

seconds	The interval (in seconds) between IPv6 router advertisement transmissions.

Command Default

seconds : 200 seconds

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The interval between transmissions should be less than or equal to the IPv6 router advertisement lifetime if the router is configured as a default router by using the **ipv6 nd ra-lifetime** command. To prevent synchronization with other IPv6 nodes, randomly adjust the actual value used to within 20 percent of the specified value.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) configures an IPv6 router advertisement interval of 201 seconds on POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd ra-interval 201
```

For BNG, this example configures an IPv6 router advertisement interval of 201 seconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1Router
Router(config-dynamic-template-type)# ipv6 nd ra-interval 201
```

Related Commands

Command	Description
ipv6 nd ra-lifetime , on page 525	Configures the lifetime of an IPv6 router advertisement.

ipv6 nd ra-lifetime

To configure the router lifetime value in IPv6 router advertisements on an interface, use the **ipv6 nd ra-lifetime** command in an appropriate configuration mode. To restore the default lifetime, use the **no** form of this command.

ipv6 nd ra-lifetime *seconds*

Syntax Description

seconds	The validity (in seconds) of this router as a default router on this interface.

Command Default

seconds : 1800 seconds

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The router lifetime value is included in all IPv6 router advertisements sent out the interface. The value indicates the usefulness of the router as a default router on this interface. Setting the value to 0 indicates that the router should not be considered a default router on this interface. The router lifetime value can be set to a nonzero value to indicate that it should be considered a default router on this interface. The nonzero value for the router lifetime value should not be less than the router advertisement interval.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) configures an IPv6 router advertisement lifetime of 1801 seconds on POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd ra-lifetime 1801
```

For BNG, this example configures an IPv6 router advertisement lifetime of 1801 seconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd ra-lifetime 1801
```

Related Commands

Command	Description
ipv6 nd ra-interval , on page 523	Configures the interval between IPv6 router advertisement transmissions on an interface.

ipv6 nd reachable-time

To configure the amount of time that a remote IPv6 node is considered reachable after some reachability confirmation event has occurred, use the **ipv6 nd reachable-time** command in an appropriate configuration mode. To restore the default time, use the **no** form of this command.

ipv6 nd reachable-time *milliseconds*

Syntax Description

milliseconds	The amount of time (in milliseconds) that a remote IPv6 node is considered reachable. The range is from 0 to 3600000.

Command Default

0 milliseconds (unspecified) is advertised in router advertisements and 30000 (30 seconds) is used for the neighbor discovery activity of the router itself.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The range value was added for the *milliseconds* argument.

Usage Guidelines

The configured time enables the router to detect unavailable neighbors. Shorter configured times enable the router to detect unavailable neighbors more quickly; however, shorter times consume more IPv6 network bandwidth and processing resources in all IPv6 network devices. Very short configured times are not recommended in normal IPv6 operation.

The configured time is included in all router advertisements sent out of an interface so that nodes on the same link use the same time value. A value of 0 indicates that the configured time is unspecified by this router.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to configure an IPv6 reachable time of 1,700,000 milliseconds for POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd reachable-time 1700000
```

For BNG, this example shows how to configure an IPv6 reachable time of 1,700,000 milliseconds in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd reachable-time 1700000
```

ipv6 nd redirects

To send Internet Control Message Protocol (ICMP) redirect messages, use the **ipv6 nd redirects** command in interface configuration mode. To restore the system default, use the **no** form of this command.

ipv6 nd redirects
no ipv6 nd redirects

Syntax Description

This command has no keywords or arguments.

Command Default

The default value is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows how to redirect IPv6 nd-directed broadcasts on POS interface 0/2/0/2:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/0/0/0
0/2/0/2
RP/0/RP0/CPU0:router(config-if)# ipv6 nd redirects
```

Related Commands

Command	Description
show ipv6 interface , on page 560	Displays the usability status of interfaces configured for IPv6.

ipv6 nd suppress-ra

To suppress IPv6 router advertisement transmissions on a LAN interface, use the **ipv6 nd suppress-ra** command in an appropriate configuration mode. To reenable the sending of IPv6 router advertisement transmissions on a LAN interface, use the **no** form of this command.

ipv6 nd suppress-ra

Syntax Description

This command has no keywords or arguments.

Command Default

IPv6 router advertisements are automatically sent on other types of interlaces if IPv6 unicast routing is enabled on the interfaces. IPv6 router advertisements are not sent on other types of interfaces.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **no ipv6 nd suppress-ra** command to enable the sending of IPv6 router advertisement transmissions on non-LAN interface types (for example, serial or tunnel interfaces).

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to suppress IPv6 router advertisements on POS interface 0/1/1/0:

```
Router(config)# interface POS 0/1/1/0
Router(config-if)# ipv6 nd suppress-ra
```

For BNG, this example shows how to suppress IPv6 router advertisements in the dynamic template configuration mode:

```
Router(config)# dynamic-template type ppp p1
Router(config-dynamic-template-type)# ipv6 nd suppress-ra
```

For Cloud Native BNG, this example shows how to suppress IPv6 router advertisements in the cnbng-nal configuration mode:

ipv6 neighbor

To configure a static entry in the IPv6 neighbor discovery cache, use the **ipv6 neighbor** command in Global Configuration mode mode. To remove a static IPv6 entry from the IPv6 neighbors discovery cache, use the **no** form of this command.

ipv6 neighbor *ipv6-address interface-type interface-instance hardware-address*
no ipv6 neighbor *ipv6-address interface-type interface-instance hardware-address*

Syntax Description

ipv6-address	The IPv6 address that corresponds to the local data-link address. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
interface-type	Interface type. For more information, use the question mark (?) online help function.

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

hardware-address	The local data-link address (a 48-bit address).

Command Default

Static entries are not configured in the IPv6 neighbor discovery cache.

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **ipv6 neighbor** command is similar to the **arp** (global) command.

If an entry for the specified IPv6 address already exists in the neighbor discovery cache—learned through the IPv6 neighbor discovery process—the entry is automatically converted to a static entry.

Use the **show ipv6 neighbors** command to display static entries in the IPv6 neighbors discovery cache. A static entry in the IPv6 neighbor discovery cache has one state: reach (reachable)—The interface for this entry is up. If the interface for the entry is down, the **show ipv6 neighbors** command does not show the entry.

Note Reachability detection is not applied to static entries in the IPv6 neighbor discovery cache; therefore, the descriptions for the reach (reachable) state are different for dynamic and static cache entries. See the **show ipv6 neighbors** command for a description of the reach (reachable) state for dynamic cache entries.

The **clear ipv6 neighbors** command deletes all entries in the IPv6 neighbors discovery cache, except static entries. The **no ipv6 neighbor** command deletes a specified static entry from the neighbor discovery cache; the command does not remove dynamic entries—learned from the IPv6 neighbor discovery process—from the cache. Disabling IPv6 on an interface by using the **no ipv6 enable** or the **no ipv6 unnumbered** command deletes all IPv6 neighbor discovery cache entries configured for that interface, except static entries (the state of the entry changes to reach [reachable]).

Static entries in the IPv6 neighbor discovery cache are not modified by the neighbor discovery process.

Note Static entries for IPv6 neighbors can be configured only on IPv6-enabled LAN and ATM LAN Emulation interfaces.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows how to configure a static entry in the IPv6 neighbor discovery cache for a neighbor with the IPv6 address 2001:0DB8::45A and link-layer address 0002.7D1A.9472 on ethernet interface 0/ RP0 /CPU0/0:

```
RP/0/RP0/CPU0:router(config)# ipv6 neighbor 2001:0DB8::45A 0002.7D1A.9472
```

Related Commands

Command	Description
clear ipv6 neighbors , on page 478	Deletes all entries in the IPv6 neighbors discovery cache, except static entries.
ipv6 enable , on page 506	Disables IPv6 processing on an interface that has not been configured with an explicit IPv6 address.
show ipv6 neighbors , on page 564	Displays IPv6 neighbors discovery cache information.

ipv6 source-route

To enable processing of the IPv6 type source (type 0) routing header, use the **ipv6 source-route** command in Global Configuration mode mode. To disable the processing of this IPv6 extension header, use the **no** form of this command.

ipv6 source-route
no ipv6 source-route

Syntax Description

This command has no keywords or arguments.

Command Default

The **no** version of the **ipv6 source-route** command is the default.

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

The **no ipv6 source-route** command (which is the default) prevents hosts from performing source routing using your routers. When the **no ipv6 source-route** command is configured and the router receives a packet with a type 0 source routing header, the router drops the packet and sends an IPv6 ICMP error message back to the source and logs an appropriate debug message.

Task ID

Task ID	Operation
network	read, write
ipv6	read, write

Example

The following example shows how to allow the processing of any IPv6 datagrams containing a source-route header option:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# ipv6 source-route
RP/0/RP0/CPU0:router(config)#
```

Related Commands

Command	Description
ipv4 source-route, on page 493	Allow the processing of any IPv4 datagrams containing a source-route header option.

ipv6 unreachables disable

To disable the generation of IPv6 Internet Control Message Protocol (ICMP) unreachable messages, use the **ipv6 unreachables disable** command in an appropriate configuration mode. To re-enable the generation of ICMP unreachable messages, use the **no** form of this command.

ipv6 unreachables disable

Syntax Description

This command has no keywords or arguments.

Command Default

IPv6 ICMP unreachables messages are generated.

Command Modes

Interface configuration (not applicable for BNG)

Dynamic template configuration (for BNG)

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

If the software receives a nonbroadcast packet destined for itself that uses a protocol it does not recognize, it sends an ICMP protocol unreachable message to the source.

If the software receives a datagram that it cannot deliver to its ultimate destination because it knows of no route to the destination address, it replies to the originator of that datagram with an ICMP host unreachable message.

This command affects a number of ICMP unreachable messages.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write
config-services	read, write

Examples

This example (not applicable for BNG) shows how to disable the generation of ICMP unreachable messages on POS interface 0/6/0/0:

```
RP/0/RP0/CPU0:router(config)# interface POS 0/6/0/0
RP/0/RP0/CPU0:router(config-if)# ipv6 unreachables disable
```

For BNG, this example shows how to disable the generation of ICMP unreachable messages on dynamic template configuration mode:

```
RP/0/RP0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/RP0/CPU0:router(config-dynamic-template-type)# ipv6 unreachables disable
```

ipv6 virtual address

To define an IPv6 virtual address for a network of management Ethernet interfaces, use the **ipv6 virtual address** command in Global Configuration mode. To remove an IPv6 virtual address from the configuration, use the **no** form of this command.

ipv6 virtual address {[**vrf** *vrf-name*] *ipv6-address/prefix-length* | **use-as-src-addr**}
no ipv6 virtual address {[**vrf** *vrf-name*] *ipv6-address/prefix-length* | **use-as-src-addr**}

Syntax Description

vrf *vrf-name*	(Optional) Configures the virtual address on a per VPN routing and forwarding (VRF) basis for the management interfaces The *vrf-name* argument specifies the name of the VRF.
ipv6 address	The virtual IPv6 address to be used.
prefix-length	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value.
use-as-src-addr	Enables the virtual address to be used as the default SRC address on sourced packets.

Command Default

No IPv6 virtual address is defined for the configuration.

Command History

Release	Modification
Release 5.3.1	This command was introduced.

Usage Guidelines

Configuring an IPv6 virtual address enables you to access the router from a single virtual address with a management network. An IPv6 virtual address persists across route processor (RP) failover situations.

Configuring an IPv6 virtual address enables you to access a dual RP router from a single address without prior knowledge of which RP is active. An IPv6 virtual address persists across RP failovers. For this to happen, the virtual IPv6 address must share a common IPv6 subnet with a Management Ethernet interface on both RPs.

If you disable the **ipv6 virtual address** command with the **vrf** keyword, the virtual IP address is unconfigured for the corresponding VRF or for the default if no VRF is specified. This results in the removal of the entry for the virtual IP address in the VRF table and in the ARP cache.

The default VRF is chosen when no VRF is specified. The virtual IP address is activated on a management interface that is attached to a default VRF.

The **use-as-src-addr** keyword eliminates the need for configuring a loopback interface as the source interface (that is, update source) for management applications. When an update source is not configured, management applications allow the transport processes (TCP, UDP, raw_ip) to pick a suitable source address. The transport processes, in turn, consult the FIB to do so. If a Management Ethernet's IP address is picked as the source address and if the **use-as-src-addr keyword** is configured, then the transport processes replace the Management Ethernet's IP address with a relevant virtual IP address. This functionality works across RP switchovers.

Task ID

Task ID	Operations
ipv6	read, write
network	read, write

Examples

The following example shows how to define an IPv6 virtual address:

```
RP/0/RP0/CPU0:router(config)# ipv6 virtual address 0:0:0:7272::72/64
```

The following example shows how to configure the virtual IP addresses for management interfaces on a per VRF basis:

```
RP/0/RP0/CPU0:router(config)# ipv6 virtual address vrf ppp 0:0:0:7272::72/64
```

local pool

To create one or more local address pools from which IP addresses are assigned when a peer connects, use the **local pool** command in Global Configuration mode. To restore the default behavior, use the **no** form of this command.

local pool [**ipv4**] [**vrf** *vrf_name*] {*poolname* | **default**} *first-ip-address* [*last-ip-address*]
no local pool [**ipv4**] [**vrf** *vrf_name*] {*poolname* | **default**} *first-ip-address* [*last-ip-address*]

Syntax Description

vrf	Specifies that a VRF name will be given. If is parameter is missing, the default VRF is assumed.
vrf_name	Specifies the name of the VRF to which the addresses of the pool belongs. If no name is given, the default VRF is assumed.
default	Creates a default local IPv4 address pool that is used if no other pool is named.
poolname	Specifies the name of the local IPv4 address pool.
first-ip-address	Specifies the first address in an IPv4 address range. If high-IP-address is not specified, the address range is considered to have only one address.
last-ip-address	(Optional) Specifies the last address in an IPv4 address range. If high-IP-address is not specified, the address range is considered to have only one address.

Command Default

Special default pool if VRF is not specified. By default, this functionality is disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

Use this command to create local address pools to use in assigning IP addresses when a peer connects. You can also add range of IP addresses to an existing pool. If no pool name is specified, the pool with the name "default" is used.

The optional **vrf** keyword and associated *vrf name* allows the association of an IPv4 address pool with a named VRF. Any IPv4 address pool created without the **vrf** keyword automatically becomes a member of a default VRF. An IPv4 address pool name can be associated with only one VRF. Subsequent use of the same pool name, within a pool group, is treated as an extension of that pool, and any attempt to associate an existing local IPv4 address pool name with a different VRF is rejected. Therefore, each use of a pool name is an implicit selection of the associated VRF.

Note To reduce the chances of inadvertent generation of duplicate addresses, the system allows creation of the default pool only in the default VRF.

All IPv4 address pools within a VRF are checked to prevent overlapping addresses; however, addresses may overlap across different VRFs.

Task ID

Task ID	Operations
ipv4	read, write
ipv6	read, write
network	read, write

Examples

The following example creates a local IPv4 address pool named "pool2," which contains all IPv4 addresses in the range 172.16.23.0 to 172.16.23.255:

```
RP/0/RP0/CPU0:router(config)# local pool ipv4 pool2 172.16.23.0 172.16.23.255
```

The following example configures a pool of 1024 IP addresses:

```
RP/0/RP0/CPU0:router(config)#no local pool ipv4 default
RP/0/RP0/CPU0:router(config)#local pool ipv4 default 10.1.1.0 10.1.4.255
```

Note It is good practice to precede local pool definitions with a **no** form of the command to remove any existing pool, because the specification of an existing pool name is taken as a request to extend that pool with the new IPv4 addresses. To extend the pool, the **no** form of the command is not applicable.

The following example configures multiple ranges of IPv4 addresses into one pool:

```
RP/0/RP0/CPU0:router(config)#local pool ipv4 default 10.1.1.0 10.1.9.255
RP/0/RP0/CPU0:router(config)#local pool ipv4 default 10.2.1.0 10.2.9.255
```

The following examples show how to configure two pool groups and IPv4 address pools in the base system group:

```
RP/0/RP0/CPU0:router(config)#local pool vrf grp1 ipv4 p1_g1 10.1.1.1 10.1.1.50
RP/0/RP0/CPU0:router(config)#local pool vrf grp1 ipv4 p2_g1 10.1.1.100 10.1.1.110
RP/0/RP0/CPU0:router(config)#local pool vrf grp2 ipv4 p1_g2 10.1.1.1 10.1.1.40
RP/0/RP0/CPU0:router(config)#local pool ipv4 lp1 10.1.1.1 10.1.1.10
RP/0/RP0/CPU0:router(config)#local pool vrf grp1 ipv4 p3_g1 10.1.2.1 10.1.2.30
RP/0/RP0/CPU0:router(config)#local pool vrf grp2 ipv4 p2_g2 10.1.1.50 10.1.1.70
RP/0/RP0/CPU0:router(config)#local pool ipv4 lp2 10.1.2.1 10.1.2.10
```

In this example:

- VRF grp1 consists of pools p1_g1, p2_g1, and p3_g1.
- VRF grp2 consists of pools p1_g2 and p2_g2.

- Pools lp1 and lp2 are not explicitly associated with a vrf and are therefore members of the default vrf.

Note IPv4 address 10.1.1.1 overlaps in vrfs grp1, grp2 and the default vrf . There is no overlap within any vrf that includes the default vrf.

The VPN requires a configuration that selects the proper vrf by selecting the proper pool based on remote user data. Each user in a given VPN can select an address space using the pool and associated vrf appropriate for that VPN. Duplicate addresses in other VPNs (other vrfs) are not a concern, because the address space of a VPN is specific to that VPN. In the example, a user in VRF vpn1 is associated with a combination of the pools p1_vpn1, p2_vpn1, and p3_vpn1, and is allocated addresses from that address space. Addresses are returned to the same pool from which they were allocated.

show arm conflicts

To display IPv4 or IPv6 address conflict information identified by the Address Repository Manager (ARM), use the **show arm conflicts** command in EXEC mode.

show arm {**ipv4** | **ipv6**} [**vrf** *vrf-name*] **conflicts** [{**address** | **override** | **unnumbered**}]

Syntax Description

ipv4	Displays IPv4 address conflicts.
ipv6	Displays IPv6 address conflicts.
vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information. Available for IPv4 only.
vrf-name	(Optional) Name of a VRF.
address	(Optional) Displays address conflict information.
override	(Optional) Displays address conflict override information.
unnumbered	(Optional) Displays unnumbered interface conflict information.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

Use the **show arm conflicts** command to display information about IPv4 or IPv6 address conflicts. You can use address conflict information to identify misconfigured IPv4 or IPv6 addresses.

Conflict information is displayed for interfaces that are forced down and for interfaces that are up.

Issuing the **show arm conflicts** command without specifying any optional keywords displays the output generated from both the **address** and **unnumbered** keywords.

Task ID

Task ID	Operations
network	read

Examples

The following sample output is from the **show arm ipv4 conflicts** command:

```
RP/0/RP0/CPU0:router# show arm ipv4 conflicts

F Forced down
| Down interface & addr                  Up interface & addr

F Lo2 10.1.1.2/24                         Lo1 10.1.1.1/24
```

```
Forced down interface          Up interface
tu2->tu1                       tu1->Lo1
```

The following is sample output from the **show arm ipv4 conflicts** command with the **address** keyword:

```
RP/0/RP0/CPU0:router# show arm ipv4 conflicts address

F Forced down
| Down interface & addr                  Up interface & addr

F Lo2 10.1.1.2/24                         Lo1 10.1.1.1/24
```

The following is sample output from the **show arm ipv4 conflicts** command with the **unnumbered** keyword:

```
RP/0/RP0/CPU0:router# show arm ipv4 conflicts unnumbered

Forced down interface          Up interface                   VRF
tu2->tu1                       tu1->Lo1
```

This table describes the significant fields shown in the display.

Table 63: show arm conflicts Command Field Descriptions

Field	Description
Forced down	Legend defining a symbol that may appear in the output for this command.
Down interface & addr	Forced down interface name, type, and address.
Up interface & addr	List of interfaces that are up.
Forced down interface	Unnumbered interfaces that are in conflict and forced down.
Up interface	Unnumbered interfaces that are in conflict and are up.

show arm database

To display IPv4 or IPv6 address information stored in the Address Repository Manager (ARM) database, use the **show arm database** command in EXEC mode.

show arm {**ipv4** | **ipv6**} [**vrf** *{vrf-name}*] **database** [{**interface** *type interface-path-id* | **network** *prefix / length*}]

Syntax Description

ipv4	Displays IPv4 address information.
ipv6	Displays IPv6 address information.
vrf	Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
interface	Displays the IPv4 or IPv6 address configured on the specified interface.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
network	Displays addresses that match a prefix.
prefix / length	Network prefix and mask. A slash (/) must precede the specified mask. The range is from 0 to 128.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **show arm database** command should be used to display information in the IP ARM database. Database information is displayed with the IPv4 or IPv6 address, interface type and name, and producer information.

Task ID

Task ID	Operations
network	read

Examples

The following is sample output from the **show arm database** command:

```
RP/0/RP0/CPU0:router# show arm
```

```
 database
Fri Jul 25 10:54:52.304 PST DST

P = Primary, S = Secondary address
|U = Unnumbered
|| Address            Interface
Producer         Route-tag
VRF: default
P  172.29.52.75/24    MgmtEth0/RP0/CPU0/0           ipv4_ma 0/RP0/CPU0         100
P  10.2.2.2/32        Loopback0                     ipv4_ma 0/RP1/CPU0
P  10.12.24.2/24      Bundle-POS24                  ipv4_ma 0/RP1/CPU0
P  10.12.28.2/24      Bundle-Ether28                ipv4_ma 0/RP1/CPU0
P  10.12.29.2/24      Bundle-Ether28.1              ipv4_ma 0/RP1/CPU0
P  10.12.30.2/24      Bundle-Ether28.2              ipv4_ma 0/RP1/CPU0
P  10.12.31.2/24      Bundle-Ether28.3              ipv4_ma 0/RP1/CPU0
P
172.
29.
52.
76/24    MgmtEth0/RP1/CPU0/0  ipv4_ma 0/RP1/CPU0P  10.
112.
12.
2/24     TenGigE0/1/1/0 ipv4_ma 0/1/CPU0

| Address             Interface  Producer
P  10.12.16.2/24      GigabitEthernet0/1/5/0        ipv4_ma 0/1/CPU0           1001
P  10.23.4.2/24       GigabitEthernet0/1/5/1        ipv4_ma 0/1/CPU0           1002
P  10.27.4.2/24       GigabitEthernet0/1/5/2        ipv4_ma 0/1/CPU0
P  10.12.8.2/24       POS0/1/0/1                    ipv4_ma 0/1/CPU0
P  10.112.4.2/24      POS0/1/0/2                    ipv4_ma 0/1/CPU0
P  10.112.8.2/24      POS0/1/0/3                    ipv4_ma 0/1/CPU0
P  10.12.32.2/24      POS0/1/4/2                    ipv4_ma 0/1/CPU0
P  10.12.32.2/24      POS0/1/4/3                    ipv4_ma 0/1/CPU0
P  172.29.52.28/24    MgmtEth0/4/CPU1/0             ipv4_ma 0/4/CPU1
P  172.29.52.27/24    MgmtEth0/4/CPU0/0             ipv4_ma 0/4/CPU0
P  10.12.20.2/24      GigabitEthernet0/6/5/1        ipv4_ma 0/6/CPU0
P  10.
12.
40.
2/24 GigabitEthernet0/6/5/7 ipv4_ma 0/6/CPU0
S 10.4.2.4/24         gigabitethernet 10/0  ipv4_io 1 10
S 10.4.3.4/24         gigabitethernet 10/1  ipv4_io 1 10

P = Primary, S = Secondary address

|U = Unnumbered

|| Address            Interface                     Producer
VRF: default
P  10.12.12.2/24      POS0/6/0/1                    ipv4_ma 0/6/CPU0
P  10.23.8.2/24       POS0/6/4/4                    ipv4_ma 0/6/CPU0
P  10.12.4.2/24       POS0/6/4/5                    ipv4_ma 0/6/CPU0
P  10.24.4.2/24       POS0/6/4/6                    ipv4_ma 0/6/CPU0
P
10.27.
8.2/24POS0/6/4/7 ipv4_ma 0/6/CPU0
```

This table describes the significant fields shown in the display.

Table 64: show arm database Command Field Descriptions

Field	Description
Primary	Primary IP address.
Secondary	Secondary IP address.
Unnumbered Address	Interface is unnumbered and the address displayed is that of the referenced interface.
Interface	Interface that has this IP address.
Producer	Process that provides the IP address to the ARM.
Route-tag	Route tag address.

show arm router-ids

To display the router identification information with virtual routing and forwarding table information for the Address Repository Manager (ARM), use the **show arm router-ids** command in EXEC mode.

show arm [**ipv4**] **router-ids**

Syntax Description

ipv4	(Optional) Displays IPv4 router information.

Command Default

None

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.5.0	The **ipv6** and **vrf** keywords were removed.

Usage Guidelines

Use the **show arm router-ids** command with the **ipv4** keyword to display the selected router ID information for the router.

Task ID

Task ID	Operations
network	read

Examples

The following is sample output from the **show arm router-ids** command:

```
RP/0/RP0/CPU0:router# show arm router-ids

Router-ID         Interface

10.10.10.10       Loopback0
```

This table describes the significant fields shown in the display.

Table 65: show arm router-ids Command Field Descriptions

Field	Description
Router-ID	Router identification.
Interface	Interface identification.

show arm registrations producers

To display producer registration information for the Address Repository Manager (ARM), use the **show arm registrations producers** command in EXEC mode.

show arm {**ipv4** | **ipv6**} **registrations producers**

Syntax Description

ipv4	Displays IPv4 producer registration information.
ipv6	Displays IPv6 producer registration information.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **show arm registrations producers** command to display information on producers of IP ARM registrations. Registration information is displayed with the ID.

Task ID

Task ID	Operations
network	read

Examples

The following is sample output from the **show arm registrations producers** command:

```
RP/0/RP0/CPU0:router# show arm ipv4 registrations producers

Id    Node            Producer Id   IPC Version Connected?
0     0/0/0           ipv4_io       1.1         Y
4     0/1/0           ipv4_io       1.1         Y
3     0/2/0           ipv4_io       1.1         Y
2     0/4/0           ipv4_io       1.1         Y
1     0/6/0           ipv4_io       1.1         Y
```

This table describes the significant fields shown in the display.

Table 66: show arm registrations producers Command Field Descriptions

Field	Description
Id	An identifier used by the IP Address ARM (IP ARM) to keep track of the producer of the IP address.
Node	The physical node (RP/LC CPU) where the producer is running.
Producer Id	The string used by the producer when registering with IP ARM.

Field	Description
IPC Version	Version of the apis used by the producer to communicate with IP ARM.
Connected?	Status of whether the producer is connected or not.

show arm summary

To display summary information for the IP Address Repository Manager (ARM), use the **show arm summary** command in EXEC mode.

show arm {**ipv4** | **ipv6**} **summary**

Syntax Description

ipv4	Displays IPv4 summary information.
ipv6	Displays IPv6 summary information.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **show arm summary** command to display a summary of the number of producers, address conflicts, and unnumbered interface conflicts in the router.

Task ID

Task ID	Operations
network	read

Examples

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

```
Router# show arm ipv4 summary
IPv4 Producers                          :          3
IPv4 address conflicts                  :          0
IPv4 unnumbered interface conflicts     :          0
IPv4 DB Master version                  : 0x00000000
```

This table describes the significant fields shown in the display.

Table 67: show arm summary Command Field Descriptions

Field	Description
IPv4 Producers	Number of IPv4 producers on the router.
IPv4 address conflicts	Number of IPv4 address conflicts on the router.
IPv4 unnumbered interface conflicts	Number of IPv4 conflicts on unnumbered interfaces.
IPv4 DB Master version	IPv4 DB Master version

show arm vrf-summary

To display a summary of VPN routing and forwarding (VRF) instance information identified by the Address Repository Manager (ARM), use the **show arm vrf-summary** command in EXEC mode.

show arm {**ipv4** | **ipv6**} **vrf-summary**

Syntax Description

ipv4	Displays IPv4 address information.
ipv6	Displays IPv6 address information.

Command Default

None

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The **ipv4** and **ipv6** keywords were added.

Usage Guidelines

Use the **show arm vrf-summary** command to display information about an IPv4 VPN routing and forwarding instance.

Task ID

Task ID	Operations
network	read

Examples

The following example is output from the **show arm vrf-summary** command:

```
RP/0/RP0/CPU0:router# show arm vrf-summary

VRF IDs:        VRF-Names:
0x60000000      default
0x60000001      vrf1
0x60000002      vrf2
```

This table describes the significant fields shown in the display.

Table 68: show arm vrf-summary Command Field Descriptions

Field	Description
VRF IDs	VPN routing and forwarding (VRF) identification (vrfid) number.
VRF-Names	Name given to the VRF.

show clns statistics

To display Connectionless Network Service (CLNS) protocol statistics, use the **show clns statistics** command in EXEC mode.

show clns statistics

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use this command to display CLNS statistics.

Task ID

Task ID	Operations
isis	read

Examples

The following is sample output from the **show clns statistics** command:

```
RP/0/RP0/CPU0:router# show clns statistics

CLNS Statistics:
Last counter clear:                    2868 seconds ago
Total number of packets sent:          0
Total number of packets received:      0
Send packets dropped, buffer overflow: 0
Send packets dropped, out of memory:   0
Send packets dropped, other:           0
Receive socket max queue size:         0
Class    Overflow/Max   Rate Limit/Max
IIH             0/0             0/0
LSP             0/0             0/0
SNP             0/0             0/0
OTHER           0/0             0/0
Total          0               0
```

This table describes the significant fields shown in the display.

Table 69: show clns traffic Command Field Descriptions

Field	Description
Class	Indicates the packet type. Packets types are as follows: • IIH—Intermediate System-to-Intermediate-System hello packets • lsp—Link state packets • snp—Sequence number packets • other
Overflow/Max	Indicates the number of packet drops due to the socket queue being overflown. The count displays in an *x/y* format where *x* indicates the total number of packet drops and *y* indicates the maximum number of drops in a row.
Rate Limit/Max	Indicates the number of packet drops due to rate limitation. The count displays in an *x/y* format where *x* indicates the total number of packet drops and *y* indicates the maximum number of drops in a row.

show ipv4 interface

To display the usability status of interfaces configured for IPv4, use the **show ipv4 interface** command in the EXEC mode.

show ipv4 [**vrf** *vrf-name*] **interface** [{*type interface-path-id* | **brief** | **summary**}]

Syntax Description

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

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

brief	(Optional) Displays the primary IPv4 addresses configured on the router's interfaces and their protocol and line states.
summary	(Optional) Displays the number of interfaces on the router that are assigned, unassigned, or unnumbered.

Command Default

If VRF is not specified, the software displays the default VRF.

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced .
Release 3.0	No modification.

Release	Modification
Release 3.3.0	The **vrf** keyword and *vrf-name* argument were added.

Usage Guidelines

The **show ipv4 interface** command provides output similar to the **show ipv6 interface** command, except that it is IPv4-specific.

The interface name will be displayed only if the name belongs to the VRF instance. If the *vrf-name* is not specified then the interface instance will be displayed only if the interface belongs to the default VRF.

Task ID

Task ID	Operations
ipv4	read
network	read

Examples

This is the sample output of the **show ipv4 interface** command:

```
RP/0/RP0/CPU0:router# show ipv4 interface

Loopback0 is Up, line protocol is Up
  Internet address is
1.0.0.1/
8 with route-tag 110
  Secondary address 10.0.0.1/8
  MTU is 1514 (1514 is available to IP)
  Multicast reserved groups joined: 10.0.0.1
  Directed broadcast forwarding is disabled
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
POS0/0/0/0 is Up, line protocol is Up
  Internet address is 10.25.58.1/16
  MTU is 1514 (1500 is available to IP)
  Multicast reserved groups joined: 224.0.0.1
  Directed broadcast forwarding is disabled
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
POS0/0/0/0 is Shutdown, line protocol is Down
  Vrf is default (vrfid 0x60000000)
  Internet protocol processing disabled
```

This table describes the significant fields shown in the display.

Table 70: show ipv4 interface Command Field Descriptions

Field	Description
Loopback0 is Up	If the interface hardware is usable, the interface is marked “Up.” For an interface to be usable, both the interface hardware and line protocol must be up.

Field	Description
line protocol is Up	If the interface can provide two-way communication, the line protocol is marked "Up." For an interface to be usable, both the interface hardware and line protocol must be up.
Internet address	IPv4 Internet address and subnet mask of the interface.
Secondary address	Displays a secondary address, if one has been set.
MTU	Displays the IPv4 MTU[11] value set on the interface.
Multicast reserved groups joined	Indicates the multicast groups this interface belongs to.
Directed broadcast forwarding	Indicates whether directed broadcast forwarding is enabled or disabled.
Outgoing access list	Indicates whether the interface has an outgoing access list set.
Inbound access list	Indicates whether the interface has an incoming access list set.
Proxy ARP	Indicates whether proxy ARP[12] is enabled or disabled on an interface.
ICMP redirects	Specifies whether ICMPv4[13] redirects are sent on this interface.
ICMP unreachables	Specifies whether unreachable messages are sent on this interface.
Internet protocol processing disabled	Indicates an IPv4 address has not been configured on the interface.

[11] MTU = maximum transmission unit
[12] ARP = Address Resolution Protocoladdress resolution protocol
[13] ICMPv4 = Internet Control Message Protocol internet control message protocol version 4

show local pool

To display IPv4 local pool details, use the **show local pool** command in EXEC mode.

show {**local***other_pool_types*} **pool** [**vrf** *vrf_name*] {**ipv4** | **ipv6**} {**default***poolname*}

Syntax Description

local	Specifies that the address pool is local.
vrf	Specifies that a VRF name will be given. If is parameter is missing, the default VRF is assumed.
vrf_name	Specifies the name of the VRF to which the addresses of the pool belongs. If no name is given, the default VRF is assumed.
default	Creates a default local IPv4 address pool that is used if no other pool is named.
poolname	Specifies the name of the local IPv4 address pool.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv4	read
network	read

Examples

The following is sample output from the **show ipv4 local pool** with a poolname of P1:

```
RP/0/RP0/CPU0:router# show ipv4 local pool P1

Pool Begin End FreeInUse
P1 172.30.228.11172.30.228.1660
Available addresses:
172.30.228.11
172.30.228.12
172.30.228.13
172.30.228.14
172.30.228.15
172.30.228.16
Inuse addresses:
None
```

This table describes the significant fields shown in the display.

Table 71: show ipv4 local pool Command Descriptions

Field	Description
Pool	Name of the pool.
Begin	First IP address in the defined range of addresses in this pool.
End	Last IP address in the defined range of addresses in this pool.
Free	Number of addresses available.
InUse	Number of addresses in use.

Related Commands

Command	Description
local pool, on page 538	Creates one or more local address pools from which IP addresses are assigned when a peer connects.

show ipv4 traffic

To display the IPv4 traffic statistics, use the **show ipv4 traffic** command in the EXEC mode.

show ipv4 traffic [**brief**]

Syntax Description

brief	(Optional) Displays only IPv4 and Internet Control Message Protocol version 4 (ICMPv4) traffic.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **show ipv4 traffic** command provides output similar to the **show ipv6 traffic** command, except that it is IPv4-specific.

Task ID

Task ID	Operations
ipv4	read
network	read

Examples

This is the sample output of the **show ipv4 traffic** command:

```
RP/0/RP0/CPU0:router# show ipv4 traffic

IP statistics:
  Rcvd:  16372 total, 16372 local destination
         0 format errors, 0 bad hop count
         0 unknown protocol, 0 not a gateway
         0 security failures, 0 bad source, 0 bad header
         0 with options, 0 bad, 0 unknown
  Opts:  0 end, 0 nop, 0 basic security, 0 extended security
         0 strict source rt, 0 loose source rt, 0 record rt
         0 stream ID, 0 timestamp, 0 alert, 0 cipso
  Frags: 0 reassembled, 0 timeouts, 0 couldn't reassemble
         0 fragmented, 0 fragment count
  Bcast: 0 sent, 0 received
  Mcast: 0 sent, 0 received
   Drop: 0 encapsulation failed, 0 no route, 0 too big, 0 sanity address check
   Sent: 16372 total

ICMP statistics:
  Sent: 0 admin unreachable, 0 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        5 echo request, 0 echo reply
        0 mask request, 0 mask reply
        0 parameter error, 0 redirects
        5 total
  Rcvd: 0 admin unreachable, 0 network unreachable
```

```
        2 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        0 echo request, 5 echo reply
        0 mask request, 0 mask reply
        0 redirect, 0 parameter error
        0 source quench, 0 timestamp, 0 timestamp reply
        0 router advertisement, 0 router solicitation
        7 total, 0 checksum errors, 0 unknown

UDP statistics:
        16365 packets input, 16367 packets output
        0 checksum errors, 0 no port
        0 forwarded broadcasts

TCP statistics:
        0 packets input, 0 packets output
        0 checksum errors, 0 no port
```

This table describes the significant fields shown in the display.

Table 72: show ipv4 traffic Command Field Descriptions

Field	Description
bad hop count	Occurs when a packet is discarded because its TTL[14] field was decremented to zero.
encapsulation failed	Usually indicates that the router had no ARP request entry and therefore did not send a datagram.
format errors	Indicates a gross error in the packet format, such as an impossible Internet header length.
IP statistics Rcvd total	Indicates the total number of local destination and other packets received in the software plane. It does not account for the IP packets forwarded or discarded in hardware.
no route	Counted when the Cisco IOS XR software discards a datagram it did not know how to route.

[14] TTL = time-to-live

show ipv6 interface

To display the usability status of interfaces configured for IPv6, use the **show ipv6 interface** command in the EXEC mode.

show ipv6 [**vrf** *vrf-name*] **interface** [{**summary** | [*type interface-path-id*][**brief** [{**link-local** | **global**}]]}]

Syntax Description

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

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

brief	(Optional) Displays the primary IPv6 addresses configured on the router interfaces and their protocol and line states.
link-local	(Optional) Displays the link local IPv6 address.
global	(Optional) Displays the global IPv6 address.
summary	(Optional) Displays the number of interfaces on the router that are assigned, unassigned, or unnumbered.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Release	Modification
Release 3.3.0	The **summary** keyword was added to the command.
Release 3.5.0	The following modifications are listed for the **show ipv6 interface** command: • The command syntax was modified to be similar to the **show ipv4 interface** command. • The sample output was modified.
Release 5.1.2	The **link-local** and **global** keywords were added to the command.

Usage Guidelines

The **show ipv6 interface** command provides output similar to the **show ipv4 interface** command, except that it is IPv6-specific.

Use the **link-local** or **global** keywords along with the **brief** keyword to view the link local or global IPv6 addresses.

Task ID

Task ID	Operations
ipv6	read

Examples

This is the sample output of the **show ipv6 interface** command:

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

GigabitEthernet0/2/0/0 is Up, line protocol is Up, Vrfid is default (0x60000000)
  IPv6 is enabled, link-local address is fe80::212:daff:fe62:c150
  Global unicast address(es):
    202::1, subnet is 202::/64 with route-tag 120
  Joined group address(es): ff02::1:ff00:1 ff02::1:ff62:c150 ff02::2
      ff02::1
  MTU is 1514 (1500 is available to IPv6)
  ICMP redirects are disabled
  ICMP unreachables are enabled
  ND DAD is enabled, number of DAD attempts 1
  ND reachable time is 0 milliseconds
  ND advertised retransmit interval is 0 milliseconds
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  Hosts use stateless autoconfig for addresses.
  Outgoing access list is not set
  Inbound  access list is not set
```

This table describes the significant fields shown in the display.

Table 73: show ipv6 interface Command Field Descriptions

Field	Description
POS0/3/0/0 is Shutdown, line protocol is Down	Indicates whether the interface hardware is currently active (whether line signal is present) and whether it has been taken down by an administrator. If the interface hardware is usable, the interface is marked "Up." For an interface to be usable, both the interface hardware and line protocol must be up.
line protocol is Up (or down)	Indicates whether the software processes that handle the line protocol consider the line usable (that is, whether keepalives are successful). If the interface can provide two-way communication, the line protocol is marked "Up." For an interface to be usable, both the interface hardware and line protocol must be up.
IPv6 is enabled, stalled, disabled (stalled and disabled are not shown in sample output)	Indicates that IPv6 is enabled, stalled, or disabled on the interface. If IPv6 is enabled, the interface is marked "enabled." If duplicate address detection processing identified the link-local address of the interface as being a duplicate address, the processing of IPv6 packets is disabled on the interface and the interface is marked "stalled." If IPv6 is not enabled, the interface is marked "disabled."
link-local address	Displays the link-local address assigned to the interface.
TENTATIVE	The state of the address in relation to duplicate address detection. States can be any of the following: • duplicate—The address is not unique and is not being used. If the duplicate address is the link-local address of an interface, the processing of IPv6 packets is disabled on that interface. • tentative—Duplicate address detection is either pending or under way on this interface. **Note** If an address does not have one of these states (the state for the address is blank), the address is unique and is being used.
Global unicast addresses	Displays the global unicast addresses assigned to the interface.
ICMP redirects	State of Internet Control Message Protocol (ICMP) IPv6 redirect messages on the interface (the sending of the messages is enabled or disabled).
ND DAD	State of duplicate address detection on the interface (enabled or disabled).
number of DAD attempts	Number of consecutive neighbor solicitation messages that are sent on the interface while duplicate address detection is performed.
ND reachable time	Displays the neighbor discovery reachable time (in milliseconds) assigned to this interface.

This is the sample output of the **show ipv6 interface brief link-local** command:

```
RP/0/RP0/CPU0:router#show ipv6 interface brief link-local

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/0     fe80::fe:8ff:fecb:26c5        Up         Up
GigabitEthernet0/0/0/1     fe80::4f:88ff:fea0:8c9d       Up         Up
GigabitEthernet0/0/0/3     unassigned                    Shutdown   Down
GigabitEthernet0/0/0/4     unassigned                    Shutdown   Down
```

This is the sample output of the **show ipv6 interface brief global** command:

```
RP/0/RP0/CPU0:router#show ipv6 interface brief global

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/0     2001:db8::1                   Up         Up
GigabitEthernet0/0/0/1     2001:db8::2                   Up         Up
GigabitEthernet0/0/0/3     unassigned                    Shutdown   Down
GigabitEthernet0/0/0/4     unassigned                    Shutdown   Down
```

This is the sample output of the **show ipv6 interface** *type interface-path-id* **brief link-local** command:

```
RP/0/RP0/CPU0:router#show ipv6 interface gigabitEthernet 0/0/0/0 brief link-local

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/0     fe80::fe:8ff:fecb:26c5        Up         Up
```

This is the sample output of the **show ipv6 interface** *type interface-path-id* **brief global** command:

```
RP/0/RP0/CPU0:router#show ipv6 interface gigabitEthernet 0/0/0/0 brief global

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/0     2001:db8::1                   Up         Up
```

This is the sample output of the **show ipv6 vrf** *vrf-name* **interface brief link-local** command:

```
RP/0/RP0/CPU0:router#show ipv6 vrf vrf1 interface brief link-local

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/2     fe80::46:c8ff:fe22:daae       Up         Up
```

This is the sample output of the **show ipv6 vrf** *vrf-name* **interface brief global** command:

```
RP/0/RP0/CPU0:router#show ipv6 vrf vrf1 interface brief global

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/2     2001:db8::2                   Up         Up
```

This is the sample output of the **show ipv6 vrf** *vrf-name* **interface** *type interface-path-id* **brief link-local** command:

```
RP/0/RP0/CPU0:router#show ipv6 vrf vrf1 interface gigabitEthernet 0/0/0/2 brief link-local

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/2     fe80::46:c8ff:fe22:daae       Up         Up
```

This is the sample output of the **show ipv6 vrf** *vrf-name* **interface** *type interface-path-id* **brief global** command:

```
RP/0/RP0/CPU0:router#show ipv6 vrf vrf1 interface gigabitEthernet 0/0/0/2 brief global

Interface                  IPv6-Address                  Status     Protocol
GigabitEthernet0/0/0/2     2001:db8::2                  Up         Up
```

Related Commands

Command	Description
show ipv4 interface , on page 553	Displays the usability status of interfaces configured for IPv4.

show ipv6 neighbors

To display the IPv6 neighbor discovery cache information, use the **show ipv6 neighbors** command in the EXEC mode.

show ipv6 neighbors [{*type interface-path-id* | **location** *node-id*}]

Syntax Description

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

Command Default

All IPv6 neighbor discovery cache information is displayed.

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

When the *interface-type* and *interface-number* arguments are not specified, cache information for all IPv6 neighbors is displayed. Specifying the *interface-type* and *interface-number* arguments displays only cache information about the specified interface.

Task ID

Task ID	Operations
ipv6	read

Examples

This is the sample output of the **show ipv6 neighbors** command when entered with an interface type and number:

```
RP/0/RP0/CPU0:router# show ipv6 neighbors POS 0/0/0/0

IPv6 Address                              Age Link-layer Addr State Interface
2000:0:0:4::2                               0 0003.a0d6.141e  REACH POS2
FE80::203:A0FF:FED6:141E                    0 0003.a0d6.141e  REACH POS2
3001:1::45a                                 - 0002.7d1a.9472  REACH POS2
```

This is the sample output of the **show ipv6 neighbors** command when entered with an IPv6 address:

```
RP/0/RP0/CPU0:router# show ipv6 neighbors 2000:0:0:4::2
```

```
IPv6 Address                              Age Link-layer Addr State Interface
2000:0:0:4::2                               0 0003.a0d6.141e  REACH POS2
```

This table describes significant fields shown in the display.

Table 74: show ipv6 neighbors Command Field Descriptions

Field	Description
IPv6 Address	IPv6 address of neighbor or interface.
Age	Time (in minutes) since the address was confirmed to be reachable. A hyphen (-) indicates a static entry.
Link-layer Addr	MAC address. If the address is unknown, a hyphen (-) is displayed.
State	The state of the neighbor cache entry. These are the states for dynamic entries in the IPv6 neighbor discovery cache: • INCMP (incomplete)—Address resolution is being performed on the entry. A neighbor solicitation message has been sent to the solicited-node multicast address of the target, but the corresponding neighbor advertisement message has not yet been received. • reach (reachable)—Positive confirmation was received within the last ReachableTime milliseconds that the forward path to the neighbor was functioning properly. While in reach state, the device takes no special action as packets are sent. • stale—More than ReachableTime milliseconds have elapsed since the last positive confirmation was received that the forward path was functioning properly. While in stale state, the device takes no action until a packet is sent. • delay—More than ReachableTime milliseconds have elapsed since the last positive confirmation was received that the forward path was functioning properly. A packet was sent within the last DELAY_FIRST_PROBE_TIME seconds. If no reachability confirmation is received within DELAY_FIRST_PROBE_TIME seconds of entering the delay state, send a neighbor solicitation message and change the state to probe. • probe—A reachability confirmation is actively sought by resending neighbor solicitation messages every RetransTimer milliseconds until a reachability confirmation is received. These are the possible states for static entries in the IPv6 neighbor discovery cache: • reach (reachable)—The interface for this entry is up. • INCMP (incomplete)—The interface for this entry is down. **Note** Reachability detection is not applied to static entries in the IPv6 neighbor discovery cache; therefore, the descriptions for the INCMP (incomplete) and reach (reachable) states are different for dynamic and static cache entries.
Interface	Interface from which the address is reachable.

Related Commands

Command	Description
show ipv6 neighbors summary , on page 566	Displays summary information for the neighbor entries.

show ipv6 neighbors summary

To display summary information for the neighbor entries, use the **show ipv6 neighbors summary** command in the EXEC mode.

show ipv6 neighbors summary

Syntax Description

None

Command Default

The default value is disabled.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ipv6	read

Examples

This is the sample output of the **show ipv6 neighbors summary** command that shows the summary information for the neighbor entries:

```
RP/0/RP0/CPU0:router# show ipv6 neighbors summary

Mcast nbr entries:
    Subtotal: 0
Static nbr entries:
    Subtotal: 0
Dynamic nbr entries:
    Subtotal: 0

Total nbr entries: 0
```

Related Commands

Command	Description
show ipv6 neighbors , on page 564	Displays IPv6 neighbor discovery cache information.

show ipv6 traffic

To display the IPv6 traffic statistics, use the **show traffic** command in the EXEC mode.

show ipv6 traffic [**brief**]

Syntax Description

brief	(Optional) Displays only IPv6 and Internet Control Message Protocol version 6 (ICMPv6) traffic statistics.

Command Default

None

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.5.0	Sample output was modified to display drop counters from the sanity address check.

Usage Guidelines

The **show ipv6 traffic** command provides output similar to the **show ipv4 traffic** command, except that it is IPv6-specific.

Task ID

Task ID	Operations
ipv6	read
network	read

Examples

This is the sample output of the **show ipv6 traffic** command:

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

 IPv6 statistics:
  Rcvd:  0 total, 0 local destination
         0 source-routed, 0 truncated
         0 format errors, 0 hop count exceeded
         0 bad header, 0 unknown option, 0 bad source
         0 unknown protocol
         0 fragments, 0 total reassembled
         0 reassembly timeouts, 0 reassembly failures
         0 reassembly max drop
         0  sanity address check drops
  Sent:  0 generated, 0 forwarded
         0 fragmented into 0 fragments, 0 failed
         0 no route, 0 too big
  Mcast: 0 received, 0 sent

ICMP statistics:
  Rcvd: 0 input, 0 checksum errors, 0 too short
        0 unknown error type
        unreach: 0 routing, 0 admin, 0 neighbor,
                 0 address, 0 port, 0 unknown
        parameter: 0 error, 0 header, 0 option,
                   0 unknown
```

```
        0 hopcount expired, 0 reassembly timeout,
        0 unknown timeout, 0 too big,
        0 echo request, 0 echo reply
  Sent: 0 output, 0 rate-limited
        unreach: 0 routing, 0 admin, 0 neighbor,
                 0 address, 0 port, 0 unknown
        parameter: 0 error, 0 header, 0 option
                 0 unknown
        0 hopcount expired, 0 reassembly timeout,
        0 unknown timeout, 0 too big,
        0 echo request, 0 echo reply

Neighbor Discovery ICMP statistics:
  Rcvd: 0 router solicit, 0 router advert, 0 redirect
        0 neighbor solicit, 0 neighbor advert
  Sent: 0 router solicit, 0 router advert, 0 redirect
        0 neighbor solicit, 0 neighbor advert

UDP statistics:
        0 packets input, 0 checksum errors
        0 length errors, 0 no port, 0 dropped
        0 packets output

TCP statistics:s
        0 packets input, 0 checksum errors, 0 dropped
        0 packets output, 0 retransmitted
```

This table describes the significant fields shown in the display.

Table 75: show ipv6 traffic Command Field Descriptions

Field	Description
Rcvd:	Statistics in this section refer to packets received by the router.
total	Total number of packets received by the software.
local destination	Locally destined packets received by the software.
source-routed	Packets seen by the software with RH.
truncated	Truncated packets seen by the software.
bad header	An error was found in generic HBH, RH, DH, or HA. Software only.
unknown option	Unknown option type in IPv6 header.
unknown protocol	Protocol specified in the IP header of the received packet is unreachable.
Sent:	Statistics in this section refer to packets sent by the router.
forwarded	Packets forwarded by the software. If the packet cannot be forwarded in the first lookup (for example, the packet needs option processing), then the packet is not included in this count, even if it ends up being forwarded by the software.
Mcast:	Multicast packets.
ICMP statistics:	Internet Control Message Protocol statistics.

Related Commands

Command	Description
show ipv4 traffic , on page 558	Displays statistics about IPv4 traffic.

show mpa client

To display information about the Multicast Port Arbitrator (MPA) clients, use the **show mpa client** command in EXEC mode.

show mpa client {**consumers** | **producers**}

Syntax Description

consumers	Displays the clients for the consumers.
producers	Displays the clients for the producers.

Command Default

No default behavior or values

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read

Examples

The following sample output is from the **show mpa client** command:

```
RP/0/RP0/CPU0:router# show mpa client producers

List of producer clients for ipv4 MPA

Location     Protocol     Process
0/1/CPU0     255          raw
0/1/CPU0     17           udp
0/4/CPU0     17           udp
0/4/CPU0     255          raw
0/4/CPU1     17           udp
0/4/CPU1     255          raw
0/6/CPU0     17           udp
0/6/CPU0     255          raw
0/RP1/CPU0   17           udp
0/RP1/CPU0   255          raw
```

This table describes the significant fields shown in the display.

Table 76: show mpa client Command Field Descriptions

Field	Description
List of producer clients for MPA	Displays the producer clients that have registered with MPA.
Location	Displays the node on which the producer client is hosted.

Field	Description
Protocol	Displays the IP protocol ID.
Process	Displays the name of the producer client.

show mpa groups

To display Multicast Port Arbitrator (MPA) multicast group information, use the **show mpa groups** command in EXEC mode.

show mpa groups *type interface-path-id*

Syntax Description

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

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

Command Default

None

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read

Examples

The following sample output is from the **show mpa groups** command:

```
RP/0/RP0/CPU0:router# show mpa groups gig 0/1/0/2
Mon Jul 27 04:07:19.802 DST
GigabitEthernet0/1/0/2 :-
  224.0.0.1 : includes 0, excludes 1, mode EXCLUDE
    <no source filter>
  224.0.0.2 : includes 0, excludes 1, mode EXCLUDE
```

```
  <no source filter>
224.0.0.5 : includes 0, excludes 1, mode EXCLUDE
  <no source filter>
224.0.0.6 : includes 0, excludes 1, mode EXCLUDE
  <no source filter>
224.0.0.13 : includes 0, excludes 1, mode EXCLUDE
  <no source filter>
224.0.0.22 : includes 0, excludes 1, mode EXCLUDE
  <no source filter>
```

This table describes the significant fields shown in the display.

Table 77: show mpa groups Command Field Descriptions

Field	Description
Includes	Displays the number of client registrations that have enabled the group in the include mode.
Excludes	Displays the number of client registrations that have enabled the group in the exclude mode.
Mode	Displays the current mode for the address.
No source filter	Indicates that the router does not have the desired list of IP addresses.

Note The source filter consists of a list of source IP addresses. Depending on the mode, the list identifies the set of addresses from where multicast packets are either allowed or disallowed. In the include mode, the router accepts packets only from the IP addresses that are present in the source filter. In the exclude mode, the router drops packets from addresses that are present in the source filter. No source filter indicates that the registration does not have such a filter.

show mpa ipv4

To display information for Multicast Port Arbitrator (MPA) for IPv4, use the **show mpa ipv4** command in EXEC mode.

show mpa ipv4 {**client** {**consumers** | **producers**} | **groups** *type interface-path-id* }

Syntax Description

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

Command Default

None

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read

Examples

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

```
RP/0/RP0/CPU0:router# show mpa ipv4 client producers

List of producer clients for ipv4 MPA

 Location     Protocol     Process
 0/1/CPU0     17           udp
 0/1/CPU0     255          raw
 0/4/CPU0     17           udp
 0/4/CPU0     255          raw
 0/4/CPU1     17           udp
 0/4/CPU1     255          raw
 0/6/CPU0     17           udp
 0/6/CPU0     255          raw
 0/RP0/CPU0   17           udp
 0/RP0/CPU0   255          raw
 0/RP1/CPU0   255          raw
 0/RP1/CPU0   17           udp
```

This table describes the significant fields shown in the display.

Table 78: show mpa ipv4 Command Field Descriptions

Field	Description
List of producer clients for ipv4 MPA	Displays the producer clients that have registered with MPA.
Location	Displays the node on which the producer client is hosted.
Protocol	Displays the IP protocol ID.
Process	Displays the name of the producer client.

show mpa ipv6

To display information for Multicast Port Arbitrator (MPA) for IPv6, use the **show mpa ipv6** command in EXEC mode.

show mpa ipv6 {**client** {**consumers** | **producers**} | **groups** *type interface-path-id*}

Syntax Description

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

Command Default

None

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read

Examples

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

```
RP/0/RP0/CPU0:router# show mpa ipv6 client producers

List of producer clients for ipv6 MPA

 Location     Protocol     Process
 0/1/CPU0     17           udp
 0/1/CPU0     255          raw
 0/4/CPU0     255          raw
 0/4/CPU0     17           udp
 0/4/CPU1     17           udp
 0/4/CPU1     255          raw
 0/6/CPU0     17           udp
 0/6/CPU0     255          raw
 0/RP0/CPU0   17           udp
 0/RP0/CPU0   255          raw
 0/RP1/CPU0   17           udp
 0/RP1/CPU0   255          raw
```

Table 79: show mpa ipv6 Command Field Descriptions

Field	Description
List of producer clients for ipv6 MPA	Displays the producer clients that have registered with MPA.
Location	Displays the node on which the producer client is hosted.
Protocol	Displays the IP protocol ID.
Process	Displays the name of the producer client.

show vrf

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

show vrf {**all***vrf-name*}

Syntax Description

all	Displays contents of all the VRFs.
vrf-name	Name that uniquely identifies the VRF.

Command Default

No default behavior or values

Command History

Release	Modificationd
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to use the **show vrf** command:

```
RP/0/RP0/CPU0:router# show vrf all

VRF                  RD                  RT                          AFI   SAFI
vpn_1                not set
                                         import  2:2                   IPV4  Unicast
                                         export  2:2                   IPV4  Unicast
vpn_2                not set
                                         import  3:3                   IPV4  Unicast
                                         export  3:3                   IPV4  Unicast
```

This table describes the significant fields shown in the display.

Table 80: show vrf Command Field Descriptions

Field	Description
VRF	User-assigned VRF names.
RD	Displays the associated route-distinguishers for each VRF.
RT	Displays import and export route target extended communities.
AFI	Displays the IP address family.

Field	Description
SAFI	Displays the VRF topology.

Related Commands

Command	Description
vrf, on page 580	Configures a VRF instance for a routing protocol.

vrf

To configure a VPN routing and forwarding (VRF) instance for a routing protocol, use the **vrf** command in router configuration mode. To place a service interface in VRF, use the command in Service Application Interface mode. To disable the VRF instance, use the **no** form of this command.

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

Syntax Description

vrf-name	Name of the VRF instance. The following names cannot be used: all, default, and global.

Command Default

All routing protocols insert their routes into a VRF's routing table.

Note The number of supported VRFs is platform specific.

Command Modes

Router configuration

Service Application Interface configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip services (Router Configuration mode)	read, write
interface (Service Application Interface configuration mode)	read, write

Examples

The following example shows how to configure VRF using the **vrf** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# vrf client
```

vrf(address-family)

To configure the address family for a VRF instance, use the **vrf(address-family)** command in VRF configuration mode. To disable the address family, use the **no** form of this command.

vrf *vrf-name* [**address-family** {**ipv4** | **ipv6**} **unicast**]
no vrf *vrf-name* [**address-family** {**ipv4** | **ipv6**} **unicast**]

Syntax Description

vrf-name	Name of the VRF instance.
address-family	(Optional) Enables AFI or SAFI configuration.
ipv4	Enables address-family configuration for IPv4 addresses.
ipv6	Enables address-family configuration for IPv6 addresses.
unicast	Indicates unicast topology.

Command Default

None

Command Modes

VRF configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ip services	read, write

Examples

The following example shows how to configure the address family for a VRF instance, using the **vrf (address-family)** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# vrf client
RP/0/RP0/CPU0:router(config-vrf)# address-family ipv4 unicast
RP/0/RP0/CPU0:router(config-vrf-af)#
```

Related Commands

Command	Description
vrf, on page 580	Configures a VRF instance for a routing protocol.

vrf (description)

To add a brief description for the VRF instance being configured, use the **vrf (description)** command in VRF configuration mode. To remove a description, use the **no** form of this command.

vrf *vrf-name* [**description**]
no vrf *vrf-name* [**description**]

Syntax Description

vrf-name	Name of the VRF instance.
description	(Optional) Specifies a description for the VRF instance.

Command Default

No default behavior of values

Command Modes

VRF configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

The description line can have a maximum of 244 characters.

Task ID

Task ID	Operations
ip services	read, write

Examples

The following example shows how to insert a description to a VRF instance using the **vrf (description)** command:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# vrf v1
RP/0/RP0/CPU0:router(config-vrf)# description client
```

Related Commands

Command	Description
vrf, on page 580	Configures a VRF instance for a routing protocol.

vrf (mhost)

To configure a multicast default interface for a particular VRF to send and receive packets from the host stack, use the **vrf (mhost)** command in VRF configuration mode. To remove the configuration, use the**no** form of this command.

vrf *vrf-name* [**mhost** {**ipv4** | **ipv6**} **interface**]
no vrf *vrf-name* [**mhost** {**ipv4** | **ipv6**} **interface**]

Syntax Description

vrf-name	Name of the VRF instance.
mhost	(Optional) Enables the multicast host stack options.
ipv4	Specifies IPv4 address.
ipv6	Specifies IPv6 address.
interface	Specifies the default *multicast interface.*

Command Default

None

Command Modes

VRF configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

The default interface should belong to the vrf for which its being configured.

Task ID

Task ID	Operations
ip services	read, write

Examples

The following example shows how to configure VRF a multicast default interface using the **vrf(mhost)** command:

```
RP/0/RP0/CPU0:router(config)# configvrf 101
RP/0/RP0/CPU0:router(config-vrf)# vrf clientmhost ipv4 default-interface loop101
```

Related Commands

Command	Description
vrf, on page 580	Configures a VRF instance for a routing protocol.

Prefix List Commands

This chapter describes the Cisco IOS XR software commands used to configure IP Version 4 (IPv4) and IP Version 6 (IPv6) prefix lists.

For detailed information about prefix list concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear prefix-list ipv4, on page 586
- clear prefix-list ipv6 , on page 588
- copy prefix-list ipv4 , on page 590
- copy prefix-list ipv6 , on page 592
- deny (prefix-list), on page 594
- ipv4 prefix-list, on page 597
- ipv6 prefix-list, on page 599
- permit (prefix-list), on page 601
- remark (prefix-list), on page 604
- resequence prefix-list ipv4, on page 606
- resequence prefix-list ipv6, on page 608
- show prefix-list, on page 610
- show prefix-list afi-all, on page 611
- show prefix-list ipv4, on page 612
- show prefix-list ipv4 standby, on page 614
- show prefix-list ipv6, on page 615

clear prefix-list ipv4

To reset the hit count on an IP Version 4 (IPv4) prefix list, use the **clear prefix-list ipv4** command in EXEC mode.

clear prefix-list ipv4 *name* [*sequence-number*]

Syntax Description

name	Name of the prefix list from which the hit count is to be cleared.
sequence-number	(Optional) Sequence number of a prefix list. Range is 1 to 2147483646.

Command Default

No default behavior or values

Command History

Release	Modification
Release 2.0	This command was introduced .
Release 3.2	The command name was changed from **clear ipv4 prefix-list** to **clear prefix-list ipv4** .

Usage Guidelines

The hit count is a value indicating the number of matches to a specific prefix list entry. Use the **clear prefix-list ipv4** command to clear counters for a specified configured prefix list.

Use the *sequence-number* argument to clear counters for a prefix list with a specific sequence number.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example displays IPv4 prefix lists, shows how to clear the counters for list3, then shows how to display the IPv4 prefix lists again, showing that counters are cleared for list3:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.18.30.154/16 (8 matches)
ipv4 prefix-list list2
 20 deny 172.24.30.164/16 (12 matches)
ipv4 prefix-list list3
 30 permit 172.19.31.154/16 (32 matches)

RP/0/RP0/CPU0:router# clear prefix-list ipv4 list3

RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.18.30.154/16 (8 matches)
ipv4 prefix-list list2
 20 deny 172.24.30.164/16 (12 matches)
```

```
ipv4 prefix-list list3
 30 permit 172.19.31.154/16
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IP IPv6 prefix list.
ipv4 prefix-list, on page 597	Defines an IPv4 prefix list.
permit (prefix-list), on page 601	Sets permit conditions for an IPv4 or IPv6 prefix list.
show prefix-list ipv4, on page 612	Displays the configuration of the current IPv4 prefix list.

clear prefix-list ipv6

To reset the hit count on an IP Version 6 (IPv6) prefix list, use the **clear prefix-list ipv6** command in EXEC mode.

clear prefix-list ipv6 *name* [*sequence-number*]

Syntax Description

name	Name of the prefix list from which the hit count is to be cleared.
sequence-number	(Optional) Clears counters for a prefix list with a specific sequence number. Range is 1 to 2147483646.

Command Default

No default behavior or values

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **clear ipv6 prefix-list** to **clear prefix-list ipv6** .
Release 3.6.0	The prefix for the sample output was modified.

Usage Guidelines

The hit count is a value indicating the number of matches to a specific prefix list entry. Use the **clear prefix-list ipv6** command to clear counters for a specified configured prefix list.

Use the *sequence-number* argument to clear counters for a prefix list with a specific sequence number.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows IPv6 prefix lists, clears the counters for sequence number 60 on prefix list list3, then displays the IPv6 prefix lists again, showing that counters are cleared for sequence number 60:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64 (5 matches)
 60 deny 3000:1::/64 (7 matches)

RP/0/RP0/CPU0:router# clear prefix-list ipv6 list1 60
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
```

```
40 permit 2000:1::/64 (5 matches)
60 deny 3000:1::/64
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IPv6 prefix list.
ipv6 prefix-list, on page 599	Defines an IPv6 prefix list.
permit (prefix-list), on page 601	Sets permit conditions for an IPv4 or IPv6 prefix list.
show prefix-list ipv6, on page 615	Displays the contents of the current IPv6 prefix list.

copy prefix-list ipv4

To create a copy of an existing IP Version 4 (IPv4) prefix list, use the **copy prefix-list ipv4** command in EXEC mode.

copy prefix-list ipv4 *source-name destination-name*

Syntax Description

source-name	Name of the prefix list to be copied.
destination-name	Destination prefix list where the contents of the *source-name* will be copied.

Command Default

No default behavior or values

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **copy ipv4 prefix-list** to **copy prefix-list ipv4** .

Usage Guidelines

Use the **copy prefix-list ipv4** command to copy a configured prefix list. Use the *source-name* argument to specify the prefix list to be copied and the *destination-name* argument to specify where to copy the contents of the source prefix list. The *destination-name* argument must be a unique name; if the *destination-name* argument name exists for a prefix list or access list, the prefix list is not copied. The **copy prefix-list ipv4** command checks that the source prefix list exists, then checks the existing list names to prevent overwriting existing prefix lists.

Task ID

Task ID	Operations
acl	read, write
filesystem	execute

Examples

The following example displays IPv4 prefix lists, shows how to copy prefix-list1 to list4, then displays the IPv4 prefix lists again, showing prefix list4:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.24.20.164/16
ipv4 prefix-list list2
 20 deny 172.18.30.154/16
ipv4 prefix-list list3
 30 permit 172.29.30.154/16

RP/0/RP0/CPU0:router# copy prefix-list ipv4 list1 list4

RP/0/RP0/CPU0:router# show prefix-list ipv4
ipv4 prefix-list list1
```

```
 10 permit 172.24.20.164/16
ipv4 prefix-list list2
 20 deny 172.18.30.154/16
ipv4 prefix-list list3
 30 permit 172.29.30.154/16
ipv4 prefix-list list4
 10 permit 172.24.20.164/16
```

Related Commands

Command	Description
ipv4 prefix-list, on page 597	Defines an IPv4 prefix list.
show prefix-list ipv4, on page 612	Displays the contents of the current IPv4 prefix lists.

copy prefix-list ipv6

To create a copy of an existing IP Version 6 (IPv6) prefix list, use the **copy prefix-list ipv6** command in EXEC mode.

copy prefix-list ipv6 *source-name destination-name*

Syntax Description

source-name	Name of the prefix list to be copied.
destination-name	Destination prefix list where the contents of the *source-name* will be copied.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command name was changed from **copy ipv6 prefix-list** to **copy prefix-list ipv6** .

Usage Guidelines

Use the **copy prefix-list ipv6** command to copy a configured prefix list. Use the *source-name* argument to specify the prefix list to be copied and the *destination-name* argument to specify where to copy the contents of the source prefix list. The *destination-name* argument must be a unique name; if the *destination-name* argument name exists for a prefix list or access list, the prefix list is not copied. The **copy prefix-list ipv6** command checks that the source prefix list exists then checks the existing list names to prevent overwriting existing prefix lists.

Task ID

Task ID	Operations
acl	read, write
filesystem	execute

Examples

The following example shows IPv6 prefix lists, shows how to copy prefix-list1 to list4, then displays the IPv6 prefix lists again, showing prefix list4:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64
ipv6 prefix-list list2
 10 permit 5555::/24

RP/0/RP0/CPU0:router# copy prefix-list ipv6 list1 list3
```

```
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64
ipv6 prefix-list list2
 10 permit 5555::/24
ipv6 prefix-list list3
 40 permit 2000:1::/64
 60 deny 3000:1::/6
```

Related Commands

Command	Description
ipv6 prefix-list, on page 599	Defines an IPv6 prefix list.
show prefix-list ipv6, on page 615	Displays the contents of current IPv6 prefix list.

deny (prefix-list)

To set deny conditions for an IP Version 4 (IPv4) or IP Version 6 (IPv6) prefix list, use the **deny** command in IPv4 prefix list configuration or IPv6 prefix list configuration modes. To remove a condition from a prefix list, use the **no** form of this command.

[sequence-number] **deny** *network/length* [**ge** *value*] [**le** *value*] [**eq** *value*]
no *sequence-number* **deny**

Syntax Description

sequence-number	(Optional) Sets deny conditions for a prefix list with a specific sequence number. If you do not use a sequence number, the condition defaults to the next available sequence number in the prefix list. Range is 1 to 2147483646. By default, the first statement is number 10, and the subsequent statements are incremented by 10. The **sequence-number** argument must be used with the **no** form of the command.
network / length	Network number and length (in bits) of the network mask.
ge *value*	(Optional) Specifies a prefix length greater than or equal to the value. It is the lowest value of a range of the *length* (the "from" portion of the length range).
le *value*	(Optional) Specifies a prefix length less than or equal to the value. It is the highest value of a range of the *length* (the "to" portion of the length range).
eq *value*	(Optional) Exact value of the *length* .

Command Default

There is no specific condition under which a packet is denied passing the IPv4 or IPv6 prefix list.

Command Modes

IPv4 prefix list configuration

IPv6 prefix list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The syntax for the **show prefix-list ipv6** command was updated in the examples.

Usage Guidelines

Use the **deny** command to specify conditions under which a packet cannot pass the prefix list.

The **ge**, **le** and **eq** keywords can be used to specify the range of the prefix length to be matched, for prefixes that are more specific than the *network/length* argument. Exact match is assumed when neither **ge** nor **le** is specified. The range is assumed to be from the **ge** *value* to 32 if only the **ge** keyword is specified. The range is assumed to be from the *length* to the **le** *value argument* if only the **le** attribute is specified.

A specified **ge** *value* or **le** *value* must satisfy the following condition:

length < **ge** *value* < **le** *value* <= 32 (for IPv4)

length < **ge** *value* < **le** *value* <= 128 (for IPv6)

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to deny the route 10.0.0.0/0:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv4_pfx)# 50 deny 10.0.0.0/0
```

The following example shows how to deny all routes with a prefix of 10.3.32.154:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv4_pfx)#80 deny 10.3.32.154 le 32
```

The following example shows how to deny all masks with a length greater than 25 bits routes with a prefix of 172.18.30.154/16:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv4_pfx)#100 deny 172.18.30.154/16 ge 25
```

The following example shows how to deny mask lengths greater than 25 bits in all address space:

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list2
RP/0/RP0/CPU0:router(config-ipv6_pfx)# 70 deny  2000:1::/64 ge 25
```

The following example shows how to add deny conditions to list3, then use the **no** form of the command to remove the condition with the sequence number 30:

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list3

RP/0/RP0/CPU0:router(config-ipv6_pfx)# deny 2000:1::/64 ge 25
RP/0/RP0/CPU0:router(config-ipv6_pfx)# deny 3000:1::/64 le 32
RP/0/RP0/CPU0:router(config-ipv6_pfx)# deny 4000:1::/64 ge 25
Uncommitted changes found, commit them? [yes]: y

RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list3
 10 deny 2000:1::/64 ge 25
 20 deny 3000:1::/64 le 32
 30 deny 4000:1::/64 ge 25

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/RP0/CPU0:router(config-ipv6_pfx)# no 30
Uncommitted changes found, commit them? [yes]: y
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list3
 10 deny 2000:1::/64 ge 25
```

```
20 deny 3000:1::/64 le 32
```

Related Commands

Command	Description
ipv4 prefix-list, on page 597	Defines an IPv4 prefix list.
ipv6 prefix-list, on page 599	Defines an IPv6 prefix list.
permit (prefix-list), on page 601	Sets the permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 604	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4, on page 612	Displays the contents of the current IPv4 prefix list.
show prefix-list ipv6, on page 615	Displays the contents of the current IPv6 prefix list.

ipv4 prefix-list

To define an IP Version (IPv4) prefix list by name, use the **ipv4 prefix-list** command in Global Configuration mode. To remove the prefix list, use the **no** form of this command.

ipv4 prefix-list *name*
no ipv4 prefix-list *name*

Syntax Description

name	Name of the prefix list. Names cannot contain a space or quotation marks.

Command Default

No IPv4 prefix list is defined.

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **ipv4 prefix-list** command to configure an IPv4 prefix list. This command places the router in prefix-list configuration mode, in which the denied or permitted access conditions must be defined with the **deny** or **permit** command. You must add a condition to create the prefix list.

Use the **resequence prefix-list ipv4** command to renumber existing statements and increment subsequent statements to allow a new IPv4 prefix list statement (**permit**, **deny**, or **remark**) to be added. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software will renumber the existing statements, thereby making room to add new statements with the unused entry numbers.

Task ID

Task ID	Operations
acl	read, write
ipv4	read, write

Examples

The following example shows the prefix lists, then configures list2, then shows the conditions in both prefix lists:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.20.10.171/16 le 24
 20 permit 172.18.0.0/16
 30 deny 172.24.20.164/16 ge 25

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list2

RP/0/RP0/CPU0:router(config-ipv4_pfx)#deny 172.18.30.154/16 ge 25
RP/0/RP0/CPU0:router(config-ipv4_pfx)#
```

```
Uncommitted changes found, commit them? [yes]: Y

RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.20.10.171/16 le 24
 20 permit 172.18.0.0/16
 30 deny 172.24.20.164/16 ge 25
ipv4 prefix-list list2
 10 deny 172.18.30.154/16 ge 25
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IPv6 prefix list.
permit (prefix-list), on page 601	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 604	Inserts a helpful remark about a prefix list entry.
resequence prefix-list ipv4, on page 606	Renumbers existing statements and increments subsequent statements.
show prefix-list ipv4, on page 612	Displays the contents of the current IPv4 prefix list.

ipv6 prefix-list

To define an IP Version (IPv6) prefix list by name, use the **ipv6 prefix-list** command in Global Configuration mode. To remove the prefix list, use the **no** form of this command.

ipv6 prefix-list *name*
no ipv6 prefix-list *name*

Syntax Description

name	Name of the prefix list. Names cannot contain a space or quotation marks.

Command Default

No IPv6 prefix list is defined.

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
acl	read, write
ipv6	read, write

Examples

The following example shows how to create a prefix list named list-1:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list-1
RP/0/RP0/CPU0:router(config-ipv6-pfx)# 40 permit 2000:1::/64
RP/0/RP0/CPU0:router(config-ipv6-pfx)# 60 deny 3000:1::/64
RP/0/RP0/CPU0:router(config-ipv6-pfx)#
Uncommitted changes found, commit them? [yes]: y

RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64
RP/0/RP0/CPU0:router#
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IPv6 prefix list.

Command	Description
permit (prefix-list), on page 601	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 604	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv6, on page 615	Displays the contents of the current IPv6 prefix list.

permit (prefix-list)

To set permit conditions for an IP Version 4 (IPv4) or IP Version 6 (IPv6) prefix list, use the **permit** command in IPv4 prefix list configuration or IPv6 prefix list configuration modes. To remove a condition from a prefix list, use the **no** form of this command.

[*sequence-number*] **permit** *network/length* [**ge** *value*] [**le** *value*] [**eq** *value*]
no *sequence-number* **permit**

Syntax Description

sequence-number	(Optional) Number of the **permit** statement in the prefix list. This number determines the order of the statements in the prefix list. Range is 1 to 2147483646. By default, the first statement is number 10, and the subsequent statements are incremented by 10.
network / *length*	Network number and length (in bits) of the network mask.
ge *value*	(Optional) Specifies a prefix length greater than or equal to the value. It is the lowest value of a range of the *length* (the "from" portion of the length range). Range is 1 to 128.
le *value*	(Optional) Specifies a prefix length less than or equal to the value. It is the highest value of a range of the *length* (the "to" portion of the length range). Range is 1 to 128.
eq *value*	(Optional) Exact value of the *length* . Range is 1 to 128.

Command Default

No default behavior or value

Command Modes

IPv4 prefix list configuration

IPv6 prefix list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **permit** command to specify conditions under which a packet can pass the prefix list.

The **ge**, **le** and **eq** keywords can be used to specify the range of the prefix length to be matched, for prefixes that are more specific than the *network/length* argument. Exact match is assumed when neither **ge** nor **le** is specified. The range is assumed to be from the **ge** *value* to 32 if only the **ge** keyword is specified. The range is assumed to be from the *length* to the **le** *value* argument if only the **le** attribute is specified.

A specified **ge** *value* or **le** *value* must satisfy the following condition:

length < **ge** *value* < **le** *value* <= 32 (for IPv4)

length < **ge** *value* < **le** *value* <= 128 (for IPv6)

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to permit the prefix 172.18.0.0/16:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv4_pfx)# permit 172.18.0.0/16
```

The following example shows how to accept a mask length of up to 24 bits in routes with the prefix 172.20.10.171/16:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv4_pfx)# permit 172.20.10.171/16 le 24
```

The following example shows how to permit mask lengths from 8 to 24 bits in all address space:

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv6_pfx)# permit 2000:1::/64 ge 8 le 24
```

The following example shows how to add permit conditions to list3, then remove the condition with the sequence number 30:

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/RP0/CPU0:router(config-ipv6_pfx)# permit 2000:1::/64 ge 25
RP/0/RP0/CPU0:router(config-ipv6_pfx)# permit 3000:1::/64 le 32
RP/0/RP0/CPU0:router(config-ipv6_pfx)# permit 3000:1::/64 ge 25
Uncommitted changes found, commit them? [yes]: y
RP/0/RP0/CPU0:router#show ipv6 prefix-list

ipv6 prefix-list list3
 10 permit 2000:1::/64 ge 25
 20 permit 3000:1::/64 le 32
 30 permit 4000:1::/64 ge 25

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/RP0/CPU0:router(config-ipv6_pfx)# no 30
Uncommitted changes found, commit them? [yes]: y
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list3
 10 permit 2000:1::/64 ge 25
 20 permit 3000:1::/64 le 32

10 deny 2000:1::/64 ge 25
 20 deny 3000:1::/64 le 32
 30 deny 4000:1::/64 ge 25
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IPv6 prefix list.
ipv4 prefix-list, on page 597	Creates an IPv4 prefix list.
ipv6 prefix-list, on page 599	Creates an IPv6 prefix list.
remark (prefix-list), on page 604	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4, on page 612	Displays the contents of current IPv4 prefix lists.
show prefix-list ipv6, on page 615	Displays the contents of current IPv6 prefix lists.

remark (prefix-list)

To write a helpful comment (remark) for an entry in either an IP Version 4 (IPv4) or IP Version 6 (IPv6) prefix list, use the **remark** command in IPv4 prefix-list configuration or IPv6 prefix-list configuration modes. To remove the remark, use the **no** form of this command.

[*sequence-number*] **remark** *remark*
no *sequence-number*

Syntax Description

sequence-number	(Optional) Number of the **remark** statement in the prefix list. This number determines the order of the statements in the prefix list. The number can be from 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10).
remark	Comment that describes the entry in the prefix list, up to 255 characters long.

Command Default

The prefix list entries have no remarks.

Command Modes

IPv4 prefix-list configuration

IPv6 prefix-list configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

Usage Guidelines

Use the **remark** command to write a helpful comment for an entry in a prefix list. The remark can be up to 255 characters in length; anything longer is truncated.

If you know the sequence number of the remark you want to delete, you can remove it by entering the **no** *sequence-number* command.

Use the **resequence prefix-list ipv4** command if you want to add statements to an existing IPv4 prefix list.

Task ID

Task ID	Operations
acl	read, write

Examples

In the following example, a remark is made to explain a prefix list entry:

```
RP/0/RP0/CPU0:router(config)# ipv4 prefix-list deny-ten
RP/0/RP0/CPU0:router(config-ipv4_pfx)# 10 remark Deny all routes with a prefix of 10/8
RP/0/RP0/CPU0:router(config-ipv4_pfx)# 20 deny 10.0.0.0/8 le 32
RP/0/RP0/CPU0:router(config-ipv4_pfx)# end
```

In the following example, a remark is made to explain usage:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list list1
RP/0/RP0/CPU0:router(config-ipv6-pfx)# 10 remark use from july23 forward
RP/0/RP0/CPU0:router(config-ipv6-pfx)#
Uncommitted changes found, commit them? [yes]: y

RP/0/0/CPU0:Apr  4 02:20:34.851 : config[65700]: %LIBTARCFG-6-COMMIT : Configura
tion committed by user 'UNKNOWN'.   Use 'show commit changes 1000000023' to view
 the changes.
RP/0/0/CPU0:Apr  4 02:20:34.984 : config[65700]: %SYS-5-CONFIG_I : Configured fr
om console by console
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 10 remark use from july23 forward
 40 permit 2000:1::/64
 60 deny 3000:1::/64
```

Related Commands

Command	Description
ipv4 prefix-list, on page 597	Creates an entry in a prefix list.
resequence prefix-list ipv4, on page 606	Renumbers existing statements and increments subsequent statements.
show prefix-list ipv4, on page 612	Displays information about a prefix list or prefix list entries.

resequence prefix-list ipv4

To renumber existing statements and increment subsequent statements to allow a new prefix list statement (**permit**, **deny**, or **remark**) to be added, use the **resequence prefix-list ipv4** command in Admin Configuration mode.

resequence prefix-list ipv4 *name* [*base* [*increment*]]

Syntax Description

name	Name of a prefix list.
base	(Optional) Number of the first statement in the specified prefix list, which determines its order in the prefix list. Maximum value is 2147483646.
increment	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483646.

Command Default

base: 10

increment: 10

Command History

Release	Modification
Release 3.2	The command name was changed from **resequence ipv4 prefix-list** to **resequence prefix-list ipv4** .
Release 3.6.0	The prefix for the sample output was modified.

Usage Guidelines

The sequence number of a prefix list entry determines the order of the entries in the list. The router compares network addresses to the prefix list entries. The router begins the comparison at the top of the prefix list, with the entry having the lowest sequence number.

If multiple entries of a prefix list match a prefix, the entry with the lowest sequence number is considered the real match. When a match or deny occurs, the router does not go through the rest of the prefix list.

By default, the first statement in a prefix list is sequence number 10, and the subsequent statements are incremented by 10.

Use the **resequence prefix-list ipv4** command to add a **permit**, **deny**, or **remark** statement between consecutive entries in an existing IPv4 prefix list. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software renumbers the existing statements, thereby making room to add new statements with the unused entry numbers.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to display the sequence number intervals for prefix list list1, resequence list1 from 10 to 30, and displays the resulting sequence numbers:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.20.10.171/16 le 24
 20 permit 172.18.0.0/16
 30 deny 172.24.20.164/16 ge 25
ipv4 prefix-list list2
 10 deny 172.18.30.154/16 ge 25

RP/0/RP0/CPU0:router# resequence prefix-list ipv4 list1 10 30

RP/0/0/CPU0:Apr  4 02:29:39.513 : ipv4_acl_action_edm[183]: %LIBTARCFG-6-COMMIT
: Configuration committed by user 'UNKNOWN'.   Use 'show commit changes 10000000
24' to view the changes.

RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.20.10.171/16 le 24
 40 permit 172.18.0.0/16
 70 deny 172.24.20.164/16 ge 25
ipv4 prefix-list list2
 10 deny 172.18.30.154/16 ge 25
```

Related Commands

Command	Description
deny (prefix-list), on page 594	Sets deny conditions for an IPv4 or IPv6 prefix list.
permit (prefix-list), on page 601	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 604	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4, on page 612	Displays the contents of the current IPv4 prefix list.

resequence prefix-list ipv6

To renumber existing statements and increment subsequent statements to allow a new prefix list statement (**permit**, **deny**, or **remark**) to be added, use the **resequence prefix-list ipv6** command in EXEC mode.

resequence prefix-list ipv6 *name* [*base* [*increment*]]

Syntax Description

name	Name of a prefix list.
base	(Optional) Number of the first statement in the specified prefix list, which determines its order in the prefix list. Maximum value is 2147483644.
increment	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483644.

Command Default

base: 10

increment: 10

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

Usage Guidelines

The sequence number of a prefix list entry determines the order of the entries in the list. The router compares network addresses to the prefix list entries. The router begins the comparison at the top of the prefix list, with the entry having the lowest sequence number.

If multiple entries of a prefix list match a prefix, the entry with the lowest sequence number is considered the real match. Once a match or deny occurs, the router does not go through the rest of the prefix list.

By default, the first statement in a prefix list is sequence number 10, and the subsequent statements are incremented by 10.

Use the **resequence prefix-list ipv6** command to add a **permit**, **deny**, or **remark** statement between consecutive entries in an existing IPv6 prefix list. Specify the first entry number (the *base*) and the increment by which to separate the entry numbers of the statements. The software renumbers the existing statements, thereby making room to add new statements with the unused entry numbers.

Task ID

Task ID	Operations
acl	read, write

Examples

The following example shows how to display the sequence number intervals for prefix list 1, resequence list1 from 10 to 30, and displays the resulting sequence numbers:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6
```

```
ipv4 prefix-list list1
 10 permit
172.20.10.171/16 le 24
 20 permit 3000:1::/16 le 32
 20 permit 172.18.0.0/16
 30 deny
172.24.20.164/16 ge 25

ipv4 prefix-list list2
 10 deny
172.18.30.154/16 ge 25

RP/0/RP0/CPU0:router# resequence prefix-list ipv4 list1 10 30

RP/0/RP0/CPU0:
Apr  4 02:29:39.513 :
ipv4_acl_action_edm[183]: %LIBTARCFG-6-COMMIT
: Configuration committed by user 'UNKNOWN'.   Use 'show commit changes 10000000
24' to view the changes.
```

show prefix-list

To display information about a prefix list or prefix list entries, use the **show prefix-list** command in EXEC mode.

show prefix-list [*list-name*] [*sequence-number*]

Syntax Description

list-name	(Optional) Name of a prefix list.
sequence-number	(Optional) Sequence number of the prefix list entry. Range is 1 to 2147483646.

Command Default

No default behavior or values

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
acl	read

Examples

The following sample output is from the **show prefix-list** command:

```
RP/0/RP0/CPU0:router# show prefix-list
```

show prefix-list afi-all

To display the contents of the prefix list for all the address families, use the **show prefix-list afi-all** command in EXEC mode.

show prefix-list afi-all

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
acl	read

Examples

The following sample output is from the **show prefix-list afi-all** command:

```
RP/0/RP0/CPU0:router# show prefix-list afi-all
```

show prefix-list ipv4

To display the contents of current IP Version 4 (IPv4) prefix list, use the **show prefix-list ipv4** command in EXEC mode.

show prefix-list ipv4 [*list-name*] [*sequence-number*] [**summary**]

Syntax Description

list-name	(Optional) Name of a prefix list.
sequence-number	(Optional) Sequence number of the prefix list entry. Range is 1 to 2147483646.
summary	(Optional) Displays summary output of prefix list contents.

Command Default

All IPv4 prefix lists are displayed.

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command syntax was changed from **show ipv4 prefix-list** to **show prefix-list ipv4** .
Release 3.6.0	The **summary** keyword was added. The prefix for the sample output was modified.

Usage Guidelines

Use the **show prefix-list ipv4** command to display the contents of all IPv4 prefix lists. To display the contents of a specific IPv4 prefix list, use the *name* argument. Use the *sequence-number* argument to specify a given prefix list entry. Use the **summary** keyword to display a summary of prefix list contents.

Task ID

Task ID	Operations
acl	read

Examples

The following example displays all configured prefix lists:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4

ipv4 prefix-list list1
 10 permit 172.20.10.171/16 le 24
 20 permit 172.18.0.0/16
 30 deny 172.24.20.164/16 ge 25
ipv4 prefix-list list2
 10 deny 172.18.30.154/16 ge 25
```

The following example uses the *list-name* argument to display the prefix list named list1:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4 list1

ipv4 prefix-list list1
```

```
 10 permit 172.20.10.171/16 le 24
 20 permit 172.18.0.0/16
 30 deny 172.24.20.164/16 ge 25
```

The following example uses the *list-name* and *sequence-number* argument to display a prefix list named list1 with a sequence number of 10:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4 list1 30

ipv4 prefix-list list1
 30 deny 172.24.20.164/16 ge 25
```

Related Commands

Command	Description
clear prefix-list ipv4, on page 586	Resest the hit count on an IPv4 prefix list.
ipv4 prefix-list, on page 597	Defines an IPv4 prefix list.
show prefix-list ipv6, on page 615	Displays the contents of the current IPv6 prefix list.

show prefix-list ipv4 standby

To display the contents of current IPv4 standby access lists, use the **show access-lists ipv4 standby** command in EXEC mode.

show prefix-list ipv4 standby [*prefix-list name*] [**summary**]

Syntax Description

prefix-list name	(Optional) Name of a particular IPv4 prefix list. The value of the prefix-list-name argument is a string of alphanumeric characters that cannot include spaces or quotation marks.
summary	(Optional) Displays a summary of all current IPv4 standby prefix lists.

Command Default

No default behavior or values

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

Use the **show prefix-list ipv4 standby** command to display the contents of current IPv4 standby prefix lists. To display the contents of a specific IPv4 prefix list, use the *name* argument.

Use the **show prefix-list ipv4 standby summary** command to display a summary of all standby IPv4 prefix lists.

Task ID

Task ID	Operations
acl	read

Examples

In the following example, the contents of all IPv4 access lists are displayed:

```
RP/0/RP0/CPU0:router# show prefix-list ipv4 standby summary
Prefix List Summary:
  Total Prefix Lists configured:         2
  Total Prefix List entries configured : 6
```

show prefix-list ipv6

To display the contents of the current IP Version 6 (IPv6) prefix list, use the **show prefix-list ipv6** command in EXEC mode.

show prefix-list ipv6 [*list-name*] [*sequence-number*] [**summary**]

Syntax Description

list-name	(Optional) Name of a prefix list.
sequence-number	(Optional) Sequence number of the prefix list entry. Range is 1 to 2147483646.
summary	(Optional) Displays summary output of prefix list contents.

Command Default

All IPv6 prefix lists are displayed.

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The command syntax was changed from **show ipv6 prefix-list** to **show prefix-list ipv6** .

Usage Guidelines

Use the **show prefix-list ipv6** command to display the contents of all IPv4 prefix lists.

To display the contents of a specific IPv6 prefix list, use the *name* argument. Use the *sequence-number* argument to specify a given prefix list entry. Use the **summary** keyword to display a summary of prefix list contents.

Task ID

Task ID	Operations
acl	read

Examples

The following example shows how to display all configured prefix lists:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 10 permit 5555::/24
 20 deny 3000::/24
 30 permit 2000::/24
ipv6 prefix-list list2
 10 permit 2000::/24
```

The following example uses the *list-name* argument to display the prefix list named list1:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6 list1

ipv6 prefix-list list1
 10 permit 5555::/24
```

```
 20 deny 3000::/24
 30 permit 2000::/24
```

The following example uses the *list-name* and *sequence-number* argument to display a prefix list named list1 with a sequence number of 10:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6 list1 10

ipv6 prefix-list abc
 10 permit 5555::/24
```

The following example displays a summary of prefix list contents:

```
RP/0/RP0/CPU0:router# show prefix-list ipv6 summary

Prefix List Summary:
  Total Prefix Lists configured:        2
  Total Prefix List entries configured: 2
```

Related Commands

Command	Description
clear prefix-list ipv6 , on page 588	Resest the hit count on an IPv4 prefix list.
copy prefix-list ipv6 , on page 592	Creates a copy of an existing IPv6 prefix list.
ipv6 prefix-list, on page 599	Creates an IPv6 prefix list.

Transport Stack Commands

This chapter describes the Cisco IOS XR softwarecommands used to configure and monitor features related to the transport stack (Stream Control Transmission Protocol [SCTP], TCP, User Datagram Protocol [UDP], and RAW). Any IP protocol other than TCP or UDP is known as a *RAW* protocol.

For detailed information about transport stack concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear nsr ncd client, on page 619
- clear nsr ncd queue, on page 621
- clear raw statistics pcb, on page 623
- clear tcp nsr client, on page 625
- clear tcp nsr pcb, on page 627
- clear tcp nsr session-set, on page 630
- clear tcp nsr statistics client, on page 632
- clear tcp nsr statistics pcb, on page 634
- clear tcp nsr statistics session-set, on page 636
- clear tcp nsr statistics summary, on page 638
- clear tcp pcb, on page 639
- clear tcp statistics, on page 640
- clear udp statistics, on page 641
- forward-protocol udp, on page 642
- nsr process-failures switchover, on page 644
- service tcp-small-servers, on page 645
- service udp-small-servers, on page 647
- show nsr ncd client, on page 649
- show nsr ncd queue, on page 651
- show raw brief, on page 653
- show raw detail pcb, on page 655
- show raw extended-filters, on page 657
- show raw statistics pcb, on page 659
- show sctp association brief, on page 661
- show sctp association detail, on page 663
- show sctp pcb brief, on page 668
- show sctp pcb detail, on page 670
- show sctp statistics, on page 672

- show sctp summary, on page 675
- show tcp brief, on page 677
- show tcp detail, on page 679
- show tcp extended-filters, on page 680
- show tcp statistics, on page 682
- show tcp nsr brief, on page 684
- show tcp nsr client brief, on page 686
- show tcp nsr detail client, on page 688
- show tcp nsr detail pcb, on page 690
- show tcp nsr detail session-set, on page 693
- show tcp nsr session-set brief, on page 695
- show tcp nsr statistics client, on page 697
- show tcp nsr statistics pcb, on page 699
- show tcp nsr statistics session-set, on page 701
- show tcp nsr statistics summary, on page 703
- show udp brief, on page 705
- show udp detail pcb, on page 707
- show udp extended-filters, on page 709
- show udp statistics, on page 710
- tcp mss, on page 712
- tcp path-mtu-discovery, on page 713
- tcp selective-ack, on page 714
- tcp synwait-time, on page 715
- tcp timestamp, on page 716
- tcp window-size, on page 717

clear nsr ncd client

To clear the counters of a specified client or all the clients of nonstop routing (NSR) Consumer Demuxer (NCD), use the **clear nsr ncd client** command in EXEC mode.

clear nsr ncd client {*PID value* | **all**} [**location** *node-id*]

Syntax Description

PID value	Process ID value of the client in which counters need to be cleared. The range is from 0 to 4294967295.
all	Clears the counters for all NCD clients.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

The default value for the *node-id* argument is the current node in which the command is being executed. The *PID value* argument does not have a default value.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

The active and standby instances of some NSR-capable applications communicate through two queues, and these applications are multiplexed onto these queues. NSR consumer demuxer (NCD) is a process that provides the demuxing services on the receiver side.

You can use the **clear nsr ncd client** command to troubleshoot traffic issues. If you clear the existing counters, it can help you to monitor the delta changes.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear all the counters for all NCD clients:

```
RP/0/RP0/CPU0:router# clear nsr ncd client all
RP/0/RP0/CPU0:router# show nsr ncd client all

Client PID                          : 3874979
Client Protocol                     : TCP
Client Instance                     : 1
Total packets received              : 0
Total acks received                 : 0
Total packets/acks accepted         : 0
Errors in changing packet ownership  : 0
Errors in setting application offset : 0
```

```
Errors in enqueuing to client        : 0
Time of last clear                   : Sun Jun 10 14:43:44 20

RP/0/RP0/CPU0:router# show nsr ncd client brief

                              Total    Total   Accepted
Pid    Protocol   Instance    Packets Acks    Packets/Acks
3874979   TCP          1          0   0         0
```

Related Commands

Command	Description
clear nsr ncd queue, on page 621	Clears the counters for the NSR Consumer Demuxer (NCD) queue.
show nsr ncd client, on page 649	Displays information about the clients for NSR Consumer Demuxer (NCD).
show nsr ncd queue, on page 651	Displays information about the nonstop routing (NSR) Consumer Queue and Dispatch (QAD) queues.

clear nsr ncd queue

To clear the counters for the nonstop routing (NSR) Consumer Demuxer (NCD) queue, use the **clear nsr ncd queue** command in EXEC mode.

clear nsr ncd queue {**all** | **high** | **low**} [**location** *node-id*]

Syntax Description

all	Clears the counters for all the NCD queues.
high	Clears the counters for the high-priority NCD queue.
low	Clears the counters the low-priority NCD queue.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear the counters for all the NCD queues:

```
RP/0/RP0/CPU0:router# clear nsr ncd queue all
RP/0/RP0/CPU0:router# show nsr ncd queue all

Queue Name                          : NSR_LOW
Total packets received              : 0
Total packets accepted              : 0
Errors in getting datagram offset   : 0
Errors in getting packet length     : 0
Errors in calculating checksum      : 0
Errors due to bad checksum          : 0
Errors in reading packet data       : 0
Errors due to bad NCD header        : 0
Drops due to a non-existent client  : 0
Errors in changing packet ownership : 0
Errors in setting application offset : 0
Errors in enqueuing to client       : 0
Time of last clear                  : Sun Jun 10 14:44:38 2007
```

```
Queue Name                          : NSR_HIGH
Total packets received              : 0
Total packets accepted              : 0
Errors in getting datagram offset   : 0
Errors in getting packet length     : 0
Errors in calculating checksum      : 0
Errors due to bad checksum          : 0
Errors in reading packet data       : 0
Errors due to bad NCD header        : 0
Drops due to a non-existent client  : 0
Errors in changing packet ownership : 0
Errors in setting application offset : 0
Errors in enqueuing to client       : 0
Time of last clear                  : Sun Jun 10 14:44:38 2007

RP/0/RP0/CPU0:router# show nsr ncd queue brief

                          Total        Accepted
          Queue         Packets         Packets
        NSR_LOW               0               0
       NSR_HIGH               0               0
```

Related Commands

Command	Description
clear nsr ncd client, on page 619	Clears the counters for the NSR Consumer Demuxer (NCD) client.
nsr process-failures switchover, on page 644	Configures failover as a recovery action for active instances to switch over to a standby route processor (RP) or a distributed route processor (DRP) to maintain nonstop routing (NSR).
show nsr ncd client, on page 649	Displays information about the clients for NSR Consumer Demuxer (NCD).
show nsr ncd queue, on page 651	Displays information about the nonstop routing (NSR) Consumer Queue and Dispatch (QAD) queues.

clear raw statistics pcb

To clear statistics for a single RAW connection or for all RAW connections, use the **clear raw statistics pcb** command in EXEC mode.

clear raw statistics pcb {**all** | **pcb-address**} [**location node-id**]

Syntax Description

all	Clears statistics for all RAW connections.
pcb-address	Clears statistics for a specific RAW connection.
location *node-id*	Clears statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The **location** keyword and *node-id* argument became required.

Usage Guidelines

Use the **all** keyword to clear all RAW connections. To clear a specific RAW connection, enter the protocol control block (PCB) address of the RAW connection. **Use the show raw brief** command to obtain the PCB address.

Use the **location** keyword and *node-id* argument to clear RAW statistics for a designated node.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear statistics for a RAW connection with PCB address 0x80553b0:

```
RP/0/RP0/CPU0:router# clear raw statistics pcb 0x80553b0
RP/0/RP0/CPU0:router# show raw statistics pcb 0x80553b0

Statistics for PCB 0x80553b0
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application
```

The following example shows how to clear statistics for all RAW connections:

```
RP/0/RP0/CPU0:router# clear raw statistics pcb all
RP/0/RP0/CPU0:router# show raw statistics pcb all

Statistics for PCB 0x805484c
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application

Statistics for PCB 0x8054f80
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application

Statistics for PCB 0x80553b0
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application
```

Related Commands

Command	Description
show raw brief, on page 653	Displays information about active RAW IP sockets.
show raw statistics pcb, on page 659	Displays statistics for either a single RAW connection or all RAW connections.

clear tcp nsr client

To bring the nonstop routing (NSR) down on all the sessions that are owned by the specified client, use the **clear tcp nsr client** command in EXEC mode.

clear tcp nsr client {*ccb-address* | **all**} [**location** *node-id*]

Syntax Description

ccb-address	Client Control Block (CCB) of the NSR client.
all	Specifies all the clients.
location *node-id*	(Optional) Displays client information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

The location defaults to the current node in which the command is executing.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

The output of the **show tcp nsr client** command is used to locate the CCB of the desired client.

Use the **clear tcp nsr client** command to gracefully bring down NSR session that are owned by one client or all clients. In addition, the **clear tcp nsr client** command is used as a work around if the activity on the sessions freezes.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the nonstop routing (NSR) client is cleared for 0x482afacc : The two sessions had NSR already up before executing the **clear tcp nsr client** command. NSR is no longer up after executing the **clear tcp nsr client** command.

```
RP/0/RP0/CPU0:router# show tcp nsr client brief

CCB          Proc Name    Instance     Sets       Sessions/NSR Up Sessions
0x482c10e0   mpls_ldp          1            2          3/1
0x482afacc   mpls_ldp          2            1          2/2

RP/0/RP0/CPU0:router# clear tcp nsr client 0x482afacc
RP/0/RP0/CPU0:router# show tcp nsr client brief

CCB          Proc Name    Instance     Sets       Sessions/NSR Up Sessions
0x482c10e0   mpls_ldp          1            2          3/1
0x482afacc   mpls_ldp          2            1          2/0
```

Related Commands

Command	Description
nsr process-failures switchover, on page 644	Configures failover as a recovery action for active instances to switch over to a standby route processor (RP) or a distributed route processor (DRP) to maintain nonstop routing (NSR).
show tcp nsr client brief, on page 686	Displays brief information about the state of nonstop routing (NSR) of TCP clients on different nodes.

clear tcp nsr pcb

To bring the nonstop routing (NSR) down on a specified connection or all connections, use the **clear tcp nsr pcb** command in EXEC mode.

clear tcp nsr pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	PCB address range for the specific connection information. 0 to ffffffff. For example, the address range can be 0x482a4e20.
all	Specifies all the connections.
location *node-id*	(Optional) Displays connection information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The **location** keyword is used so that active and standby TCP instances are independently queried.

The output of the **show tcp nsr brief** command is used to locate the Protocol Control Block (PCB) of a desired connection.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the information for TCP connections is cleared:

```
RP/0/RP0/CPU0:router# show tcp nsr brief

PCB     Local Address Foreign Address        NSR   RcvOnly
0x482d7470
5.1.1.1:646
           5.1.1.2:14142          Up    No
0x482d2844
5.1.1.1:646
           5.1.1.2:15539          Up    No
0x482d3bc0
5.1.1.1:646
           5.1.1.2:25671          Up    No
0x482d4f3c
```

```
5.1.1.1:646
           5.1.1.2:32319          Up    No
0x482d87ec
5.1.1.1:646
           5.1.1.2:39592          Up    No
0x482cd670
5.1.1.1:646
           5.1.1.2:43447          Up    No
0x482d14c8
5.1.1.1:646
           5.1.1.2:45803          Up    No
0x482bdee4
5.1.1.1:646
           5.1.1.2:55844          Up    No
0x482d62b8
5.1.1.1:646
           5.1.1.2:60695          Up    No
0x482d0310
5.1.1.1:646
           5.1.1.2:63007          Up    No

RP/0/RP0/CPU0:router# clear tcp nsr pcb 0x482d7470
RP/0/RP0/CPU0:router# clear tcp nsr pcb 0x482d2844
RP/0/RP0/CPU0:router# show tcp nsr brief

PCB     Local Address Foreign Address NSR   RcvOnly
0x482d7470
5.1.1.1:646
           5.1.1.2:14142          Down  No
0x482d2844
5.1.1.1:646
           5.1.1.2:15539          Down  No
0x482d3bc0
5.1.1.1:646
           5.1.1.2:25671          Up    No
0x482d4f3c
5.1.1.1:646
           5.1.1.2:32319          Up    No
0x482d87ec
5.1.1.1:646
           5.1.1.2:39592          Up    No
0x482cd670
5.1.1.1:646
           5.1.1.2:43447          Up    No
0x482d14c8
5.1.1.1:646
           5.1.1.2:45803          Up    No
0x482bdee4
5.1.1.1:646
           5.1.1.2:55844          Up    No
0x482d62b8
5.1.1.1:646
           5.1.1.2:60695          Up    No
0x482d0310
5.1.1.1:646
           5.1.1.2:63007          Up    No
```

Related Commands

Command	Description
show tcp nsr brief, on page 684	Displays the key nonstop routing (NSR) state of TCP connections on different nodes.

Command	Description
show tcp nsr detail pcb, on page 690	Displays detailed information about the state of nonstop routing (NSR) for TCP connections.

clear tcp nsr session-set

To clear the nonstop routing (NSR) on all the sessions in the specified session-set or all session sets, use the **clear tcp nsr session-set** command in EXEC mode.

clear tcp nsr session-set { *sscb-address* | **all**} [**location** *node-id*]

Syntax Description

sscb-address	Session-Set Control Block (SSCB) address range for the specific session set information. 0 to ffffffff. For example, the address range can be 0x482a4e20.
all	Specifies all the session sets.
location *node-id*	(Optional) Displays session set information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

The output of the **show tcp nsr session-set brief** command is used to locate the SSCB of the desired session-set.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the information for the session sets is cleared:

```
RP/0/RP0/CPU0:router# show tcp nsr client brief

CCB               Proc Name         Instance  Sets       Sessions/NSR Up Sessions
0x482b5ee0        mpls_ldp             1        1          10/10

RP/0/RP0/CPU0:router# clear tcp nsr client 0x482b5ee0
RP/0/RP0/CPU0:router# show tcp nsr client brief

CCB               Proc Name         Instance  Sets       Sessions/NSR Up Sessions
0x482b5ee0        mpls_ldp             1        1          10/0
```

Related Commands

Command	Description
show tcp nsr detail session-set, on page 693	Displays detailed information about the nonstop routing (NSR) state of the session sets on different nodes.

Command	Description
show tcp nsr session-set brief, on page 695	Displays brief information about the session sets for the state of nonstop routing (NSR) on different nodes.

clear tcp nsr statistics client

To clear the nonstop routing (NSR) statistics of the client, use the **clear tcp nsr statistics client** command in EXEC mode.

clear tcp nsr statistics client {*ccb-address* | **all**} [**location** *node-id*]

Syntax Description

ccb-address	Client Control Block (CCB) of the desired client. For example, the address range can be 0x482a4e20.
all	Specifies all the clients.
location *node-id*	(Optional) Displays client information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the statistics for the NSR clients is cleared:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics client all

============================================================
CCB: 0x482b5ee0
Name: mpls_ldp, Job ID: 365
Connected at: Thu Aug 16 18:20:32 2007

Notification Statistics :   Queued    Failed    Delivered Dropped
Init-Sync Done          :         2          0          2          0
Replicated Session Ready:         0          0          0          0
Operational Down        :        12          0         12          0
Last clear at: Never Cleared

RP/0/RP0/CPU0:router# clear tcp nsr statistics client all

RP/0/RP0/CPU0:router# show tcp nsr statistics client all
```

```
==============================================================
CCB: 0x482b5ee0
Name: mpls_ldp, Job ID: 365
Connected at: Thu Aug 16 18:20:32 2007

Notification Statistics :   Queued    Failed    Delivered Dropped
Init-Sync Done          :         0         0          0         0
Replicated Session Ready:         0         0          0         0
Operational Down        :         0         0          0         0
Last clear at: Thu Aug 16 18:28:38 2007
```

Related Commands

Command	Description
show tcp nsr statistics client, on page 697	Displays the nonstop routing (NSR) statistics for the client.

clear tcp nsr statistics pcb

To clear the nonstop routing (NSR) statistics for TCP connections, use the **clear tcp nsr statistics pcb** command in EXEC mode.

clear tcp nsr statistics pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	PCB address range for the specific connection information. 0 to ffffffff. For example, the address range can be 0x482a4e20.
all	Specifies all the connections.
location *node-id*	(Optional) Displays connection information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the NSR statistics for TCP connections is cleared:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics pcb 0x482d14c8

==============================================================
PCB 0x482d14c8
Number of times NSR went up: 1
Number of times NSR went down: 0
Number of times NSR was disabled: 0
Number of times switch-over occured : 0
IACK RX Message Statistics:
        Number of iACKs dropped because SSO is not up              : 0
        Number of stale iACKs dropped                              : 1070
        Number of iACKs not held because of an immediate match     : 98
TX Messsage Statistics:
        Data transfer messages:
            Sent 317, Dropped 0, Data (Total/Avg.) 2282700/7200
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
        Segmentation instructions:
            Sent 1163, Dropped 0, Units (Total/Avg.) 4978/4
```

```
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
                Dropped (TCP)     : 0
        NACK messages:
            Sent 0, Dropped 0
            Rcvd 0
                Success           : 0
                Dropped (Data snd): 0
        Cleanup instructions      :
            Sent 8, Dropped 0
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
Last clear at: Never cleared

RP/0/RP0/CPU0:router# clear tcp nsr statistics pcb 0x482d14c8
RP/0/RP0/CPU0:router# show tcp nsr statistics pcb 0x482d14c8

==============================================================
PCB 0x482d14c8
Number of times NSR went up: 0
Number of times NSR went down: 0
Number of times NSR was disabled: 0
Number of times switch-over occured : 0
IACK RX Message Statistics:
        Number of iACKs dropped because SSO is not up               : 0
        Number of stale iACKs dropped                               : 0
        Number of iACKs not held because of an immediate match      : 0
TX Messsage Statistics:
        Data transfer messages:
            Sent 0, Dropped 0, Data (Total/Avg.) 0/0
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
        Segmentation instructions:
            Sent 0, Dropped 0, Units (Total/Avg.) 0/0
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
                Dropped (TCP)     : 0
        NACK messages:
            Sent 0, Dropped 0
            Rcvd 0
                Success           : 0
                Dropped (Data snd): 0
        Cleanup instructions      :
            Sent 0, Dropped 0
            Rcvd 0
                Success           : 0
                Dropped (Trim)    : 0
Last clear at: Thu Aug 16 18:32:12 2007
```

Related Commands

Command	Description
show tcp nsr statistics pcb, on page 699	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).

clear tcp nsr statistics session-set

To clear the nonstop routing (NSR) statistics for session sets, use the **clear tcp nsr statistics session-set** command in EXEC mode.

clear tcp nsr statistics session-set {*sscb-address* | **all**} [**location** *node-id*]

Syntax Description

sscb-address	Session-Set Control Block (SSCB) address range for the specific session set information. 0 to ffffffff. For example, the address range can be 0x482a4e20.
all	Specifies all the session sets.
location *node-id*	(Optional) Displays session set information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the NSR statistics for session sets is cleared:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics session-set all

==================Session Set Stats ==========================
SSCB 0x482b6684, Set ID: 1
Number of times init-sync was attempted  :3
Number of times init-sync was successful :3
Number of times init-sync failed         :0
Number of times switch-over occured      :0
Last clear at: Never Cleared

RP/0/RP0/CPU0:router# clear tcp nsr statistics session-set all
RP/0/RP0/CPU0:router# show tcp nsr statistics session-set all

==================Session Set Stats ==========================
SSCB 0x482b6684, Set ID: 1
Number of times init-sync was attempted  :0
```

```
Number of times init-sync was successful :0
Number of times init-sync failed         :0
Number of times switch-over occured      :0
Last clear at: Thu Aug 16 18:37:00 2007
```

Related Commands

Command	Description
show tcp nsr statistics session-set, on page 701	Displays nonstop routing (NSR) statistics for a session set.

clear tcp nsr statistics summary

To clear the nonstop routing (NSR) statistics summary, use the **clear tcp nsr statistics summary** command in EXEC mode.

clear tcp nsr statistics summary [**location** *node-id*]

Syntax Description

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

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear the summary statistics:

```
RP/0/RP0/CPU0:router# clear tcp nsr statistics summary
```

Related Commands

Command	Description
show tcp nsr statistics summary, on page 703	Displays the nonstop routing (NSR) summary statistics across all TCP sessions.

clear tcp pcb

To clear TCP protocol control block (PCB) connections, use the **clear tcp pcb** command in EXEC mode.

clear tcp pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	Clears the TCP connection at the specified PCB address.
all	Clears all open TCP connections.
location *node-id*	Clears the TCP connection for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **clear tcp pcb** command is useful for clearing hung TCP connections. Use the show tcp brief, on page 677 command to find the PCB address of the connection you want to clear.

If the **clear tcp pcb all** command is used, the software does not clear a TCP connection that is in the listen state. If a specific PCB address is specified, then a connection in listen state is cleared.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows that the TCP connection at PCB address 60B75E48 is cleared:

```
RP/0/RP0/CPU0:router# clear tcp pcb 60B75E48
```

Related Commands

Command	Description
show tcp brief, on page 677	Displays the TCP summary table.

clear tcp statistics

To clear TCP statistics, use the **clear tcp statistics** command in EXEC mode.

clear tcp statistics {**pcb** {**all** *pcb-address*} | **summary**} [**location** *node-id*]

Syntax Description

pcb all	(Optional) Clears statistics for all TCP connections.
pcb *pcb-address*	(Optional) Clears statistics for a specific TCP connection.
summary	(Optional) Clears summary statistic for a specific node or connection.
location *node-id*	(Optional) Clears TCP statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The **summary** keyword was added.

Usage Guidelines

Use the **clear tcp statistics** command to clear TCP statistics. Use the show tcp statistics, on page 682 command to display TCP statistics. You might display TCP statistics and then clear them before you start debugging TCP.

The optional **location** keyword and *node-id* argument can be used to clear TCP statistics for a designated node.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear TCP statistics:

```
RP/0/RP0/CPU0:router# clear tcp statistics
```

Related Commands

Command	Description
show tcp statistics, on page 682	Displays TCP statistics.

clear udp statistics

To clear User Datagram Protocol (UDP) statistics, use the **clear udp statistics** command in EXEC mode.

clear udp statistics {**pcb** {**all** *pcb-address*} | **summary**} [**location** *node-id*]

Syntax Description

pcb all	Clears statistics for all UDP connections.
pcb *pcb-address*	Clears statistics for a specific UDP connection.
summary	Clears UDP summary statistics.
location *node-id*	Clears UDP statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **clear udp statistics** command to clear UDP statistics. Use the show udp statistics, on page 710 command to display UDP statistics. You might display UDP statistics and then clear them before you start debugging UDP.

The optional **location** keyword and *node-id* argument can be used to clear UDP statistics for a designated node.

Task ID

Task ID	Operations
transport	execute

Examples

The following example shows how to clear UDP summary statistics:

```
RP/0/RP0/CPU0:router# clear udp statistics summary
```

Related Commands

Command	Description
show udp statistics, on page 710	Displays UDP statistics.

forward-protocol udp

To configure the system to forward any User Datagram Protocol (UDP) datagrams that are received as broadcast packets to a specified helper address, use the **forward-protocol udp** command in Global Configuration mode. To restore the system to its default condition with respect to this command, use the **no** form of this command.

forward-protocol udp {*port-number* | **disable** | **domain** | **nameserver** | **netbios-dgm** | **netbios-ns** | **tacacs** | **tftp**}
no forward-protocol udp {*port-number* | **disable** | **domain** | **nameserver** | **netbios-dgm** | **netbios-ns** | **tacacs** | **tftp**}

Syntax Description

port-number	Forwards UDP broadcast packets to a specified port number. Range is 1 to 65535.
disable	Disables IP Forward Protocol UDP.
domain	Forwards UDP broadcast packets to Domain Name Service (DNS, 53).
nameserver	Forwards UDP broadcast packets to IEN116 name service (obsolete, 42).
netbios-dgm	Forwards UDP broadcast packets to NetBIOS datagram service (138).
netbios-ns	Forwards UDP broadcast packets to NetBIOS name service (137).
tacacs	Forwards UDP broadcast packets to TACACS (49).
tftp	Forwards UDP broadcast packets to TFTP (69).

Command Default

Enabled

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **forward-protocol udp** command to specify that UDP broadcast packets received on the incoming interface are forwarded to a specified helper address.

When you configure the **forward-protocol udp** command, you must also configure the **helper-address** command to specify a helper address on an interface. The helper address is the IP address to which the UDP datagram is forwarded. Configure the **helper-address** command with IP addresses of hosts or networking devices that can handle the service. Because the helper address is configured per interface, you must configure a helper address for each incoming interface that will be receiving broadcasts that you want to forward.

You must configure one **forward-protocol udp** command per UDP port you want to forward. The port on the packet is either port 53 (**domain**), port 69 (**tftp**), or a port number you specify.

The **forward-protocol udp** command is by default enabled on the following ports: domain, nameserver, netbios-dgm, netbios-ns, tacacs, tftp. This feature can be disabled using the **forward-protocol udp disable** command.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to specify that all UDP broadcast packets with port 53 or port 69 received on incoming MgmtEth interface 0/0/CPU0/0 are forwarded to 172.16.0.1. MgmtEth interface 0/0/CPU0/0 receiving the UDP broadcasts is configured with a helper address of 172.16.0.1, the destination address to which the UDP datagrams are forwarded.

```
RP/0/RP0/CPU0:router(config)# forward-protocol udp domain disable
RP/0/RP0/CPU0:router(config)# forward-protocol udp tftp disable
RP/0/RP0/CPU0:router(config)# interface MgmtEth 0/0/CPU0/0
RP/0/RP0/CPU0:router(config-if)# ipv4 helper-address 172.16.0.1
```

nsr process-failures switchover

To configure failover as a recovery action for active instances to switch over to a standby route processor (RP) or a standby distributed route processor (DRP) to maintain nonstop routing (NSR), use the **nsr process-failures switchover** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

nsr process-failures switchover
no nsr process-failures switchover

Syntax Description

This command has no keywords or arguments.

Command Default

If not configured, a process failure of the active TCP or its applications (for example LDP, BGP, and so forth) can cause sessions to go down, and NSR is not provided.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to use the **nsr process-failures switchover** command:

```
RP/0/RP0/CPU0:router(config)# nsr process-failures switchover
```

service tcp-small-servers

To enable small TCP servers such as the ECHO, use the **service tcp-small-servers** command in Global Configuration mode. To disable the TCP server, use the **no** form of this command.

service {**ipv4** | **ipv6**} **tcp-small-servers** [{**max-servers** *number* | **no-limit**}] [*access-list-name*]
no service {**ipv4** | **ipv6**} **tcp-small-servers** [{**max-servers** *number* | **no-limit**}] [*access-list-name*]

Syntax Description

ip4	Specifies IPv4 small servers.
ipv6	Specifies IPv6 small servers.
max-servers	(Optional) Sets the number of allowable TCP small servers.
number	(Optional) Number value. Range is 1 to 2147483647.
no-limit	(Optional) Sets no limit to the number of allowable TCP small servers.
access-list-name	(Optional) The name of an access list.

Command Default

TCP small servers are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The TCP small servers currently consist of three services: Discard (port 9), Echo (port 7), and Chargen (port 19). These services are used to test the TCP transport functionality. The Discard server receives data and discards it. The Echo server receives data and echoes the same data to the sending host. The Chargen server generates a sequence of data and sends it to the remote host.

Task ID

Task ID	Operations
ipv4	read, write
ip-services	read, write

Examples

In the following example, small IPv4 TCP servers are enabled:

```
RP/0/RP0/CPU0:router(config)# service ipv4 tcp-small-servers max-servers 5 acl100
```

Related Commands

Command	Description
service udp-small-servers, on page 647	Enables small UDP servers such as the ECHO.
show cinetd services	Displays the services whose processes are spawned by cinetd.

service udp-small-servers

To enable small User Datagram Protocol (UDP) servers such as the ECHO, use the **service udp-small-servers** command in Global Configuration mode. To disable the UDP server, use the **no** form of this command.

service {**ipv4** | **ipv6**} **udp-small-servers** [{**max-servers** *number* | **no-limit**}] [*access-list-name*]
no service {**ipv4** | **ipv6**} **udp-small-servers** [{**max-servers** *number* | **no-limit**}] [*access-list-name*]

Syntax Description

ip4	Specifies IPv4 small servers.
ipv6	Specifies IPv6 small servers.
max-servers	(Optional) Sets the number of allowable UDP small servers.
number	(Optional) Number value. Range is 1 to 2147483647.
no-limit	(Optional) Sets no limit to the number of allowable UDP small servers.
access-list-name	(Optional) Name of an access list.

Command Default

UDP small servers are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The UDP small servers currently consist of three services: Discard (port 9), Echo (port 7), and Chargen (port 19). These services are used to test the UDP transport functionality. The discard server receives data and discards it. The echo server receives data and echoes the same data to the sending host. The chargen server generates a sequence of data and sends it to the remote host.

Task ID

Task ID	Operations
ipv6	read, write
ip-services	read, write

Examples

The following example shows how to enable small IPv6 UDP servers and set the maximum number of allowable small servers to 10:

```
RP/0/RP0/CPU0:router(config)# service ipv6 udp-small-servers max-servers 10
```

Related Commands

Command	Description
service tcp-small-servers, on page 645	Enables small TCP servers such as the ECHO.

show nsr ncd client

To display information about the clients for nonstop routing (NSR) Consumer Demuxer (NCD), use the **show nsr ncd client** command in EXEC mode.

show nsr ncd client {*PID value* | **all** | **brief**} [**location** *node-id*]

Syntax Description

PID v alue	Process ID (PID) information for a specific client. The range is from 0 to 4294967295.
all	Displays detailed information about all the clients.
brief	Displays brief information about all the clients.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows detailed information about all the clients:

```
RP/0/RP0/CPU0:router# show nsr ncd client all

Client PID                          : 3874979
Client Protocol                     : TCP
Client Instance                     : 1
Total packets received              : 28
Total acks received                 : 0
Total packets/acks accepted         : 28
Errors in changing packet ownership  : 0
Errors in setting application offset : 0
Errors in enqueuing to client        : 0
Time of last clear                  : Never cleared
```

The following sample output shows brief information about all the clients:

```
RP/0/RP0/CPU0:router# show nsr ncd client brief
```

```
                                Total   Total   Accepted
Pid    Protocol    Instance     Packets Acks    Packets/Acks
3874979   TCP           1          28  0              28
```

This table describes the significant fields shown in the display.

Table 81: show nsr ncd client Command Field Descriptions

Field	Description
Client PID	Process ID of the client process.
Client Protocol	Protocol of the client process. The protocol can be either TCP, OSPF, or BGP.
Client Instance	Instance number of the client process. There can be more than one instance of a routing protocol, such as OSPF.
Total packets received	Total packets received from the partner stack on the partner route processor (RP).
Total acks received	Total acknowledgements received from the partner stack on the partner RP for the packets sent to the partner stack.
Total packets/acks accepted	Total packets and acknowledgements received from the partner stack on the partner RP.
Errors in changing packet ownership	NCD changes the ownership of the packet to that of the client before queueing the packet to the client. This counter tracks the errors, if any, in changing the ownership.
Errors in setting application offset	NCD sets the offset of the application data in the packet before queueing the packet to the client. This counter tracks the errors, if any, in setting this offset.
Errors in enqueuing to client	Counter tracks any queueing errors.
Time of last clear	Statistics last cleared by the user.

Related Commands

Command	Description
clear nsr ncd client, on page 619	Clears the counters for the NSR Consumer Demuxer (NCD) client.
clear nsr ncd queue, on page 621	Clears the counters for the NSR Consumer Demuxer (NCD) queue.
show nsr ncd queue, on page 651	Displays information about the nonstop routing (NSR) Consumer Queue and Dispatch (QAD) queues.

show nsr ncd queue

To display information about the queues that are used by the nonstop routing (NSR) applications to communicate with their partner stacks on the partner route processors (RPs), use the **show nsr ncd queue** command in EXEC mode.

show nsr ncd queue {**all** | **brief** | **high** | **low**} [**location** *node-id*]

Syntax Description

all	Displays detailed information about all the consumer queues.
brief	Displays brief information about all the consumer queues.
high	Displays information about high-priority Queue and Dispatch (QAD) queues.
low	Displays information about low-priority QAD queues.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows brief information about all the consumer queues:

```
RP/0/RP0/CPU0:router# show nsr ncd queue brief

                        Total        Accepted
          Queue         Packets       Packets
       NSR_LOW              992           992
      NSR_HIGH                0             0
```

This table describes the significant fields shown in the display.

Table 82: show nsr ncd queue Command Field Descriptions

Field	Description
Total Packets	Total number of packets that are received from the partner stack.

Field	Description
Accepted Packets	Number of received packets that were accepted after performing some validation tasks.
Queue	Name of queue. NSR_HIGH and NSR_LOW are the two queues. High priority packets flow on the NSR_HIGH queue. Low priority packets flow on the NSR_LOW queue.

Related Commands

Command	Description
clear nsr ncd client, on page 619	Clears the counters for the NSR consumer demuxer (NCD) client.
clear nsr ncd queue, on page 621	Clears the counters for the NSR consumer demuxer (NCD) queue.
show nsr ncd client, on page 649	Displays information about the clients for NSR consumer demuxer(NCD).

show raw brief

To display information about active RAW IP sockets, use the **show raw brief** command in EXEC mode.

show raw brief [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The **location** keyword and *node-id* argument became required.

Usage Guidelines

Protocols such as Open Shortest Path First (OSPF) and Protocol Independent Multicast (PIM) use long-lived RAW IP sockets. The **ping** and **traceroute** commands use short-lived RAW IP sockets. Use the **show raw brief** command if you suspect a problem with one of these protocols.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show raw brief** command:

```
RP/0/RP0/CPU0:router# show raw brief

PCB      Recv-Q Send-Q Local Address          Foreign Address Protocol
0x805188c        0      0 0.0.0.0               0.0.0.0            2
0x8051dc8        0      0 0.0.0.0               0.0.0.0          103
0x8052250        0      0 0.0.0.0               0.0.0.0          255
```

This table describes the significant fields shown in the display.

Table 83: show raw brief Command Field Descriptions

Field	Description
PCB	Protocol control block address. This is the address to a structure that contains connection information such as local address, foreign address, local port, foreign port, and so on.
Recv-Q	Number of bytes in the receive queue.
Send-Q	Number of bytes in the send queue.

Field	Description
Local Address	Local address and local port.
Foreign Address	Foreign address and foreign port.
Protocol	Protocol that is using the RAW IP socket. For example, the number 2 is IGMP, 103 is PIM, and 89 is OSPF.

show raw detail pcb

To display detailed information about active RAW IP sockets, use the **show raw detail pcb** command in EXEC mode.

show raw detail pcb {*pcb-address* | **all**} **location** *node-id*

Syntax Description

pcb-address	Displays statistics for a specified RAW connection.
all	Displays statistics for all RAW connections.
location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The command name was changed from **show raw pcb** to **show raw detail pcb** .

Usage Guidelines

The **show raw detail pcb** command displays detailed information for all connections that use the RAW transport. Information that is displayed includes family type (for example, 2 for AF_INET also known as IPv4), PCB address, Layer 4 (also known as transport) protocol, local address, foreign address, and any filter that is being used.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show raw detail pcb** command:

```
RP/0/RP0/CPU0:router# show raw detail pcb 0x807e89c

==============================================================
PCB is 0x807e89c, Family: 2, PROTO: 89, VRF: 0x0
 Local host: 0.0.0.0
 Foreign host: 0.0.0.0

Current send queue size: 0
Current receive queue size: 0
Paw socket: Yes
```

This table describes the significant fields shown in the display.

Table 84: show raw detail pcb Command Field Descriptions

Field	Description
JID	Job ID of the process that created the socket.
Family	Network protocol. IPv4 is 2; IPv6 is 26.
PCB	Protocol control block address.
L4-proto	Layer 4 (also known as transport) protocol.
Laddr	Local address.
Faddr	Foreign address.
ICMP error filter mask	If an ICMP filter is being set, output in this field has a nonzero value.
LPTS socket options	If an LPTS option is being set, output in this field has a nonzero value.
Packet Type Filters	Packet filters that are being set for a particular RAW socket, including the number of packets for that filter type. Multiple filters can be set.

show raw extended-filters

To display information about active RAW IP sockets, use the **show raw extended-filters** command in EXEC mode.

show raw extended-filters {**interface-filter location** *node-id* | **location** *node-id* | **paktype-filter location** *node-id*}

Syntax Description

interface-filter	Displays the protocol control blocks (PCBs) with configured interface filters.
location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
paktype-filter	Displays the PCBs with configured packet type filters.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The command name was changed from **show raw pcb** to **show raw extended-filters** .

Usage Guidelines

The **show raw extended-filters** command displays detailed information for all connections that use the RAW transport. Information that is displayed includes family type (for example, 2 for AF_INET also known as IPv4), PCB address, Layer 4 (also known as transport) protocol, local address, foreign address, and any filter that is being used.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show raw extended-filters** command:

```
RP/0/RP0/CPU0:router# show raw extended-filters 0/0/CPU0

Total Number of matching PCB's in database: 1
JID: 0/0
Family: 2
PCB: 0x0803dd38
L4-proto: 1
Laddr: 0.0.0.0
Faddr: 0.0.0.0
ICMP error filter mask: 0x3ff
LPTS socket options: 0x0020
Packet Type Filters:
0
```

```
[220 pkts in]
3
[0 pkts in]
4
[0 pkts in]
```

This table describes the significant fields shown in the display.

Table 85: show raw extended-filters Output Command Field Descriptions

Field	Description
JID	Job ID of the process that created the socket.
Family	Network protocol. IPv4 is 2; IPv6 is 26.
PCB	Protocol control block address.
L4-proto	Layer 4 (also known as transport) protocol.
Laddr	Local address.
Faddr	Foreign address.
ICMP error filter mask	If an ICMP filter is being set, output in this field has a nonzero value.
LPTS socket options	If an LPTS option is being set, output in this field has a nonzero value.
Packet Type Filters	Packet filters that are being set for a particular RAW socket, including the number of packets for that filter type. Multiple filters can be set.

show raw statistics pcb

To display statistics for a single RAW connection or for all RAW connections, use the **show raw statistics pcb** command in EXEC mode.

show raw statistics pcb {**all** | **pcb-address**} **location** *node-id*

Syntax Description

all	Displays statistics for all RAW connections.
pcb-address	Displays statistics for a specified RAW connection.
location *node-id*	Displays RAW statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **all** keyword to display all RAW connections. If a specific RAW connection is desired, then enter the protocol control block (PCB) address of that RAW connection. Use the **show raw brief** command to obtain the PCB address.

Use the **location** keyword and *node-id* argument to display RAW statistics for a designated node.

Task ID

Task ID	Operations
transport	read

Examples

In the following example, statistics for a RAW connection with PCB address 0x80553b0 are displayed:

```
RP/0/RP0/CPU0:router# show raw statistics pcb 0x80553b0

Statistics for PCB 0x80553b0
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application
```

In this example, statistics for all RAW connections are displayed:

```
RP/0/RP0/CPU0:router# show raw statistics pcb all
```

```
Statistics for PCB 0x805484c, Vrfid: 0x60000000
Send: 0 packets received from application
0 xipc pulse received from application
0 packets sent to network
0 packets failed getting queued to network
Rcvd: 0 packets received from network
0 packets queued to application
0 packets failed queued to application
```

This table describes the significant fields shown in the display.

Table 86: show raw statistics pcb Command Field Descriptions

Field	Description
Send:	Statistics in this section refer to packets sent from an application to RAW.
Vrfid	VPN routing and forwarding (VRF) identification (vrfid) number.
xipc pulse received from application	Number of notifications sent from applications to RAW.
packets sent to network	Number of packets sent to the network.
packets failed getting queued to network	Number of packets that failed to get queued to the network.
Rcvd:	Statistics in this section refer to packets received from the network.
packets queued to application	Number of packets queued to an application.
packets failed queued to application	Number of packets that failed to get queued to an application.

Related Commands

Command	Description
clear raw statistics pcb, on page 623	Clears statistics for either a single RAW connection or for all RAW connections.
show raw brief, on page 653	Displays information about active RAW IP sockets.

show sctp association brief

To display brief association information for Stream Control Transmission Protocol (SCTP), use the **show sctp association brief** command in EXEC mode.

show sctp association brief all pcb *address* [**location** *node-id*]

Syntax Description

all	Displays all association information for the SCTP PCB in the current node.
pcb *address*	Displays all the associations for the PCB address, endpoint, or both.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The PCB address, which is used for this command, is obtained from the show sctp pcb brief, on page 668 command with the **all** keyword.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output is from the **show sctp association brief** command:

```
RP/0/RP0/CPU0:router# show sctp association brief all pcb 0x4834e088

All assocations for PCB: 0x4834e088

Asoc ID    VRF ID     RemotePort NextTSN    PeerRwnd   TotalFlight  State
--------------------------------------------------------------------------------
0x4c6c35ee 0x60000000 5000       0xbaba612f 0x100000   0x0          OPEN
```

This table describes the significant fields shown in the display.

Table 87: show sctp association brief Command Field Descriptions

Field	Description
Asoc ID	Association ID for the mentioned association.
VRF ID	VRF ID to which the association belongs.
RemotePort	Port number on the remote endpoint of the association.
NextTSN	Transmission sequence number of the chunk that is lined up to be sent next on the wire.
PeerRwnd	Calculated receiver window, in bytes, of the peer.
TotalFlight	Amount of data, in bytes, currently in flight (on all destinations).
State	Present association status.

Related Commands

Command	Description
show sctp association detail, on page 663	Displays detailed statistics that have accumulated for the specified Stream Control Transmission Protocol (SCTP) association.
show sctp pcb brief, on page 668	Displays brief Stream Control Transmission Protocol (SCTP) endpoint Protocol Control Block (PCB) information.

show sctp association detail

To display detailed statistics that have accumulated for the specified Stream Control Transmission Protocol (SCTP) association, use the **show sctp association detail** command in EXEC mode.

show sctp association detail *association-id* [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
transport	read

Examples

The following sample output is from the **show sctp association detail** command:

```
RP/0/RP0/CPU0:router# show sctp association detail 0x4c6c35ee

PCB 0x4834e088,  Asoc 0x4c6c35ee,  lport 56100,  rport 5000,  vrf 0x60000000,  state OPEN
Local addrs 0,   remote addrs 2,   mtu 1500,   v4 addr legal yes,   v6 addr legal no

Vtag 0x4c6c35ee,   Peer vtag 0xa65a0cf0,   Vtag nonce 0xce545ca9,  Peer vtag nonce 0x
c4b5e813
Pdapi ppid 0x0, context 0x0 refcount 0

Init seq 3132776750,  Send seq 3132776751,  Total in flight 0
Last acked seq 3132776750,  SACK highest gap 3132776750
ASCONF: seqout 3132776750, seqin 166718713,  STRRST: seqout 3132776750, seqin 1667187 14
Last strseq recv 0, last stream num recv 0

PeerRwnd 1048576, MyRwnd 1048576, Last reported rwnd 0, Rwnd ctrl len 0
InitialRTOMax 60000, InitialRTO 3000, MinRTO 1000, MaxRTO 60000

Last stream num of pdapi 0, Last ssn of pdapi 0, Last tsn of pd api 0
 Stream locked 0, Stream lock num 0
```

```
no Strrst chunk pending to be read, no Strrst chunk pending to be sent
Delayed connect off, Fast retran loss recovery off, Data chunks timer retransmitted y es
Chunk memory not freed 3,  Last revoke count 0, Size/Count of data on all streams 0/0
Total output Q size 0, Chunks on outputQ 0, ECN echo count on ouput Q 0

Streamincnt 10, Streamoutcnt 10, Max burst 4, HB disabled no
Default TOS 0, ECN nonce allowed no, ECN allowed yes
Max init retran 8, Max send retran 10, Def net retran 5,
HB delay 30000, Preopen stream 10 Max inbound stream 2048
Cookie life 6000, Delayed ACK yes, SACK freq 2

Peer hmac 0x1
Peer supports: ecn nonce : no, Asconf: yes, PRsctp: yes,
AUTH: yes, Stream Reset: yes, PKT Drop: yes

Send timers pending 0, Timeout init 1, Timeout data 1, timeout sack 0
Timeout shutdown 0, Timeout shutdownack 0 Timeout heartbeat 96 Timeout cookie 0

Send: total data sent 0, StmQ cnt 0, SendQ cnt 0,
SentQ cnt 0, SentQcntremovable 0, SendQ retran cnt 0
Size/msg on reassemblyQ 0/0, Msg on strmbuf 0

Overall error cnt 0, Dup tsns recv 0, Stale cookie 0,
Dropped special cnt 0 Enobuf 0

Asoc up sent to app 1
```

This table describes the significant fields shown in the display.

Table 88: show sctp association detail Command Field Descriptions

Field	Description
PCB	Protocol Control Block ID.
Asoc	Association ID.
lport	Local port number.
rport	Remote port number.
vrf	VRF ID of the PCB.
state	Present association state.
Local addrs	Local addresses attached to the association.
rmote addrs	Remote addresses attached to the association.
mtu	MTU of the association.
v4 addr legal	Attached IPv4 addresses are valid.
v6 addr legal	Attached IPv6 addresses are valid.
Init seq	Association initialization sequence number that is used.
Send seq	Latest chunk sequence number that is sent.
Last acked seq	Last acknowledged chunk sequence number.

Field	Description
Total in flight	Amount of data, in bytes, currently in flight (on all destinations).
SACK highest gap	Largest unacknowledged gap in the selective acknowledgement (SACK) blocks.
ASCONF	ASCONF field displays the following fields: • seqout—Displays the Address/Stream Configuration Change (ASCONF) next sequence that is being sent out (inits at init-tsn). • seqin—Displays the ASCONF that is last received from the ASCONF peer. (starts at peer's TSN-1).
STRRST	STRRST field displays the following fields: • seqout—Displays the next sequence that is being sent in stream reset messages. • seqin—Displays the next sequence that is expected in stream reset messages.
PeerRwnd	Calculated receiver window size of the peer.
MyRwnd	Calculated receiver window size of current node
Last reported rwnd	Last reported receiver window size of current node.
Rwnd ctrl len	Shadow of stream buffer message and buffer count that is used for receiver window control.
InitialRTOMax	Initial RTO for INIT's.
InitialRTO	Initial sent RTO.
MinRTO	Per association RTO-MIN.
MaxRTO	Per association RTO-MAX.
Last stream num of pdapi	Stream number of the last delivered chunk for the partial delivery API.
Last ssn of pdapi	SSN of the last delivered chunk for the partial delivery API.
Last tsn of pd api	Transmission Sequence Number (TSN) of the last delivered chunk for the partial delivery API.
Stream locked	Stream locked waiting for acknowledgement or not.
Stream lock num	Lock flag of 0 and is ok to send. The value of 1+, duals as a retransmission count, and is awaiting acknowledgement.
Streamincnt	Count of incoming chunks that are on actual built streams.
Streamoutcnt	Count of outgoing chunks that are on actual built streams.
Max burst	Maximum burst value after fast retransmit completes.

Field	Description
HB disabled	Heartbeat disabled.
Default TOS	Default Type-of-Service (ToS) value.
ECN nonce allowed	Explicit Congestion Notification (ECN)-nonce is allowed.
ECN allowed	Flag to specify if ECN is allowed.
Max init retran	Maximum number of retransmissions of INIT.
Max send retran	Maximum number of retransmissions of SEND.
Def net retran	Maximum times to send before considering some peers dead.
HB delay	Heartbeat delay in ticks.
Preopen stream	Number of preopen streams.
Max inbound stream	Number of incoming streams supported.
Cookie life	Cookie life awarded for any cookie, in seconds.
Delayed ACK	Time for delaying acknowledgements.
SACK freq	Frequency of selective acknowledgements.
Peer hmac	Peer Hash Message Authentication Code (HMAC) ID to send.
Peer supports	Peer supports the following list: • ecn nonce—Peer support for ECN-nonce. • Asconf—Peer support for ASCONF. • PRsctp—Peer support for PR SCTP. • AUTH—Peer support for authentication. • Stream Reset—Peer support for stream reset. • PKT Drop—Peer support for packet drop.
Send timers pending	Number of expired for send timers.
Timeout init, Timeout data, Timeout sack, Timeout shutdown, Timeout shutdownack, Timeout heartbeat, Timeout cookie	Mapping array used to track out-of-order sequences above the last_acked_seq. The value of 0 indicates that the packet is missing. The value of 1 indicates that the packet is received. The packet rises up every time it is raised to last_acked_seq, and 0 trailing locations are out. If a TSN above the array is mappingArrayS, the datagram is discarded and a retransmit is allowed to happen.

Field	Description
Send	Send is listed as one of the following types: • total data sent—Total data sent out. • StmQ cnt—Number of datagrams in the individual stream queue. • SendQ cnt—Total number of datagrams waiting to be sent. • SentQ cnt—Total number of datagrams sent. • SentQcntremovable—Number of removable datagrams from the sent queue (PR-SCTP). • SendQ retran cnt—Number of sent queue that is marked for retransmission. When this value is 0, only one packet is sent for retransmissioned data.
Size/msg on reassemblyQ	Size or number of message on reassembly queue.
Msg on strmbuf	Number of messages in the stream buffer.
Overall error cnt	Total error count on this association.
Dup tsns recv	Number of duplicate TSNs received.
Stale cookie	Total number of stale cookies.
Dropped special cnt	Number of dropped INITs.
Enobuf	ENOBUF is true or not. ENOBUF happens when no buffer space is available.
Asoc up sent to app	Notification of association is being up sent to the application or not.

Related Commands

Command	Description
show sctp association brief, on page 661	Displays brief association information for Stream Control Transmission Protocol (SCTP).

show sctp pcb brief

To display brief Stream Control Transmission Protocol (SCTP) endpoint Protocol Control Block (PCB) information, use the **show sctp pcb brief** command in EXEC mode.

show sctp pcb brief all [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The output from the **show sctp pcb brief** command is used for the show sctp association brief, on page 661 command.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output is from the **show sctp pcb brief** command for the **all** keyword:

```
RP/0/RP0/CPU0:router# show sctp pcb brief all

PCB         LocalPort  VRF ID     LAddrCnt   Flags      NumVRFs    TotalSend  TotalRecv
-------------------------------------------------------------------------------------
0x4834e088 56100      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x4834ccc8 41384      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x4834b878 36423      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x4834a4b8 24295      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48349068 55788      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48347ca8 25376      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48346978 34114      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48345528 14875      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x483440d8 10467      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48336bd0 57853      0x60000000 0000000000 0x5        0000000001 0000000001 0000000000
0x48335924 5000       0x60000000 0000000000 0x5        0000000001 0000000000 0000000010
```

This table describes the significant fields shown in the display.

Table 89: show sctp pcb brief Command Field Descriptions

Field	Description
PCB	Protocol Control Block ID.
LocalPort	Endpoint local port that is associated with the PCB.
VRF ID	VRF ID in which the PCB belongs.
LAddrCnt	Number of local IP addresses.
Flags	Flags set for the PCB.
NumVRFs	Number of VRFs in which the PCB is associated.
TotalSend	Total number of chunks sent through the PCB.
TotalRecv	Total number of chunks received through the PCB.

Related Commands

Command	Description
show sctp association brief, on page 661	Displays brief association information for Stream Control Transmission Protocol (SCTP).
show sctp pcb detail, on page 670	Displays detailed Stream Control Transmission Protocol (SCTP) endpoint Protocol Control Block (PCB) information.

show sctp pcb detail

To display detailed Stream Control Transmission Protocol (SCTP) endpoint Protocol Control Block (PCB) information, use the **show sctp pcb detail** command in EXEC mode.

show sctp pcb detail *pcb-address* [**location** *node-id*]

Syntax Description

pcb-address	PCB address range for the specific PCB of interest is from 0 to ffffffff. For example, the address range can be 0x807e89c.
location *node-id*	(Optional) Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
transport	read

Examples

The following sample output is from the **show sctp pcb detail** command for the PCB address of 0x4834e088:

```
RP/0/RP0/CPU0:router# show sctp pcb detail 0x4834e088

PCB: 0x4834e088, NON-PAW socket: 0x4834dee8, vrf: 0x60000000, local Port: 56100
Total VRFs: 1, VRF size: 4
Local address 0, assocations: 1

Flags: 0x5, Features: 0xffc68, Refcount: 0, HashMark: 255
vFlag: 0x2,  TTL: 0x40,  TOS: 0x0,  RESV: 0x0
Fragmentation Point: 65535, Partial Delivery Point 524288, SCTP Context 0x0, Last Abort
Code: 0x0

socket Q limit 0, Socket Q len 0

Send:   0 received from application
        1 sent to network  0 nospaces
Rcvd:   0 packets received from network  0 packets queued to application
        0 packets failed queued to application
```

This table describes the significant fields shown in the display.

Table 90: show sctp pcb detail Command Field Descriptions

Field	Description
Flags	Bitmask of flags set for the PCB.
Features	Bitmask of features enabled for the endpoint.
Refcount	Reference count of the PCB.
HashMark	Hash mark for the association.
vFlag	vFlags set.
TTL	Time-to-Live value.
TOS	ToS value.
RESV	Type of reservation.
Fragmentation Point	Point-of-fragmentation for the datagram.
Partial Delivery Point	Point up to which the datagram is partially delivered.
SCTP Context	SCTP context.
Last Abort Code	Error code for the last termination.
Socket Q limit	Maximum value for socket queue.
Socket Q len	Current length of socket queue.

Related Commands

Command	Description
show sctp pcb brief, on page 668	Displays brief Stream Control Transmission Protocol (SCTP) endpoint Protocol Control Block (PCB) information.

show sctp statistics

To display the overall statistics counts for the Stream Control Transmission Protocol (SCTP) activity, use the **show sctp statistics** command in privileged EXEC mode.

show sctp statistics

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The statistics displayed are for the current node.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows SCTP statistics from the **show sctp statistics** command:

```
Input Statistics:
        1979 total input packets
        1979 total input datagrams
        10 total packets that had data
        10 total input SACK chunks
        10 total input DATA chunks
        2 total input duplicate DATA chunks
        1000 total input HB chunks
        910 total input HB-ACK chunks
        0 total input ECNE chunks
        0 total input AUTH chunks
        0 total input chunks missing AUTH
        0 total number of invalid HMAC ids received
        0 total number of invalid secret ids received
        0 total number of auth failed
        0 total fast path receives all one chunk
        0 total fast path multi-part data
Output Statistics:
        3466 total output packets
        12 total output SACKs
        10 total output DATA chunks
        8 total output retransmitted DATA chunks
        0 total output fast retransmitted DATA chunks
```

```
        0 total FR's that happened more than once to same chunk (u-del multi-fr algo).
        2367 total output HB chunks
        0 total output ECNE chunks
        0 total output AUTH chunks
        0 ip_output error counter
Packet Dropped Statistics:
        0 packet drop from middle box
        0 packet drop from end host
        0 packet drops with data
        0 packet drops, non-data, non-endhost
        0 packet drop, non-endhost, bandwidth rep only
        0 packet drop, not enough for chunk header
        0 packet drop, not enough data to confirm
        0 packet drop, where process_chunk_drop said break
        0 packet drop, could not find TSN
        0 packet drop, attempt reverse TSN lookup
        0 packet drop, e-host confirms zero-rwnd
        0 packet drop, midbox confirms no space
        0 packet drop, data did not match TSN
        0 packet drop, TSN's marked for Fast Retran
Timeouts:
        0 number of iterator timers that fired
        8 number of T3 data time outs
        0 number of window probe (T3) timers that fired
        22 number of INIT timers that fired
        2 number of sack timers that fired
        0 number of shutdown timers that fired
        2348 number of heartbeat timers that fired
        6 number of times a cookie timeout fired
        11 number of times an endpoint changed its cookie secret
        240 number of PMTU timers that fired
        0 number of shutdown ack timers that fired
        0 number of shutdown guard timers that fired
        0 number of stream reset timers that fired
        0 number of early FR timers that fired
        0 number of times an asconf timer fired
        0 number of times auto close timer fired
        0 number of asoc free timers expired
        0 number of inp free timers expired
Other Counters:
        0 packet shorter than header
        0 checksum error
        0 no endpoint for port
        0 bad v-tag
        0 bad SID
        0 no memory
        0 number of multiple FR in a RTT window
        8 sctps_markedretrans
        10 nagle allowed sending
        0 nagle does't allow sending
        0 max burst dosn't allow sending
       0 look ahead tells us no memory in interface ring buffer or we had a send error and
 are queuing one send.
        0 total number of window probes sent
        0 total times an output error causes us to clamp down on next user send.
       0 total times sctp_senderrors were caused from a user send from a user invoked send
 not a sack response
        0 number of in data drops due to chunk limit reached
        0 number of in data drops due to rwnd limit reached
        0 number of times a ECN reduced the cwnd
        1942 used express lookup via vtag
        0 collision in express lookup.
        0 number of times the sender ran dry of user data on primary
        0 same for above
```

```
0 sacks the slow way
0 window update only sacks sent
0 number of sends with sinfo_flags !=0
0 number of undordered sends
0 number of sends with EOF flag set
0 number of sends with ABORT flag set
0 number of times protocol drain called
0 number of times we did a protocol drain
0 number of times recv was called with peek
3355 number of cached chunks used
0 number of cached stream oq's used
0 number of unread message abandonded by close
0 send burst avoidance, already max burst inflight to net
0 send cwnd full avoidance, already max burst inflight to net
0 number of map array over-runs via fwd-tsn's
```

This table describes the significant fields shown in the display.

Table 91: show sctp statistics Field Descriptions

Field	Description
Input Statistics	Cumulative total of all the input packets, datagrams, and so forth.
Output Statistics	Cumulative total of all the output packets, selective acknowledgements, and so forth.
Packet Dropped Statistics	Cumulative total of all dropped packets grouped by location, type of drop, and so forth.
Timeouts	Cumulative total of timer expirations due to different events.
Other Counters	Cumulative total of all other types of counters that are used in SCTP.

Related Commands

Command	Description
show sctp summary, on page 675	Displays summary information for Stream Control Transmission Protocol (SCTP) on a node.

show sctp summary

To display summary information for Stream Control Transmission Protocol (SCTP) on a node, use the **show sctp summary** command in EXEC mode.

show sctp summary

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

The statistics displayed are for the current node.

Task ID

Task ID	Operations
transport	read

Examples

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

```
RP/0/RP0/CPU0:router# show sctp summary

PCB Summary
-------------
Total End Points              :       11
Total Associations            :       20
Total Local Addresses         :        0
Total Remote Addresses        :       40
Total chunk count             :       54
Total Readq count             :        0
Total chunk frees             :       54
Total Output Stream queues    :        0

Other Summary
-------------
Total VRFs                    :        1
Total IFAs                    :        3
Total IFNs                    :        3
```

This table describes the significant fields shown in the display.

Table 92: show sctp summary Command Field Descriptions

Field	Description
Total End Points	Total number of logical senders or receivers of SCTP packets.
Total Associations	Total number of associations on all nodes.
Total Local Addresses	Total number of local addresses.
Total Remote Addresses	Total number of remote addresses.
Total chunk count	Total count of chunks.
Total Readq count	Total count of the read queue.
Total chunk frees	Total number of free chunks.
Total Output Stream queues	Total number of output stream queues.
Total VRFs	Total number of VRFs in the system.
Total IFAs	Total number of active interface IP addresses.
Total IFNs	Total number of active interfaces.

Related Commands

Command	Description
show sctp statistics, on page 672	Displays the overall statistics counts for the Stream Control Transmission Protocol (SCTP) activity.

show tcp brief

To display a summary of the TCP connection table, use the **show tcp brief** command in EXEC mode.

show tcp brief [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show tcp brief** command:

```
RP/0/RP0/CPU0:router# show tcp brief

TCPCB     Recv-Q Send-Q  Local Address          Foreign Address        State
0x80572a8      0      0  0.0.0.0:513            0.0.0.0:0              LISTEN
0x8056948      0      0  0.0.0.0:23             0.0.0.0:0              LISTEN
0x8057b60      0      3  10.8.8.2:23            10.8.8.1:1025          ESTAB
```

This table describes the significant fields shown in the display.

Table 93: show tcp brief Command Field Descriptions

Field	Description
TCPCB	Memory address of the TCP control block.
Recv-Q	Number of bytes waiting to be read.
Send-Q	Number of bytes waiting to be sent.
Local Address	Source address and port number of the packet.
Foreign Address	Destination address and port number of the packet.

Field	Description
State	State of the TCP connection.

Related Commands

Command	Description
clear tcp pcb, on page 639	Clears the TCP connection.

show tcp detail

To display the details of the TCP connection table, use the **show tcp detail** command in EXEC mode.

show tcp detail pcb [{*value* | **all**}]

Syntax Description

pcb	Displays TCP connection information.
value	Displays a specific connection information. Range is from 0 to ffffffff.
all	Displays all connections information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show tcp detail pcb all** command:

```
RP/0/RP0/CPU0:router# show tcp detail pcb all

Connection state is LISTEN, I/O status: 0, socket status: 0
PCB 0x8092774, vrfid 0x0
Local host: 0.0.0.0, Local port: 23
Foreign host: 0.0.0.0, Foreign port: 0

Current send queue size: 0 (max 16384)
Current receive queue size: 0 (max 16384)  mis-ordered: 0 bytes

Timer          Starts    Wakeups         Next(msec)
Retrans             0          0                 0
SendWnd             0          0                 0
TimeWait            0          0                 0
AckHold             0          0                 0
KeepAlive           0          0                 0
PmtuAger            0          0                 0
GiveUp              0          0                 0
Throttle            0          0                 0
iss: 0           snduna: 0           sndnxt: 0
sndmax: 0           sndwnd: 0           sndcwnd: 1073725440
   irs: 0           rcvnxt: 0           rcvwnd: 16384   rcvadv: 0
```

show tcp extended-filters

To display the details of the TCP extended-filters, use the **show tcp extended-filters** command in EXEC mode.

show tcp extended-filters [**location** *node-id*]
peer-filter [**location** *node-id*]

Syntax Description

location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
peer-filter	Displays connections with peer filter configured.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show tcp extended-filters** command for a specific location (0/0/CPU0):

```
RP/0/RP0/CPU0:router# show tcp extended-filters location 0/0/CPU0

Total Number of matching PCB's in database: 3
-----------------------------------
JID: 135
Family: 2
PCB: 0x4826c5dc
L4-proto: 6
Lport: 23
Fport: 0
Laddr: 0.0.0.0
Faddr: 0.0.0.0
ICMP error filter mask: 0x12
LPTS options: 0x00000000
-----------------------------------

-----------------------------------
JID: 135
Family: 2

PCB: 0x4826dd8c
```

```
L4-proto: 6
Lport: 23
Fport: 59162
Laddr: 12.31.22.10
Faddr: 223.255.254.254
ICMP error filter mask: 0x12
LPTS options: 0x00000000
-----------------------------------

-----------------------------------
JID: 135
Family: 2
PCB: 0x4826cac0
L4-proto: 6
Lport: 23
Fport: 59307
Laddr: 12.31.22.10
Faddr: 223.255.254.254
ICMP error filter mask: 0x12
LPTS options: 0x00000000
-----------------------------------
```

show tcp statistics

To display TCP statistics, use the **show tcp statistics** command in EXEC mode.

show tcp statistics {**pcb** {**all** *pcb-address*} | **summary** } [**location** *node-id*]

Syntax Description

pcb *pcb-address*	(Optional) Displays detailed statistics for a specified connection.
pcb all	(Optional) Displays detailed statistics for all connections.
summary	(Optional) Clears summary statistic for a specific node or connection.
location *node-id*	(Optional) Displays statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show tcp statistics** command:

```
RP/0/RP0/CPU0:router# show tcp statistics pcb 0x08091bc8

Statistics for PCB 0x8091bc8 VRF Id 0x60000000
Send:   0 bytes received from application
        0 xipc pulse received from application
        0 bytes sent to network
        0 packets failed getting queued to network
Rcvd:   0 packets received from network
        0 packets queued to application
        0 packets failed queued to application
```

This table describes the significant fields shown in the display.

Table 94: show tcp statistics Command Field Descriptions

Field	Description
vrfid	VPN routing and forwarding (VRF) identification (vrfid) number.

Field	Description
Send	Statistics in this section refer to packets sent by the router.
Rcvd:	Statistics in this section refer to packets received by the router.

Related Commands

Command	Description
clear tcp statistics, on page 640	Clears TCP statistics.

show tcp nsr brief

To display the key nonstop routing (NSR) state of TCP connections on different nodes, use the **show tcp nsr brief** command in EXEC mode.

show tcp nsr brief [**location** *node-id*]

Syntax Description

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

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows the administrative and operational NSR state of each TCP session in the NSR column:

```
RP/0/RP0/CPU0:router# show tcp nsr brief

PCB        Local Address          Foreign Address        NSR   RcvOnly
0x482c6b8c
5.1.1.1:646
5.1.1.2:23945          Down  No
0x482db564
5.1.1.1:646
5.1.1.2:25398          Down  No
0x482844e0
5.1.1.1:646
5.1.1.2:25430          Down  No
0x482c9284
5.1.1.1:646
5.1.1.2:37434          Down  No
0x482d98c8
5.1.1.1:646
5.1.1.2:37895          Down  No
0x482d6018
5.1.1.1:646
5.1.1.2:50616          Down  No
0x482c7f08
5.1.1.1:646
5.1.1.2:55860          Down  No
```

```
0x482dbab0
5.1.1.1:646
5.1.1.2:56656          Down  No
0x482d7394
5.1.1.1:646
5.1.1.2:57365          Down  No
0x482d854c
5.1.1.1:646
5.1.1.2:59927          Down  No
```

This table describes the significant fields shown in the display.

Table 95: show tcp nsr brief Command Field Descriptions

Field	Description
PCB	Protocol Control Block (PCB).
Local Address	Local address and port of the TCP connection.
Foreign Address	Foreign address and port of the TCP connection.
NSR	Current operational NSR state of this TCP connection.
RevOnly	If yes, the TCP connection is replicated only in the receive direction. Some applications may need to replicate a TCP connection that is only in the receive direction.

Related Commands

Command	Description
clear tcp nsr pcb, on page 627	Brings the NSR down on a specified connection or all connections.
show tcp nsr client brief, on page 686	Displays brief information about the state of nonstop routing (NSR) for the TCP clients on different nodes.

show tcp nsr client brief

To display brief information about the state of nonstop routing (NSR) for TCP clients on different nodes, use the **show tcp nsr client brief** command in EXEC mode.

show tcp nsr client brief [**location** *node-id*]

Syntax Description

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

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output is from the **show tcp nsr client brief** command:

```
RP/0/RP0/CPU0:router# show tcp nsr client brief location 0/1/CPU0


CCB          Proc Name     Instance Sets Sessions/NSR Up Sessions
0x482bf378   mpls_ldp  1        1             1/1
0x482bd32c   mpls_ldp  2        1             0/0
```

This table describes the significant fields shown in the display.

Table 96: show tcp nsr client brief Command Field Descriptions

Field	Description
CCB	Client Control Block (CCB). Unique ID to identify the client.
Proc Name	Name of the client process.
Instance	Instance is identified as the instance number of the client process because there can be more than one instance for a routing application.
Sets	Set number is identified as the ID of the session-set.
Sessions/NSR Up Sessions	Total sessions in the set versus the number of the sessions in which NSR is up.

Related Commands

Command	Description
clear tcp nsr client, on page 625	Clears detailed information about the nonstop routing (NSR) clients.
show tcp nsr brief, on page 684	Displays the key nonstop routing (NSR) state of TCP connections on different nodes.

show tcp nsr detail client

To display detailed information about the nonstop routing (NSR) clients, use the **show tcp nsr detail client** command in EXEC mode.

show tcp nsr detail client {*ccb-address* | **all**} [**location** *node-id*]

Syntax Description

ccb-address	Client Control Block (CCB) address range for the specific client information. 0 to ffffffff. For example, the address range can be 0x482a4e20.
all	Specifies all the clients.
location *node-id*	(Optional) Displays client information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows detailed information for all clients:

```
RP/0/RP0/CPU0:router# show tcp nsr detail client all


============================================================
CCB 0x482b25d8, Proc Name mpls_ldp
Instance ID 1, Job ID 360
Number of session-sets 2
Number of sessions 3
Number of NSR Synced sessions 1
Connected at: Sun Jun 10 07:05:31 2007
Registered for notifications: Yes

============================================================
CCB 0x4827fd30, Proc Name mpls_ldp
Instance ID 2, Job ID 361
Number of session-sets 1
Number of sessions 2
Number of NSR Synced sessions 2
Connected at: Sun Jun 10 07:05:54 2007
Registered for notifications: Yes
```

```
============================================================

RP/0/RP0/CPU0:router# show tcp nsr detail client all location 1
RP/0/RP0/CPU0:router# show tcp nsr detail client all location 0/1/CPU0

============================================================
CCB 0x482bf378, Proc Name mpls_ldp
Instance ID 1, Job ID 360
Number of session-sets 1
Number of sessions 1
Number of NSR Synced sessions 1
Connected at: Sun Jun 10 07:05:41 2007
Registered for notifications: Yes

============================================================
CCB 0x482bd32c, Proc Name mpls_ldp
Instance ID 2, Job ID 361
Number of session-sets 1
Number of sessions 2
Number of NSR Synced sessions 2
Connected at: Sun Jun 10 07:06:01 2007
Registered for notifications: Yes
```

Related Commands

Command	Description
show tcp nsr detail pcb, on page 690	Displays detailed information about the nonstop routing (NSR) state of TCP connections.
show tcp nsr detail session-set, on page 693	Displays the detailed information about the nonstop routing (NSR) state of the session sets on different nodes.

show tcp nsr detail pcb

To display detailed information about the nonstop routing (NSR) state of TCP connections, use the **show tcp nsr detail pcb** command in EXEC mode.

show tcp nsr detail pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	PCB address range for the specific connection information. 0 to ffffffff. For example, the address range can be 0x482c6b8c.
all	Specifies all the connections.
location *node-id*	(Optional) Displays connection information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows the complete details for NSR for all locations:

```
RP/0/RP0/CPU0:router# show tcp nsr detail pcb all location 0/0/cpu0


==============================================================
PCB 0x482b6b0c, VRF Id 0x60000000, Client PID: 2810078
Local host: 5.1.1.1, Local port: 646
Foreign host: 5.1.1.2, Foreign port: 31466
SSCB 0x482bc80c, Client PID 2810078
Node Role: Active, Protected by: 0/1/CPU0, Cookie: 0x00001000

NSR State: Up, Rcv Path Replication only: No
Replicated to standby: Yes
Synchronized with standby: Yes
FSSN: 3005097735, FSSN Offset: 0

Sequence number of last or current initial sync: 1181461961
Initial sync started at: Sun Jun 10 07:52:41 2007
Initial sync ended   at: Sun Jun 10 07:52:41 2007

Number of incoming packets currently held: 1
```

```
          Pak#    SeqNum     Len     AckNum
         -----  ----------  -----  ----------
             1  3005097735      0  1172387202

Number of iACKS currently held: 0

==============================================================
PCB 0x482c2920, VRF Id 0x60000000, Client PID: 2810078
Local host: 5.1.1.1, Local port: 646
Foreign host: 5.1.1.2, Foreign port: 11229
SSCB 0x482bb3bc, Client PID 2810078
Node Role: Active, Protected by: 0/1/CPU0, Cookie: 0x00001000

NSR State: Down, Rcv Path Replication only: No
Replicated to standby: No
Synchronized with standby: No
NSR-Down Reason: Initial sync was aborted
NSR went down at: Sun Jun 10 11:55:38 2007

Initial sync in progress: No
Sequence number of last or current initial sync: 1181476338
Initial sync error, if any: 'ip-tcp' detected the 'warning' condition 'Initial sync operation
 timed out'
Source of initial sync error: Local TCP
Initial sync started at: Sun Jun 10 11:52:18 2007
Initial sync ended   at: Sun Jun 10 11:55:38 2007

Number of incoming packets currently held: 0

Number of iACKS currently held: 0

==============================================================
PCB 0x482baea0, VRF Id 0x60000000, Client PID: 2810078
Local host: 5.1.1.1, Local port: 646
Foreign host: 5.1.1.2, Foreign port: 41149
SSCB 0x482bb3bc, Client PID 2810078
Node Role: Active, Protected by: 0/1/CPU0, Cookie: 0x00001000

NSR State: Down, Rcv Path Replication only: No
Replicated to standby: No
Synchronized with standby: No
NSR-Down Reason: Initial sync was aborted
NSR went down at: Sun Jun 10 11:55:38 2007

Initial sync in progress: No
Sequence number of last or current initial sync: 1181476338
Initial sync error, if any: 'ip-tcp' detected the 'warning' condition 'Initial sync operation
 timed out'
Source of initial sync error: Local TCP
Initial sync started at: Sun Jun 10 11:52:18 2007
Initial sync ended   at: Sun Jun 10 11:55:38 2007

Number of incoming packets currently held: 0

Number of iACKS currently held: 0

==============================================================
PCB 0x482c35ac,  VRF Id 0x60000000, Client PID: 2859233
Local host: 5:1::1, Local port: 8889
Foreign host: 5:1::2, Foreign port: 14008
SSCB 0x4827fea8, Client PID 2859233
Node Role: Active, Protected by: 0/1/CPU0, Cookie: 0x0000001c

NSR State: Up, Rcv Path Replication only: No
```

```
Replicated to standby: Yes
Synchronized with standby: Yes
FSSN: 2962722865, FSSN Offset: 0

Sequence number of last or current initial sync: 1181474373
Initial sync started at: Sun Jun 10 11:19:33 2007
Initial sync ended   at: Sun Jun 10 11:19:33 2007

Number of incoming packets currently held: 0

Number of iACKS currently held: 0

============================================================
PCB 0x482c2f10,  VRF Id 0x60000000, Client PID: 2859233
Local host: 5:1::1, Local port: 8889
Foreign host: 5:1::2, Foreign port: 40522
SSCB 0x4827fea8, Client PID 2859233
Node Role: Active, Protected by: 0/1/CPU0, Cookie: 0x0000001b

NSR State: Up, Rcv Path Replication only: No
Replicated to standby: Yes
Synchronized with standby: Yes
FSSN: 3477316401, FSSN Offset: 0

Sequence number of last or current initial sync: 1181474373
Initial sync started at: Sun Jun 10 11:19:33 2007
Initial sync ended   at: Sun Jun 10 11:19:33 2007

Number of incoming packets currently held: 0

Number of iACKS currently held: 0
```

Related Commands

Command	Description
clear tcp nsr pcb, on page 627	Brings the NSR down on a specified connection or all connection.
show tcp nsr detail client, on page 688	Displays detailed information about the nonstop routing (NSR) clients.
show tcp nsr detail session-set, on page 693	Displays the detailed information about the nonstop routing (NSR) state of the session sets on different nodes.

show tcp nsr detail session-set

To display the detailed information about the nonstop routing (NSR) state of the session sets on different nodes, use the **show tcp nsr detail session-set** command in EXEC mode.

show tcp nsr detail session-set {*sscb-address* | **all**} [**location** *node-id*]

Syntax Description

sscb-address	Session-Set Control Block (SSCB) address range for the specific session set information. 0 to ffffffff. For example, the address range can be 0x482c6b8c.
all	Specifies all the session sets.
location *node-id*	(Optional) Displays information for session sets for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows all the session sets:

```
RP/0/RP0/CPU0:router# show tcp nsr detail session-set all


============================================================
SSCB 0x482bc80c, Client PID: 2810078
Set Id: 1, Addr Family: IPv4
Role: Active, Protected by: 0/1/CPU0, Well known port: 646
Sessions: total 1, synchronized 1
Initial sync in progress: No
        Sequence number of last or current initial sync: 1181461961
        Number of sessions in the initial sync: 1
        Number of sessions already synced: 1
        Number of sessions that failed to sync: 0
        Initial sync started at: Sun Jun 10 07:52:41 2007
        Initial sync ended   at: Sun Jun 10 07:52:41 2007

============================================================
SSCB 0x482bb3bc, Client PID: 2810078
Set Id: 2, Addr Family: IPv4
Role: Active, Protected by: 0/1/CPU0, Well known port: 646
```

```
Sessions: total 2, synchronized 0
Initial sync in progress: Yes
        Sequence number of last or current initial sync: 1181476338
        Initial sync timer expires in 438517602 msec
        Number of sessions in the initial sync: 2
        Number of sessions already synced: 0
        Number of sessions that failed to sync: 0
        Initial sync started at: Sun Jun 10 11:52:18 2007

============================================================
SSCB 0x4827fea8, Client PID: 2859233
Set Id: 1, Addr Family: IPv6
Role: Active, Protected by: 0/1/CPU0, Well known port: 8889
Sessions: total 2, synchronized 2
Initial sync in progress: No
        Sequence number of last or current initial sync: 1181474373
        Number of sessions in the initial sync: 2
        Number of sessions already synced: 2
        Number of sessions that failed to sync: 0
        Initial sync started at: Sun Jun 10 11:19:33 2007
        Initial sync ended   at: Sun Jun 10 11:19:33 2007
```

Related Commands

Command	Description
clear tcp nsr session-set, on page 630	Clears information about session sets.
show tcp nsr detail client, on page 688	Displays detailed information about the nonstop routing (NSR) clients.
show tcp nsr detail pcb, on page 690	Displays detailed information about the nonstop routing (NSR) state of TCP connections.

show tcp nsr session-set brief

To display brief information about the session sets for the nonstop routing (NSR) state on different nodes, use the **show tcp nsr session-set brief** command in EXEC mode.

show tcp nsr session-set brief [**location** *node-id*]

Syntax Description

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

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

A session set consists of a subset of the application's session in which the subset is protected by only one standby node. The TCP NSR state machine operates with respect to these session sets.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows all the session sets that are known to the TCP instance:

```
RP/0/RP0/CPU0:router# show tcp nsr session-set brief

SSCB       Client   LocalAPP Set-Id   Family    Role      Protect-Node Total/Synced
0x482bc80c 2810078  mpls_ldp#1    1     IPv4    Active     0/1/CPU0      1/1
0x482bb3bc 2810078  mpls_ldp#1    2     IPv4    Active     0/1/CPU0      2/0
0x4827fea8 2859233  mpls_ldp#2    1     IPv6    Active     0/1/CPU0      2/2
```

The following sample output shows brief information about the session sets for location 0/1/CPU0:

```
RP/0/RP0/CPU0:router# show tcp nsr session-set brief location 0/1/CPU0

SSCB           Client   LocalAPP  Set-Id      Family   Role   Protect-Node  Total/Synced
0x4827ff74     602319   mpls_ldp#1     1       IPv4    Stdby  0/0/CPU0      1/1
0x482b8f54     602320   mpls_ldp#2     1       IPv6    Stdby  0/0/CPU0      2/2
```

This table describes the significant fields shown in the display.

Table 97: show tcp nsr session-set brief Command Field Descriptions

Field	Description
SSCB	Unique ID for Session-Set Control Block (SSCB) to identify a session-set of a client.
Client	PID of the client process.
LocalAPP	Name and instance number of the client process.
Set-Id	ID of the session-set.
Family	Address family of the sessions added to the session set for IPv4 or IPv6.
Role	Role of the TCP stack for active or standby.
Protect-Node	Node that is offering the protection, for example, partner node.
Total/Synced	Total number of sessions in the set versus the sessions that have been synchronized.

Related Commands

Command	Description
clear tcp nsr session-set, on page 630	Clears information about session sets.
show tcp nsr detail session-set, on page 693	Displays the detailed information about the nonstop routing (NSR) state of the session sets on different nodes.

show tcp nsr statistics client

To display the nonstop routing (NSR) statistics for the clients, use the **show tcp nsr statistics client** command in EXEC mode.

show tcp nsr statistics client {*ccb-address* | **all**} [**location** *node-id*]

Syntax Description

ccb-address	Client Control Block (CCB) address range for the specific statistics information for the client. 0 to ffffffff. For example, the address range can be 0x482c6b8c.
all	Specifies all the statistics for the clients.
location *node-id*	(Optional) Displays statistics for the client for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows all the statistics for the client:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics client all


============================================================
CCB: 0x482b25d8
Name: mpls_ldp, Job ID: 360
Connected at: Thu Jan  1 00:00:00 1970

Notification Stats      : Queued  Failed  Delivered  Dropped
Init-Sync Done          :      0       0          0       0
Replicated Session Ready:      0       0          0       0
Operational Down        :      0       0          0       0
Last clear at: Sun Jun 10 12:19:12 2007


============================================================
CCB: 0x4827fd30
Name: mpls_ldp, Job ID: 361
Connected at: Sun Jun 10 07:05:54 2007
```

```
Notification Stats      : Queued  Failed  Delivered  Dropped
Init-Sync Done          :      1       0          1       0
Replicated Session Ready:      0       0          0       0
Operational Down        :      0       0          0       0
Last clear at: Never Cleared
```

Related Commands

Command	Description
clear tcp nsr statistics client, on page 632	Clears the nonstop routing (NSR) statistics of the client.
show tcp nsr statistics pcb, on page 699	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics session-set, on page 701	Displays the nonstop routing (NSR) statistics for a session set.
show tcp nsr statistics summary, on page 703	Displays the nonstop routing (NSR) summary statistics across all TCP sessions.

show tcp nsr statistics pcb

To display the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB), use the **show tcp nsr statistics pcb** command in EXEC mode.

show tcp nsr statistics pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	PCB address range for the specific connection information. 0 to ffffffff. For example, the address range can be 0x482c6b8c.
all	Specifies all the connection statistics.
location *node-id*	(Optional) Displays connection statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows all NSR statistics:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics pcb all


==============================================================
PCB 0x482b6b0c
Number of times NSR went up: 0
Number of times NSR went down: 0
Number of times NSR was disabled: 0
Number of times fail-over occured : 0
Last clear at: Sun Jun 10 13:55:35 2007


==============================================================
PCB 0x482c2920
Number of times NSR went up: 2
Number of times NSR went down: 2
Number of times NSR was disabled: 0
Number of times fail-over occured : 0
Last clear at: Never Cleared
```

```
==============================================================
PCB 0x482baea0
Number of times NSR went up: 2
Number of times NSR went down: 2
Number of times NSR was disabled: 0
Number of times fail-over occured : 0
Last clear at: Never Cleared

==============================================================
PCB 0x482c35ac
Number of times NSR went up: 4
Number of times NSR went down: 2
Number of times NSR was disabled: 1
Number of times fail-over occured : 0
Last clear at: Never Cleared

==============================================================
PCB 0x482c2f10
Number of times NSR went up: 4
Number of times NSR went down: 2
Number of times NSR was disabled: 1
Number of times fail-over occured : 0
Last clear at: Never Cleared
```

Related Commands

Command	Description
clear tcp nsr statistics pcb, on page 634	Clears the nonstop routing (NSR) statistics for TCP connections.
show tcp nsr statistics client, on page 697	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics session-set, on page 701	Displays the nonstop routing (NSR) statistics for a session set.
show tcp nsr statistics summary, on page 703	Displays the nonstop routing (NSR) summary statistics across all TCP sessions.

show tcp nsr statistics session-set

To display the nonstop routing (NSR) statistics for a session set, use the **show tcp nsr statistics session-set** command in EXEC mode.

show tcp nsr statistics session-set {*sscb-address* | **all**} [**location** *node-id*]

Syntax Description

sscb-address	Session-Set Control Block (SSCB) address range for the specific session set information for the statistics. 0 to ffffffff. For example, the address range can be 0x482b3444.
all	Specifies all the session sets for the statistics.
location *node-id*	(Optional) Displays session set information for the statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows all session set information for the statistics:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics session-set all


==================Session Set Stats ============================
SSCB 0x482bc80c, Set ID: 1
Number of times init-sync was attempted  :1
Number of times init-sync was successful :1
Number of times init-sync failed         :0
Number of times switch-over occured      :0
Last clear at: Never Cleared

==================Session Set Stats ============================
SSCB 0x482bb3bc, Set ID: 2
Number of times init-sync was attempted  :1
Number of times init-sync was successful :0
Number of times init-sync failed         :1
Number of times switch-over occured      :0
Last clear at: Never Cleared

==================Session Set Stats ============================
```

```
SSCB 0x4827fea8, Set ID: 1
Number of times init-sync was attempted  :0
Number of times init-sync was successful :0
Number of times init-sync failed         :0
Number of times switch-over occured      :0
Last clear at: Sun Jun 10 13:36:51 2007
```

Related Commands

Command	Description
clear tcp nsr statistics session-set, on page 636	Clears the nonstop routing (NSR) statistics for session sets.
show tcp nsr statistics client, on page 697	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics pcb, on page 699	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics summary, on page 703	Displays the nonstop routing (NSR) summary statistics across all TCP sessions.

show tcp nsr statistics summary

To display the nonstop routing (NSR) summary statistics across all TCP sessions, use the **show tcp nsr statistics summary** command in EXEC mode.

show tcp nsr statistics summary [**location** *node-id*]

Syntax Description

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

Command Default

If a value is not specified, the current RP in which the command is being executed is taken as the location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

The **location** keyword is used so that active and standby TCP instances are independently queried.

Task ID

Task ID	Operations
transport	read

Examples

The following sample output shows the summary statistics for all TCP sessions:

```
RP/0/RP0/CPU0:router# show tcp nsr statistics summary


====================Summary Stats=========================
The last clear at Thu Jan  1 00:00:00 1970

Notif Statistic:
                         Queued  Failed  Delivered  Dropped
Init-sync Done          :      3       0          3        0
Replicated Session Ready:      0       0          0        0
Operational Down        :      8       0          8        0
QAD Msg Statistic:
Number of dropped messages from partner TCP stack(s)        : 0
Number of unknown messages from partner TCP stack(s)        : 0
Number of messages accepted from partner TCP stack(s)       : 31
Number of messages sent to partner TCP stack(s)             : 0
Number of messages failed to be sent to partner TCP stack(s): 0
IACK RX Msg Statistic:
Number of iACKs dropped because there is no PCB             : 0
Number of iACKs dropped because there is no datapath SCB    : 0
Number of iACKs dropped because SSO is not up               : 0
Number of stale iACKs dropped                               : 6
Number of iACKs not held because of an immediate match      : 0
Number of held packets dropped because of errors            : 0
```

Related Commands

Command	Description
clear tcp nsr statistics summary, on page 638	Clears the statistics summary.
show tcp nsr statistics client, on page 697	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics pcb, on page 699	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics session-set, on page 701	Displays the nonstop routing (NSR) statistics for a session set.

show udp brief

To display a summary of the User Datagram Protocol (UDP) connection table, use the **show udp brief** command in EXEC mode.

show udp brief [**location** *node-id*]

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show udp brief** command:

```
RP/0/RP0/CPU0:router# show udp brief

PCB        Recv-Q Send-Q  Local Address          Foreign Address
0x8040c4c      0      0  0.0.0.0:7              0.0.0.0:0
0x805a120      0      0  0.0.0.0:9              0.0.0.0:0
0x805a430      0      0  0.0.0.0:19             0.0.0.0:0
0x805a740      0      0  0.0.0.0:67             0.0.0.0:0
0x804fcb0      0      0  0.0.0.0:123            0.0.0.0:0
```

This table describes the significant fields shown in the display.

Table 98: show udp brief Command Field Descriptions

Field	Description
PCB	Protocol control block address. This is the address to a structure that contains connection information such as local address, foreign address, local port, foreign port, and so on.
Recv-Q	Number of bytes in the receive queue.
Send-Q	Number of bytes in the send queue.
Local Address	Local address and local port.

Field	Description
Foreign Address	Foreign address and foreign port.

Related Commands

Command	Description
show tcp brief, on page 677	Displays details of TCP connections.

show udp detail pcb

To display detailed information of the User Datagram Protocol (UDP) connection table, use the **show udp detail pcb** command in EXEC mode.

show udp detail pcb {*pcb-address* | **all**} [**location** *node-id*]

Syntax Description

pcb-address	Address of a specified UDP connection.
all	Provides statistics for all UDP connections.
location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.3.0	The command name was changed from **show udp pcb** to s **how udp detail pcb** .

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show udp detail pcb all** command:

```
RP/0/RP0/CPU0:router# show udp detail pcb all location 0/3/CPU0

==============================================
PCB is 0x4822fea0, Family: 2, VRF: 0x60000000
 Local host: 0.0.0.0:3784
 Foreign host: 0.0.0.0:0

Current send queue size: 0
Current receive queue size: 0
==============================================
PCB is 0x4822d0e0, Family: 2, VRF: 0x60000000
 Local host: 0.0.0.0:3785
 Foreign host: 0.0.0.0:0

Current send queue size: 0
Current receive queue size: 0
```

This table describes the significant fields shown in the display.

Table 99: show raw pcb Command Field Descriptions

Field	Description
PCB	Protocol control block address.
Family	Network protocol. IPv4 is 2; IPv6 is 26.
VRF	VPN routing and forwarding (VRF) instance name.
Local host	Local host address.
Foreign host	Foreign host address.
Current send queue size	Size of the send queue (in bytes).
Current receive queue size	Size of the receive queue (in bytes).

show udp extended-filters

To display the details of the UDP extended-filters, use the **show udp extended-filters** command in EXEC mode.

show udp extended-filters {**location** *node-id* | **peer-filter** {**location** *node-id}*}

Syntax Description

location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.
peer-filter	Displays connections with peer filter configured.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show udp extended-filters** command for a specific location (0/0/CPU0):

```
RP/0/RP0/CPU0:router# show udp extended-filters location 0/0/CPU0

Total Number of matching PCB's in database: 1
----------------------------------
JID: 248
Family: 2
PCB: 0x48247e94
L4-proto: 17
Lport: 646
Fport: 0
Laddr: 0.0.0.0
Faddr: 0.0.0.0
ICMP error filter mask: 0x0
LPTS options: 0x00000000
----------------------------------
```

show udp statistics

To display User Datagram Protocol (UDP) statistics, use the **show udp statistics** command in EXEC mode.

show udp statistics {**summary** | **pcb** {*pcb-addressall*}} [**location** *node-id*]

Syntax Description

summary	Displays summary statistics.
pcb *pcb-address*	Displays detailed statistics for each connection.
pcb *all*	Displays detailed statistics for all connections.
location *node-id*	Displays information for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.2	The **location** keyword and *node-id* argument became required.

Usage Guidelines

UDP clones the received packets if there are multiple multicast applications that are interested in receiving those packets.

Task ID

Task ID	Operations
transport	read

Examples

The following is sample output from the **show udp statistics summary** command:

```
RP/0/RP0/CPU0:router# show udp statistics summary

UDP statistics:
Rcvd: 0 Total, 0 drop, 0 no port
      0 checksum error, 0 too short
Sent: 0 Total, 0 error
0 Total forwarding broadcast packets
0 Cloned packets, 0 failed cloningication
```

This table describes the significant fields shown in the display.

Table 100: show udp Command Field Descriptions

Field	Description
Rcvd: Total	Total number of packets received.
Rcvd: drop	Total number of packets received that were dropped.
Rcvd: no port	Total number of packets received that have no port.
Rcvd: checksum error	Total number of packets received that have a checksum error.
Rcvd: too short	Total number of packets received that are too short for UDP packets.
Sent: Total	Total number of packets sent successfully.
Sent: error	Total number of packets that cannot be sent due to errors.
Total forwarding broadcast packets	Total number of packets forwarded to the helper address.
Cloned packets	Total number of packets cloned successfully.
failed cloning	Total number of packets that failed cloning.

Related Commands

Command	Description
clear udp statistics, on page 641	Clears UDP statistics.

tcp mss

To configure the TCP maximum segment size that determines the size of the packet that TCP uses for sending data, use the **tcp mss** command in Global Configuration mode.

tcp mss *segment-size*

Syntax Description

segment-size	Size, in bytes, of the packet that TCP uses to send data. Range is 68 to 10000 bytes.

Command Default

If this configuration does not exist, TCP determines the maximum segment size based on the settings specified by the application process, interface maximum transfer unit (MTU), or MTU received from Path MTU Discovery.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read, write

Examples

This example shows how to configure the TCP maximum segment size:

```
RP/0/RP0/CPU0:router(config)# tcp mss 1460
RP/0/RP0/CPU0:router(config)# exit

Uncommitted changes found, commit them? [yes]:
RP/0/RP0/CPU0:router:Sep  8 18:29:51.084 : config[65700]: %LIBTARCFG-6-COMMIT :

Configuration committed by user 'lab'.   Use 'show commit changes 1000000596' to view the
changes.
RP/0/RP0/CPU0:routerSep  8 18:29:51.209 : config[65700]: %SYS-5-CONFIG_I : Configured from
 console by lab
```

tcp path-mtu-discovery

To allow TCP to automatically detect the highest common maximum transfer unit (MTU) for a connection, use the **tcp path-mtu-discovery** in Global Configuration mode. To reset the default, use the **no** form of this command.

tcp path-mtu-discovery [{**age-timer** *minutes* | **infinite**}]
no tcp path-mtu-discovery

Syntax Description

age-timer *minutes*	(Optional) Specifies a value in minutes. Range is 10 to 30.
infinite	(Optional) Turns off the age timer.

Command Default

Disabled

age-timer default is 10 minutes

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **tcp path-mtu-discovery** command to allow TCP to automatically detect the highest common MTU for a connection, such that when a packet traverses between the originating host and the destination host the packet is not fragmented and then reassembled.

The age timer value is in minutes, with a default value of 10 minutes. The age timer is used by TCP to automatically detect if there is an increase in MTU for a particular connection. If the **infinite** keyword is specified, the age timer is turned off.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to set the age timer to 20 minutes:

```
RP/0/RP0/CPU0:router(config)# tcp path-mtu-discovery age-timer 20
```

tcp selective-ack

To enable TCP selective acknowledgment (ACK) and identify which segments in a TCP packet have been received by the remote TCP, use the **tcp selective-ack** command in Global Configuration mode. To reset the default, use the **no** form of this command.

tcp selective-ack
no tcp selective-ack

Syntax Description

This command has no keywords or arguments.

Command Default

TCP selective ACK is disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If TCP Selective ACK is enabled, each packet contains information about which segments have been received by the remote TCP. The sender can then resend only those segments that are lost. If selective ACK is disabled, the sender receives no information about missing segments and automatically sends the first packet that is not acknowledged and then waits for the other TCP to respond with what is missing from the data stream. This method is inefficient in Long Fat Networks (LFN), such as high-speed satellite links in which the bandwidth * delay product is large and valuable bandwidth is wasted waiting for retransmission.

Task ID

Task ID	Operations
transport	read, write

Examples

In the following example, the selective ACK is enabled:

```
RP/0/RP0/CPU0:router(config)# tcp selective-ack
```

Related Commands

Command	Description
tcp timestamp, on page 716	Measures the round-trip time of a packet.

tcp synwait-time

To set a period of time the software waits while attempting to establish a TCP connection before it times out, use the **tcp synwait-time** command in Global Configuration mode. To restore the default time, use the **no** form of this command.

tcp synwait-time *seconds*
no tcp synwait-time *seconds*

Syntax Description

seconds	Time (in seconds) the software waits while attempting to establish a TCP connection. Range is 5 to 30 seconds.

Command Default

The default value for the synwait-time is 30 seconds.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to configure the software to continue attempting to establish a TCP connection for 18 seconds:

```
RP/0/RP0/CPU0:router(config)# tcp synwait-time 18
```

tcp timestamp

To more accurately measure the round-trip time of a packet, use the **tcp timestamp** command inGlobal Configuration mode. To reset the default, use the **no** form of this command.

tcp timestamp
no tcp timestamp

Syntax Description

This command has no keywords or arguments.

Command Default

A TCP time stamp is not used.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use the **tcp timestamp** command to more accurately measure the round-trip time of a packet. If a time stamp is not used, a TCP sender deduces the round-trip time when an acknowledgment of its packet is received, which is not a very accurate method because the acknowledgment can be delayed, duplicated, or lost. If a time stamp is used, each packet contains a time stamp to identify packets when acknowledgments are received and the round-trip time of that packet.

This feature is most useful in Long Fat Network (LFN) where the bandwidth * delay product is long.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to enable the timestamp option:

```
RP/0/RP0/CPU0:router(config)# tcp timestamp
```

Related Commands

Command	Description
tcp selective-ack, on page 714	Enables the TCP selective acknowledgment feature.

tcp window-size

To alter the TCP window size, use the **tcp window-size** command in Global Configuration mode. To restore the default value, use the **no** form of this command.

tcp window-size *bytes*
no tcp window-size

Syntax Description

bytes	Window size in bytes. Range is 2048 to 65535 bytes.

Command Default

The default value for the window size is 16k.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Note Do not use this command unless you clearly understand why you want to change the default value.

Task ID

Task ID	Operations
transport	read, write

Examples

The following example shows how to set the TCP window size to 3000 bytes:

```
RP/0/RP0/CPU0:router(config)# tcp window-size 3000
```

VRRP Commands

This document describes the Cisco IOS XR software commands used to configure and monitor the Virtual Router Redundancy Protocol (VRRP).

For detailed information about VRRP concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- accept-mode, on page 721
- accept-mode (subordinate), on page 723
- address-family, on page 724
- address (VRRP), on page 725
- address global, on page 727
- address linklocal, on page 729
- address secondary, on page 731
- bfd minimum-interval (VRRP), on page 733
- bfd multiplier (VRRP), on page 734
- clear vrrp statistics, on page 735
- delay (VRRP), on page 737
- interface (VRRP), on page 738
- message state disable, on page 740
- router vrrp, on page 741
- session name(vrrp), on page 742
- show vrrp, on page 743
- vrrp slave follow, on page 748
- subordinate primary virtual IPv4 address(vrrp), on page 749
- subordinate secondary virtual IPv4 address(vrrp), on page 750
- snmp-server traps vrrp events, on page 751
- track object(vrrp), on page 752
- vrrp, on page 753
- vrrp assume-ownership disable, on page 755
- vrrp bfd fast-detect, on page 757
- vrrp bfd minimum-interval, on page 759
- vrrp bfd multiplier, on page 760
- vrrp delay, on page 761
- vrrp ipv4, on page 763
- vrrp preempt, on page 764

- vrrp priority, on page 766
- vrrp text-authentication, on page 767
- vrrp timer, on page 768
- vrrp track interface, on page 769

accept-mode

To disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses, use the **accept-mode** command in the VRRP virtual router submode. To enable the installation of routes for the VRRP virtual addresses, use the **no** form of this command.

accept-mode disable

no accept-mode disable

Syntax Description

disable	Disables the accept mode.

Command Default

By default, the accept mode is enabled.

Command Modes

VRRP virtual router configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced. This command replaced the **vrrp assume-ownership disable** command.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to disable the installation of routes for the VRRP virtual addresses:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# accept-mode disable
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 725	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 727	Configures the global virtual IPv6 address for a virtual router.
address linklocal, on page 729	Sets the virtual link-local IPv6 address for a virtual router.

Command	Description
address secondary, on page 731	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 740	Disables the task of logging the VRRP state change events.

accept-mode (subordinate)

To disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses, use the **accept-mode** command in the VRRP slave submode. To enable the installation of routes for the VRRP virtual addresses, use the **no** form of this command.

accept-mode disable

no accept-mode disable

Syntax Description

disable	Disables the accept mode.

Command Default

By default, the accept mode is enabled.

Command Modes

VRRP slave submode configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to disable the installation of routes for the VRRP virtual addresses:

```
Router# configure
Router(config)# router vrrp
Router(config-vrrp)# interface tenGigE 0/4/0/4
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 3 slave
Router(config-vrrp-virtual-router)# accept-mode disable
Router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

address-family

To enable address-family mode, use the **address-family** command in interface configuration mode. To terminate address-family mode, use the **no** form of this command.

address-family {**ipv4** | **ipv6**}
no address-family {**ipv4** | **ipv6**}

Syntax Description

ipv4	IPv4 address-family.
ipv6	IPv6 address-family.

Command Default

None.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

The following example shows how to enable address-family mode:

```
RP/0/RP0/CPU0:router # config
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
```

Related Commands

Command	Description
interface (VRRP), on page 738	Enables VRRP interface configuration mode.

address (VRRP)

To configure the primary virtual IPv4 address for a virtual router, use the **address** command in the Virtual Router Redundancy Protocol (VRRP) virtual router submode. To deconfigure the primary virtual IPv4 address for the virtual router, use the **no** form of this command.

address *address*

no address *address*

Syntax Description

address	VRRP IPv4 address.

Command Default

None

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 4.1.0	This command was introduced. This command replaced the **vrrp ipv4** command.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to set the primary virtual IPv4 address for the virtual router:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# address 192.168.18.1
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode, on page 721	Disables the installation of routes for the VRRP virtual addresses.
address global, on page 727	Configures the global virtual IPv6 address for a virtual router.
address linklocal, on page 729	Sets the virtual link-local IPv6 address for a virtual router.

Command	Description
address secondary, on page 731	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 740	Disables the task of logging the VRRP state change events.

address global

To configure the global virtual IPv6 address for a virtual router, use the **address global** command in the Virtual Router Redundancy Protocol (VRRP) virtual router submode. To deconfigure the global virtual IPv6 address for a virtual router, use the **no** form of this command.

address global *ipv6-address*

no address global *ipv6-address*

Syntax Description

ipv6-address	Global VRRP IPv6 address.

Command Default

None

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to add a global virtual IPv6 address for the virtual router:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv6
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# address global 4000::1000
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 725	Sets the primary virtual IPv4 address for a virtual router.
accept-mode, on page 721	Disables the installation of routes for the VRRP virtual addresses.
address linklocal, on page 729	Sets the virtual link-local IPv6 address for a virtual router.

Command	Description
address secondary, on page 731	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 740	Disables the task of logging the VRRP state change events.

address linklocal

To either configure the virtual link-local IPv6 address for a virtual router or to specify that the virtual link-local IPv6 address should be enabled and calculated automatically from the virtual router virtual Media Access Control (MAC) address, use the **address linklocal** command in the Virtual Router Redundancy Protocol (VRRP) virtual router submode. To deconfigure the virtual link-local IPv6 address for a virtual router, use the **no** form of this command.

address linklocal [{*ipv6-address* | **autoconfig**}]

no address linklocal [{*ipv6-address* | **autoconfig**}]

Syntax Description

ipv6-address	VRRP IPv6 link-local address.
autoconfig	Autoconfigures the VRRP IPv6 link-local address.

Command Default

None

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to autoconfigure the VRRP IPv6 link-local address:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router vrrp
RP/0/RP0/CPU0:router(config-vrrp)#interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)#address-family ipv6
RP/0/RP0/CPU0:router(config-vrrp-address-family)#vrrp 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#address linklocal autoconfig
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

This example shows how to configure the virtual link-local IPv6 address for the virtual router:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router vrrp
```

```
RP/0/RP0/CPU0:router(config-vrrp)#interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)#address-family ipv6
RP/0/RP0/CPU0:router(config-vrrp-address-family)#vrrp 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#address linklocal FE80::260:3EFF:FE11:6770

RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Note The **version** keyword is available only if IPv4 address-family is selected. By default, version is set to 3 for IPv6 address families.

Related Commands

Command	Description
address (VRRP), on page 725	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 727	Configures the global virtual IPv6 address for a virtual router.
accept-mode, on page 721	Disables the installation of routes for the VRRP virtual addresses.
address secondary, on page 731	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 740	Disables the task of logging the VRRP state change events.

address secondary

To configure the secondary virtual IPv4 address for a virtual router, use the **address secondary** command in the Virtual Router Redundancy Protocol (VRRP) virtual router submode. To deconfigure the secondary virtual IPv4 address for a virtual router, use the **no** form of this command.

address *address* **secondary**

no address *address* **secondary**

Syntax Description

secondary	Sets the secondary VRRP IP address.
address	VRRP IPv4 address.

Command Default

None

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to set the secondary virtual IPv4 address for the virtual router:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# address 192.168.18.1 secondary
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 725	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 727	Configures the global virtual IPv6 address for a virtual router.

Command	Description
address linklocal, on page 729	Sets the virtual link-local IPv6 address for a virtual router.
accept-mode, on page 721	Disables the installation of routes for the VRRP virtual addresses.
message state disable, on page 740	Disables the task of logging the VRRP state change events.

bfd minimum-interval (VRRP)

To configure the BFD minimum interval to be used for all VRRP BFD sessions on a given interface, use the **bfd minimum-interval** command in the interface configuration mode. To remove the configured minimum-interval period and set the minimum-interval period to the default period, use the **no** form of this command.

bfd minimum-interval *interval*
no bfd minimum-interval *interval*

Syntax Description

interval	Specify the minimum-interval in milliseconds. Range is 15 to 30000.

Command Default

Default minimum interval is 15 ms.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

Minimum interval determines the frequency of sending BFD packets to BFD peers. It is the time between successive BFD packets sent for the session. Minimum interval is defined in milliseconds. The configured minimum interval applies to all BFD sessions on the interface.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a minimum interval of 100 milliseconds:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-vrrp-if)# bfd minimum-interval 100
```

bfd multiplier (VRRP)

To set the BFD multiplier value, use the **bfd multiplier** command in the interface configuration mode. To remove the configured multiplier value and set the multiplier to the default value, use the **no** form of this command.

bfd multiplier *multiplier*
no bfd multiplier *multiplier*

Syntax Description

multiplier	Specifies the BFD multiplier value. Range is 2 to 50.

Command Default

Default value is 3.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

The multiplier value specifies the number of consecutive BFD packets that, if not received as expected, cause a BFD session to go down. The BFD multiplier applies to all configured BFD sessions on the interface.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a BFD multiplier with multiplier value of 10:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-vrrp-if)# bfd multiplier 10
```

clear vrrp statistics

To reset the Virtual Router Redundancy Protocol (VRRP) statistics (to zero or default value), use the **clear vrrp statistics** command in EXEC mode.

clear vrrp statistics {**ipv4** | **ipv6**}[**interface** *type* *interface-path-id* [*vrid*]]

Syntax Description

ipv4	(Optional) Resets the IPv4 information.
ipv6	(Optional) Resets the IPv6 information.
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 as follows:
	• Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
	  • *rack*: Chassis number of the rack.
	  • *slot*: Physical slot number of the modular services card or line card.
	  • *module*: Module number. A physical layer interface module (PLIM) is always 0.
	  • *port*: Physical port number of the interface.
	Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface mgmtEth 0/RP1/CPU0/0.
	• Virtual interface instance. Number range varies depending on interface type.
	For more information about the syntax for the router, use the question mark (?) online help function.

vrid	(Optional) Virtual router identifier, which is the number identifying the virtual router for which status is displayed.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.0	This command was introduced.

Usage Guidelines

If no **interface** is specified, the statistics for all virtual routers on all interfaces are cleared.

If no value for *vrid* is specified, the statistics for all virtual routers on the specified interface are cleared.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to clear vrrp statistics:

```
RP/0/RP0/CPU0:router# clear vrrp statistics
```

Related Commands

Command	Description
show vrrp	Displays a brief or detailed status of one or all Virtual Router Redundancy Protocol (VRRP) virtual routers.

delay (VRRP)

To configure the activation delay for a VRRP router, use the **delay** command in HSRP interface configuration mode. To delete the activation delay, use the **no** form of this command.

delay minimum *value* **reload** *value*
no delay

Syntax Description

minimum *value*	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload *value*	Sets the reload delay in seconds for first interface up event. Range is 0 to 10000.

Command Default

minimum *value:* 1

reload *value:* 5

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 4.1.0	This command was introduced. This command replaced the **vrrp delay** command.

Usage Guidelines

The **vrrp delay** command delays the start of the VRRP finite state machine (FSM) on an interface up event to ensure that the interface is ready to pass traffic. This ensures that there are no mistaken state changes due to loss of hello packets. The minimum delay is applied on all interface up events and the reload delay is applied on the first interface up event.

The values of zero must be explicitly configured to turn this feature off.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a minimum delay of 10 seconds with a reload delay of 100 seconds:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface mgmtEth 0/RP0/CPU0/0
RP/0/RP0/CPU0:router(config-vrrp-if)# delay minimum 10 reload 100
```

Related Commands

Command	Description
show vrrp	Displays a brief or detailed status of one or all Virtual Router Redundancy Protocol (VRRP) virtual routers.

interface (VRRP)

To enable VRRP interface configuration mode, use the **interface (VRRP)** command in VRRP configuration mode. To terminate VRRP interface configuration mode, use the **no** form of this command.

interface *type interface-path-id*
no interface *type interface-path-id*

Syntax Description

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

Command Default

VRRP is disabled.

Command Modes

VRRP configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **interface (VRRP)** command is used in VRRP configuration mode.

Usage Guidelines

Use the **interface (VRRP)** command to enter VRRP interface configuration mode.

You must configure all VRRP configuration commands in VRRP interface configuration mode.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure VRRP and a virtual router 1 on 10-Gigabit Ethernet interface 0/3/0/0:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-vrrp-if)# vrrp 1 ipv4 192.168.18.1
```

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
```

```
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
router vrrp, on page 741	Configures a VRRP redundancy process.

message state disable

To disable the task of logging the Virtual Router Redundancy Protocol (VRRP) state change events via syslog, use the **message state disable** command in the VRRP virtual router submode. To re-enable the task of logging the VRRP state change events , use the **no** form of this command.

message state disable

no message state disable

Syntax Description

This command has no keywords or arguments.

Command Default

By default, the task of logging the VRRP state change events is enabled.

Command Modes

VRRP global

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to disable the logging of VRRP state change events:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router vrrp
RP/0/RP0/CPU0:router(config-vrrp)#message state disable
RP/0/RP0/CPU0:router(config-vrrp)#
```

Related Commands

Command	Description
address (VRRP), on page 725	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 727	Configures the global virtual IPv6 address for a virtual router.
accept-mode, on page 721	Disables the installation of routes for the VRRP virtual addresses.
address secondary, on page 731	Sets the secondary virtual IPv4 address for a virtual router.
address linklocal, on page 729	Sets the virtual link-local IPv6 address for a virtual router.

router vrrp

To configure Virtual Router Redundancy Protocol (VRRP), use the **router vrrp** command in Global Configuration mode. To remove the VRRP configuration, use the **no** form of this command.

router vrrp
no router vrrp

Command Default

This command has no keywords or arguments.

VRRP is disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 3.6.0	The **router vrrp** command is used in global configuration mode.

Usage Guidelines

Use the **router vrrp** command to enter VRRP configuration mode.

You must configure all VRRP configuration commands in VRRP interface configuration mode.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a VRRP with virtual router 1 on an interface:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
interface (VRRP), on page 738	Enables VRRP interface configuration mode.

session name(vrrp)

To configure a VRRP session name, use the **session name** command in the VRRP virtual router submode. To deconfigure a VRRP session name, use the **no** form of this command.

name *name*
no name *name*

Syntax Description

name	MGO session name

Command Default

None

Command Modes

VRRP virtual router configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read

Example

This example shows how to configure a VRRP session name.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-ipv4)# vrrp 1
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# name s1
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

show vrrp

To display a brief or detailed status of one or all Virtual Router Redundancy Protocol (VRRP) virtual routers, use the **show vrrp** command in EXEC mode.

show vrrp [{**ipv4** | **ipv6**}] [**interface** *type interface-path-id* [*vrid*]] [{**brief** | **detail** | **statistics** [**all**]}]

Syntax Description

ipv4	(Optional) Displays the IPv4 information.
ipv6	(Optional) Displays the IPv6 information.
interface	(Optional) Displays the status of the virtual router interface.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
vrid	(Optional) Virtual router identifier, which is the number identifying the virtual router for which status is displayed. The virtual router identifier is configured with the **vrrp ipv4** command. Range is 1 to 255.
brief	(Optional) Provides a summary view of the virtual router information.
detail	(Optional) Displays detailed running state information.
statistics	(Optional) Displays total statistics.

all	(Optional) Displays statistics for each virtual router.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

If no interface is specified, all virtual routers on all interfaces are displayed. If no vrid is specified, all vrids on the given interface are displayed.

Task ID

Task ID	Operations
vrrp	read

Examples

The following sample output is from the **show vrrp** command:

```
Router# show vrrp

                     A indicates IP address owner
                     | P indicates configured to preempt
                     | |
Interface   vrID Prio A P State    Master addr     VRouter addr
Te0/3/0/0      1  100   P Init     unknown         192.168.18.10
Te0/3/0/2      7  100   P Init     unknown         192.168.19.1
```

This table describes the significant fields shown in the display.

Table 101: show vrrp Command Field Descriptions

Field	Description
Interface	Interface of the virtual router.
vrID	ID of the virtual router.
Prio	Priority of the virtual router.
A	Indicates whether the VRRP router is the IP address owner.
P	Indicates whether the VRRP router is configured to preempt (default).
State	State of the virtual router.
Master addr	IP address of the IP address owner router.

Field	Description
VRouter addr	Virtual router IP address of the virtual router.

The following sample output is from the **show vrrp** command with the **detail** keyword:

```
Router# show vrrp detail
GigabitEthernet0/4/0/0 - IPv4 vrID 1
  State is Master, IP address owner
    2 state changes, last state change 00:00:59
  Virtual IP address is 192.168.10.1
    Secondary Virtual IP address is 192.168.10.2
    Secondary Virtual IP address is 192.168.11.1
  Virtual MAC address is 0000.5E00.0101
  Master router is local
  Advertise time 1 secs
    Master Down Timer 3.609 (3 x 1 + 156/256)
  Minimum delay 1 sec, reload delay 5 sec
  Current priority 100
    Configured priority 110, may preempt
      Minimum delay 0 secs
  Authentication enabled, string "myauth"
  BFD enabled: state Up, interval 15ms multiplier 3 remote IP 192.168.10.3
    Tracked items:
                                      Priority
    Interface                State     Decrement
    POS0/5/0/1                Down            10

GigabitEthernet0/4/0/0 - IPv4 vrID 2
  State is Backup
    3 state changes, last state change 00:01:58
  Virtual IP address is 192.168.10.2
  Virtual MAC address is 0000.5E00.0102
  Master router is IP address owner (192.168.11.1), priority 200
  Advertise time 1.500 secs (forced)
    Master Down Timer 5.109 (3 x 1 + 156/256)
  Minimum delay 1 sec, reload delay 5 sec
  Current priority 100
    Configured priority 100, may preempt
      Minimum delay 20 secs


Bundle-Ether1 - IPv4 vrID 5
  State is Init
    0 state changes, last state change never
  Virtual IP address is unknown
  Virtual MAC address is 0000.5E00.0100
  Master router is unknown
  Advertise time 1 secs
    Master Down Timer 3.500 (3 x 1 + 128/256)
  Minimum delay 1 sec, reload delay 5 sec
  Current priority 128
    Configured priority 128

GigabitEthernet0/4/0/0 - IPv6 vrID 1
  State is Master
    2 state changes, last state change 00:10:01
  Virtual Linklocal address is FE80::100
    Global Virtual IPv6 address is 4000::100
    Global Virtual IPv6 address is 5000::100
```

```
Virtual MAC address is 0000.5E00.0201
Master router is local
Advertise time 1 secs
  Master Down Timer 3.609 (3 x 1 + 156/256)
Minimum delay 1 sec, reload delay 5 sec
Current priority 100
  Configured priority 100, may preempt
    Minimum delay 0 secs
```

This table describes the significant fields shown in the displays.

Table 102: show vrrp detail Command Field Descriptions

Field	Description
TenGigE 0/3/0/0 - vrID 1	Interface type and number, and VRRP group number.
State is	Role this interface plays within VRRP (IP address owner router or backup router).
Virtual IP address is	Virtual IP address for this virtual router.
Virtual MAC address is	Virtual MAC address for this virtual router.
Master router is	Location of the IP address owner router.
Advertise time	Interval (in seconds) at which the router sends VRRP advertisements when it is the IP address owner virtual router. This value is configured with the **vrrp timer** command.
Master Down Timer	Time the backup router waits for the IP address owner router advertisements before assuming the role of IP address owner router.
Minimum delay	Time that the state machine start-up is delayed when an interface comes up, giving the network time to settle. The minimum delay is the delay that is applied after any subsequent interface up event (if the interface flaps) and the reload delay is the delay applied after the first interface up event.
Current priority	Priority of the virtual router.
Configured priority	Priority configured on the virtual router.
may preempt	Indication of whether preemption is enabled or disabled.
minimum delay	Delay time before preemption (default) occurs.
Tracked items	Section indicating the items being tracked by the VRRP router.
Interface	Interface being tracked.
State	State of the tracked interface.
Priority Decrement	Priority to decrement from the VRRP priority when the interface is down.

The following sample output is from the **show vrrp** command with the **interface** and **detail** keywords for 10-Gigabit Ethernet interface 0/3/0/0:

```
Router# show vrrp interface gigabitEthernet 0/3/0/0

                     A indicates IP address owner
                     | P indicates configured to preempt
                     | |
Interface   vrID Prio A P State    Master addr     VRouter addr
Te0/3/0/0      1  100   P Init     unknown         192.168.10.20
Te0/3/0/2      7  100   P Init     unknown         192.168.20.0
```

This table describes the significant fields shown in the displays.

Table 103: show vrrp interface Command Field Descriptions

Field	Description
Interface	Interface of the virtual router.
vrID	ID of the virtual router.
Prio	Priority of the virtual router.
A	Indicates whether the VRRP router is the IP address owner.
P	Indicates whether the VRRP router is configured to preempt (default).
State	State of the virtual router.
Master addr	IP address of the IP address owner router.
VRouter addr	Virtual router IP address of the virtual router.

vrrp slave follow

To instruct the subordinate group to inherit its state from a specified group, use the **vrrp slave follow** command in VRRP slave submode.

follow *mgo-session-name*

Syntax Description

mgo-session-name	Name of the MGO session from which the subordinate group will inherit the state.

Command Default

None

Command Modes

VRRP slave submode configuration

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to instruct the subordinate group to inherit its state from a specified group.

```
Router# configure
Router(config)# router vrrp
Router(config-vrrp)# interface tenGigE 0/4/0/4
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 2 slave
Router(config-vrrp-slave)# follow m1
```

Note Before configuring a subordinate group to inherit its state from a specified group, the group must be configured with the **session name** command on another vrrp group.

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

subordinate primary virtual IPv4 address(vrrp)

To configure the primary virtual IPv4 address for the subordinate group, use the **subordinate primary virtual IPv4 address** command in the VRRP slave submode.

address *ip-address*

Syntax Description

ip-address	IP address of the Hot Standby router interface.

Command Default

None

Command Modes

VRRP slave submode configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to configure the primary virtual IPv4 address for the subordinate group.

```
Router# configure
Router(config)# router vrrp
Router(config-vrrp)# interface tenGigE 0/4/0/4
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 2 slave
Router(config-vrrp-slave)# address 192.168.10.4
```

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

subordinate secondary virtual IPv4 address(vrrp)

To configure the secondary virtual IPv4 address for the subordinate group, use the **subordinate secondary virtual IPv4 address** command in the VRRP slave submode.

address *ip-address* **secondary**

Syntax Description

ip-address	IP address of the Hot Standby router interface.
secondary	Sets the secondary hot standby IP address.

Command Default

None

Command Modes

VRRP slave submode configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

Before configuring secondary virtual IPv4 address, the primary virtual IPv4 address for the subordinate group must be configured.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to configure the secondary virtual IPv4 address for the subordinate group.

```
Router# configure
Router(config)# router vrrp
Router(config-vrrp)# interface tenGigE 0/4/0/4
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 2 slave
Router(config-vrrp-slave)# address 192.168.10.4 secondary
```

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

snmp-server traps vrrp events

To enable the Simple Network Management Protocol (SNMP) server notifications (traps) available for VRRP, use the **snmp-server traps vrrp events command** in Global Configuration mode. To disable all available VRRP SNMP notifications, use the **no** form of this command.

snmp-server traps vrrp events
no snmp-server traps vrrp events

Syntax Description

events	Specifies all VRRP SNMP server traps.

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
snmp	read, write

Examples

The following example shows how to enable snmpserver notifications for VRRP:

```
RP/0/RP0/CPU0:routerrouter(config)# snmp-server traps vrrp events
```

track object(vrrp)

To enable tracking of a named object with the specified decrement, use the **track object** command in VRRP virtual router submode. To remove the tracking, use the **no** form of this command.

track object *name*[*priority-decrement*]
no track object *name*[*priority-decrement*]

Syntax Description

object *name*	Object tracking. Name of the object to be tracked.
priority-decrement	(Optional) Amount by which the VRRP priority for the router is decremented when the interface goes down (or comes back up). Range is 1 to 255.

Command Default

The default priority-decrement is 10.

Command Modes

VRRP virtual router configuration

Command History

Release	Modification
Release 4.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

This example shows how to configure object tracking under the VRRP virtual router submode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-ipv4)# vrrp 1
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# track object t1 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode, on page 721	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

vrrp

To enable Virtual Router Redundancy Protocol (VRRP) virtual router mode, use the **vrrp** command in address-family mode. To terminate VRRP virtual router mode, use the **no** form of this command.

vrrp *vrid* **version** *version-no*
novrrp *vrid* **version** *version-no*

Syntax Description

vrid	(Optional) Virtual router identifier, which is the number identifying the virtual router for which status is displayed. The virtual router identifier is configured with the vrrp ipv4 command. Range is 1 to 255.
version *version-no*	The VRRP version number. Range is 2-3.

Note The **version** keyword is available only for the ipv4 address family. By default, version is set to 3 for IPv6 address families.

Command Default

None.

Command Modes

address-family

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
vrrp	read, write

Example

The following example shows how to enable VRRP virtual router mode:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
interface (VRRP), on page 738	Enables VRRP interface configuration mode.

vrrp assume-ownership disable

The VRRP router assumes ownership of the virtual IP Address in the IP address owner router's state by default. To disable this feature, use the **vrrp assume- assume ownership disable**command in VRRP interface configuration mode. To restore the default setting (assumed ownership), use the **no** form of this command.

vrrp *vrid* **assume-ownership disable**
no vrrp *vrid* **assume- ownership disable**

Syntax Description

vrid	Virtual router identifier, which is the number identifying the virtual router for which virtual IP address ownership is being configured. The virtual router identifier is configured with the **vrrp ipv4** command. Range is 1 to 255.
disable	(Optional) Does not accept IP packets sent to the Virtual IP address.

Command Default

The IP address owner router assumes ownership by default and accepts IP packets sent to the Virtual IP address.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the accept-mode, on page 721 command.

Usage Guidelines

By default, a router that is not the IP address owner, but is the IP address owner router for another IP address, accepts and responds to pings and accepts a Telnet to that router. Accepting packets sent to the other IP address is a useful tool during verification of network configuration. The **vrrp assume-ownership disable** command specifies that the router should not assume ownership of the virtual IP address if it is the IP address owner router regardless of whether it is the IP address owner, which means that it will not accept packets sent to that IP address during verification of network configuration.This command is ignored (irrelevant) when the router is the IP address owner (section 6.4.3 of RFC 2338, Virtual Router Redundancy Protocol).

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how the configuration disables the **vrrp assume-ownership** command on 10-Gigabit Ethernet interface 0/3/0/0:

```
Router(config)# router vrrp
Router(config-vrrp)# interface TenGigE 0/3/0/0
```

```
Router(config-vrrp-if)# vrrp 1 ipv4 10.0.0.101 secondary
Router(config-vrrp-if)# vrrp 1 assume-ownership disable
```

Related Commands

Command	Description
vrrp ipv4, on page 763	Enables VRRP on an interface and specifies the IP address of the virtual router.

vrrp bfd fast-detect

To enable bidirectional forwarding detection (BFD) fast detection on a VRRP interface, use the **vrrp bfd fast-detect** command in the interface configuration mode. This creates a BFD session between the Virtual Router Redundancy Protocol (VRRP) router and its peer, and if the session goes down while the VRRP is in the backup state, a VRRP failover is initiated. To disable BFD fast-detection, use the **no** form of this command.

vrrp *vrid* **bfd fast-detect peer** {**ipv4** | **ipv6**} *address*
no vrrp *vrid* **bfd fast-detect peer** {**ipv4** | **ipv6**} *address*

Syntax Description

vrid	Virtual Router Identifier.
peer	VRRP peer for BFD monitoring.
ipv4 *address*	IPv4 address of the BFD peer interface.
ipv6 *address*	IPv6 address of the BFD peer interface.

Command Default

BFD is disabled.

Command Modes

VRRP interface configuration

VRRP virtual router

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.1.0	The IPv6 keyword was introduced.

Usage Guidelines

BFD is supported only on systems with exactly two redundant VRRP routers.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to enable **bfd fast-detect** for an IPv4 address:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-vrrp-if)# vrrp 1 bfd fast-detect peer ipv4 10.1.1.1
```

Examples

The following example shows how to enable **bfd fast-detect** for an IPv6 address:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv6
RP/0/RP0/CPU0:router(config-vrrp-address-family)#vrrp 3 version 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)#bfd fast-detect peer ipv6
fe80::211:bcff:fea5:28bb
```

Related Commands

Command	Description
vrrp bfd minimum-interval, on page 759	Configures the BFD minimum interval value for a given interface.
vrrp bfd multiplier, on page 760	Configures the BFD multiplier value for a given interface.

vrrp bfd minimum-interval

To configure the BFD minimum interval to be used for all VRRP BFD sessions on a given interface, use the **vrrp bfd minimum-interval** command in the interface configuration mode. To remove the configured minimum-interval period and set the minimum-interval period to the default period, use the **no** form of this command.

vrrp bfd minimum-interval *interval*
no vrrp bfd minimum-interval *interval*

Syntax Description

interval	Specify the minimum-interval in milliseconds. Range is 15 to 30000.

Command Default

Default minimum interval is 15 ms.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the bfd minimum-interval (VRRP), on page 733 command.

Usage Guidelines

Minimum interval determines the frequency of sending BFD packets to BFD peers. It is the time between successive BFD packets sent for the session. Minimum interval is defined in milliseconds. The configured minimum interval applies to all BFD sessions on the interface.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a minimum interval of 100 milliseconds:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-vrrp-if)# vrrp bfd minimum-interval 100
```

vrrp bfd multiplier

To set the BFD multiplier value, use the **vrrp bfd multiplier** command in the interface configuration mode. To remove the configured multiplier value and set the multiplier to the default value, use the **no** form of this command.

vrrp bfd multiplier *multiplier*
no vrrp bfd multiplier *multiplier*

Syntax Description

multiplier	Specifies the BFD multiplier value. Range is 2 to 50.

Command Default

Default value is 3.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the bfd multiplier (VRRP), on page 734 command.

Usage Guidelines

The multiplier value specifies the number of consecutive BFD packets that, if not received as expected, cause a BFD session to go down. The BFD multiplier applies to all configured BFD sessions on the interface.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a BFD multiplier with multiplier value of 10:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/RP0/CPU0:router(config-vrrp-if)# vrrp bfd multiplier 10
```

vrrp delay

To configure the activation delay for a VRRP router, use the **vrrp delay** command in HSRP interface configuration mode. To delete the activation delay, use the **no** form of this command.

vrrp delay minimum *value* **reload** *value*
no vrrp delay

Syntax Description

minimum *value*	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload *value*	Sets the reload delay in seconds for first interface up event. Range is 0 to 10000.

Command Default

minimum *value:* 1

reload *value:* 5

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.6.0	The range was changed from 1 to 10000 to 0 to 10000.
Release 4.1.0	This command has been deprecated. This command was replaced with the delay (VRRP), on page 737 command.

Usage Guidelines

The **vrrp delay** command delays the start of the VRRP finite state machine (FSM) on an interface up event to ensure that the interface is ready to pass traffic. This ensures that there are no mistaken state changes due to loss of hello packets. The minimum delay is applied on all interface up events and the reload delay is applied on the first interface up event.

The values of zero must be explicitly configured to turn this feature off.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure a minimum delay of 10 seconds with a reload delay of 100 seconds:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface mgmtEth 0/RP0/CPU0/0
RP/0/RP0/CPU0:router(config-vrrp-if)# vrrp delay minimum 10 reload 100
```

Related Commands

Command	Description
show vrrp, on page 743	Displays a brief or detailed status of one or all Virtual Router Redundancy Protocol (VRRP) virtual routers.

vrrp ipv4

To enable the Virtual Router Redundancy Protocol (VRRP) on an interface and specify the IP address of the virtual router, use the **vrrp ipv4** command in VRRP interface configuration mode. To disable VRRP on the interface and remove the IP address of the virtual router, use the **no** form of this command.

vrrp *vrid* **ipv4** *ip-address* [**secondary**]
no vrrp *vrid* **ipv4** *ip-address* [**secondary**]

Syntax Description

vrid	Virtual router identifier, which is the number identifying the virtual router. Range is 1 to 255.
ip-address	IP address of the virtual router.
secondary	(Optional) Indicates additional IP addresses supported by this group.

Command Default

VRRP is not configured on the interface.

Command Modes

VRRP interface configuration

Command History

Release	Modification
Release 2.0	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the address (VRRP), on page 725 command.

Usage Guidelines

Configure the **vrrp ipv4** command once without the **secondary** keyword to indicate the virtual router IP address. If you want to indicate additional IP addresses supported by the virtual router, include the **secondary** keyword.

Removing the VRRP configuration from the IP address owner and leaving the IP address of the interface active is considered a misconfiguration because this results in duplicate IP addresses on the LAN.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to enable VRRP on 10-Gigabit Ethernet interface 0/3/0/0. The VRRP virtual router identifier is 1, and 10.0.1. 20 is the IP address of the virtual router.

Related Commands

Command	Description
show vrrp, on page 743	Displays a brief or detailed status of one or all Virtual Router Redundancy Protocol (VRRP) virtual routers.

vrrp preempt

VRRP preempt is enabled by default. This means, a VRRP router with higher priority than the current IP address owner router will take over as new IP address owner router. To disable this feature, use the **preempt disable** command. To delay preemption, so that the higher priority router waits for a period of time before taking over, use the **preempt delay** command. To restore the default behavior (preempt enabled with no delay), use the **no** form of the command.

preempt {**delay** *seconds* | **disable**}
no preempt {**delay** *seconds* | **disable**}

Syntax Description

delay *seconds*	(Optional) Specifies the number of seconds the router delays before issuing an advertisement claiming virtual IP address ownership to be the IP address owner router. Range is 1 to 3600 seconds (1 hour).
disable	(Optional) Disables preemption .

Command Default

VRRP preempt is enabled.

seconds : 0 (no delay)

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Using the **delay** keyword, you can configure a delay, which causes the VRRP router to wait the specified number of seconds before issuing an advertisement claiming virtual IP address ownership to be the IP address owner router.

Note The router that is the virtual IP address owner preempts, regardless of the setting of this command.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure the router to preempt the current IP address owner router when its priority of 200 is higher than that of the current IP address owner router. If the router preempts the current IP address owner router, it waits 15 seconds before issuing an advertisement claiming that it is the new IP address owner router.

```
Router(config)# router vrrp
```

```
Router(config-vrrp)# interface TenGigE 0/3/0/0
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 1 version 3
Router(config-vrrp-virtual-router)# preempt delay 15
Router(config-vrrp-virtual-router)# priority 200
```

Related Commands

Command	Description
vrrp priority, on page 766	Sets the priority of the virtual router.

vrrp priority

To set the priority of the virtual router, use the **priority** command in VRRP virtual router submode. To remove the priority of the virtual router, use the **no** form of this command.

priority *priority*
nopriority *priority*

Syntax Description

priority	Priority of the virtual router. Range is 1 to 254.

Command Default

priority : 100

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

Use this command to control which router becomes the IP address owner router. This command is ignored while the router is the virtual IP address owner.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure the router with a priority of 254:

```
Router(config)# router vrrp
Router(config-vrrp)# interface TenGigE 0/3/0/0
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 1 version 3
Router(config-vrrp-virtual router)# priority 254
```

Related Commands

Command	Description
vrrp preempt, on page 764	Configures the router to take over as IP address owner router for a VRRP virtual router if it has a higher priority than the current IP address owner router.

vrrp text-authentication

To configure the simple text authentication used for Virtual Router Redundancy Protocol (VRRP) packets received from other routers running VRRP, use the **text-authentication** command in VRRP virtual router submode. To disable VRRP authentication, use the **no** form of this command.

text-authentication *string*
no text-authentication [*string*]

Syntax Description

string	Authentication string (up to eight alphanumeric characters) used to validate incoming VRRP packets.

Command Default

No authentication of VRRP messages occurs.

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

When a VRRP packet arrives from another router in the VRRP group, its authentication string is compared to the string configured on the local system. If the strings match, the message is accepted. If they do not match, the packet is discarded.

All routers within the group must be configured with the same authentication string.

Note Plain text authentication is not meant to be used for security. It simply provides a way to prevent a misconfigured router from participating in VRRP.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure an authentication string of x30dn78k:

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 2
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# text-authentication x30dn78k
```

Note Text authentication is only valid for VRRP version 2 routers.

vrrp timer

To configure the interval between successive advertisements by the IP address owner router in a Virtual Router Redundancy Protocol (VRRP) virtual router, use the **timer** command in VRRP virtual router submode. To restore the default value, use the **no** form of this command.

timer [**msec**] *interval* [**force**]
no timer [**msec**] *interval* [**force**]

Syntax Description

msec	(Optional) Changes the unit of the advertisement time from seconds to milliseconds. Without this keyword, the advertisement interval is in seconds. Range is 20 to 3000 milliseconds.
interval	Time interval between successive advertisements by the IP address owner router. The unit of the interval is in seconds, unless the **msec** keyword is specified. Range is 1 to 255 seconds.
force	(Optional) Forces the configured value to be used. This keyword is required if milliseconds is specified.

Command Default

interval:1 second

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
vrrp	read, write

Examples

The following example shows how to configure the IP address owner router to send advertisements every 4 seconds:

```
Router(config)# router vrrp
Router(config-vrrp)# interface TenGigE 0/3/0/0
Router(config-vrrp-if)# address-family ipv4
Router(config-vrrp-address-family)# vrrp 1 version 3
Router(config-vrrp-virtual-router)# timer 4
```

vrrp track interface

To configure the Virtual Router Redundancy Protocol (VRRP) to track an interface, use the **track interface** command in VRRP virtual router submode. To disable the tracking, use the **no** form of this command.

track interface *type interface-path-id* [*priority-decrement*]
no track interface *type interface-path-id* [*priority-decrement*]

Syntax Description

vrid	Virtual router identifier, which is the number identifying the virtual router to which tracking applies.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
priority-decrement	(Optional) Amount by which the priority for the router is decremented (or incremented) when the tracked interface goes down (or comes back up). Decrements can be set to any value between 1 and 254. Default value is 10.

Command Default

The default decrement value is 10. Range is 1 to 254.

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **vrrp track interface** command ties the priority of the router to the availability of its interfaces. It is useful for tracking interfaces that are not configured for VRRP. Only IP interfaces are tracked. A tracked interface is up if IP on that interface is up. Otherwise, the tracked interface is down.

You can configure VRRP to track an interface that can alter the priority level of a virtual router for a VRRP virtual router. When the IP protocol state of an interface goes down or the interface has been removed from the router, the priority of the backup virtual router is decremented by the value specified in the *priority-decrement* argument. When the IP protocol state on the interface returns to the up state, the priority is restored.

Task ID

Task ID	Operations
vrrp	read, write

Examples

In the following example, 10-Gigabit Ethernet interface 0/3/0/0 tracks interface 0/3/0/3 and 0/3/0/2. If one or both of these two interfaces go down, the priority of the router decreases by 10 (default priority decrement) for each interface. The default priority decrement is changed using the *priority-decrement* argument. In this example, because the default priority of the virtual router is 100, the priority becomes 90 when one of the tracked interfaces goes down and the priority becomes 80 when both go down. See the **priority** command for details on setting the priority of the virtual router.

```
RP/0/RP0/CPU0:router(config)# router vrrp
RP/0/RP0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/RP0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# track interface TenGigE 0/3/0/3
RP/0/RP0/CPU0:router(config-vrrp-virtual-router)# track interface TenGigE 0/3/0/2
```

Related Commands

Command	Description
vrrp priority, on page 766	Sets the priority of the virtual router.

Video Monitoring Commands

This chapter describes the commands used to configure and monitor video monitoring service on Cisco CRS Routers.

For detailed information about video monitoring concepts, configuration tasks, and examples, refer to the *Implementing Video Monitoring Service on Cisco ASR 9000 Series Routers* chapter in *IP Addresses and Services Configuration Guide for Cisco CRS Routers*.

- clear performance traffic statistics, on page 772
- show performance traffic alerts, on page 773
- show policy-map type performance-traffic, on page 775

clear performance traffic statistics

To clear all policy-map statistics, use the **clear performance traffic statistics** command in EXEC mode. This command clears all interval statistics, except the aggregate statistics.

clear performance traffic statistics interface *type instance* **input**

Syntax Description

interface	Specifies the particular interface whose statistics must be cleared.
input	Specifies the direction of traffic.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
netflow	read, write

Examples

This example shows how to execute the **clear performance traffic statistics** command from the command line interface:

```
RP/0/RP0/CPU0:router clear performance traffic statistics interface gigabitEthernet 0/0/0/8
input
```

show performance traffic alerts

To display the active TCA (Threshold Crossing Alerts), use the **show performance traffic alerts** command in EXEC mode. TCAs are set when the configured parameters are met. TCAs are cleared when the configured parameters are not true. An event is generated for both set and clear.

show performance traffic alerts interface *type instance* **input**

Syntax Description

interface	Specifies a particular interface for which the performance traffic alerts are set.

Command Default

None.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
netflow	read

Examples

This is a sample output from the **show performance traffic alerts** command:

```
RP/0/RP0/CPU0:router# show performance traffic alerts interface ten0/6/0/0 input

Interface: TenGigE0/6/0/0 Direction: input

 GROUP Alerts
  Class: class1
    Num Flows: 1
    Num Grouped Alerts: 1
    Highest Alert Severity: Warning
    React ID         Severity                  Metric
    --------         --------                  ------
          4          Critical               Flow Count

 FLOW Alerts
  Flow ID: 3496  Class: class1
    Num Alerts: 3
    Highest Alert Severity: Warning
    React ID         Severity                  Metric
    --------         --------                  ------
          1          Critical
          2          Critical                  Media Rate Variation
```

```
RP/0/RP0/CPU0:router# show performance traffic alerts  interface TenGigE0/2/0/7 input

Interface: TenGigE0/2/0/7 Direction: input

 GROUP Alerts
  Class: C1
    Num Flows: 2000
    Num Grouped Alerts: 4
    Highest Alert Severity: Alert
    React ID         Severity                  Metric
    --------         --------                  ------
       1001          Alert                     Flow Count
       1002          Alert                     Flow Count
       1003          Alert                     Flow Count
       1004          Alert                     Flow Count

 FLOW Alerts
  Flow ID: 21566  Class: C1
    Num Alerts: 5
    Highest Alert Severity: Critical
    React ID         Severity                  Metric
    --------         --------                  ------
      10001          Critical                  MDI Error Seconds
      11001          Critical                  MDI Transport Availability
      13001          Critical                  MDI MDC
      14001          Critical                  MDI MLR
      15001          Critical                  MPEG Loss Pkts
:
```

This table describes the significant fields shown in the display.

Table 104: show performance traffic alerts Field Descriptions

Field	Description
Group/Flow Alerts	This alert is grouped or applies to a single flow.
Class	Name of the class-map used in the policy.
Flow ID	Unique identifier for the flow. **Note** The flow id number will be different for unbind and rebind.
Num Flows	Number of flows that have been set in this group alert.
Num Grouped Alerts	Total number of grouped alerts.
Num Alerts	Total number of alerts set by flow.
Severity	Indicates the configured severity.
Highest Alert Severity	Indicates the highest severity of an alert set.
React ID	Specifies the configured react ID.
Metric	Indicates the type of alert set.

show policy-map type performance-traffic

To display the policy-map statistics of video monitoring features, use the **show policy-map type performance-traffic** command in EXEC mode. This command helps you to monitor the Quality of Experience (QoE) of the service provider's video flows.

show policy-map type performance-traffic interface *type instance* [{**aggregate** | **brief** | **cumulative** | **detail** | **input** | **last** | **match**}]

Syntax Description

interface *type instance*	Specifies particular interface to display.
aggregate	(Optional) Displays total number of flows and last time changed.
brief	(Optional) Displays only key metrics.
cumulative	(Optional) Displays cumulative statistics over the life time of the flow.
detail	(Optional) Displays detailed metrics.
input	(Optional) Displays input traffic policy.
last	(Optional) Displays last *n* intervals.
match	(Optional) Specifies match criteria to filter.

Command Default

The command default is 1.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
qos	read

Examples

These are various sample outputs from the **show policy-map type performance-traffic** command:

```
 RP/0/RP0/CPU0:router# show policy-map type performance-traffic interface tenGigE 0/6/0/0
brief

 ------------------------------------------------------------------------------
 Interface:      TenGigE0/6/0/0     Direction: input
 Service-Policy: policy1
 ------------------------------------------------------------------------
  Total Num Flows: 2
```

```
  FlowID   Flow Key                                                MRV(%)
  ------   --------                                                ------
    3528  6.1.1.2:4000          -> 225.0.0.1:4000        UDP      0.000
    3496  6.1.1.2:4000          -> 225.0.0.101:4000      UDP     50.000

 ------------------------------------------------------------------------
  Class Name                                Num-Flows
  ----------                                ---------
  class1                                    2
 ------------------------------------------------------------------------------
 RP/0/RSP0/CPU0:router#show policy-map type performance-traffic interface tenGigE0/6/0/0
aggregate brief


 Interface: TenGigE0/6/0/0 Direction: input

  Number of flows      : 2
  Last flow add/delete : Tue Nov  3 13:46:56 2009

 RP/0/RSP0/CPU0:ios#show policy-map type performance-traffic interface ten0/6/0/0 detail
 Tue Nov  3 13:52:02.046 EST
 ------------------------------------------------------------------------------
 Interface:      TenGigE0/6/0/0     Direction: input
 Service-Policy: policy1
 ------------------------------------------------------------------------------
  Total Num Flows: 2

  Flow: 3528     Key: 6.1.1.2:4000 -> 225.0.0.1:4000 UDP
  Class: class1                                    Total Intvls: 1
   Intvl#  1,  Updated at: Tue Nov  3 13:51:56 2009,  Duration: 10 s
     Metric type:       IP-CBR
     MRV:               0.000    %         DF:             3.338 ms
     Avg Packet Rate:   300.00  pps        Total Packets:  3000
     Avg Bit Rate:      3158    kbps       Total Bytes:    3948000
     Avg Packet Len:    1316.00  B
     IPv4 TTL:          63

  Flow: 3496     Key: 6.1.1.2:4000 -> 225.0.0.101:4000 UDP
  Class: class1                                    Total Intvls: 1
   Intvl#  1,  Updated at: Tue Nov  3 13:51:54 2009,  Duration: 10 s
     Metric type:       IP-CBR
     MRV:               50.000   %         DF:             2502.220 ms
     Avg Packet Rate:   450.00  pps        Total Packets:  4500
     Avg Bit Rate:      4737    kbps       Total Bytes:    5922000
     Avg Packet Len:    1316.00  B
     IPv4 TTL:          63

 ------------------------------------------------------------------------------
  Class Name                                 Num-Flows
  ----------                                 ---------
  class1                                     2
 ------------------------------------------------------------------------------

 RP/0/RSP0/CPU0:router#show policy-map type performance-traffic interface tenGigE0/6/0/0
last 5

 ------------------------------------------------------------------------------
 Interface:      TenGigE0/6/0/0     Direction: input
 Service-Policy: policy1
 ------------------------------------------------------------------------------
  Total Num Flows: 2

  Flow: 3528     Key: 6.1.1.2:4000 -> 225.0.0.1:4000 UDP
  Class: class1                           Total Intvls: 5
```

```
   Intvl#   Updated at                   Durn    MRV(%)
      1     Tue Nov  3 13:53:26 2009      10      0.000
      2     Tue Nov  3 13:53:16 2009      10      0.000
      3     Tue Nov  3 13:53:06 2009      10      0.000
      4     Tue Nov  3 13:52:56 2009      10      0.000
      5     Tue Nov  3 13:52:46 2009      10      0.000


  Flow: 3496     Key: 6.1.1.2:4000 -> 225.0.0.101:4000 UDP
  Class: class1                          Total Intvls: 5
   Intvl#   Updated at                   Durn    MRV(%)
      1     Tue Nov  3 13:53:24 2009      10     50.000
      2     Tue Nov  3 13:53:14 2009      10     50.000
      3     Tue Nov  3 13:53:04 2009      10     50.000
      4     Tue Nov  3 13:52:54 2009      10     50.000
      5     Tue Nov  3 13:52:44 2009      10     50.000


 ------------------------------------------------------------------------------
   Class Name                                Num-Flows
   ----------                                ---------
   class1                                    2
 ------------------------------------------------------------------------------

  RP/0/RSP0/CPU0:router#show policy-map type performance-traffic interface tenGigE0/6/0/0
match flow-id 3496

  ------------------------------------------------------------------------
  Interface:      TenGigE0/6/0/0     Direction: input
  Service-Policy: policy1
  ------------------------------------------------------------------------
   Total Num Flows: 2
   FlowID   Flow Key                                                MRV(%)
   ------   --------                                                ------
     3496  6.1.1.2:4000          -> 225.0.0.101:4000      UDP    50.000
  ------------------------------------------------------------------------
    Num Flows Displayed: 1
  ------------------------------------------------------------------------



RP/0/RP0/CPU0:router# show policy-map type performance-traffic interface  TenGigE0/2/0/11
detail

Interface:      TenGigE0/2/0/11     Direction: input
Service-Policy: MDI-RTP-5
--------------------------------------------------------------------------------------
 Total Num Flows: 2048

Flow:14396 Key:60.0.0.2:12345->50.0.0.2:11223 RTP        SSRC:305419896
 Class: C1                                          Total Intvls: 1
  Intvl#  1,  Updated at: Wed Jan 16 18:07:24 2013,  Duration: 10 s
    Metric Type            :   RTP
    Payload Type           :   33
    Clock Frequency        :   90000 Hz
    Lost Packets           :   0
    Loss Fraction          :   0.000    %
    Intvl Jitter           :   45.455 ms
    Max Intvl Jitter       :   45.466 ms
    Avg Packet Rate        :   22.00     pps
    Total Packets          :   220
    Avg Bit Rate           :   43      kbps
    Total Bytes            :   54120
```

```
    Avg Packet Len         :   246.00 B
    Seq Discon Count       :   0
    Avg Seq Discon Len     :   0
    Num Cycles             :   0
    Num Resync             :   0
    Num Out of Order       :   0
    Num Duplicates         :   0
    Num Seq Jumps          :   0
    Error Seconds          :   0.00     s
    Transport Availability :   100.00   %


Flow:14438 Key:60.0.0.2:12346->50.0.0.2:11223 RTP        SSRC:305419896
 Class: C1                                        Total Intvls: 1
  Intvl#  1,  Updated at: Wed Jan 16 18:07:24 2013,  Duration: 10 s
    Metric Type            :   RTP
    Payload Type           :   33
    Clock Frequency        :   90000 Hz
    Lost Packets           :   0
    Loss Fraction          :   0.000    %
    Intvl Jitter           :   45.455 ms
    Max Intvl Jitter       :   45.466 ms
    Avg Packet Rate        :   22.00     pps
    Total Packets          :   220
    Avg Bit Rate           :   43      kbps
    Total Bytes            :   54120
    Avg Packet Len         :   246.00 B
    Seq Discon Count       :   0
    Avg Seq Discon Len     :   0
    Num Cycles             :   0
    Num Resync             :   0
    Num Out of Order       :   0
    Num Duplicates         :   0
    Num Seq Jumps          :   0
    Error Seconds          :   0.00     s
    Transport Availability :   100.00   %
:
Flow:22857 Key:60.0.0.2:12346->50.0.0.2:11223 MDI-MPEG PID:1234
 SSRC: 305419896   Class: C1                          Total Intvls: 1
  Intvl#  1,  Updated at: Wed Jan 16 18:07:29 2013,  Duration: 10 s
    Metric type            :   MDI-MPEG
    MPEG MLR               :   0.000     pps
    MPEG Lost Packets      :   0
    MPEG MDC               :   0
    IP Jitter              :   0.000 ms
    Max IP Jitter          :   0.000 ms
    Avg MPEG Packet Rate   :   22.00     pps
    Total MPEG Packets     :   220
    Avg MPEG Bit Rate      :   33      kbps
    Error Seconds          :   0.00     s
    Transport Availability :   100.00   %


Flow:22856 Key:60.0.0.2:12347->50.0.0.2:11223 MDI-MPEG PID:1234
 SSRC: 305419896   Class: C1                          Total Intvls: 1
  Intvl#  1,  Updated at: Wed Jan 16 18:07:29 2013,  Duration: 10 s
    Metric type            :   MDI-MPEG
    MPEG MLR               :   0.000     pps
    MPEG Lost Packets      :   0
    MPEG MDC               :   0
    IP Jitter              :   0.000 ms
    Max IP Jitter          :   0.000 ms
    Avg MPEG Packet Rate   :   22.00     pps
    Total MPEG Packets     :   220
```

```
    Avg MPEG Bit Rate      :   33      kbps
    Error Seconds          :   0.00     s
    Transport Availability :   100.00   %
        :

------------------------------------------------------------------------------
  Class Name                                Num-Flows
  ----------                                ---------
  C1                                        2048
------------------------------------------------------------------------------
```

This table describes the significant fields shown in the display.

Table 105: show policy-map type performance traffic command Descriptions

Field	Description
Mrv	Media Rate Variation.
Total intvls	Number of user-defined intervals.
Service-policy	Name of the service-policy for this flow.
Duration	Length of an interval.
Num-flows	Total number of flows matching this policy.
Flow	Unique flow-ID

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