



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

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Preface

The *Cisco IOS XR IP Addresses and Services Command Reference for the Cisco XR 12000 Series Router* contains commands related to IP addresses and services features.

The preface contains the following sections:

- [Changes to This Document](#), page xvii
- [Obtaining Documentation and Submitting a Service Request](#), page xviii

Changes to This Document

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

Table 1: Changes to This Document

Revision	Date	Change Summary
OL-28453-05	May 2014	Republished with these commands: <ul style="list-style-type: none">• address linklocal(HSRP)• address linklocal(HSRP)
OL-28453-04	April 2014	Republished with local proxy arp command.
OL-28453-03	September 2013	Republished with documentation updates for Cisco IOS XR Release 4.3.2 features.
OL-28453-02	May 2013	Republished with documentation updates for Cisco IOS XR Release 4.3.1 features.
OL-28453-01	December 2012	Initial release of this document.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see [What's New in Cisco Product Documentation](#).

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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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [clear access-list ipv4, page 3](#)
- [clear access-list ipv6, page 6](#)
- [copy access-list ipv4, page 9](#)
- [copy access-list ipv6, page 11](#)
- [deny \(IPv4\), page 13](#)
- [deny \(IPv6\), page 25](#)
- [ipv4 access-group, page 30](#)
- [ipv4 access-list, page 33](#)
- [ipv4 access-list log-update rate, page 35](#)
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- [ipv6 access-group, page 38](#)
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- [ipv6 access-list maximum ace threshold, page 45](#)
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- [show access-lists ipv6 standby](#) , page 88

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 <i>node-id</i>	(Optional) Clears hardware resource counters from the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
sequence <i>number</i>	(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 3.2	This command was introduced.

Release	Modification
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/0/0/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/0/0/CPU0:router# clear access-list ipv4 marketing
```

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

```
RP/0/0/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 30	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list , on page 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
resequence access-list ipv4 , on page 71	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

<i>access-list-name</i>	Name of a particular IPv6 access list. The name cannot contain a space or quotation marks, but can include numbers.
<i>sequence-number</i>	(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.
<i>instance</i>	Physical interface or virtual interface.
<i>interface-path-id</i>	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 <i>node-id</i>	(Optional) Clears counters for an access list enabled on a card interface. The <i>node-id</i> 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 3.2	This command was introduced.

Release	Modification
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/0/0/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/0/0/CPU0:router# clear access-list ipv6 marketing
RP/0/0/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/0/0/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/0/0/CPU0:router# clear access-list ipv6 acl_hw_1 hardware egress location 0/2/cp0
RP/0/0/CPU0:router# show access-lists ipv6 acl_hw_1 hardware egress location 0/2/cp0
```

clear access-list ipv6

```
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 40	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 <i>source-acl</i> argument is copied.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

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/0/0/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/0/0/CPU0:router# copy access-list ipv4 list-1 list-2
RP/0/0/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/0/0/CPU0:router# copy access-list ipv4 list-1 list-3

list-3 exists in access-list

RP/0/0/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 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
show access-lists ipv4 , on page 76	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 <i>source-acl</i> argument is copied.

Command Default No default behavior or value

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.2	This command was introduced . 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/0/0/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/0/0/CPU0:router# copy access-list ipv6 list-1 list-2

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

list-3 exists in access-list

RP/0/0/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 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
show access-lists ipv6 , on page 83	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]denyprotocol source source-wildcard destination destination-wildcard
[precedenceprecedence] [dscpdscp] [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 {port| protocol-port}] destination
destination-wildcard [operator {port| protocol-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: <ul style="list-style-type: none"> • Use a 32-bit quantity in four-part dotted-decimal format. • Use the any keyword as an abbreviation for a <i>source</i> and <i>source-wildcard</i> of 0.0.0.0 255.255.255.255. • Use the host source combination as an abbreviation for a <i>source</i> and <i>source-wildcard</i> of <i>source</i> 0.0.0.0.

source-wildcard	<p>Wildcard bits to be applied to the source. There are three alternative ways to specify the source wildcard:</p> <ul style="list-style-type: none"> • 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 <i>source</i> and <i>source-wildcard</i> of 0.0.0.0 255.255.255.255. • Use the host source combination as an abbreviation for a <i>source</i> and <i>source-wildcard</i> of <i>source</i> 0.0.0.0.
protocol	<p>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.</p>
destination	<p>Number of the network or host to which the packet is being sent. There are three alternative ways to specify the destination:</p> <ul style="list-style-type: none"> • Use a 32-bit quantity in four-part dotted-decimal format. • Use the any keyword as an abbreviation for the <i>destination</i> and <i>destination-wildcard</i> of 0.0.0.0 255.255.255.255. • Use the host destination combination as an abbreviation for a <i>destination</i> and <i>destination-wildcard</i> of <i>destination</i> 0.0.0.0.
destination-wildcard	<p>Wildcard bits to be applied to the destination. There are three alternative ways to specify the destination wildcard:</p> <ul style="list-style-type: none"> • 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 <i>destination</i> and <i>destination-wildcard</i> of 0.0.0.0 255.255.255.255. • Use the host destination combination as an abbreviation for a <i>destination</i> and <i>destination-wildcard</i> of <i>destination</i> 0.0.0.0.

precedence <i>precedence</i>	(Optional) Packets can be filtered by precedence level (as specified by a number from 0 to 7) or by the following names: <ul style="list-style-type: none">• 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 <i>dscp</i>	<p>(Optional) Differentiated services code point (DSCP) provides quality of service control. The values for <i>dscp</i> are as follows:</p> <ul style="list-style-type: none"> • 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	<p>(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.</p>
packet-length operator	<p>(Optional) Packet length operator used for filtering.</p>
packet-length value	<p>(Optional) Packet length used to match only packets in the range of the length.</p>

log	<p>(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.)</p> <p>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.</p>
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	<p>(Optional) TTL value used for filtering. Range is 1 to 255.</p> <p>If only <i>value1</i> is specified, the match is against this value.</p> <p>If both <i>value1</i> and <i>value2</i> are specified, the packet TTL is matched against the range of TTLs between <i>value1</i> and <i>value2</i>.</p>
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	<p>(Optional) IGMP message type (0 to 15) or message name for filtering IGMP packets, as follows:</p> <ul style="list-style-type: none"> • dvmrp • host-query • host-report • mtrace • mtrace-response • pim • precedence • trace • v2-leave • v2-report • v3-report

operator	<p>(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).</p> <p>If the operator is positioned after the <i>source</i> and <i>source-wildcard</i> values, it must match the source port.</p> <p>If the operator is positioned after the <i>destination</i> and <i>destination-wildcard</i> values, it must match the destination port.</p> <p>If the operator is positioned after the ttl keyword, it matches the TTL value.</p> <p>The range operator requires two port numbers. All other operators require one port number.</p>
protocol-port	<p>Name of a TCP or UDP port. TCP and UDP port names are listed in the “Usage Guidelines” section.</p> <p>TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.</p>
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 <i>flag-name</i> with + or - . Use the + <i>flag-name</i> argument to match packets with the TCP flag set. Use the - <i>flag-name</i> 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 3.2	This command was introduced.

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

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 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.

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

Related Commands

Command	Description
ipv4 access-group , on page 30	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list , on page 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an IPv4 access list
remark (IPv4) , on page 67	Inserts a helpful remark about an IPv4 access list entry.
resequence access-list ipv4 , on page 71	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 76	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 [operator {port | protocol-port}] [dscpvalue] [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 [icmp-type] [ icmp-code][dscp value] [ routing] [authen] [destopts] [
fragments] [ log] [log-input] [icmp-off]
```

Transmission Control Protocol (TCP)

```
[sequence-number] deny tcp [operator {port | protocol-port}] [operator {port | protocol | port}] [dscpvalue]
[routing] [authen] [destopts] [fragments] [established] {match-any | match-all | + | -} [flag-name] [log]
[log-input]
```

User Datagram Protocol (UDP)

```
[sequence-number] deny tcp [operator {port | protocol-port}] [operator {port | protocol | port}] [dscpvalue]
[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.

<i>operator</i> { <i>port</i> <i>protocol-port</i> }	<p>(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).</p> <p>If the operator is positioned after the <i>source-ipv6-prefix / prefix-length</i> argument, it must match the source port.</p> <p>If the operator is positioned after the <i>destination-ipv6-prefix / prefix-length</i> argument, it must match the destination port.</p> <p>The range operator requires two port numbers. All other operators require one port number.</p> <p>The <i>port</i> argument is the decimal number of a TCP or UDP port. Range is 0 to 65535. The <i>protocol-port</i> 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.</p>
<i>destination-ipv6-prefix / prefix-length</i>	<p>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.</p>
host <i>destination-ipv6-address</i>	<p>Destination IPv6 host address about which to set deny conditions. This <i>destination-ipv6-address</i> argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.</p>
dscp value	<p>(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.</p>
routing	<p>(Optional) Matches source-routed packets against the routing extension header within each IPv6 packet header.</p>
authen	<p>(Optional) Matches if the IPv6 authentication header is present.</p>
destopts	<p>(Optional) Matches if the IPv6 destination options header is present.</p>
fragments	<p>(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 <i>operator</i> [<i>port-number</i>] arguments are not specified.</p>
packet-length operator	<p>(Optional) Packet length operator used for filtering.</p>
packet-length value	<p>(Optional) Packet length used to match only packets in the range of the length.</p>

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 <i>value1</i> is specified, the match is against this value. If both <i>value1</i> and <i>value2</i> are specified, the packet TTL is matched against the range of TTLs between <i>value1</i> and <i>value2</i> .
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 <i>flag-name</i> with + or -. Use the + <i>flag-name</i> argument to match packets with the TCP flag set. Use the - <i>flag-name</i> 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 3.2	This command was introduced.
Release 3.3.0	The optional keywords match-any and match-all were added for the TCP protocol. The argument <i>flag-name</i> was added for the TCP protocol. The match-any and match-all keywords and the <i>flag-name</i> 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 <i>ttl value1</i> , <i>value2</i> and <i>operator</i> , 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/0/0/CPU0:router(config)# ipv6 access-list toCISCO
RP/0/0/CPU0:router(config-ipv6-acl)# deny tcp any any gt 5000
RP/0/0/CPU0:router(config-ipv6-acl)# deny ipv6 any lt 5000 any log
RP/0/0/CPU0:router(config-ipv6-acl)# permit icmp any any
RP/0/0/CPU0:router(config-ipv6-acl)# permit any any
RP/0/0/CPU0:router(config)# interface POS 0/2/0/2
RP/0/0/CPU0:router(config-if)# ipv6 access-group toCISCO out
```

Related Commands

Command	Description
ipv6 access-list , on page 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 62	Sets permit conditions for an IPv6 access list.
remark (IPv6) , on page 69	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 73	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 *access-list-name* {**ingress**|**egress**} [**hardware-count**] [**interface-statistics**]

no ipv4 access-group *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.
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 3.2	This command was supported .
Release 3.4.0	The argument <i>hw-count</i> was changed to <i>hardware-count</i> .
Release 3.5.0	The interface-statistics 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.

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

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 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an ACE of an IPv4 access list.
show access-lists ipv4 , on page 76	Displays the contents of all current IPv4 access lists.

Command	Description
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*

no ipv4 access-list *name*

Syntax Description

<i>name</i>	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 3.2	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

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

```
RP/0/0/CPU0:router(config)# ipv4 access-list Internetfilter
RP/0/0/CPU0:router(config-ipv4-acl)# 10 permit 192.168.34.0 0.0.0.255
RP/0/0/CPU0:router(config-ipv4-acl)# 20 permit 172.16.0.0 0.0.255.255
RP/0/0/CPU0:router(config-ipv4-acl)# 30 permit 10.0.0.0 0.255.255.255
```

```
RP/0/0/CPU0:router(config-ipv4-acl)# 39 remark Block BGP traffic from 172.16 net.  
RP/0/0/CPU0:router(config-ipv4-acl)# 40 deny tcp host 172.16.0.0 eq bgp host 192.168.202.203  
range 1300 1400
```

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 3.4.0	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/0/0/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 3.2	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/0/0/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 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an IPv4 access list
show access-lists ipv4 , on page 76	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**]

no ipv6 access-group *access-list-name* {**ingress**| **egress**} [**interface-statistics**]

Syntax Description

<i>access-list-name</i>	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 3.2	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.

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



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

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

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

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

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

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

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

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 interface configuration mode. To remove the access list, use the **no** form of this command.

ipv6 access-list *name*

no ipv6 access-list *name*

Syntax Description

<i>name</i>	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

Interface configuration

Command History

Release	Modification
Release 3.2	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.

See the “Examples” section for an example of a translated IPv6 access control list (ACL) configuration.



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 An IPv6 access list applied to an interface with the **ipv6 access-group** command filters traffic that is forwarded, not originated, by the router.



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

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

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



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 3.4.0	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/0/0/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 3.2	This command was supported.

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/0/0/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 3.2	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/0/0/CPU0:router(config)# ipv6 access-list maximum ace threshold 75000
```

Related Commands

Command	Description
show access-lists ipv6 , on page 83	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 3.2	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/0/0/CPU0:router(config)# ipv6 access-list maximum acl threshold 1500
```

Related Commands

Command	Description
show access-lists ipv6 , on page 83	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]
```

```
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 {port| protocol-port}] destination
destination-wildcard [operator {port| protocol-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.
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)

	<ul style="list-style-type: none"> • 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	<p>(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.)</p> <p>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.</p>
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 <i>track-name</i>	Specifies the TRACK Name for this nexthop.

ttl	(Optional) Turns on matching against time-to-life (TTL) value.
ttl value [value1 ... value2]	<p>(Optional) TTL value used for filtering. Range is 1 to 255.</p> <p>If only <i>value</i> is specified, the match is against this value.</p> <p>If both <i>value1</i> and <i>value2</i> are specified, the packet TTL is matched against the range of TTLs between <i>value1</i> and <i>value2</i> .</p>
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	<p>(Optional) IGMP message type (0 to 15) or message name for filtering IGMP packets, as follows:</p> <ul style="list-style-type: none"> • dvmrp • host-query • host-report • mtrace • mtrace-response • pim • precedence • trace • v2-leave • v2-report • v3-report

operator	<p>(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).</p> <p>If the operator is positioned after the <i>source</i> and <i>source-wildcard</i> values, it must match the source port.</p> <p>If the operator is positioned after the <i>destination</i> and <i>destination-wildcard</i> values, it must match the destination port.</p> <p>If the operator is positioned after the ttl keyword, it matches the TTL value.</p> <p>The range operator requires two port numbers. All other operators require one port number.</p>
port	<p>Decimal number a TCP or UDP port. Range is 0 to 65535.</p> <p>TCP ports can be used only when filtering TCP. UDP ports can be used only when filtering UDP.</p>
protocol-port	<p>Name of a TCP or UDP port. TCP and UDP port names are listed in the “Usage Guidelines” section.</p> <p>TCP port names can be used only when filtering TCP. UDP port names can be used only when filtering UDP.</p>
established	<p>(Optional) For the TCP protocol only: Indicates an established connection.</p>
match-any	<p>(Optional) For the TCP protocol only: Filters on any combination of TCP flags.</p>
match-all	<p>(Optional) For the TCP protocol only: Filters on all TCP flags.</p>

+ -	(Required) For the TCP protocol match-any , match-all : Prefix <i>flag-name</i> with + or - . Use the + <i>flag-name</i> argument to match packets with the TCP flag set. Use the - <i>flag-name</i> 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 <i>flag-name</i> was added for the TCP protocol. The match-any and match-all keywords and the <i>flag-name</i> 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 <i>ttl value1</i> , <i>value2</i> , and <i>operator</i> , 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.

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 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.

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.

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.

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

Related Commands

Command	Description
deny (IPv4) , on page 13	Sets the conditions for an IPv4 access list.
ipv4 access-group , on page 30	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list , on page 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
remark (IPv4) , on page 67	Inserts a helpful remark about an IPv4 access list entry.
resequence access-list ipv4 , on page 71	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 76	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.

no *sequence-number*

Internet Control Message Protocol (ICMP)

[sequence-number] **permit icmp** [*icmp-type*] [*icmp-code*][**dscp value**] [routing] [**authen**] [**destopts**] [**fragments**] [**log**] [**log-input**] [**icmp-off**]

Transmission Control Protocol (TCP)

[sequence-number] **permit tcp**[*operator*{*port* | *protocol-port*}] [*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**[*operator*{*port* | *protocol-port*}] [*operator*{*port* | *protocol* | *port*}] [**dscp value**] [**routing**] [**authen**] [**destopts**] [**fragments**] [**established**][*flag-name*] [**log**] [**log-input**]

Syntax Description

<i>sequence-number</i>	(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.
<i>protocol</i>	Name or number of an Internet protocol. It can be one of the keywords ahp , esp , icmp , ipv6 , pcp , setp , tcp , or udp , or an integer in the range from 0 to 255 representing an IPv6 protocol number.
<i>source-ipv6-prefix / prefix-length</i>	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.
<i>any</i>	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.
<i>nexthop1, nexthop2, nexthop3</i>	(Optional) Forwards the specified next hop for this entry.

host <i>source-ipv6-address</i>	Source IPv6 host address about which to set permit conditions. This <i>source-ipv6-address</i> argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>operator {port protocol-port}</i>	(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 <i>source-ipv6-prefix / prefix-length</i> argument, it must match the source port. If the operator is positioned after the <i>destination-ipv6-prefix / prefix-length</i> argument, it must match the destination port. The range operator requires two port numbers. All other operators require one port number. The <i>port</i> argument is the decimal number of a TCP or UDP port. A port number is a number from 0 to 65535. The <i>protocol-port</i> 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.
<i>destination-ipv6-prefix / prefix-length</i>	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 <i>destination-ipv6-address</i>	Specifies the destination IPv6 host address about which to set permit conditions. This <i>destination-ipv6-address</i> 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 <i>operator [port-number]</i> 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 <i>value1</i> is specified, the match is against this value. If both <i>value1</i> and <i>value2</i> are specified, the packet TTL is matched against the range of TTLs between <i>value1</i> and <i>value2</i> .
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 <i>flag-name</i> with + or -. Use the + <i>flag-name</i> argument to match packets with the TCP flag set. Use the - <i>flag-name</i> 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 3.3.0	The optional keywords match-any and match-all were added for the TCP protocol. The argument <i>flag-name</i> was added for the TCP protocol. The match-any and match-all keywords and the <i>flag-name</i> 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 <i>ttl value1</i> , <i>value2</i> , and <i>operator</i> , 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.

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

```
RP/0/0/CPU0:router(config)# ipv6 access-list v6-abf-acl
RP/0/0/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/0/0/CPU0:router(config-ipv6-acl)# 20 permit ipv4 any any
RP/0/0/CPU0:router(config)# interface 0/0/2/0
RP/0/0/CPU0:router(config-if)# ipv6 access-group v6-abf-acl ingress
```

Related Commands

Command	Description
deny (IPv6) , on page 25	Sets deny conditions for an IPv6 access list.
ipv6 access-list , on page 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
remark (IPv6) , on page 69	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 73	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 3.2	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/0/0/CPU0:router(config)# ipv4 access-list telnetting
RP/0/0/CPU0:router(config-ipv4-acl)# 10 remark Do not allow user1 to telnet out
RP/0/0/CPU0:router(config-ipv4-acl)# 20 deny tcp host 172.16.2.88 255.255.0.0 any eq telnet
RP/0/0/CPU0:router(config-ipv4-acl)# 30 permit icmp any any
RP/0/0/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 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an IPv4 access list
resequence access-list ipv4 , on page 71	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 76	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# ipv6 access-list Internetfilter
RP/0/0/CPU0:router(config-ipv6-acl)# 10 permit ipv6 3333:1:2:3::/64 any
RP/0/0/CPU0:router(config-ipv6-acl)# 20 permit ipv6 4444:1:2:3::/64 any
RP/0/0/CPU0:router(config-ipv6-acl)# 30 permit ipv6 5555:1:2:3::/64 any
RP/0/0/CPU0:router(config-ipv6-acl)# 39 remark Block BGP traffic from a given host
RP/0/0/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/0/0/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 25	Sets the deny conditions for an IPv6 access list.
ipv6 access-list , on page 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 62	Sets permit conditions for an IPv6 access list
resequence access-list ipv6 , on page 73	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 3.2	This command was introduced.

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/0/0/CPU0:router# resequence access-list ipv4 marketing 20 5
RP/0/0/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/0/0/CPU0:router(config)# ipv4 access-list marketing
RP/0/0/CPU0:router(config-ipv4-acl)# 3 remark Do not allow user1 to telnet out
RP/0/0/CPU0:router(config-ipv4-acl)# 4 deny tcp host 172.16.2.88 255.255.0.0 any eq telnet
RP/0/0/CPU0:router(config-ipv4-acl)# 29 remark Allow user2 to telnet out
RP/0/0/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 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an IPv4 access list
remark (IPv4) , on page 67	Inserts a helpful remark about an IPv4 access list . entry
show access-lists ipv4 , on page 76	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 3.2	This command was supported. The command name was changed from resequence ipv6 access-list to resequence access-list ipv6 . The <i>increment</i> 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/0/0/CPU0:router# resequence access-list ipv6 Internetfilter 20 5
RP/0/0/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/0/0/CPU0:router(config)# ipv6 access-list Internetfilter
RP/0/0/CPU0:router(config-ipv6-acl)# 3 remark Block BGP traffic from a given host
RP/0/0/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/0/0/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 25	Sets the deny conditions for an IPv6 access list.
ipv6 access-list , on page 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 62	Set permit conditions for an IPv6 access list.
remark (IPv6) , on page 69	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/0/0/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

<code>access-list-name</code>	(Optional) Name of a particular IPv4 access list. The name cannot contain spaces or quotation marks, but can include numbers.
<code>hardware</code>	(Optional) Identifies the access list as an access list for an interface.
<code>ingress</code>	(Optional) Specifies an inbound interface.
<code>egress</code>	(Optional) Specifies an outbound interface.
<code>interface</code>	(Optional) Displays interface statistics.
<code>type</code>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<code>interface-path-id</code>	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.
<code>sequence number</code>	(Optional) Sequence number of a particular IPv4 access list. Range is 1 to 2147483644.
<code>location node-id</code>	(Optional) Location of a particular IPv4 access list. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 <i>type interface-path-id</i>	(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 3.2	This command was introduced.
	Release 3.3.0	The optional keywords usage and pfilter were added.
	Release 3.5.0	The interface keyword was added.

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/0/0/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 `acl_hw_1` are displayed:

```
RP/0/0/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.

Field	Description
Sequence Number	Each ACE sequence number is programmed into hardware with all the fields that are corresponding to the values set in ACE.
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.
Hits	Hardware counter for that ACE.

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

```
RP/0/0/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/0/0/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.
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.

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 30	Filters incoming or outgoing IPv4 traffic on an interface.
ipv4 access-list , on page 33	Defines an IPv4 access list and enters IPv4 access list configuration mode.
permit (IPv4) , on page 49	Sets the permit conditions for an ACE of an IPv4 access list.
remark (IPv4) , on page 67	Inserts a helpful remark about an IPv4 access list entry.

Command	Description
resequence access-list ipv4 , on page 71	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/0/0/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

<i>access-list-name</i>	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.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location <i>node-id</i>	Location of a particular IPv4 access list. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 3.2	This command was introduced.
Release 3.3.0	The optional keywords usage and pfilter were added.
Release 3.5.0	The interface keyword was added.
Release 3.6.0	The all 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/0/0/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/0/0/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/0/0/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/0/0/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.

Field	Description
Total ACEs configured	Number of configured IPV6 ACEs.

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

```
RP/0/0/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.

Related Commands

Command	Description
copy access-list ipv6 , on page 11	Copies an existing IPv6 access list.
deny (IPv6) , on page 25	Sets the deny conditions for an IPv6 access list.

Command	Description
ipv6 access-list , on page 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.
permit (IPv6) , on page 62	Set permit conditions for an IPv6 access list.
remark (IPv6) , on page 69	Inserts a helpful remark about an IPv6 access list entry.
resequence access-list ipv6 , on page 73	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/0/0/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 40	Defines an IPv6 access list and enters IPv6 access list configuration mode.

show access-lists ipv6 standby



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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [arp](#), page 92
- [arp purge-delay](#), page 94
- [arp timeout](#), page 95
- [clear arp-cache](#), page 97
- [local-proxy-arp](#), page 99
- [proxy-arp](#), page 100
- [show arp](#), page 102
- [show arp traffic](#), page 105

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: <ul style="list-style-type: none"> • arpa • srp • srpa • srpb <p>For Ethernet interfaces, this is typically the arpa keyword.</p>
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 3.2	This command was supported.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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 97 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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# arp 192.168.7.19 0800.0900.1834 arpa
```

Related Commands

Command	Description
clear arp-cache , on page 97	Deletes all dynamic entries from the ARP cache.
show arp , on page 102	Displays the ARP cache.

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

<i>v value</i>	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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface MgmtEth 0/RP1/CPU0/0
RP/0/0/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 3.2	This command was supported.

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/0/0/CPU0:router# configure
```

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

Related Commands

Command	Description
clear arp-cache, on page 97	Deletes all dynamic entries from the ARP cache.
show arp, on page 102	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 <i>Interface and Hardware Component Command Reference</i> .

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 traffic statistics on the specified interface.
<i>t type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/RP1/CPU0/0.</p> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location <i>node-id</i>	Clears the ARP entries for a specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Release	Modification
Release 3.3.0	The location keyword and <i>node-id</i> argument were made mandatory.

Usage Guidelines

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

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:

```
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router# clear arp-cache location 0/1/CPU0
```

Related Commands

Command	Description
arp , on page 92	Adds a permanent entry in the ARP cache.
show arp , on page 102	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/0/0/CPU0:router#(config)# interface TenGigE 0/0/0/0
RP/0/0/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 3.2	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/0/0/CPU0:router#(config)# interface MgmtEth 0/RP1/CPU0/0  
RP/0/0/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

<i>vrf</i>	(Optional) Specifies VPN routing and forwarding (VRF) instance.
<i>vrf-name</i>	(Optional) VRF instance that identifies a VPN.
<i>ip-address</i>	(Optional) The ARP entries you want to display.
location <i>node-id</i>	(Optional) Displays the ARP entry for a specific location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
<i>hardware-address</i>	(Optional) The ARP entries that match the 48-bit MAC address are displayed.
<i>traffic</i>	(Optional) Displays ARP traffic statistics.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the modular services card or line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default

The active RP is the default location.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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 and then discarded.

For **show arp 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. For physical interfaces, specifying the **location 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:

```
RP/0/0/CPU0: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:

```
RRP/0/0/CPU0: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:

```
RP/0/0/CPU0: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:

```
RP/0/0/CPU0: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

Related Commands

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.
<i>interface- path-id</i>	(Optional) Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location <i>node-id</i>	(Optional) Displays the ARP entry for a specific location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 to indicate which location the cache entries for the bundle should be displayed. For physical interfaces, specifying the **location** *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 traffic** command:

```
RP/0/0/CPU0: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: 4
  Dynamic: 3, Interface: 1, Standby: 0
  Alias: 0,   Static: 0

  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:

```
RP/0/0/CPU0:router# show arp traffic location 0/2/CPU0

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

ARP cache:
  Total ARP entries in cache: 4
  Dynamic: 1, Interface: 1, Static: 1

  Alias: 1, Standby: 0

  IP Packet drop count for node 0/2/CPU0: 1
```

Related Commands

Command	Description
arp , on page 92	Adds a permanent entry to the ARP cache.

Command	Description
clear arp-cache, on page 97	Deletes all dynamic entries from the ARP cache.
show arp, on page 102	Displays ARP statistics.

show arp traffic



Cisco Express Forwarding Commands

This chapter describes the commands used to configure and monitor Cisco Express Forwarding (CEF) on . For detailed information about CEF concepts, configuration tasks, and examples, see *Cisco IOS XR IP Addresses and Services Configuration Guide*.

- [cef load-balancing algorithm adjust, page 112](#)
- [cef load-balancing fields, page 113](#)
- [clear adjacency statistics, page 119](#)
- [clear cef ipv4 drops, page 121](#)
- [clear cef ipv4 exceptions, page 123](#)
- [clear cef ipv4 interface bgp-policy-statistics, page 125](#)
- [clear cef ipv4 interface rpf-statistics, page 127](#)
- [clear cef ipv6 drops, page 129](#)
- [clear cef ipv6 exceptions, page 131](#)
- [clear cef ipv6 interface bgp-policy-statistics, page 133](#)
- [clear cef ipv6 interface rpf-statistics, page 134](#)
- [ipv4 bgp policy accounting, page 135](#)
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- [ipv4 verify unicast source reachable-via , page 140](#)
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- [rp mgmtethernet forwarding, page 147](#)
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- [show cef ipv4 drops, page 171](#)
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- [show cef ipv6 drops, page 204](#)
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- [show cef ipv6 non-recursive, page 219](#)
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- [show cef mpls adjacency, page 229](#)
- [show cef mpls adjacency hardware, page 232](#)
- [show cef mpls interface, page 234](#)
- [show cef mpls unresolved, page 236](#)

- [show cef vrf, page 238](#)

cef load-balancing algorithm adjust

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

cef load-balancing algorithm adjust *value*

Syntax Description

value This value is subject to a 'modulo' of 4 when applied on ASR 9000 Ethernet Line Card. For example, if the value configured is 10, the actual adjust value applied on ASR 9000 Ethernet Line Cards will be "10 mod 4" which is '2'. ASR 9000 Enhanced Ethernet Line Card will continue using the same adjust value as configured. Range is from 0 to 31.

Note: the hash shift command changes the hash result that is computed by the ingress linecard. This hash change affects both IPv4 and IPv6 for Equal Cost Multipath (ECMP) as well as the Bundle Member selection when used as either a routed (sub)-interface or as attachment circuit (AC) in L2VPN

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Release 4.2.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
config-services	read, write

Examples

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

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

cef load-balancing fields

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

cef load-balancing fields {L4}

no cef load-balancing fields {L4}

Syntax Description

L3

Specifies the Layer 3 load-balancing for the hash algorithm that is based on the following fields:

- Source IP address—Specifies the source IP address field in the IP packet header.
- Destination IP address—Specifies the destination IP address in the IP packet header.
- Router ID—Specifies the unique IP address that is assigned to the router.

Since L3 is configured as the default value, you do not need to use the **cef load-balancing fields** command unless you want to configure Layer 4.

L4	<p>Specifies the Layer 3 and Layer 4 load-balancing for the hash algorithm that is based on the following fields:</p> <ul style="list-style-type: none"> • Source IP address—Specifies the source IP address field in the IP packet header. • Destination IP address—Specifies the destination IP address in the IP packet header. • Source port—Specifies the value of the source port field in the TCP, UDP, or SCP packet header for Layer 4. • Destination port—Specifies the value of the destination port field in the TCP, UDP, or SCP packet header for Layer 4. • Router ID—Specifies the unique IP address that is assigned to the router. • Protocol—Specifies the value of the protocol field as specified in the IP packet header for Layer 4. • Slot Number:Rx UIDB Index—Specifies the slot number.
----	---

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

Command Modes Global Configuration mode

Command History

Release	Modification
Release 4.1.0	This command was introduced.

Usage Guidelines

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

You can undo only a Layer 4 configuration.

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

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

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

Task ID

Task ID	Operations
ipv4	read, write

Examples

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

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

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

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

Router ID is 1.1.1.101

IP CEF with switching (Table Version 0) for node0_0_CPU0

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

IP CEF with switching (Table Version 0) for node0_0_CPU1

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

IP CEF with switching (Table Version 0) for node0_1_CPU0

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

IP CEF with switching (Table Version 0) for node0_2_CPU0

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

```

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

IP CEF with switching (Table Version 0) for node0_2_CPU1

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

IP CEF with switching (Table Version 0) for node0_3_CPU0

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

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

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

```

Related Commands

Command	Description
show cef, on page 151	Displays information about packets forwarded by Cisco Express Forwarding (CEF).
show cef summary, on page 159	Displays summary information for the Cisco Express Forwarding (CEF) table.

Command	Description
show cef ipv4 exact-route, on page 173	Displays an IPv4 Cisco Express Forwarding (CEF) exact route.
show cef ipv4 summary, on page 190	Displays a summary of the IPv4 Cisco Express Forwarding (CEF) table
show cef ipv6 exact-route, on page 207	Displays the path an IPv6 flow comprising a source and destination address would take.
show cef ipv6 summary, on page 224	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 <i>ipv4-address</i>	(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: <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location <i>node-id</i>	(Optional) Clears detailed adjacency statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.2	This command was introduced.

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

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

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

Related Commands	Command	Description
	show adjacency, on page 148	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 <i>node-id</i>	Clears IPv4 packet drop counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

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

clear cef ipv4 drops

```

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

```

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

```

Node: 0/1/CPU0
Clearing CEF Drop Statistics

```

Related Commands

Command	Description
show cef ipv4 drops, on page 171	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 <i>node-id</i>	Clears IPv4 CEF exception packet counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--------------------------------	--

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

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

Command History	Release	Modification
	Release 3.2	This command was introduced.

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

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

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

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

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

clear cef ipv4 exceptions

```

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

```

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

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

Related Commands

Command	Description
show cef ipv4 exceptions, on page 176	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 bgp-policy-statistics** command in EXEC mode.

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

```
clear cef ipv4 interface bgp-policy-statistics
```

Related Commands

Command	Description
show cef ipv4 interface bgp-policy-statistics , on page 183	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/0/0/CPU0:router# clear cef ipv4 interface tenGigE 0/4/0/0 rpf-statistics
```

clear cef ipv6 drops

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

clear cef ipv6 drops location *node-id*

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

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

clear cef ipv6 drops

```

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

```

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

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

Related Commands

Command	Description
show cef ipv6 drops, on page 204	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 <i>node-id</i>	Clears IPv6 CEF exception packet counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--------------------------------	--

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

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

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

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

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

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

```
RP/0/0/CPU0:router# show cef ipv6 exceptions
CEF Exception Statistics
Node: 0/1/CPU0
  Slow encap packets :           0
  Unsupported packets :           0
  Redirect packets   :           0
```

clear cef ipv6 exceptions

```

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

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

Node: 0/1/CPU0
Clearing CEF Exception Statistics

```

Related Commands

Command	Description
show cef ipv6 exceptions, on page 209	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 bgp-policy-statistics** command in EXEC mode.

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

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

Task ID

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

Examples

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

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

clear cef ipv6 interface rpf-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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


ipv4 bgp policy accounting

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

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

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

Syntax Description

input	Enables BGP policy accounting policy on the ingress IPv4 unicast interface.
output	Enables BGP policy accounting policy on the egress IPv4 unicast interface.
{ destination-accounting [source-accounting] source-accounting [destination-accounting]}	<p>When you specify the ingress or egress interface, you must specify one of the following keywords:</p> <ul style="list-style-type: none"> • destination-accounting —Enables accounting policy on the basis of the destination address. • source-accounting —Enables accounting policy on the basis of the source address. <p>After specifying destination-accounting you can optionally specify source-accounting , or after specifying source-accounting , you can optionally specify destination-accounting .</p>

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

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

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

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

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

To specify the accounting policy, the proper route policy configuration must be in place, matching specific BGP attributes using the **set traffic-index** command. In BGP router configuration mode, use the **table-policy** command to modify the accounting buckets when the IP routing table is updated with routes learned from BGP. To display accounting policy information, use the **show cef ipv4 interface bgp-policy-statistics**, **show bgp 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/0/0/CPU0:router(config)# interface gigabitethernet pos 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv4 bgp policy accounting output source-accounting
```

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy. For more information, see <i>Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router</i>
show bgp policy	Displays information about BGP advertisements under a proposed policy. For more information, see <i>Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router</i>
show cef ipv4 interface bgp-policy-statistics, on page 183	Displays IPv4 CEF BGP policy statistics.
show route	Displays the current routes for BGP in the RIB. For more information, see <i>Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router</i>
table-policy	Applies a routing policy to routes being installed into the routing table. For more information, see <i>Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router</i>

ipv4 bgp policy propagation

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

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

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

Syntax Description

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

Command Default

The default is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ipv4	read, write
network	read, write

Examples

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

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

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

Related Commands

Command	Description
route-policy (BGP)	Defines a route policy.
show bgp policy	Displays information about BGP advertisements under a proposed policy.
show cef ipv4 interface bgp-policy-statistics, on page 183	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 <i>Cisco IOS XR Routing Command Reference for the Cisco XR 12000 Series Router</i>

ipv4 verify unicast source reachable-via

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

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

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

Syntax Description

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

Command Default

IPv4 unicast RPF is disabled.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

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

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

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

Task ID

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

Examples

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

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

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

```
RP/0/0/CPU0:routeries(config)# interface gigabitethernet 0/0/0/1
RP/0/0/CPU0:routeries(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]}	<p>When you specify the ingress or egress interface, you must specify one of the following keywords:</p> <ul style="list-style-type: none"> • destination-accounting —Enables accounting policy on the basis of the destination address. • source-accounting —Enables accounting policy on the basis of the source address. <p>After specifying destination-accounting, you can optionally specify source-accounting or, after specifying source-accounting, you can optionally specify destination-accounting.</p>

Command Default

There is no BGP policy accounting.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

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

```
RP/0/0/CPU0:router#ipv6 bgp policy accounting output destination-accounting
```

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

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

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

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to configure BGP policy accounting:

```
RP/0/
0

/
CPU0:router(config)# interface
pos
0/1/0/0
RP/0/
0

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

Related Commands

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

Command	Description
show cef ipv6 interface bgp-policy-statistics , on page 215	Displays IPv6 CEF BGP policy statistics.

ipv6 verify unicast source reachable-via

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

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

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

Syntax Description

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

Command Default

Loose IPv6 unicast RPF is disabled.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
network	read, write
ipv6	read, write

Examples

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

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

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

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

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

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

Related Commands

Command	Description
ipv4 verify unicast source reachable-via , on page 140	Enables IPv4 unicast RPF checking.

rp mgmtethernet forwarding

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

rp mgmtethernet forwarding

no rp mgmtethernet forwarding

Syntax Description This command has no keywords or arguments.

Command Default Switching is disabled.

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 2.0	This command was introduced .

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



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

Task ID	Task ID	Operations
	cef	read, write

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

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

show adjacency

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

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

Syntax Description

ipv4	(Optional) Displays only IPv4 adjacencies.
nexthop <i>ipv4-address</i>	(Optional) Displays adjacencies that are destined to the specified IPv4 nexthop.
mpls	(Optional) Displays only MPLS adjacencies.
ipv6	(Optional) Displays only IPv6 adjacencies.
interface-type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-instance	<p>Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
remote	(Optional) Displays only remote adjacencies. A remote adjacency is an internal adjacency used to forward packets between line cards.
detail	(Optional) Displays detailed adjacency information, including Layer 2 information.
location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.2	This command was introduced.

Usage Guidelines This command is used to verify that an adjacency exists for a connected device, that the adjacency is valid, and that the MAC header rewrite string is correct.

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

Task ID	Task ID	Operations
	cef	read

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

```
RP/0/0/CPU0:router# show adjacency location 0/0/CPU0
Interface Address Version Refcount Protocol
gigabitethernet0
/0/1/2(src mac only) 6 1 ipv4
gigabitethernet0
/0/1/2 point to point 7 100004
gigabitethernet0
/0/1/2 (interface) 3 1
```

This table describes the significant fields shown in the display.

Table 9: show adjacency Command Field Descriptions

Field	Description
Interface	Outgoing interface associated with the adjacency.
Address	Address can represent one of these addresses: <ul style="list-style-type: none"> • Next hop IPv4 or IPv6 address • Point-to-Point address <p>Information in parentheses indicates different types of adjacency.</p>

show adjacency

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

Related Commands

Command	Description
clear adjacency statistics, on page 119	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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
all	(Optional) Displays all locations.

Command Default

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

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

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

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

FCR  2 TLU Address 0x00210b19 TI 0 AS 6

VPN Label 1 0

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

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

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

show cef bgp-attribute

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

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

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

Command Default The default location is active RP.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	cef	read

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

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

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

```

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

```

This table describes the significant fields shown in the display.

Table 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 151	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** | **6vpe-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 <i>node-id</i>	(Optional) Displays external client dependency information for the specified node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

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

Data identical on all NPs:

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

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

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

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

IPV4:

```
-----
Client Name      : l2fib_mgr (comp-id: 0x7e6d) (0x9f6f70fc)
Protocol        : ipv4
Prefix          : 100.100.100.2 (0x9f13d22c)
Gateway array   : 9e8fb058 (0x201500/1)
Loadinfo        : 9fbd41a8 (0x10181101/1)
Number of notif : 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 151	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 <i>node-id</i>	(Optional) Displays recursive next-hop information for the specified node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

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

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

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.6.0	This command was introduced.

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

Task ID	Task ID	Operations
	cef	read

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

```
RP/0/0/CPU0:router# show cef summary location 0/1/CPU0
Router ID is 10.1.1.1
IP CEF with switching (Table Version 0) for node0_1_CPU0
Load balancing: L3
Tableid 0xe0000000, Vrfid 0x60000000, Vrid 0x20000000, Flags 0x301
Vrfname default, Refcount 318
170 routes, 0 reresolve, 0 unresolved (0 old, 0 new), 12240 bytes
183 load sharing elements, 57292 bytes, 184 references
19 shared load sharing elements, 7036 bytes
164 exclusive load sharing elements, 50256 bytes
0 CEF route update drops, 10 revisions of existing leaves
```

```

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

```

This table describes the significant fields shown in the display.

Table 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.
rerresolve	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 xs, peak xs)	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 113	Selects the hashing algorithm that is used for load balancing during forwarding.
show cef, on page 151	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	<p>Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
detail	(Optional) Displays full CEF entry information.
location <i>node-id</i>	(Optional) Displays the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

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

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router/CPU0:router# show cef ipv4
Prefix      Next Hop      Interface
10.0.0.0/0  10.25.0.1     MgmtEth0/0/CPU0/0
10.0.0.0/32  broadcast
10.25.0.0/16 attached      MgmtEth0/0/CPU0/0
10.25.12.10/32 receive       MgmtEth0/0/CPU0/0
10.25.13.12/32 10.25.13.12  MgmtEth0/0/CPU0/0
10.25.16.11/32 10.25.16.11  MgmtEth0/0/CPU0/0
10.25.22.10/32 10.25.22.10  MgmtEth0/0/CPU0/0
10.25.26.10/32 10.25.26.10  MgmtEth0/0/CPU0/0
10.25.41.2/32  10.25.41.2   MgmtEth0/0/CPU0/0
10.25.41.5/32  10.25.41.5   MgmtEth0/0/CPU0/0
10.25.42.5/32  10.25.42.5   MgmtEth0/0/CPU0/0
10.25.44.15/32 10.25.44.15  MgmtEth0/0/CPU0/0
10.25.55.2/32  10.25.55.2   MgmtEth0/0/CPU0/0
10.25.255.255/32 10.25.255.255 MgmtEth0/0/CPU0/0
10.0.0.0/4    0.0.0.0
10.0.0.1/32   0.0.0.0
10.255.255.255/32 broadcast
```

This table describes the significant fields shown in the display.

Table 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

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: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. 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. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location node-id	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
detail	(Optional) Displays the detailed adjacency information.
discard	(Optional) Filters out and displays only the discarded adjacency information.
glean	(Optional) Filters out and displays only the glean adjacency information.
null	(Optional) Filters out and displays only the adjacency information.
punt	(Optional) Filters out and displays only the punt adjacency information.

show cef ipv4 adjacency

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

Mg0/
0/CPU0/0Prefix: 10.24.0.32/32          remote    6
                Adjacency: PT:0x782a2b58
                Interface: Mg0/0/CPU0/0
                MAC: 28.4e.4f.4e.45.29
                Interface Type: 0x8, Base Flags: 0x0
```

This table describes the significant fields shown in the display.

Table 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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
protected	(Optional) Filters out and displays only the IP-Fast Reroute (FRR) protected adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Release	Modification
Release 3.6.0	<p>The following enhancements were added:</p> <ul style="list-style-type: none"> • The TE flag value was added to the sample output for both ingress and egress keywords to display the load information flag. • The protected keyword was added for IP-FRR.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

```
Display protocol is ipv4
Interface      Address                                     Type      Refcount
-----
tt0            Prefix: 0.0.0.0/32                          local     5
               no next-hop adj
               Interface: NULLIFHNDL
               Mac-length is 0
               tunnel interface
               Interface Type: 0x24, Base Flags: 0x2001
               Dependent adj type: remote
               Dependent adj intf: tt0

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

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

```

Dependent adj intf: Te0/2/0/1
TLU 3 Unavailable

```

This table describes the significant fields shown in the display.

Table 14: show cef ipv4 adjacency hardware Command Field Descriptions

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

show cef ipv4 drops

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef ipv4 drops
CEF Drop Statistics
Node: 0/0/CPU0
```

```

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 121	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-ports 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 <i>protocol name</i>	(Optional) Displays the specified protocol for the route.
source-port <i>source-port</i>	(Optional) Sets the UDP source port. The range is from 0 to 65535.
destination-port <i>destination-port</i>	(Optional) Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	(Optional) Sets the ingress interface.
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 <i>value</i>	(Optional) Displays the class for the policy-based tunnel selection. The range for the tunnel policy class value is from 1 to 7.
detail	(Optional) Displays full CEF entry information.
location <i>node-id</i>	(Optional) Displays the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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: <ul style="list-style-type: none"> • protocol • source-port • destination-port • ingress-interface <p>The policy-class keyword was added to tunnel policy.</p>

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef ipv4 exact-route 10.1.1.1 10.1.1.2 detail
0.0.0.0/0, version 432, proxy default, internal 0x2000201[1]
  Prefix Len 0, traffic index 0, precedence routine (0)
  via MgmtEth0/RP1/CPU0/0
```

This table describes the significant fields shown in the display.

Table 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 113	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 <i>node-id</i>	(Optional) Displays CEF exception packet counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

```

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

```

This table describes the significant fields shown in the display.

Table 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 123	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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

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	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the modular services card or line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
detail	(Optional) Displays detailed CEF information for all the interfaces on the node in which the command is issued.
location <i>node-id</i>	(Optional) Displays IPv4 CEF-related information for an interface. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef ipv4 interface MgmtEth 0/0/CPU0/0
MgmtEth0/0/CPU0/0 is up (if_handle 0x01000100)
  Forwarding is enabled
  ICMP redirects are never sent
  IP MTU 1500, TableId 0xe0000000
  Reference count 2
```

This table describes the significant fields shown in the display.

Table 18: show cef ipv4 interface Command Field Descriptions

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

⁴ ICMP = internet control message protocol

show cef ipv4 interface

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 <i>node-id</i>	(Optional) Displays IPv4 CEF-related information for an interface. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

This table describes the significant fields shown in the display.

Table 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

<i>vrf</i>	(Optional) Displays VPN routing and forwarding (VRF) instance information.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>detail</i>	(Optional) Displays detailed information about nonrecursive prefix entries in the IPv4 CEF table.
<i>hardware</i>	(Optional) Displays detailed information about hardware.
<i>egress</i>	(Optional) Displays egress packet switch exchange (PSE).
<i>ingress</i>	(Optional) Displays ingress packet switch exchange (PSE).
<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-instance</i>	<p>(Optional) Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<i>location node-id</i>	(Optional) Displays the IPv4 nonrecursive prefix entries in the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

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

Task ID	Operations
cef	read

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

```
RP/0/0/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.
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 <i>node-id</i>	(Optional) Displays the IPv4 resource entries in the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

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 <i>node-id</i>	(Optional) Displays a summary of the IPv4 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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



```

0
.0.0.0

IP CEF with switching (Table Version 0)

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

```

This table describes the significant fields shown in the display.

Table 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.

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

Related Commands

Command	Description
bundle-hash	Displays the path a bundle flow that comprises a source and destination address would take.
cef load-balancing fields, on page 113	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 <i>vrf-name</i> 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/0/0/CPU0:router# show cef ipv4 unresolved
Prefix          Next Hop      Interface
10.3.3.3        102.2.2.2    ?
```

This table describes the significant fields shown in the display.

Table 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 [vrfvrf-name]ipv6[interface-type interface-number | ipv6-prefix/ prefix-length] [detail]
[locationnode-id]
```

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 <i>vrf-name</i> 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/0/0/CPU0:router# show cef ipv6

::/0

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

This table describes the significant fields shown in the display.

Table 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.

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

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

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

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

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

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

66::4/128
  flags: receive, source_rib
  Loadinfo owner: <this route>
  fast adj: receive
  path 1:
    flags      : point-to-point
    next hop   : ::
    interface  : Loopback0
```

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

Table 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.

Field	Description
path 1:	<p>The following three items are displayed below path 1:</p> <ul style="list-style-type: none">• flags—Properties of the path.• next hop—Next-hop prefix if the packet is being forwarded.• interface—Next-hop interface if the packet is being forwarded.

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: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location node-id	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
detail	(Optional) Displays the detailed adjacency information.
discard	(Optional) Filters out and displays only the discarded adjacency information.
glean	(Optional) Filters out and displays only the glean adjacency information.
null	(Optional) Filters out and displays only the null adjacency information.
punt	(Optional) Filters out and displays only the punt adjacency information.

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

Command Default No default behavior or values

Command Modes EXEC mode

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	Operations
cef	read

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

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

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

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

```
Display protocol is ipv6
Interface      Address                                     Type      Refcount
-----
Te0/2/0/3     Ifhandle: 0x8000240                         remote    2
               Adjacency: PT:0xalbed9e4
               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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

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

show cef ipv6 drops

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

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

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



Note

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

IPv6 CEF Drop Statistics
Line status down      ingress :          0 egress : Not Applicable
Packet sanity fail    ingress :          0 egress :          0
PLU set to drop       ingress :          0 egress :          0
Unknown type,plu drop ingress :          0 egress :          0
Packet length err     ingress :          0 egress :          0
TCAM src-comp err    ingress :          0 egress :          0
```

This table describes the significant fields shown in the display.

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

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

Table 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 .
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 129	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 <i>protocol name</i>	(Optional) Displays the specified protocol for the route.
source-port <i>source-port</i>	(Optional) Sets the UDP source port. The range is from 0 to 65535.
destination-port <i>destination-port</i>	(Optional) Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	(Optional) Sets the ingress interface.
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 <i>value</i>	(Optional) Displays the class for the policy-based tunnel selection. The range for the tunnel policy class value is from 1 to 7.
detail	(Optional) Displays full CEF entry information.
location <i>node-id</i>	(Optional) Displays the IPv6 CEF table for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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: <ul style="list-style-type: none"> • protocol • source-port • destination-port • ingress-interface <p>The policy-class keyword was added to tunnel policy.</p>

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

Related Commands

Command	Description
cef load-balancing fields, on page 113	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 <i>node-id</i>	(Optional) Displays IPv6 CEF exception packet counters for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

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

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

```

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

```

This table describes the significant fields shown in the display.

Table 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 131	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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.3.0	This command was introduced.

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

Task ID	Task ID	Operations
	cef	read

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

```
RP/0/0/CPU0:router# show cef ipv6 hardware egress detail
::/0, version 0, proxy default, default route handler, drop adjacency, internal
```

```

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

```

```

Load distribution: 0 (refcount 0)

```

```

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

```

show cef ipv6 interface

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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


show cef ipv6 interface bgp-policy-statistics

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

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

show cef ipv6 interface rpf-statistics

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

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

Syntax Description

vrf	(Optional) Displays VPN routing and forwarding (VRF) instance information.
vrf-name	(Optional) Name of a VRF.
type	Interface type. For more information, use the question mark (?) online help function.
<i>in terface-path-id</i>	Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
location <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

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

show cef ipv6 non-recursive

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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/0/0/CPU0:router# show cef ipv6 non-recursive
::/0
::/128
  drop
::1/128
  loopback
66::4/128
  receive    Loopback0
2222::/64
  connected  0/4/0/0
2222::1/128
  receive    0/4/0/0
3333::/64
  connected  0/3/0/0
3333::2/128
  receive    0/3/0/0
7777::/64
  connected  0/0/0/0
7777::2/128
  receive    0/0/0/0
ff00::/8
  drop
ff02::1/128
  receive
ff02::2/128
  receive
ff02::5/128
  receive
ff02::6/128
  receive
ff02::1:ff00:0/104
  receive
```

This table describes the significant fields shown in the display.

Table 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.

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

show cef ipv6 resource

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

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

show cef ipv6 summary

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

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

Syntax Description

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

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

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

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef ipv6 summary
IP CEF with switching (Table Version 0)
```

```

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

```

This table describes the significant fields shown in the display.

Table 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 (<i>x</i> old, <i>x</i> new)	Number of routes not yet resolved.
load sharing elements	Total number of internal load-sharing data structures.
bytes	Total memory used by internal load sharing data structures.
references	Total reference count of all internal load sharing data structures.
CEF resets	Number of CEF table resets.
revisions of existing leaves	Number of updates to existing prefixes.
Exponential (currently <i>xs</i> , peak <i>xs</i>)	Currently not used.
prefixes modified in place	Prefixes modified in place.
Router ID	Router identification.
Adjacency Table has <i>x</i> adjacencies	Total number of adjacencies.
<i>x</i> incomplete adjacency	Total number of incomplete adjacencies.

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 <i>Cisco IOS XR Interface and Hardware Component Command Reference for the Cisco XR 12000 Series Router</i>

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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 <i>vrf-name</i> argument were added.

Usage Guidelines

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

Task ID	Task ID	Operations
	cef	read

Examples

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

```
RP/0/0/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

<i>interface-type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>(Optional) Either a physical interface instance or a virtual interface instance:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash mark between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
detail	(Optional) Displays full 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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.6.0	The following keywords were added: <ul style="list-style-type: none"> • 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

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

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

Related Commands

Command	Description
show cef mpls adjacency hardware, on page 232	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.

Command	Description
show cef mpls interface, on page 234	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 236	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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
null	(Optional) Displays the null adjacency information.
punt	(Optional) Displays the punt adjacency information.
remote	(Optional) Displays the remote adjacency information.

Command Default

No default behavior or values

Command Modes

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

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

Related Commands

Command	Description
show cef mpls adjacency, on page 229	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls interface, on page 234	Displays the Multiprotocol Label Switching (MPLS) Cisco Express Forwarding (CEF)-related information for an interface.
show cef mpls unresolved, on page 236	Displays the Multiprotocol Label Switching (MPLS) unresolved routes.

show cef mpls interface

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

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

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
in <i>terface-path-id</i>	Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1 /CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
detail	(Optional) Displays detailed CEF information for all the interfaces on the node in which the command is issued.
location <i>node-id</i>	(Optional) Displays IPv4 CEF-related information for an interface. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
cef	read

Examples

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

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

Related Commands

Command	Description
show cef mpls adjacency, on page 229	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 232	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls unresolved, on page 236	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 <i>node-id</i>	(Optional) Displays detailed CEF information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
cef	read

Examples

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

```
RP/0/0/CPU0:router# show cef mpls unresolved
Label/EOS          Next Hop          Interface
20001/0
20001/1
```

This table describes the significant fields shown in the display.

Table 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 229	Displays the Multiprotocol Label Switching (MPLS) adjacency table.
show cef mpls adjacency hardware, on page 232	Displays the Multiprotocol Label Switching (MPLS) adjacency hardware status and configuration information.
show cef mpls interface, on page 234	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

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

```
RP/0/0/CPU0:router# show cef vrf 0
Prefix          Next Hop          Interface
0.0.0.0/0       drop              default handler
0.0.0.0/32      broadcast
224.0.0.0/4     0.0.0.0
224.0.0.0/24    receive
255.255.255.255/32 broadcast
```

This table describes the significant fields shown in the display.

Table 32: show cef vrf Command Field Descriptions

Field	Description
Prefix	Prefix in the IPv4 CEF table.

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

show cef vrf



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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [allow-hint](#), page 243
- [broadcast-flag policy check](#) , page 244
- [clear dhcp ipv6 binding](#), page 246
- [database](#), page 248
- [destination \(DHCP IPv6\)](#), page 250
- [dhcp ipv4](#) , page 253
- [show dhcp ipv4 client](#), page 254
- [show dhcp ipv4 client statistics](#), page 256
- [clear dhcp ipv4 client](#), page 258
- [clear dhcp ipv4 client statistics](#), page 260
- [show tech support dhcp ipv4 client](#), page 262
- [dhcp ipv6](#) , page 264
- [distance](#), page 266
- [dns-server](#) , page 268
- [domain-name \(DHCP IPv6 pool\)](#), page 269
- [duid](#), page 270
- [giaddr policy](#), page 272
- [helper-address](#) , page 274
- [interface \(DHCP\)](#), page 276
- [interface \(relay profile\)](#), page 277
- [pd \(prefix-delegation - DHCP IPv6 pool\)](#), page 279

- [pd \(prefix-delegation - DHCP IPv6 interface\), page 282](#)
- [pool \(DHCP IPv6\), page 284](#)
- [preference, page 286](#)
- [profile relay, page 287](#)
- [rapid-commit, page 289](#)
- [relay information check , page 290](#)
- [relay information option , page 292](#)
- [relay information option allow-untrusted , page 294](#)
- [relay information policy , page 296](#)
- [secure-arp, page 298](#)
- [show dhcp ipv4 relay profile, page 300](#)
- [show dhcp ipv4 relay profile name, page 301](#)
- [show dhcp ipv4 relay statistics, page 303](#)
- [show dhcp ipv6, page 305](#)
- [show dhcp ipv6 binding, page 306](#)
- [show dhcp ipv6 database , page 308](#)
- [show dhcp ipv6 interface, page 310](#)
- [show dhcp ipv6 pool, page 312](#)
- [sip address, page 314](#)
- [sip domain-name, page 316](#)
- [vrf \(relay profile\), page 318](#)

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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# dhcp ipv6 interface pos 0/5/0/0 server
RP/0/0/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 broadcast 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 }

no 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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# broadcast-flag policy check
```

Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	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/0/0/CPU0:router# clear dhcp ipv6 binding
```

Related Commands

Command	Description
show dhcp ipv6 database , on page 308	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 <i>seconds</i>	(Optional) How often (in seconds) DHCP for IPv6 sends database updates. The default is 300 seconds. The minimum write delay is 60 seconds.
timeout <i>seconds</i>	(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/0/0/CPU0:router# configure  
RP/0/0/CPU0:router(config)# dhcp ipv6  
RP/0/0/CPU0:router(config-dhcpv6)# database tftp://10.0.0.1/dhcp-binding
```

Related Commands

Command	Description
dhcp ipv6 , on page 264	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.
interface (DHCP) , on page 276	Enables DHCP for IPv6 on an interface.
show dhcp ipv6 database , on page 308	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	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the modular services card or line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

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/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# interface tenGigE 0/5/0/0 relay
RP/0/0/CPU0:router(config-dhcpv6-if)# destination 10:10::10
```

Related Commands

Command	Description
interface (DHCP) , on page 276	Enables DHCP for IPv6 on an interface.

destination (DHCP IPv6)

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

no 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/0/0/CPU0:router# dhcp ipv4
RP/0/0/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:

```
RP/0/0/CPU0:ios#show dhcp ipv4 client
Mon May 6 16:35:32.581 UTC
```

Interface name	IP Address	Binding State	Lease
MgmtEth0_0_CPU0_0	192.168.190.130	BOUND	1688 secs (00:28:08)

```
RP/0/0/CPU0:ios#
RP/0/0/CPU0:ios#show dhcp ipv4 client binding ?
MgmtEth      Ethernet/IEEE 802.3 interface(s)
detail       Show detailed client binding information
|            Output Modifiers
<cr>
```



```
RP/0/0/CPU0:ios#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
-----
```

```
RP/0/0/CPU0:ios#
RP/0/0/CPU0:ios#show dhcp ipv4 client binding detail ?
  MgmtEth      Ethernet/IEEE 802.3 interface(s)
  debug        Show detailed debug level client binding information
  |            Output Modifiers
  <cr>
RP/0/0/CPU0:ios#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
-----
```

```
RP/0/0/CPU0:ios#
RP/0/0/CPU0:ios#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	Parameter	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.

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:

```
RP/0/0/CPU0:ios#clear dhcp ipv4 client mgmtEth 0/0/CPU0/0
Fri Jun  6 08:24:14.558 UTC
RP/0/0/CPU0:ios#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)

```
RP/0/0/CPU0:ios#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 256	Displays the statistics of the DHCP client.
show dhcp ipv4 client, on page 254	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:

```
RP/0/0/CPU0:ios#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)
RP/0/0/CPU0:ios#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)
RP/0/0/CPU0:ios#show tech-support dhcp ipv4 client file disk0?
WORD disk0:   disk0a:
RP/0/0/CPU0:ios#show tech-support dhcp ipv4 client file disk0:/dhcpv4-client-showtech.tgz
```



```
Fri Jun 6 08:25:24.793 UTC
RP/0/0/CPU0:ios#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)
RP/0/0/CPU0:ios#
```

Related Commands

Command	Description
show dhcp ipv4 client, on page 254	Displays DHCP IPv4 client information.
show dhcp ipv4 client statistics, on page 256	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

no 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.

Usage Guidelines

Task ID	Task ID	Operations
	ip-services	read, write

Examples This example shows how to enable DHCP for IPv6:

```
RP/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)#
```

Related Commands

Command	Description
database, on page 248	Configures a Dynamic Host Configuration Protocol (DHCP) for IPv6 binding database agent.
distance, on page 266	Specifies an administrative distance for Dynamic Host Configuration Protocol (DHCP) for IPv6 Prefix Delegation.

Command	Description
pool (DHCP IPv6), on page 284	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

<i>administrative distanc e</i>	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/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# distance 200
```

Related Commands

Command	Description
dhcp ipv6 , on page 264	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*

no dns-server *ipv6-address*

Syntax Description

<i>ipv6-address</i>	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 Modes

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/0/0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/0/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*

no domain-name

Syntax Description

<i>domain</i>	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.

Command Modes

DHCP IPv6 pool configuration

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

This is an example of how to configure a DHCP IPv6 domain name using the **domain-name** command:

```
RP/0/0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)# domain-name howie.com
```

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 000200000090CC084D303000912 using the **duid** command:

```
RP/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# duid 000200000090CC084D303000912
```


Related Commands

Command	Description
dhcp ipv6 , on page 264	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# giaddr policy drop
```

Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
interface (relay profile) , on page 277	Specifies a relay profile on an interface.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	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*]

no helper-address [*vrf vrf-name*] [*address*] [**giaddr** *gateway-address*]

Syntax Description

<i>vrf-name</i>	(Optional) Specifies the name of a particular VRF.
<i>address</i>	IPv4 and Pv6 address in four part, dotted decimal format.
giaddr <i>gateway-address</i>	(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 Modes

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 253	Enables Dynamic Host Configuration Protocol (DHCP) for IPv4 and enters DHCP IPv4 configuration mode.

Command	Description
interface (relay profile) , on page 277	Specifies a relay profile on an interface.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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

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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# interface pos 0/1/4/1
RP/0/0/CPU0:router(config-dhcpv4)# interface pos 0/1/4/1 relay profile client
```

Related Commands

Command	Description
broadcast-flag policy check , on page 244	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 253	Enables Dynamic Host Configuration Protocol (DHCP) for IPv4 and enters DHCP IPv4 configuration mode.
giaddr policy , on page 272	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.
vrf (relay profile) , on page 318	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

<i>ipv6-prefix</i>	(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
<i>/prefix-length</i>	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).
<i>client-DUID</i>	The DHCP unique identifier (DUID) of the client to which the prefix is delegated.
iaid <i>iaid</i>	(Optional) Identity association identifier (IAID), which uniquely identifies an IAPD on the client.

lifetime	<p>(Optional) Sets a length of time during which the requesting router is allowed to use the prefix. The following values can be used:</p> <ul style="list-style-type: none"> • 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/0/0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)# pd 2001:420:10::/48 0002000000090CC084D303000912
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 284	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

<i>ipv6-prefix</i>	(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
<i>/prefix-length</i>	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: <ul style="list-style-type: none"> • 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/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)# exit
RP/0/0/CPU0:router(config-dhcpv6)# interface POS 0/5/0/0 server
RP/0/0/CPU0:router(config-dhcpv6-if)# pd 2001:420:10::/48
RP/0/0/CPU0:router(config-dhcpv6-if)# pool pool1
```

Related Commands

Command	Description
interface (DHCP), on page 276	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/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)#
```

Related Commands

Command	Description
dhcp ipv6 , on page 264	Enables Dynamic Host Configuration Protocol (DHCP) for IPv6 and enters DHCP IPv6 configuration mode.
show dhcp ipv6 pool , on page 312	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

Examples

The following is an example of the **preference** command:

```
RP/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# interface pos 0/5/0/0 server
RP/0/0/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/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
```

Related Commands

Command	Description
broadcast-flag policy check , on page 244	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 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.

Command	Description
giaddr policy, on page 272	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
interface (relay profile), on page 277	Specifies a relay profile on an interface.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.
vrf (relay profile), on page 318	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/0/0/CPU0:router(config)# dhcp ipv6
RP/0/0/CPU0:router(config-dhcpv6)# interface pos 0/5/0/0 server
RP/0/0/CPU0:router(config-dhcpv6-if)# rapid-commit
```

Related Commands	Command	Description
	interface (DHCP) , on page 276	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 submenu. To disable this feature, use the **no** form of this command.

relay information check

no 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

Examples This example shows how to use the **relay information check** command:

```
RP/0/0/CPU0:router#config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# relay information check
```

Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.

Command	Description
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information option , on page 292	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 294	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

no 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

Examples

This example shows how to use the **relay information option** command:

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# relay information option
```

Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option allow-untrusted , on page 294	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

no 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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# relay information option allow-untrusted
```


Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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}

no 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.

Usage Guidelines

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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# profile client relay
```

```
RP/0/0/CPU0:router(config-dhcpv4-relay-profile)# relay information policy keep
```

Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 277	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

Examples

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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# dhcp ipv4
```

```
RP/0/0/CPU0:router(config-dhcpv4)# profile profile1 server  
RP/0/0/CPU0:router(config-dhcpv4-server-profile)# secure-arp  
RP/0/0/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/0/0/CPU0:router# show dhcp ipv4 relay profile
DHCP IPv4 Relay Profiles
-----
r1
r2
```

Related Commands	Command	Description
	show dhcp ipv4 relay profile name , on page 301	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/0/0/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:
```

```
show dhcp ipv4 relay profile name
```

```
FINT0_0_CPU0  
MgmtEth0_0_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 <i>vrf-name</i>	(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/0/0/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/0/0/CPU0:router# show dhcp vrf default ipv4 relay statistics
Sun Apr 6 07:10:35.873 UTC
```

show dhcp ipv4 relay statistics

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/0/0/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 <i>ipv6-address</i> 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/0/0/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

<i>agent-URL</i>	(Optional) Flash, NVRAM, FTP, TFTP, or Remote Copy Protocol (RCP) uniform resource locator.
location	Displays the database information of the DHCPv6 node.
<i>location</i>	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/0/0/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/0/0/CPU0:router
# show dhcp ipv6 interface

POS 0/5/0/0 is in server mode
  Using pool: svr-pl
  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 276	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/0/0/CPU0:router# show dhcp ipv6 pool

DHCPv6 pool: svr-pl
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 <i>ipv6-address</i> 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/0/0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)# sip address 10:10::10
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 284	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/0/0/CPU0:router(config)# dhcp ipv6 pool pool1
RP/0/0/CPU0:router(config-dhcpv6-pool)# sip domain-name domain1.com
```

Related Commands

Command	Description
pool (DHCP IPv6), on page 284	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

<i>vrf-name</i>	User-defined name for the VRF.
relay	Specifies a relay profile.
<i>profile-name</i>	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# dhcp ipv4
RP/0/0/CPU0:router(config-dhcpv4)# vrf all
```


Related Commands

Command	Description
dhcp ipv4 , on page 253	Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode.
giaddr policy , on page 272	Configures how a relay agent processes BOOTREQUEST messages that already contain a nonzero giaddr attribute.
helper-address , on page 274	Configures the DHCP relay agent to relay packets to a specific DHCP Server.
relay information check , on page 290	Configures a DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
relay information option , on page 292	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 294	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 296	Configures how a relay agent processes BOOTREQUEST messages that already contain a relay information option.



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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [cinetd rate-limit](#), page 323
- [clear host](#), page 324
- [destination address\(ipsla\)](#), page 326
- [domain ipv4 host](#), page 328
- [domain ipv6 host](#), page 329
- [domain list](#), page 330
- [domain lookup disable](#), page 332
- [domain name \(IPAddr\)](#), page 334
- [domain name-server](#), page 336
- [ftp client anonymous-password](#), page 338
- [ftp client passive](#), page 340
- [ftp client password](#), page 342
- [ftp client source-interface](#), page 344
- [ftp client username](#), page 346
- [logging source-interface vrf](#), page 348
- [ping \(network\)](#), page 350
- [ping bulk \(network\)](#), page 353
- [rcp client source-interface](#), page 355
- [rcp client username](#), page 357

- [scp](#), page 359
- [show cinetd services](#), page 361
- [show hosts](#), page 363
- [source address\(ipsla\)](#), page 366
- [telnet](#), page 368
- [telnet client source-interface](#), page 372
- [telnet dscp](#), page 374
- [telnet server](#), page 376
- [telnet transparent](#), page 378
- [tftp client source-interface](#), page 379
- [tftp server](#), page 381
- [traceroute](#), page 383

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 3.2	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/0/0/CPU0:router# config
RP/0/0/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 3.2	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 328](#) or the [domain ipv6 host, on page 329](#) 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/0/0/CPU0:router# clear host *
```

Related Commands

Command	Description
domain ipv4 host, on page 328	Defines a static IPv4 hostname-to-address mapping in the host cache.
domain ipv6 host, on page 329	Defines a static IPv6 hostname-to-address mapping in the host cache.
show hosts, on page 363	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

<i>address</i>	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

Examples

This example shows how to configure 10.10.10.20 as the destination address of a device.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipsla
RP/0/0/CPU0:router(config-ipsla)# operation 500
RP/0/0/CPU0:router(config-ipsla-op)# type icmp echo
RP/0/0/CPU0:router(config-ipsla-echo)# timeout 5000
RP/0/0/CPU0:router(config-ipsla-echo)# destination address 10.10.10.20
```


Related Commands

Command	Description
source address(ipsla) , on page 366	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 3.2	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/0/0/CPU0:router(config)# domain ipv4 host host1 192.168.7.18
RP/0/0/CPU0:router(config)# domain ipv4 host host2 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 [v6address2v6address4]*

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 3.2	This command was supported.

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/0/0/CPU0:router(config)# domain ipv6 host host1 ff02::2
RP/0/0/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 3.2	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 334](#) 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 334](#) 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/0/0/CPU0:router(config)# domain list domain1.com
RP/0/0/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/0/0/CPU0:router(config)# domain list domain3.edu
```

```
RP/0/0/CPU0:router(config)# no domain list domain2.edu
```

Related Commands

Command	Description
domain name (IPAddr), on page 334	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).
show hosts, on page 363	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 3.2	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/0/0/CPU0:router(config)# domain lookup disable
```

Related Commands

Command	Description
domain name (IPAddr), on page 334	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).

Command	Description
domain name-server , on page 336	Specifies the address of one or more name servers to use for name and address resolution.
show hosts , on page 363	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 3.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes 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 330	Defines a list of default domain names to complete unqualified hostnames.

Command	Description
domain name-server, on page 336	Specifies the address of one or more name servers to use for name and address resolution.
show hosts, on page 363	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 3.2	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/0/0/CPU0:router(config)# domain name-server 192.168.1.111
RP/0/0/CPU0:router(config)# domain name-server 192.168.1.2
```

Related Commands

Command	Description
domain lookup disable , on page 332	Disables the domain lookup.
domain name (IPAddr) , on page 334	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# ftp client anonymous-password xxxx
```

Related Commands

Command	Description
ftp client passive , on page 340	Configures the software to use only passive File Transfer Protocol (FTP) connections.

Command	Description
ftp client password , on page 342	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client source-interface , on page 344	Specifies the source IP address for File Transfer Protocol (FTP) connections.
ftp client username , on page 346	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 3.2	This command was supported.

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/0/0/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 338	Assigns a password for anonymous users.

Command	Description
ftp client password , on page 342	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client source-interface , on page 344	Specifies the source IP address for File Transfer Protocol (FTP) connections.
ftp client username , on page 346	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

<i>clear-text-password</i>	Specifies an unencrypted (cleartext) user password
clear <i>clear-text password</i>	Specifies an unencrypted (cleartext) shared password.
encrypted <i>encrypted-text password</i>	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/0/0/CPU0:router(config)# ftp client password lab
```

Related Commands

Command	Description
ftp client anonymous-password , on page 338	Assigns a password for anonymous users.

Command	Description
ftp client passive , on page 340	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client source-interface , on page 344	Specifies the source IP address for File Transfer Protocol (FTP) connections.
ftp client username , on page 346	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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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 3.2	This command was supported.

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/0/0/CPU0:router(config)# ftp client source-interface POS 0/1/2/1
```

Related Commands

Command	Description
ftp client anonymous-password, on page 338	Assigns a password for anonymous users.
ftp client passive, on page 340	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client password, on page 342	Specifies the password for the File Transfer Protocol (FTP) connections.
ftp client username, on page 346	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/0/0/CPU0:router(config)# ftp client username brownfox
```

Related Commands

Command	Description
ftp client anonymous-password , on page 338	Assigns a password for anonymous users.
ftp client passive , on page 340	Configures the software to use only passive File Transfer Protocol (FTP) connections.
ftp client password , on page 342	Specifies the password for the File Transfer Protocol (FTP) connections.

Command	Description
ftp client source-interface , on page 344	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

<i>interface</i>	Interface number of the source
<i>vrf-name</i>	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

Examples

This example shows how to configure interface loopback 0 to be the logging source interface for VRF vrf1.

```
RP/0/0/CPU0:router#logging source-interface loopback 0 vrf vrf1
RP/0/0/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/0/0/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-name* | *ip-address*] [**count** *number*] [**size** *number*] [**source** {*ip-address* | *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 <i>number</i>	(Optional) Sets the repeat count. Range is 0 to 2147483647.
size <i>number</i>	(Optional) Sets the datagram size. Range is 36 to 18024
source	(Optional) Identifies the source address or source interface.
type <i>number</i>	(Optional) Sets the type of service. Range is 0 to 255. Available when the ipv4 keyword is specified.
timeout <i>seconds</i>	(Optional) Sets the timeout in seconds. Range is 0 to 3600.
priority <i>number</i>	(Optional) Sets the packet priority. Range is 0 to 15. Available when the ipv6 keyword is specified.
pattern <i>number</i>	(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

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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 36: 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.

Character	Description
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/0/0/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/0/0/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 <i>vrf-name ip-address domain-name</i>	(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

Examples

The following example shows how to ping many hosts by the input via CLI method:

```
RP/0/0/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/0/0/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 350	Checks host reachability and network connectivity on IP networks.

rnp client source-interface

To specify the source IP address for remote copy protocol (rnp) connections, use the **rnp client source-interface** command in Global Configuration mode. To remove the **rnp client source-interface** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

rnp client source-interface *type interface-path-id*

no rnp 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 rnp source address is the IP address of the interface used by the rnp packets to leave the networking device.

Command Modes

Global configuration

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

Use the **rnp client source-interface** command to set the IP address of an interface as the source for all rnp connections. To configure the remote username to be used when a remote copy using rnp is requested, use the **rnp 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 rnp connections:

```
RP/0/0/CPU0:router (config) # rnp client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
rcp client username, on page 357	Configures the remote username to be used when a remote copy using rcp is requested.

rtp client username

To configure the local user on the client side to be used when requesting a remote copy using remote copy protocol (rtp), use the **rtp client username** command in Global Configuration mode. To restore the system to its default condition, use the **no** form of this command.

rtp client username *username*

no rtp client username *username*

Syntax Description

username	Name of the remote user on the rtp server. This name is used for rtp copy requests. If the rtp 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 rtp 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 rtp 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 3.2	This command was supported.

Usage Guidelines

The rtp protocol requires that a client send the remote username on an rtp request to the network server. Use the **rtp client username** command to specify the remote username to be sent to the network server for an rtp 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 rtp connections, use the **rtp 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/0/0/CPU0:router(config)# rcp client username netadmin1
```

Related Commands

Command	Description
rcp client source-interface, on page 355	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

<i>local-directory</i>	Specifies the local directory on the device.
<i>username@location/directory</i>	Specifies the remote directory where <i>location</i> is the IP address of the remote device.
<i>filename</i>	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/0/0/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/0/0/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 3.2	This command was supported.

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/0/0/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 37: 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).

Field	Description
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.
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 376	Enables Telnet services on a networking device.
tftp server, on page 381	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 3.2	This command was supported.

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/0/0/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 38: 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.
Flags	Indicates the status of an entry. <ul style="list-style-type: none"> • 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 324	Deletes entries from the host-name-and-address cache.
domain list, on page 330	Defines a list of default domain names to complete unqualified hostnames.
domain lookup disable, on page 332	Disables the IP DNS-based hostname-to-address translation.
domain name (IPAddr), on page 334	Defines a default domain name to complete unqualified hostnames (names without a dotted-decimal domain name).

Command	Description
domain name-server , on page 336	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

<i>address</i>	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

Examples

This example shows how to configure 10.10.10.5 as the source address of a device.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipsla
RP/0/0/CPU0:router(config-ipsla)# operation 500
RP/0/0/CPU0:router(config-ipsla-op)# type icmp echo
RP/0/0/CPU0:router(config-ipsla-echo)# timeout 5000
RP/0/0/CPU0:router(config-ipsla-echo)# source address 10.10.10.5
```

Related Commands

Command	Description
destination address(ipsla) , on page 326	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-address| host-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. <ul style="list-style-type: none"> 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 39: Telnet Connection Options , on page 369 for 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 3.2	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 39: 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 40: Special Telnet Escape Sequences, on page 369](#) lists the special Telnet escape sequences.

Table 40: Special Telnet Escape Sequences

Escape Sequence ⁹	Purpose
Ctrl-^ c	Interrupt Process (IP).
Ctrl-^ o	Abort 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/0/0/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/0/0/CPU0:router# telnet host1
```

Related Commands

Command	Description
aaa authentication login default local	Sets AAA authentication at login. For more information, see <i>Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Series Router</i> .
telnet server , on page 376	Enables Telnet services on a networking device.

Command	Description
terminal length	Sets the number of lines on the current terminal screen for the current session. For more information, see <i>Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Series Router</i> .
terminal width	Sets the number of character columns on the terminal screen for the current session. For more information, see <i>Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Series Router</i> .

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/0/0/CPU0:router(config)# telnet ipv4 client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
telnet server, on page 376	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 is 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/0/0/CPU0:router(config)# telnet vrf default ipv4 dscp 40  
RP/0/0/CPU0:router(config)# telnet vrf default ipv4 dscp 10
```

Related Commands

Command	Description
telnet, on page 368	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.
<i>list-name</i>	(Optional) Access list name.

Command Default

Telnet services are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.4.0	The vrf and default keywords and <i>vrf-name</i> 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 (Cineta) 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/0/0/CPU0:router(config)# telnet ipv4 server max-servers 1
```

Related Commands

Command	Description
telnet , on page 368	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# line console
RP/0/0/CPU0:router(config-line)# telnet transparent
```

Related Commands

Command	Description
telnet , on page 368	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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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 supported.

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/0/0/CPU0:router (config) # tftp client source-interface POS 1/0/2/1
```

Related Commands

Command	Description
tftp server , on page 381	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 <i>tftp-home-directory</i>	Specifies the home directory.
max-servers <i>number</i>	(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 <i>name</i>	(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 3.2	This command was supported.
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/0/0/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-name*|*ip-address*] [**source** *ip-address-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	(Optional) Source address.
<i>ip-address-name</i>	(Optional) IP address A.B.C.D or hostname.
numeric	(Optional) Numeric display only.
timeout <i>seconds</i>	(Optional) Timeout value. Range is 0 to 3600.
probe <i>count</i>	(Optional) Probe count. Range is 0 to 65535.
minttl <i>seconds</i>	(Optional) Minimum time to live. Range is 0 to 255.
maxttl <i>seconds</i>	(Optional) Maximum time to live. Range is 0 to 255.
port <i>number</i>	(Optional) Port number. Range is 0 to 65535.
priority <i>number</i>	(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 3.2	This command was supported.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

Usage Guidelines

The default value for the **tracert** command refers only to the destination. No default value is available for the destination address.

The **tracert** command works by taking advantage of the error messages generated by networking devices when a datagram exceeds its time-to-live (TTL) value.

The **tracert** 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 **tracert** command sends several probes at each TTL level and displays the round-trip time for each.

The **tracert** 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 **tracert** command prints an asterisk (*).

The **tracert** 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 **tracert** 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 **tracert** test.

Because of how IP is implemented on various networking devices, the IP **tracert** 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, **tracert** 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/0/0/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: 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 41: 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.

Character	Description
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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [address \(hsrp\)](#), page 389
- [address global \(HSRP\)](#), page 391
- [address global slave \(HSRP\)](#), page 393
- [address linklocal\(HSRP\)](#), page 395
- [address linklocal \(HSRP\)](#), page 397
- [address secondary \(hsrp\)](#), page 399
- [authentication \(hsrp\)](#), page 401
- [bfd fast-detect \(hsrp\)](#), page 403
- [clear hsrp statistics](#), page 405
- [hsrp authentication](#), page 407
- [hsrp bfd fast-detect](#), page 409
- [hsrp bfd minimum-interval](#), page 411
- [hsrp bfd multiplier](#), page 413
- [hsrp delay](#), page 415
- [hsrp ipv4](#), page 417
- [hsrp mac-address](#), page 419
- [hsrp preempt](#), page 421
- [hsrp priority](#), page 423
- [hsrp redirects](#), page 425
- [hsrp timers](#), page 427
- [hsrp track](#), page 429

- [hsrp use-bia](#), page 431
- [interface \(HSRP\)](#), page 432
- [preempt \(hsrp\)](#), page 434
- [priority \(hsrp\)](#), page 436
- [router hsrp](#), page 438
- [session name](#), page 439
- [show hsrp](#), page 441
- [show hsrp bfd](#), page 445
- [show hsrp mgo](#), page 447
- [show hsrp statistics](#), page 449
- [show hsrp summary](#), page 451
- [slave follow](#), page 453
- [slave primary virtual IPv4 address](#), page 455
- [slave secondary virtual IPv4 address](#), page 457
- [slave virtual mac address](#), page 459
- [timers \(hsrp\)](#), page 461
- [track \(hsrp\)](#), page 463
- [track\(object\)](#), page 465

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.
<i>address</i>	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

Examples

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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# address learn
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
```

```
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# address learn
RP/0/0/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 399	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	<i>ipv6-address</i>	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

Examples This example shows how to add a global virtual IPv6 address for the HSRP group:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv6
RP/0/0/CPU0:router(config-hsrp-address-family)# hsrp 3
RP/0/0/CPU0:router(config-hsrp-virtual-router)# address global 4000::1000
RP/0/0/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 slave (HSRP)

To configure the global virtual IPv6 address for the slave group, use the **address global** command in the HSRP slave submode. To deconfigure the global virtual IPv6 address for the slave group, use the **no** form of this command.

address global *ipv6-address*

no address global *ipv6-address*

Syntax Description	<i>ipv6-address</i>	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

Examples This example shows how to add a global virtual IPv6 address for the slave group:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv6
RP/0/0/CPU0:router(config-hsrp-address-family)# hsrp 3 slave
RP/0/0/CPU0:router(config-hsrp-virtual-router)# address global 4000::1000
RP/0/0/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 linklocal(HSRP)

To either configure the virtual link-local IPv6 address for the HSRP 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 HSRP group submode, under the IPv6 address-family. To deconfigure the virtual link-local IPv6 address for the HSRP group, use the **no** form of this command.

address linklocal *ipv6-address* | **autoconfig**

no address linklocal *ipv6-address* | **autoconfig**

Syntax Description

<i>ipv6-address</i>	HSRP IPv6 link-local address.
autoconfig	Autoconfigures the HSRP IPv6 link-local 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

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

Examples

This example shows how to autoconfigure the HSRP IPv6 link-local address:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router hsrp
RP/0/0/CPU0:router(config-hsrp)#interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)#address-family ipv6
```

```
RP/0/0/CPU0:router(config-hsrp-address-family)#hsrp 3 version 2
RP/0/0/CPU0:router(config-hsrp-virtual-router)#address linklocal autoconfig
RP/0/0/CPU0:router(config-hsrp-virtual-router)#
```

This example shows how to configure the virtual link-local IPv6 address for the HSRP group:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router hsrp
RP/0/0/CPU0:router(config-hsrp)#interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)#address-family ipv6
RP/0/0/CPU0:router(config-hsrp-address-family)#hsrp 3
RP/0/0/CPU0:router(config-hsrp-virtual-router)#address linklocal FE80::260:3EFF:FE11:6770
RP/0/0/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 linklocal (HSRP)

To either configure the virtual link-local IPv6 address for the slave 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 slave group, use the **no** form of this command.

address linklocal *ipv6-address* | **autoconfig**

no address linklocal *ipv6-address* | **autoconfig**

Syntax Description

<i>ipv6-address</i>	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

Examples

This example shows how to autoconfigure the HSRP IPv6 link-local address:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router hsrp
RP/0/0/CPU0:router(config-hsrp)#interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)#address-family ipv6
RP/0/0/CPU0:router(config-hsrp-address-family)#hsrp 3 slave
```

```
RP/0/0/CPU0:router(config-hsrp-virtual-router)#address linklocal autoconfig
RP/0/0/CPU0:router(config-hsrp-virtual-router)#
```

This example shows how to configure the virtual link-local IPv6 address for the slave group:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router hsrp
RP/0/0/CPU0:router(config-hsrp)#interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)#address-family ipv6
RP/0/0/CPU0:router(config-hsrp-address-family)#hsrp 3 slave
RP/0/0/CPU0:router(config-hsrp-virtual-router)#address linklocal FE80::260:3EFF:FE11:6770
RP/0/0/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 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.
	<i>address</i>	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

Examples 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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 3
RP/0/0/CPU0:router(config-hsrp-gp)# address 10.20.30.1 secondary
RP/0/0/CPU0:router(config-hsrp-gp)#
```

```
(applicable for Cisco IOS XR Releases 4.3.x and above)
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
```

```
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 3 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# address 10.20.30.1 secondary
RP/0/0/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 389	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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# authentication company1
```

```

RP/0/0/CPU0:router(config-hsrp-gp)#

(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 1
RP/0/0/CPU0:router(config-hsrp-gp)# authentication company1
RP/0/0/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 441	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*]

no bfd fast-detect

Syntax Description

peer ipv4 <i>ipv4-address</i>	(Optional) BFD peer interface IPv4 address.
<i>interface-type interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
```

```
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# bfd fast-detect
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# bfd fast-detect
RP/0/0/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 413	Configures the multiplier value for BFD.
hsrp bfd minimum-interval, on page 411	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 <i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
<i>group</i>	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

Examples

This sample output is from the **clear hsrp statistics** command:

```
RP/0/0/CPU0:router# clear hsrp statistics
```

Related Commands

Command	Description
show hsrp , on page 441	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 3.2	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 interoperability. 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/0/0/CPU0:router(config)# router hsrp  
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1  
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 authentication company1
```

Related Commands

Command	Description
show hsrp, on page 441	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 bfd fast-detect
```

Related Commands

Command	Description
hsrp bfd multiplier , on page 413	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-hsrp-if)# hsrp bfd minimum-interval 100
```

Related Commands

Command	Description
hsrp bfd fast-detect, on page 409	Enables BFD fast-detection on a HSRP interface.
hsrp bfd multiplier, on page 413	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-hsrp-if)# hsrp bfd multiplier 10
```

Related Commands

Command	Description
hsrp bfd fast-detect , on page 409	Enables BFD fast-detection on a HSRP interface.

hsrp bfd multiplier

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 <i>value</i>	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload <i>value</i>	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/0/0/CPU0:router(config)# router hsrp  
RP/0/0/CPU0:router(config-hsrp)# interface mgmtEth 0/RP0/CPU0/0  
RP/0/0/CPU0:router(config-hsrp-if)# hsrp delay minimum 10 reload 100
```

Related Commands

Command	Description
show hsrp, on page 441	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 3.2	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:routerrouter(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
```

Related Commands

Command	Description
hsrp redirects, on page 425	Configures ICMP redirect messages to be sent when the HSRP is configured on an interface.
show hsrp, on page 441	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 3.2	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 42: APPN and IP Parallel Terms

APPN	IP
end node	host
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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 5 mac-address 4000.1000.1060
```

Related Commands

Command	Description
hsrp use-bia, on page 431	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 441	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 <i>seconds</i> argument causes the local router to postpone taking over the active role for the specified preempt delay <i>seconds</i> 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 3.2	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.168.18.1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp preempt delay 300
```

Related Commands

Command	Description
hsrp priority, on page 423	Configures HSRP priority.
hsrp track, on page 429	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 441	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 3.2	This command was supported.
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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.168.18.1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp priority 120
```

Related Commands

Command	Description
hsrp preempt, on page 421	Configures HSRP preemption and preemption delay.
hsrp track, on page 429	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 441	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 3.2	This command was supported.
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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4 192.168.18.1
```

```
RP/0/0/CPU0:router(config-hsrp-if)# hsrp redirects disable
```

Related Commands

Command	Description
show hsrp, on page 441	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 3.2	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 ($\text{holdtime} > 3 * \text{hellotime}$).

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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
RP/0/0/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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 ipv4
RP/0/0/CPU0:router(config-hsrp-if)# hsrp 1 timers msec 200 msec 1000
```

Related Commands

Command	Description
show hsrp , on page 441	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 hsrp** 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 3.2	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface TenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp track TenGigE 0/1/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp track TenGigE 0/3/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp preempt
RP/0/0/CPU0:router(config-hsrp-if)# hsrp ipv4 192.92.72.46
```

Related Commands

Command	Description
hsrp preempt , on page 421	Configures HSRP preemption and preemption delay.
hsrp priority , on page 423	Configures HSRP priority.
show hsrp , on page 441	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 3.2	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)# hsrp use-bia
```

Related Commands	Command	Description
	hsrp mac-address, on page 419	Specifies a virtual MAC address for HSRP.
	show hsrp, on page 441	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/0/CPU0:router(config-hsrp-if)#
```

Related Commands

Command	Description
router hsrp , on page 438	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 <i>seconds</i> argument causes the local router to postpone the taking over the active role for the specified preempt delay <i>seconds</i> 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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# preempt delay 300
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# preempt delay 300
RP/0/0/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 , on page 423	Configures HSRP priority.
hsrp track , on page 429	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp , on page 441	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

<i>priority</i>	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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
```

```
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# priority 120
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# priority 120
RP/0/0/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 421	Configures HSRP preemption and preemption delay.
hsrp track, on page 429	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
show hsrp, on page 441	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 3.2	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/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/2/0/1
RP/0/0/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

<i>name</i>	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

Examples

This example shows how to configure an HSRP session name.

```
(applicable for Cisco IOS XR Releases 4.2.x and below)
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# name s1
RP/0/0/CPU0:router(config-hsrp-gp)#
```

```
(applicable for Cisco IOS XR Releases 4.3.x and above)
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# name s1
```

```
RP/0/0/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, on page 419	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.

show hsrp [**interface** *interface-type interface-path-id*] [*group-number*] [**brief** | **detail**]

Syntax Description

interface <i>interface-type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
<i>group-number</i>	(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: <ul style="list-style-type: none"> • 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 3.2	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/0/0/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 43: 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: <ul style="list-style-type: none"> • 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.

Field	Description
Hello time	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)
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, on page 407	Configures an authentication string for HSRP.
hsrp ipv4, on page 417	Activates the HSRP.
hsrp mac-address, on page 419	Specifies a virtual MAC address for HSRP.
hsrp preempt, on page 421	Configures HSRP preemption and preemption delay.
hsrp priority, on page 423	Configures HSRP priority.
hsrp timers, on page 427	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, on page 429	Configures an interface so that the Hot Standby priority changes based on the availability of other interfaces.
hsrp use-bia, on page 431	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.

```
show hsrp bfd [interface-type interface-path-id ip-address]
```

Syntax Description

<i>interface-type</i>	(Optional) Physical interface or virtual interface.
<i>interface-path-id</i>	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.
<i>ip-address</i>	(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

Examples

This example shows Hot Standby Router Protocol (HSRP) bfd information across all interfaces.

```
RP/0/0/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/0/0/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 441	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.
<i>session-name</i>	(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

Examples This example shows Hot Standby Router Protocol (HSRP) mgo information for interface HSRP3.

```
RP/0/0/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/0/0/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 441	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-id*] *group-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

Examples

This sample output is from the **show hsrp statistics** command:

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

show hsrp statistics

```

      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 441	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

Release	Modification
Release 4.2.0	This command was introduced.

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

Task ID	Operation
hsrp	read

Examples This sample output is from the **show hsrp summary** command:

```
RP/0/0/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 441	Displays HSRP information.

slave follow

To instruct the slave group to inherit its state from a specified group, use the **slave follow** command in HSRP slave submode.

follow *mgo-session-name*

Syntax Description	<i>mgo-session-name</i>	Name of the MGO session from which the slave 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

Examples This example shows how to instruct the slave group to inherit its state from a specified group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp slave
RP/0/0/CPU0:router(config-hsrp-slave)# follow m1
```

Related Commands	Command	Description
	slave virtual mac address, on page 459	Configures the virtual MAC address for the slave group.

slave follow

slave primary virtual IPv4 address

To configure the primary virtual IPv4 address for the slave group, use the **slave primary virtual IPv4 address** command in the HSRP slave submode.

address *ip-address*

Syntax Description

<i>ip-address</i>	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

Examples

This example shows how to configure the primary virtual IPv4 address for the slave group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp slave
RP/0/0/CPU0:router(config-hsrp-slave)# address 10.2.1.4
```

Related Commands

Command	Description
slave follow , on page 453	Instructs the slave group to inherit its state from a specified group.

Command	Description
slave virtual mac address, on page 459	Configures the virtual MAC address for the slave group.

slave secondary virtual IPv4 address

To configure the secondary virtual IPv4 address for the slave group, use the **slave secondary virtual IPv4 address** command in the HSRP slave submode.

address *ip-address* **secondary**

Syntax Description		
<i>ip-address</i>		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

Examples This example shows how to configure the secondary virtual IPv4 address for the slave group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp slave
RP/0/0/CPU0:router(config-hsrp-slave)# address 10.2.1.4 secondary
```

Related Commands

Command	Description
slave follow, on page 453	Instructs the slave group to inherit its state from a specified group.
slave virtual mac address, on page 459	Configures the virtual MAC address for the slave group.

slave virtual mac address

To configure the virtual MAC address for the slave group, use the **slave virtual mac address** command in the HSRP slave submode.

mac-address *address*

Syntax Description	<i>address</i>	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

Examples This example shows how to configure the virtual MAC address for the slave group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp slave
RP/0/0/CPU0:router(config-hsrp-slave)# mac-address 10.2.4
```

Related Commands	Command	Description
	slave follow , on page 453	Instructs the slave group to inherit its state from a specified group.

■ slave virtual mac address

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 <i>hello-milliseconds</i>	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 <i>hold-milliseconds</i>	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 ($\text{holdtime} > 3 * \text{hellotime}$).

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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# timers 5 15
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# timers msec 200 msec 1000
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# timers msec 200 msec 1000
RP/0/0/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 441	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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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.
<i>priority-decrement</i>	(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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# track tenGigE 0/4/0/4 2
RP/0/0/CPU0:router(config-hsrp-gp)#
```

(applicable for Cisco IOS XR Releases 4.3.x and above)

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# track tenGigE 0/4/0/4 2
RP/0/0/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 421	Configures HSRP preemption and preemption delay.
hsrp priority , on page 423	Configures HSRP priority.
show hsrp , on page 441	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.
<i>priority-decrement</i>	(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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1
RP/0/0/CPU0:router(config-hsrp-gp)# track object t1 2
```

```

RP/0/0/CPU0:router(config-hsrp-gp)#

(applicable for Cisco IOS XR Releases 4.3.x and above)

RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router hsrp
RP/0/0/CPU0:router(config-hsrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-hsrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-hsrp-ipv4)# hsrp 1 version 2
RP/0/0/CPU0:router(config-hsrp-gp)# track object t1 2
RP/0/0/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 421	Configures HSRP preemption and preemption delay.
hsrp priority, on page 423	Configures HSRP priority.
show hsrp, on page 441	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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [clear lpts ifib statistics](#), page 468
- [clear lpts pifib hardware statistics](#), page 469
- [clear lpts pifib statistics](#), page 470
- [flow \(LPTS\)](#), page 471
- [lpts pifib hardware police](#), page 477
- [show lpts bindings](#), page 479
- [show lpts clients](#), page 484
- [show lpts flows](#), page 486
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- [show lpts pifib hardware context](#), page 508
- [show lpts pifib hardware entry](#), page 510
- [show lpts pifib hardware police](#), page 514
- [show lpts pifib hardware usage](#), page 517
- [show lpts pifib statistics](#), page 519
- [show lpts port-arbitrator statistics](#), page 521
- [show lpts vrf](#), page 522

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 <i>node-id</i>	(Optional) Clears the IFIB statistics for the designated node. The <i>node-id</i> argument is entered in standard <i>rack/slot/module</i> notation.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, 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/0/0/CPU0:router# clear lpts ifib statistics
```

Related Commands

Command	Description
show lpts ifib statistics , on page 497	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 <i>node-id</i>	Clears the Pre-IFIB hardware statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	--

Command Default

No default behavior or values

Command Modes

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 514	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 <i>node-id</i>	Clears the Pre-IFIB statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

If you do not specify a node with the **location** keyword and *node-id* argument, this command clears 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/0/0/CPU0:router# clear lpts pifib statistics
```

Related Commands

Command	Description
show lpts pifib statistics , on page 519	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 44: 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

Flow Type	Description	Default Packet Rate (Recommended)
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
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

Flow Type	Description	Default Packet Rate (Recommended)
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
ntp-known	Packets from an established NTP session.	500
ntp-default	Packets from a new or newly established NTP session.	500

Flow Type	Description	Default Packet Rate (Recommended)
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 SHTTP 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

Flow Type	Description	Default Packet Rate (Recommended)
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
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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# lpts pifib hardware police
RP/0/0/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/0/0/CPU0:router# configure  
RP/0/0/CPU0:routerconfig# lpts pifib hardware police location 0/2/CPU0  
RP/0/0/CPU0:router(config-pifib-policer-per-node)# flow isis-known rate 2222
```

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 <i>node-id</i>	(Optional) Designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
flow <i>flow-type rate rate</i>	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, tacaacs, 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/0/0/CPU0:router(config)# lpts pifib hardware police
RP/0/0/CPU0:router(config-pifib-policer-global)#
```

This example shows how to configure the **lpts pifib hardware police** command for a specific line card:

```
RP/0/0/CPU0:router# configure
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/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 471	Configures the policer for the LPTS flow type.
show lpts pifib hardware police, on page 514	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 {cnl| ipsec| ipv4-io| ipv6-io| mpa| tcp| test| udp| raw}]
[brief] [vrf vrf-name]
```

Syntax Description

location <i>node-id</i>	(Optional) Displays information for the specified node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
client-id	(Optional) Type of client. It can be one of the following values: <ul style="list-style-type: none"> • cnl —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 <i>vrf-name</i>	(Optional) Name of assigned VRF.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.
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/0/0/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 45: show lpts bindings Command Field Descriptions

Field	Description
Location	Node location, in the format of <i>rack/slot/module</i> .
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.

Field	Description
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/0/0/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 46: show lpts bindings brief Command Field Descriptions

Field	Description
Location	Node location, in the format of <i>rack/slot/module</i> .
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 484	Displays the client information for the Port Arbitrator.
show lpts flows , on page 486	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 Modes

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/CPU0:router# show lpts clients
o_flg - open flags ; clid - client id
clid      loc      flags  o_flg
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 47: show lpts clients Command Field Descriptions

Field	Description
Clid	LPTS client ID.

Field	Description
Loc	Node location, in the format <i>rack/slot/module</i> .
Flags	Client flags. Note The client flags are used only for debugging purposes.
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/0/0/CPU0:router# show lpts clients times

o_flg - open flags ; clid - client id
clid      loc      flags  o_flg
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 479	Displays the binding information in the port arbitrator.
show lpts flows, on page 486	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 3.2	This command was supported.

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/0/0/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 48: 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	<ul style="list-style-type: none"> • 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	<i>rack/slot/module</i> to deliver to

Field	Description
Element References	<ul style="list-style-type: none"> • location: <i>rack/slot/module</i> 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/0/0/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 49: 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: <ul style="list-style-type: none"> • <i>rack/slot/module</i>— 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 479	Displays the binding information in the port arbitrator.
show lpts clients, on page 484	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. <ul style="list-style-type: none"> • 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 <i>node-id</i>	(Optional) Specifies the location of the Flow Manager. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Release	Modification
Release 3.2	This command was supported.
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	Operations
lpts	read

Examples The following sample output is from the **show lpts ifib** command:

```
RP/0/0/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 50: 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.
Interface	Ingress interface name.
O/S/P/R/L/I/Y	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • (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/0/0/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/0/0/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 494	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. <ul style="list-style-type: none"> • 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 3.2	This command was supported.

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/0/0/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/0/0/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

```

show lpts ifib slices

```

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/0/0/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 51: 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 <i>rack/slot/module</i> .

Related Commands

Command	Description
show lpts ifib , on page 490	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 <i>node-id</i>	(Optional) Displays IFIB statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	--

Command Default

No default behavior or values

Command Modes

EXEC mode

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
lpts	read

Examples

The following sample output is from the **show lpts ifib statistics** command:

```
RP/0/0/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 52: 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.
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 490	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
-------------------------	--

Command Modes

EXEC mode

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
lpts	read

Examples

The following sample output is from the **show lpts ifib times** command:

```
RP/0/0/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/-/lms/tx
```

This table describes the significant fields shown in the display.

Table 53: 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 <i>rack/slot/module</i> .

Related Commands

Command	Description
show lpts ifib , on page 490	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 3.2	This command was supported.

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/0/0/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 54: 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 or IPv6 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

Release	Modification
Release 3.2	This command was supported.
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	Operations
lpts	read

Examples The following is sample output for the **show lpts pifib** command:

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

0/CPU0
Accepts/Drops    : 0/0
Is Stale         : 0
-----

```

The following is sample output from the **show lpts pifib entry brief** command:

```

RP/0/0/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

```

show lpts pifib

```

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/0/0/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 55: 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 (<i>n</i> 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 <i>node-id</i>	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 [**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: <ul style="list-style-type: none"> • ipv4 —Specifies IPv4 entries. • ipv6 —Specifies IPv6 entries. • isis —Specifies ISIS entries.
start-index <i>number</i>	(Optional) Starting index number.
num-entries <i>number</i>	(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 3.2	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 entry** command with the **location** keyword:

```
RP/0/0/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 56: 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	<ul style="list-style-type: none"> • 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.

Field	Description
Sq/Dq/Ct	<ul style="list-style-type: none">• 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

To display the policer configuration value set, use the **show lpts pifib hardware police** command in EXEC mode.

show lpts pifib hardware police [**location** {*node_id* }]

Syntax Description

location <i>node-id</i>	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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

No specific guidelines impact the use of this command.

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/0/0/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
-----
unconfigured-default    100      Static    500         500         0         0
Fragment                106      Static    1000        1000        0         0
OSPF-mc-known           107      Static    20000       20000       0         0
OSPF-mc-default         111      Static    5000        5000        0         0
```

OSPF-uc-known	161	Static	5000	5000	0	0
OSPF-uc-default	162	Static	1000	1000	0	0
ISIS-known	108	Static	20000	20000	0	0
ISIS-default	112	Static	5000	5000	0	0
BFD-known	170	Static	8500	8500	0	0
BFD-default	171	Static	8500	8500	0	0
BFD-MP-known	177	Static	8400	8400	0	0
BFD-MP-0	178	Static	128	128	0	0
BGP-known	113	Static	25000	25000	0	0
BGP-cfg-peer	114	Static	10000	10000	0	0
BGP-default	115	Static	1500	1500	0	0
PIM-mcast-default	116	Static	23000	23000	0	0
PIM-mcast-known	176	Static	23000	23000	0	0
PIM-ucast	117	Static	10000	10000	0	0
IGMP	118	Static	3500	3500	0	0
ICMP-local	119	Static	2500	2500	0	0
ICMP-app	120	Static	2500	2500	0	0
ICMP-control	164	Static	2500	2500	0	0
ICMP-default	121	Static	2500	2500	0	0
LDP-TCP-known	122	Static	25000	25000	0	0
LDP-TCP-cfg-peer	152	Static	10000	10000	0	0
LDP-TCP-default	154	Static	10000	10000	0	0
LDP-UDP	158	Static	2500	2500	0	0
All-routers	160	Static	10000	10000	0	0
LMP-TCP-known	123	Static	25000	25000	0	0
LMP-TCP-cfg-peer	153	Static	10000	10000	0	0
LMP-TCP-default	155	Static	10000	10000	0	0
LMP-UDP	159	Static	2500	2500	0	0
RSVP-UDP	124	Static	7000	7000	0	0
RSVP-default	125	Static	500	500	0	0
RSVP-known	126	Static	7000	7000	0	0
IKE	127	Static	1000	1000	0	0
IPSEC-known	129	Static	3000	3000	0	0
IPSEC-default	128	Static	1000	1000	0	0
MSDP-known	130	Static	1000	1000	0	0
MSDP-cfg-peer	131	Static	1000	1000	0	0
MSDP-default	132	Static	1000	1000	0	0
SNMP	133	Static	2000	2000	0	0
SSH-known	135	Static	1000	1000	0	0
SSH-default	136	Static	1000	1000	0	0
HTTP-known	137	Static	1000	1000	0	0
HTTP-default	138	Static	1000	1000	0	0
SHTTP-known	139	Static	1000	1000	0	0
IFIB_FT_SHTTP_DEFAULT	140	Static	1000	1000	0	0
TELNET-known	141	Static	1000	1000	0	0
TELNET-default	142	Static	1000	1000	0	0
CSS-known	143	Static	1000	1000	0	0
CSS-default	144	Static	1000	1000	0	0
RSH-known	145	Static	1000	1000	0	0
RSH-default	146	Static	1000	1000	0	0
UDP-known	147	Static	25000	25000	0	0
UDP-listen	156	Static	4000	4000	0	0
UDP-cfg-peer	157	Static	4000	4000	0	0
UDP-default	101	Static	500	500	0	0
TCP-known	148	Static	25000	25000	0	0
TCP-listen	149	Static	25000	25000	0	0
TCP-cfg-peer	150	Static	25000	25000	0	0
TCP-default	102	Static	500	500	0	0
Mcast-known	151	Static	25000	25000	0	0
Mcast-default	103	Static	500	500	0	0
Raw-listen	104	Static	500	500	0	0
Raw-default	105	Static	500	500	0	0
Ip-Sla	163	Static	10000	10000	0	0
EIGRP	109	Static	20000	20000	0	0
RIP	110	Static	20000	20000	0	0
L2TPv3	165	Static	25000	25000	0	0
PCEP	166	Static	100	100	0	0
GRE	167	Static	1000	1000	0	0
VRRP	168	Static	1000	1000	0	0
HSRP	169	Static	400	400	0	0
MPLS-oam	172	Static	100	100	0	0
L2TPv2	179	Static	25000	25000	0	0
DNS	173	Static	500	500	0	0

show lpts pifib hardware police

```

RADIUS                174      Static  7000    7000    0        0
TACACS                175      Static  500     500     0        0
NTP-default           134      Static  500     500     0        0
NTP-known              180      Static  500     500     0        0

```

```

-----
statistics:
Packets accepted by deleted entries: 0
Packets dropped by deleted entries: 0
Run out of statistics counter errors: 0

```

This table describes the significant fields shown in the display.

Table 57: 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 471	Configures the policer for the LPTS flow type.
lpts pifib hardware police, on page 477	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: <ul style="list-style-type: none"> • ipv4 —Specifies IPv4 entries. • ipv6 —Specifies IPv6 entries. • isis —Specifies ISIS entries.
location <i>node-id</i>	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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

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/0/0/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 58: 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 <i>node-id</i>	(Optional) Displays Pre-IFIB statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	--

Command Default

No default behavior or values

Command Modes

EXEC mode

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
lpts	read

Examples

The following sample output is from the **show lpts pifib statistics** command:

```
RP/0/0/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 59: show lpts pifib statistics Command Field Descriptions

Field	Description
Packets into Pre-IFIB	Packets presented for pre-IFIB lookups.

Field	Description
Lookups	Packets looked up.
Packets delivered locally	Packets delivered to local applications or the local stack (<i>n</i> 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 503	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/0/0/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/0/0/CPU0:router# show lpts vrf
```

```
VRF-ID      VRF-NAME
0x00000000  *
0x60000000  default
```

This table describes the significant fields shown in the display.

Table 60: 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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [clear ipv6 duplicate address, page 526](#)
- [clear ipv6 neighbors , page 527](#)
- [icmp ipv4 rate-limit unreachable, page 529](#)
- [icmp source, page 531](#)
- [ipv4 address \(network\), page 532](#)
- [ipv4 assembler max-packets, page 535](#)
- [ipv4 assembler timeout, page 536](#)
- [ipv4 conflict-policy, page 537](#)
- [ipv4 directed-broadcast, page 539](#)
- [ipv4 helper-address, page 541](#)
- [ipv4 mask-reply, page 543](#)
- [ipv4 mtu , page 544](#)
- [ipv4 redirects, page 546](#)
- [ipv4 source-route, page 547](#)
- [ipv4 unnumbered \(point-to-point\), page 548](#)
- [ipv4 unreachable disable , page 550](#)
- [ipv4 virtual address, page 552](#)
- [ipv6 address, page 554](#)
- [ipv6 address link-local, page 556](#)
- [ipv6 assembler, page 558](#)
- [ipv6 conflict-policy, page 560](#)

- [ipv6 enable](#) , page 561
- [ipv6 hop-limit](#), page 563
- [ipv6 icmp error-interval](#), page 564
- [ipv6 mtu](#) , page 566
- [ipv6 nd dad attempts](#) , page 568
- [ipv6 nd managed-config-flag](#) , page 571
- [ipv6 nd ns-interval](#) , page 573
- [ipv6 nd other-config-flag](#) , page 575
- [ipv6 nd prefix](#), page 577
- [ipv6 nd ra-interval](#) , page 580
- [ipv6 nd ra-lifetime](#) , page 582
- [ipv6 nd reachable-time](#) , page 584
- [ipv6 nd redirects](#), page 586
- [ipv6 nd scavenge-timeout](#), page 587
- [ipv6 nd suppress-ra](#) , page 588
- [ipv6 neighbor](#), page 590
- [ipv6 source-route](#), page 593
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- [ipv6 virtual address](#), page 597
- [local pool](#), page 599
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- [show clns statistics](#), page 619
- [show ipv4 interface](#) , page 621
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- [show ipv6 interface](#) , page 635
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- [show svd role](#), page 658
- [show vrf](#), page 659
- [show vrf-group](#), page 661
- [vrf](#), page 663
- [vrf\(address-family\)](#), page 664
- [vrf-group](#), page 666
- [vrf \(description\)](#), page 668
- [vrf \(mhost\)](#), page 670

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 Modes

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/0/0/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 <i>node-id</i>	(Optional) The designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	---

Command Default

None

Command Modes

Command History

Release	Modification
Release 3.2	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/0/0/CPU0:router# clear ipv6 neighbors ?
location specify a node name

RP/0/0/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 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/0/0/CPU0:router# clear ipv6 neighbors location 0/2/0
```

clear ipv6 neighbors

```
RP/0/0/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.
<i>milliseconds</i>	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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

The Cisco IOS XR software maintains 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/0/0/CPU0:router(config)# icmp ipv4 rate-limit unreachable 10
```

icmp source

To select the appropriate source IP address to be inserted in the ICMP response packets for generating exception packets (ICMP responses to packets that cannot be forwarded), use the **icmp source** command. To discard an IP address inserted in the ICMP response packets, use the **no** form of this command.

icmp ipv4 source {rfc|vrf}

no icmp ipv4 source {rfc|vrf}

Syntax Description

ipv4	Specifies an IPv4 address.
ipv6	Specifies an IPv6 address.
rfc	Enables RFC compliance for source address selection.
vrf	Enables VRF source address selection.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

The **rfc** keyword selects a source address that conforms to RFC 1812. RFC 1812 states that when generating an ICMP packet, the source address must be one of the addresses on the outgoing physical interface. If such an address is not available, selection may resort to the global router ID.

The **vrf** keyword selects a source address relevant to the VRF, in which the packet is interpreted.

Task ID

Task ID	Operations
network	read, write

Examples

The following example shows how to use the **icmp source** command:

```
RP/0/0/CPU0:router (config) #icmp ipv4 source vrf
```

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.
<i>mask</i>	Mask for the associated IP subnet. The network mask can be specified in either of two ways: <ul style="list-style-type: none"> 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.
<i>route-tag value</i>	(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 3.2	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/0/0/CPU0:router(config)# interface gigabitethernet 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv4 address 192.168.1.27 255.255.255.0
RP/0/0/CPU0:router(config-if)# ipv4 address 192.168.7.17 255.255.255.0 secondary
RP/0/0/CPU0:router(config-if)# ipv4 address 192.168.8.17 255.255.255.0 secondary
```

Related Commands

Command	Description
show ipv4 interface , on page 621	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** form of this command.

ipv4 assembler max-packets *percentage value*

no ipv4 assembler max-packets *percentage value*

Syntax Description

<i>percentage value</i>	Percentage of total packets available in the system. The range is from 1 to 50.
-------------------------	---

Command Default

None

Command Modes

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/0/0/CPU0:router(config)# ipv4 assembler max-packets 35
```

Related Commands

Command	Description
ipv4 assembler timeout , on page 536	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

<i>seconds</i>	Number of seconds an assembly queue can hold before a timeout occurs. The range is from 1 to 120.
----------------	---

Command Default

None

Command Modes

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/0/0/CPU0:router(config)# ipv4 assembler timeout 88
```

Related Commands

Command	Description
ipv4 assembler max-packets , on page 535	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 Modes

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/0/0/CPU0:router (config)# ipv6 conflict-policy static
```

Related Commands

Command	Description
show arm conflicts , on page 606	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 3.2	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/0/0/CPU0:router(config)# interface gigabitethernet 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv4 directed-broadcast
```

Related Commands

Command	Description
ipv4 unnumbered (point-to-point), on page 548	Enables IP processing on a point-to-point interface without assigning an explicit IP address to the interface.
show ipv4 interface , on page 621	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, 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>destination-address</i>	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 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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.

**Note**

To configure the address to which the software forwards BOOTP broadcasts, use the **helper-address** command in the DHCP IPv4 profile relay configuration submode. For more information, see the **helper-address** command in the DHCP Commands chapter.

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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/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 software to 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 3.2	This command was introduced.

Usage Guidelines This command enables the Cisco IOS XR software to 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 POS interface 0/1/1/0:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/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*

no ipv4 mtu

Syntax Description

<i>bytes</i>	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv4 mtu 300
```

Related Commands

Command	Description
show ipv4 interface , on page 621	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 3.2	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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.5.0	The following sections were modified: <ul style="list-style-type: none"> • 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/0/0/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*

no 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 3.2	This command was supported.

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/0/0/CPU0:router(config)# interface loopback 5
RP/0/0/CPU0:router(config-if)# ipv4 address 192.168.6.6 255.255.255.0
RP/0/0/CPU0:router(config)# interface gigabitethernet 0/1/1/0
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv4 unnumbered Bundle-Ether100.10
```

ipv4 unreachable disable

To disable the generation of IPv4 Internet Control Message Protocol (ICMP) unreachable messages, use the **ipv4 unreachable disable** command in an appropriate configuration mode. To re-enable the generation of ICMP unreachable messages, use the **no** form of this command.

ipv4 unreachable disable

no ipv4 unreachable disable

Syntax Description This command has no keywords or arguments.

Command Default IPv4 ICMP unreachable 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 3.2	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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv4 unreachable 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/0/0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv4 unreachable 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 <i>vrf-name</i>	(Optional) Configures the virtual address on a per VPN routing and forwarding (VRF) basis for the management interfaces. The <i>vrf-name</i> argument specifies the name of the VRF.
<i>ipv4 address</i>	Virtual IPv4 address and the mask that is to be unconfigured.
<i>mask</i>	Mask for the associated IP subnet. The network mask can be specified in either of two ways: <ul style="list-style-type: none"> • 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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
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. On a Cisco XR 12000 router, in which each RP has multiple Management Ethernet interfaces (two on PRP-1 or three on PRP-2), the virtual IPv4 address maps to whichever Management Ethernet interface on the active RP with which it shares a common IP subnet.

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/0/0/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/0/0/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

<i>ipv6-prefix</i>	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.
<i>/ prefix-length</i>	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.
<i>route-tag value</i>	(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 3.2	This command was supported.
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
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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv6 address 2001:0DB8:0:1::/64 eui-64
```

Related Commands

Command	Description
ipv6 address link-local, on page 556	Configures an IPv6 link-local address for an interface and enables IPv6 processing on the interface.
show ipv6 interface , on page 630	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

<i>ipv6-address</i>	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 <i>ipv6-address</i> 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.
<i>route-tag value</i>	(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 3.2	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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv6 address FE80::260:3EFF:FE11:6770 link-local
```

Related Commands

Command	Description
ipv6 address, on page 554	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 630	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

Examples

The following example shows how to configure the maximum number of packets that are allowed in assembly queues:

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# ipv6 assembler max-packets 100
```


Related Commands

Command	Description
ipv4 assembler max-packets , on page 535	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. 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 Modes

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/0/0/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

no 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 3.2	This command was supported.

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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv6 enable
```

For BNG, this example show how to enable IPv6 processing on dynamic template configuration mode:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 enable
```

Related Commands

Command	Description
show ipv6 interface , on page 630	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. 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

<i>hops</i>	Maximum number of hops. Range is 1 to 255.
-------------	--

Command Default

hops : 64 hops

Command Modes

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
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/0/0/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

<i>milliseconds</i>	Time interval (in milliseconds) between tokens being placed in the bucket. Range is 0 to 2147483647.
<i>bucketsize</i>	(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 Modes

Command History

Release	Modification
Release 3.2	This command was supported.

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

Task ID	Operations
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/0/0/CPU0:router(config)# ipv6 icmp error-interval 50 20
```

Related Commands

Command	Description
show ipv6 neighbors , on page 640	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*

no ipv6 mtu

Syntax Description

<i>bytes</i>	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 3.2	This command was supported.

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/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/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/0/0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 mtu 1350
```

Related Commands

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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*

no ipv6 nd dad attempts *value*

Syntax Description

<i>value</i>	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 3.2	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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface POS 0/2/0/1
```

```

RP/0/0/CPU0:router(config-if)# ipv6 nd dad attempts 1
RP/0/0/CPU0:router(config-if)# Uncommitted changes found, commit them before
exiting(yes/no/cancel)? [cancel]:y

RP/0/0/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/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd dad attempts 1

```

Related Commands

Command	Description
ipv6 nd ns-interval , on page 573	Configures the interval between IPv6 neighbor solicitation transmissions on an interface.
show ipv6 interface , on page 630	(Not applicable for BNG) Displays the usability status of interfaces configured for IPv6.

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

no 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 3.2	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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1  
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd managed-config-flag
```

Related Commands

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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*

no ipv6 nd ns-interval

Syntax Description

<i>milliseconds</i>	Interval (in milliseconds) between IPv6 neighbor solicit transmissions. Range is 1000 to 3600000.
---------------------	---

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 3.2	This command was supported.

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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd ns-interval 9000
```

Related Commands

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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

no 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 3.2	This command was supported.

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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd other-config-flag
```

Related Commands

Command	Description
ipv6 nd managed-config-flag , on page 571	Sets the managed address configuration flag in IPv6 router advertisements.
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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 <i>date-valid-expire month-valid-expire hh:mm-valid-expire date-prefer-expire month-prefer-expire hh:mm-prefer-expire</i> .
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 <i>onlink</i> 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 3.2	This command was supported.

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/0/0/CPU0:router(config)# interface POS 0/1/0/0
RP/0/0/CPU0:router(config-if)# ipv6 nd prefix 2001:0DB8::/35 1000 900
```

Related Commands

Command	Description
ipv6 address, on page 554	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 556	Configures an IPv6 link-local address for an interface and enables IPv6 processing on the interface.

Command	Description
ipv6 nd managed-config-flag , on page 571	Sets the managed address configuration flag in IPv6 router advertisements.
show ipv6 interface , on page 630	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*

no ipv6 nd ra-interval *seconds*

Syntax Description

<i>seconds</i>	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 3.2	This command was supported.

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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd ra-interval 201
```

Related Commands

Command	Description
ipv6 nd ra-lifetime , on page 582	Configures the lifetime of an IPv6 router advertisement.
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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*

no ipv6 nd ra-lifetime

Syntax Description

<i>seconds</i>	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 3.2	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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd ra-lifetime 1801
```

Related Commands

Command	Description
ipv6 nd ra-interval , on page 580	Configures the interval between IPv6 router advertisement transmissions on an interface.
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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*

no ipv6 nd reachable-time

Syntax Description

<i>milliseconds</i>	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 3.2	This command was supported .
Release 3.6.0	The range value was added for the <i>milliseconds</i> 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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0: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:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd reachable-time 1700000
```

Related Commands

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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 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
	network	read, write

Examples The following example shows how to redirect IPv6 nd-directed broadcasts on POS interface 0/2/0/2:

```
RP/0/0/CPU0:router(config)# interface POS 0/0/0/0
0/2/0/2
RP/0/0/CPU0:router(config-if)# ipv6 nd redirects
```

Related Commands	Command	Description
	show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

ipv6 nd scavenge-timeout

To set the lifetime for neighbor entries in the stale state, use the **ipv6 nd scavenge-timeout** command in Global Configuration mode mode. To disable this feature, use the **no** form of this command.

ipv6 nd scavenge-timeout *seconds*

no ipv6 nd scavenge-timeout *seconds*

Syntax Description

seconds	RA lifetime in seconds. The range is from 0 to 43200.
---------	---

Command Default

No default behavior or values

Command Modes

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

The following example shows how to set the lifetime for the neighbor entry:

```
RP/0/0/CPU0:router(config)# ipv6 nd scavenge-timeout 3000
```

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 reenale the sending of IPv6 router advertisement transmissions on a LAN interface, use the **no** form of this command.

ipv6 nd suppress-ra

no 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 3.2	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:

```
RP/0/0/CPU0:router(config)# interface POS 0/1/1/0
RP/0/0/CPU0:router(config-if)# ipv6 nd suppress-ra
```

For BNG, this example shows how to suppress IPv6 router advertisements in the dynamic template configuration mode:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp p1  
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 nd suppress-ra
```

Related Commands

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

ipv6 neighbor

To configure a static entry in the IPv6 neighbor discovery cache, use the **ipv6 neighbor** command in Global Configuration 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

<i>ipv6-address</i>	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.
<i>interface-type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-instance</i>	Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the modular services card or line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<i>hardware-address</i>	The local data-link address (a 48-bit address).

Command Default

Static entries are not configured in the IPv6 neighbor discovery cache.

Command Modes

Command History

Release	Modification
Release 3.2	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 0/0/CPU0/0:

```
RP/0/0/CPU0:router (config) # ipv6 neighbor 2001:0DB8::45A 0002.7D1A.9472
```

Related Commands

Command	Description
clear ipv6 neighbors , on page 527	Deletes all entries in the IPv6 neighbors discovery cache, except static entries.

Command	Description
ipv6 enable , on page 561	Disables IPv6 processing on an interface that has not been configured with an explicit IPv6 address.
show ipv6 neighbors , on page 640	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. 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 Modes

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

Examples

The following example shows how to allow the processing of any IPv6 datagrams containing a source-route header option:

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# ipv6 source-route
RP/0/0/CPU0:router(config)#
```

Related Commands

Command	Description
ipv4 source-route , on page 547	Allow the processing of any IPv4 datagrams containing a source-route header option.

ipv6 unreachable disable

To disable the generation of IPv6 Internet Control Message Protocol (ICMP) unreachable messages, use the **ipv6 unreachable disable** command in an appropriate configuration mode. To re-enable the generation of ICMP unreachable messages, use the **no** form of this command.

ipv6 unreachable disable

no ipv6 unreachable disable

Syntax Description This command has no keywords or arguments.

Command Default IPv6 ICMP unreachable 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/0/0/CPU0:router(config)# interface POS 0/6/0/0
RP/0/0/CPU0:router(config-if)# ipv6 unreachable disable
```

For BNG, this example shows how to disable the generation of ICMP unreachable messages on dynamic template configuration mode:

```
RP/0/0/CPU0:router(config)# dynamic-template type ppp foo
RP/0/0/CPU0:router(config-dynamic-template-type)# ipv6 unreachable 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 <i>vrf-name</i>	(Optional) Configures the virtual address on a per VPN routing and forwarding (VRF) basis for the management interfaces. The <i>vrf-name</i> argument specifies the name of the VRF.
<i>ipv6 address</i>	The virtual IPv6 address to be used.
<i>prefix-length</i>	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 Modes

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/0/0/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/0/0/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.
<i>vrf_name</i>	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.
<i>poolname</i>	Specifies the name of the local IPv4 address pool.
<i>first-ip-address</i>	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.
<i>last-ip-address</i>	(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/0/0/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/0/0/CPU0:router(config)#no local pool ipv4 default
RP/0/0/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/0/0/CPU0:router(config)#local pool ipv4 default 10.1.1.0 10.1.9.255
RP/0/0/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/0/0/CPU0:router(config)#local pool vrf grp1 ipv4 p1_g1 10.1.1.1 10.1.1.50
RP/0/0/CPU0:router(config)#local pool vrf grp1 ipv4 p2_g1 10.1.1.100 10.1.1.110
RP/0/0/CPU0:router(config)#local pool vrf grp2 ipv4 p1_g2 10.1.1.1 10.1.1.40
RP/0/0/CPU0:router(config)#local pool ipv4 lp1 10.1.1.1 10.1.1.10
RP/0/0/CPU0:router(config)#local pool vrf grp1 ipv4 p3_g1 10.1.2.1 10.1.2.30
RP/0/0/CPU0:router(config)#local pool vrf grp2 ipv4 p2_g2 10.1.1.50 10.1.1.70
RP/0/0/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.

remote-route-filtering

To disable remote route filtering on a vrf for SVD core-facing cards, use the **remote-route-filtering** command in the VRF configuration mode. To enable remote route filtering, use the **no** form of this command.

remote-route-filtering disable

no remote-route-filtering disable

Syntax Description

disable	Disables remote route filtering per VRF.
----------------	--

Command Default

By default, remote route filtering on a vrf is enabled.

Command Modes

VRF configuration

Command History

Release	Modification
Release 4.3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ip-services	read, write

Examples

This example shows how to disable remote route filtering on a vrf for SVD core-facing cards, using the **remote-route-filtering** command:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# vrf vrf-1
RP/0/0/CPU0:router(config-vrf)# remote-route-filtering disable
RP/0/0/CPU0:router(config-vrf)#
```

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

selective-vrf-download

To download locally significant tables on a customer-facing card, or to disable selective VRF download, use the **selective-vrf-download** command in Global Configuration mode. To disable this feature, use the **no** form of this command.

selective-vrf-download [**location** *location* **vrf-group** *group-name*] | [**disable**]

no selective-vrf-download [**location** *location* **vrf-group** *group-name*] | [**disable**]

Syntax Description

location <i>location</i>	Configures selective vrf-download on specified location.
vrf-group <i>group-name</i>	Downloads tables corresponding to the vrfs of the specified vrf-group.
disable	Disables selective VRF download.

Command Default

If selective VRF download is supported by the router, then, by default, **selective-vrf-download** is enabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 4.3.2	This command was introduced.

Usage Guidelines

For a location, only one vrf group is supported.

Task ID

Task ID	Operation
ip-services	read, write

Examples

This example shows how to download locally-significant routes on a customer facing router, using the **selective-vrf-download** command:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# selective-vrf-download location 0/2/CPU0 vrf-group group1
RP/0/0/CPU0:router(config-svd)#
```

This example shows how to disable selective VRF download, using the **selective-vrf-download** command:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# selective-vrf-download disable
RP/0/0/CPU0:router(config-svd)#
```

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

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.
<i>vrf-name</i>	(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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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/0/0/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/0/0/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/0/0/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 61: 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
interface	Displays the IPv4 or IPv6 address configured on the specified interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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.
<i>prefix / length</i>	Network prefix and mask. A slash (/) must precede the specified mask. The range is from 0 to 128.

Command Default

None

Command Modes

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> argument were added.

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/0/0/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 62: 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 Modes

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/0/0/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 63: show arm router-ids Command Field Descriptions

Field	Description
Router-ID	Router identification.

Field	Description
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 Modes

Command History

Release	Modification
Release 3.2	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/0/0/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 64: 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.
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 Modes

Command History

Release	Modification
Release 3.2	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:

```
RP/0/0/CPU0:router# show arm ipv4 summary
IPv4 Producers                : 5
IPv4 Router id consumers      : 7
IPv4 address conflicts        : 2
IPv4 unnumbered interface conflicts : 1
```

This table describes the significant fields shown in the display.

Table 65: 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 Modes

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/0/0/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 66: 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 Modes

Command History	Release	Modification
	Release 3.2	This command was supported.

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/0/0/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 67: show clns traffic Command Field Descriptions

Field	Description
Class	Indicates the packet type. Packet types are as follows: <ul style="list-style-type: none"> • IIS—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 overflowed. 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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ 0/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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 3.2	This command was introduced.
Release 3.3.0	The vrf keyword and <i>vrf-name</i> 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/0/0/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 unreachable 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 unreachable 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 68: 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.
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 unreachable	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 Protocol address resolution protocol

¹³ ICMPv4 = Internet Control Message Protocol internet control message protocol version 4

 show ipv4 interface**Related Commands**

Command	Description
show ipv6 interface , on page 630	Displays the usability status of interfaces configured for IPv6.

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 its parameter is missing, the default VRF is assumed.
<i>vrf_name</i>	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.
<i>poolname</i>	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/0/0/CPU0:router# show ipv4 local pool P1
Pool Begin End FreeInUse
```

show local pool

```

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 69: 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 599	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 Modes

Command History

Release	Modification
Release 3.2	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/0/0/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
```

show ipv4 traffic

```

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 70: 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

Related Commands

Command	Description
show ipv6 traffic , on page 647	Displays statistics about IPv6 traffic.

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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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

Release	Modification
Release 3.2	This command was introduced.
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: <ul style="list-style-type: none"> • 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	Operations
ipv6	read

Examples This is the sample output of the **show ipv6 interface** command:

```
RP/0/0/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 unreachable 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 71: 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	<p>The state of the address in relation to duplicate address detection. States can be any of the following:</p> <ul style="list-style-type: none"> • 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. <p>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.</p>
Global unicast addresses	Displays the global unicast addresses assigned to the interface.

Field	Description
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.

Examples

This is the sample output of the **show ipv6 interface brief link-local** command:

```
RP/0/0/CPU0:router#show ipv6 interface brief link-local
```

Interface	IPv6-Address	Status	Protocol
GigabitEthernet0/0/0/0	fe80::fe:8ff:feeb: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/0/0/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/0/0/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:feeb:26c5	Up	Up

This is the sample output of the **show ipv6 interface type interface-path-id brief global** command:

```
RP/0/0/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/0/0/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/0/0/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/0/0/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/0/0/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 621	Displays the usability status of interfaces configured for IPv4.

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.
<i>vrf-name</i>	(Optional) Name of a VRF.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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 3.2	This command was introduced.
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: <ul style="list-style-type: none"> • 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/0/0/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 unreachable 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 72: 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	<p>The state of the address in relation to duplicate address detection. States can be any of the following:</p> <ul style="list-style-type: none"> • 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. <p>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.</p>
Global unicast addresses	Displays the global unicast addresses assigned to the interface.

Field	Description
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.

Examples

This is the sample output of the **show ipv6 interface brief link-local** command:

```
RP/0/0/CPU0:router#show ipv6 interface brief link-local
```

```
Interface                IPv6-Address                Status    Protocol
GigabitEthernet0/0/0/0  fe80::fe:8ff:feeb: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/0/0/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/0/0/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:feeb:26c5     Up        Up
```

This is the sample output of the **show ipv6 interface type interface-path-id brief global** command:

```
RP/0/0/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/0/0/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/0/0/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/0/0/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/0/0/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 621	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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	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 <i>node-id</i>	(Optional) Designates a node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

All IPv6 neighbor discovery cache information is displayed.

Command Modes

Command History

Release	Modification
Release 3.2	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/0/0/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/0/0/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 73: 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.

show ipv6 neighbors

Field	Description
State	

Field	Description
	<p>The state of the neighbor cache entry. These are the states for dynamic entries in the IPv6 neighbor discovery cache:</p> <ul style="list-style-type: none"> • INCOMP (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. <p>These are the possible states for static entries in the IPv6 neighbor discovery cache:</p> <ul style="list-style-type: none"> • reach (reachable)—The interface for this entry is up. • INCOMP (incomplete)—The interface for this entry is down. <p>Note Reachability detection is not applied to static entries in the IPv6 neighbor discovery cache;</p>

show ipv6 neighbors

Field	Description
	therefore, the descriptions for the INCOMPLETE (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 645	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 This command has no keywords or arguments.

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/0/0/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 640	Displays IPv6 neighbor discovery cache information.

`show ipv6 neighbors summary`

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 Modes

Command History

Release	Modification
Release 3.2	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/0/0/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
```

show ipv6 traffic

```

    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 74: 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.

Field	Description
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 627	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 Modes

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/0/0/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 75: 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.
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 Modes

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/0/0/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 76: 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.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default

None

Command Modes

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/0/0/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 77: 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.
<i>interface-path-id</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <i>rack</i>: Chassis number of the rack. <i>slot</i>: Physical slot number of the modular services card or line card. <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default

None

Command Modes

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/0/0/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 78: 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 svd role

To display selective VRF download feature role information, use the **show svd role** command in EXEC mode.

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes EXEC mode

Release	Modification
Release 4.3.2	This command was introduced.

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

Task ID	Task ID	Operation
	ip-services	read

Examples This is a sample output from the **show svd role** command:

```
RP/0/0/CPU0:router# show svd role
Codes: (C) : user Configured role
Node Name      IPv4 Role      IPv6 Role
-----
0/0/CPU0      Standard      Standard
```

Related Commands

Command	Description
vrf, on page 663	Configures a VRF instance for a routing protocol.

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 Modes

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
	network	read, write

Examples The following example shows how to use the **show vrf** command:

```
RP/0/0/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 79: 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.
SAFI	Displays the VRF topology.

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

show vrf-group

To display all vrfs in a vrf group, use the **show vrf-group** command in EXEC mode.

show vrf-group *group-name* **location** *location*

Syntax Description

<i>group-name</i>	vrf-group with specified group-name
location <i>location</i>	vrfs corresponding to a specified location.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.3.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ip-services	read


Examples

This is a sample output from the **show vrf-group** command:

```
RP/0/0/CPU0:router# show vrf-group group1 location 0/0/CPU0
VRF-group : group1
Status    : Inactive
VRF count : 2
VRFs     :
           vrf1
           vrf2
```

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

 `show vrf-group`

vrf

To configure a VPN routing and forwarding (VRF) instance for a routing protocol, use the **vrf** command in router configuration mode. To disable the VRF instance, use the **no** form of this command.

vrf *vrf-name*

no vrf *vrf-name*

Syntax Description

<i>vrf-name</i>	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

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 VRF using the **vrf** command:

```
RP/0/0/CPU0:router# config
RP/0/0/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

<i>vrf-name</i>	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# vrf client
RP/0/0/CPU0:router(config-vrf)# address-family ipv4 unicast
```

```
RP/0/0/CPU0:router(config-vrf-af)#
```

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

vrf-group

To configure a vrf-group, use the **vrf-group** command in global configuration mode. To deconfigure a vrf-group, use the **no** form of this command.

vrf-group *group-name* **vrf** *vrf-name*

no vrf-group *group-name* **vrf** *vrf-name*

Syntax Description

<i>group-name</i>	vrf-group with specified group-name.
vrf <i>vrf-name</i>	Creates a vrf under the specified vrf group.

Command Default

None

Command Modes

Global Configuration

Command History

Release	Modification
Release 4.3.2	This command was introduced.

Usage Guidelines

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

The maximum vrf groups supported for a line card is 30. The maximum vrfs supported for each vrf-group is 300.

Task ID

Task ID	Operation
ip-services	read, write

Examples

This example shows how to configure a vrf-group using the **vrf-group** command:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# vrf-group VRF1
RP/0/0/CPU0:router(config-vrf-group)# vrf vrf5
RP/0/0/CPU0:router(config-vrf-group)# vrf vrf6
```

Related Commands

Command	Description
vrf , on page 663	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

<i>vrf-name</i>	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# vrf v1
RP/0/0/CPU0:router(config-vrf)# description client
```

Related Commands

Command	Description
vrf , on page 663	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

<i>vrf-name</i>	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 <i>multicast interface</i> .

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/0/0/CPU0:router(config)# configvrf 101
```



```
RP/0/0/CPU0:router(config-vrf)# vrf clientmhost ipv4 default-interface loop101
```

Related Commands

Command	Description
vrf , on page 663	Configures a VRF instance for a routing protocol.

vrf (mhost)



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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [clear prefix-list ipv4](#), page 674
- [clear prefix-list ipv6](#), page 676
- [copy prefix-list ipv4](#), page 678
- [copy prefix-list ipv6](#), page 680
- [deny \(prefix-list\)](#), page 682
- [ipv4 prefix-list](#), page 685
- [ipv6 prefix-list](#), page 687
- [permit \(prefix-list\)](#), page 689
- [remark \(prefix-list\)](#), page 692
- [resequence prefix-list ipv4](#), page 694
- [resequence prefix-list ipv6](#), page 696
- [show prefix-list](#), page 698
- [show prefix-list afi-all](#), page 699
- [show prefix-list ipv4](#), page 700
- [show prefix-list ipv4 standby](#), page 702
- [show prefix-list ipv6](#), page 703

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

<i>name</i>	Name of the prefix list from which the hit count is to be cleared.
<i>sequence-number</i>	(Optional) Sequence number of a prefix list. Range is 1 to 2147483646.

Command Default

No default behavior or values

Command Modes

Command History

Release	Modification
Release 3.2	This command was introduced.

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/0/0/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/0/0/CPU0:router# clear prefix-list ipv4 list3

RP/0/0/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 682	Sets deny conditions for an IPv4 or IP IPv6 prefix list.
ipv4 prefix-list, on page 685	Defines an IPv4 prefix list.
permit (prefix-list), on page 689	Sets permit conditions for an IPv4 or IPv6 prefix list.
show prefix-list ipv4, on page 700	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

<i>name</i>	Name of the prefix list from which the hit count is to be cleared.
<i>sequence-number</i>	(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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
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/0/0/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/0/0/CPU0:router# clear prefix-list ipv6 list1 60
RP/0/0/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 682	Sets deny conditions for an IPv4 or IPv6 prefix list.
ipv6 prefix-list, on page 687	Defines an IPv6 prefix list.
permit (prefix-list), on page 689	Sets permit conditions for an IPv4 or IPv6 prefix list.
show prefix-list ipv6, on page 703	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

<i>source-name</i>	Name of the prefix list to be copied.
<i>destination-name</i>	Destination prefix list where the contents of the <i>source-name</i> will be copied.

Command Default

No default behavior or values

Command Modes

Command History

Release	Modification
Release 3.2	This command was introduced.

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/0/0/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/0/0/CPU0:router# copy prefix-list ipv4 list1 list4

RP/0/0/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 685	Defines an IPv4 prefix list.
show prefix-list ipv4, on page 700	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

<i>source-name</i>	Name of the prefix list to be copied.
<i>destination-name</i>	Destination prefix list where the contents of the <i>source-name</i> will be copied.

Command Default

No default behavior or values

Command Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

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/0/0/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/0/0/CPU0:router# copy prefix-list ipv6 list1 list3

RP/0/0/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 687	Defines an IPv6 prefix list.
show prefix-list ipv6, on page 703	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

<i>sequence-number</i>	(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.
<i>network / length</i>	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 <i>length</i> (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 <i>length</i> (the “to” portion of the length range).
eq value	(Optional) Exact value of the <i>length</i> .

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 3.2	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

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:

$length < ge \text{ value} < le \text{ value} \leq 32$ (for IPv4)

$length < ge \text{ value} < le \text{ value} \leq 128$ (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/0/0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv6 prefix-list list2
RP/0/0/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/0/0/CPU0:router(config)# ipv6 prefix-list list3

RP/0/0/CPU0:router(config-ipv6_pfx)# deny 2000:1::/64 ge 25
RP/0/0/CPU0:router(config-ipv6_pfx)# deny 3000:1::/64 le 32
RP/0/0/CPU0:router(config-ipv6_pfx)# deny 4000:1::/64 ge 25
Uncommitted changes found, commit them? [yes]: y

RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/0/CPU0:router(config-ipv6_pfx)# no 30
Uncommitted changes found, commit them? [yes]: y
RP/0/0/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 685	Defines an IPv4 prefix list.
ipv6 prefix-list, on page 687	Defines an IPv6 prefix list.
permit (prefix-list), on page 689	Sets the permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 692	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4, on page 700	Displays the contents of the current IPv4 prefix list.
show prefix-list ipv6, on page 703	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

<i>name</i>	Name of the prefix list. Names cannot contain a space or quotation marks.
-------------	---

Command Default

No IPv4 prefix list is defined.

Command Modes

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.6.0	The prefix for the sample output was modified.

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/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipv4 prefix-list list2

RP/0/0/CPU0:router(config-ipv4_pfx)#deny 172.18.30.154/16 ge 25
RP/0/0/CPU0:router(config-ipv4_pfx)#
Uncommitted changes found, commit them? [yes]: Y

RP/0/0/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 682	Sets deny conditions for an IPv4 or IPv6 prefix list.
permit (prefix-list), on page 689	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 692	Inserts a helpful remark about a prefix list entry.
resequence prefix-list ipv4, on page 694	Renumbers existing statements and increments subsequent statements.
show prefix-list ipv4, on page 700	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

<i>name</i>	Name of the prefix list. Names cannot contain a space or quotation marks.
-------------	---

Command Default

No IPv6 prefix list is defined.

Command Modes

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
acl	read, write
ipv6	read, write

Examples

The following example shows how to create a prefix list named list-1:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipv6 prefix-list list-1
RP/0/0/CPU0:router(config-ipv6-pfx)# 40 permit 2000:1::/64
RP/0/0/CPU0:router(config-ipv6-pfx)# 60 deny 3000:1::/64
RP/0/0/CPU0:router(config-ipv6-pfx)#
Uncommitted changes found, commit them? [yes]: y

RP/0/0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64
RP/0/0/CPU0:router#
```

Related Commands

Command	Description
deny (prefix-list), on page 682	Sets deny conditions for an IPv4 or IPv6 prefix list.
permit (prefix-list), on page 689	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list), on page 692	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv6, on page 703	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

<i>sequence-number</i>	(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.
<i>network / length</i>	Network number and length (in bits) of the network mask.
ge <i>value</i>	(Optional) Specifies a prefix length greater than or equal to the value. It is the lowest value of a range of the <i>length</i> (the “from” portion of the length range). Range is 1 to 128.
le <i>value</i>	(Optional) Specifies a prefix length less than or equal to the value. It is the highest value of a range of the <i>length</i> (the “to” portion of the length range). Range is 1 to 128.
eq <i>value</i>	(Optional) Exact value of the <i>length</i> . 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 3.2	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/0/0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv4 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv6 prefix-list list1
RP/0/0/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/0/0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/0/CPU0:router(config-ipv6_pfx)# permit 2000:1::/64 ge 25
RP/0/0/CPU0:router(config-ipv6_pfx)# permit 3000:1::/64 le 32
RP/0/0/CPU0:router(config-ipv6_pfx)# permit 3000:1::/64 ge 25
Uncommitted changes found, commit them? [yes]: y
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipv6 prefix-list list3
RP/0/0/CPU0:router(config-ipv6_pfx)# no 30
Uncommitted changes found, commit them? [yes]: y
RP/0/0/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 682	Sets deny conditions for an IPv4 or IPv6 prefix list.
ipv4 prefix-list , on page 685	Creates an IPv4 prefix list.
ipv6 prefix-list , on page 687	Creates an IPv6 prefix list.
remark (prefix-list) , on page 692	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4 , on page 700	Displays the contents of current IPv4 prefix lists.
show prefix-list ipv6 , on page 703	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

<i>sequence-number</i>	(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).
<i>remark</i>	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 3.2	This command was supported.
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/0/0/CPU0:router(config)# ipv4 prefix-list deny-ten
RP/0/0/CPU0:router(config-ipv4_pfx)# 10 remark Deny all routes with a prefix of 10/8
RP/0/0/CPU0:router(config-ipv4_pfx)# 20 deny 10.0.0.0/8 le 32
RP/0/0/CPU0:router(config-ipv4_pfx)# end
```

In the following example, a remark is made to explain usage:

```
RP/0/0/CPU0:router# show prefix-list ipv6

ipv6 prefix-list list1
 40 permit 2000:1::/64
 60 deny 3000:1::/64

RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# ipv6 prefix-list list1
RP/0/0/CPU0:router(config-ipv6-pfx)# 10 remark use from july23 forward
RP/0/0/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/0/0/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 685	Creates an entry in a prefix list.
resequence prefix-list ipv4, on page 694	Renumbers existing statements and increments subsequent statements.
show prefix-list ipv4, on page 700	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

<i>name</i>	Name of a prefix list.
<i>base</i>	(Optional) Number of the first statement in the specified prefix list, which determines its order in the prefix list. Maximum value is 2147483646.
<i>increment</i>	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483646.

Command Default

base: 10
increment: 10

Command Modes

Command History

Release	Modification
Release 3.2	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. 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/0/0/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/0/0/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/0/0/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 682	Sets deny conditions for an IPv4 or IPv6 prefix list.
permit (prefix-list) , on page 689	Sets permit conditions for an IPv4 or IPv6 prefix list.
remark (prefix-list) , on page 692	Inserts a helpful remark about a prefix list entry.
show prefix-list ipv4 , on page 700	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

<i>name</i>	Name of a prefix list.
<i>base</i>	(Optional) Number of the first statement in the specified prefix list, which determines its order in the prefix list. Maximum value is 2147483644.
<i>increment</i>	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483644.

Command Default

base: 10

increment: 10

Command Modes

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/0/0/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/0/0/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.
```

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

<i>list-name</i>	(Optional) Name of a prefix list.
<i>sequence-number</i>	(Optional) Sequence number of the prefix list entry. Range is 1 to 2147483646.

Command Default

No default behavior or values

Command Modes

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/0/0/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 Modes

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/0/0/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

<i>list-name</i>	(Optional) Name of a prefix list.
<i>sequence-number</i>	(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 Modes

Command History

Release	Modification
Release 3.2	This command was supported.
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/0/0/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/0/0/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/0/0/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 674	Resest the hit count on an IPv4 prefix list.
ipv4 prefix-list, on page 685	Defines an IPv4 prefix list.
show prefix-list ipv6, on page 703	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

<i>prefix-list name</i>	(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 Modes

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/0/0/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

<i>list-name</i>	(Optional) Name of a prefix list.
<i>sequence-number</i>	(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 Modes

Command History

Release	Modification
Release 3.2	This command was introduced.

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/0/0/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/0/0/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/0/0/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/0/0/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 676	Resest the hit count on an IPv4 prefix list.
copy prefix-list ipv6 , on page 680	Creates a copy of an existing IPv6 prefix list.
ipv6 prefix-list , on page 687	Creates an IPv6 prefix list.



Transport Stack Commands

This chapter describes the Cisco IOS XR software commands 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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [clear nsr ncd client, page 707](#)
- [clear nsr ncd queue, page 709](#)
- [clear raw statistics pcb, page 711](#)
- [clear tcp nsr client, page 713](#)
- [clear tcp nsr pcb, page 715](#)
- [clear tcp nsr session-set, page 718](#)
- [clear tcp nsr statistics client, page 720](#)
- [clear tcp nsr statistics pcb, page 722](#)
- [clear tcp nsr statistics session-set, page 724](#)
- [clear tcp nsr statistics summary, page 726](#)
- [clear tcp pcb, page 727](#)
- [clear tcp statistics, page 729](#)
- [clear udp statistics, page 731](#)
- [forward-protocol udp, page 733](#)
- [nsr process-failures switchover, page 735](#)
- [service tcp-small-servers, page 736](#)
- [service udp-small-servers, page 738](#)
- [show nsr ncd client, page 740](#)
- [show nsr ncd queue, page 743](#)
- [show raw brief, page 745](#)

- [show raw detail pcb](#), page 747
- [show raw extended-filters](#), page 749
- [show raw statistics pcb](#), page 751
- [show sctp association brief](#), page 753
- [show sctp association detail](#), page 755
- [show sctp pcb brief](#), page 761
- [show sctp pcb detail](#), page 763
- [show sctp statistics](#), page 765
- [show sctp summary](#), page 768
- [show tcp brief](#), page 770
- [show tcp detail](#), page 772
- [show tcp extended-filters](#), page 774
- [show tcp statistics](#), page 776
- [show tcp nsr brief](#), page 778
- [show tcp nsr client brief](#), page 780
- [show tcp nsr detail client](#), page 782
- [show tcp nsr detail pcb](#), page 784
- [show tcp nsr detail session-set](#), page 787
- [show tcp nsr session-set brief](#), page 789
- [show tcp nsr statistics client](#), page 791
- [show tcp nsr statistics pcb](#), page 793
- [show tcp nsr statistics session-set](#), page 795
- [show tcp nsr statistics summary](#), page 797
- [show udp brief](#), page 799
- [show udp detail pcb](#), page 801
- [show udp extended-filters](#), page 803
- [show udp statistics](#), page 805
- [tcp mss](#), page 807
- [tcp path-mtu-discovery](#), page 808
- [tcp selective-ack](#), page 809
- [tcp synwait-time](#), page 811
- [tcp timestamp](#), page 812
- [tcp window-size](#), page 813

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

<i>PID value</i>	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

The default 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/0/0/CPU0:router# clear nsr ncd client all
RP/0/0/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 enqueueing to client : 0
Time of last clear        : Sun Jun 10 14:43:44 20

RP/0/0/CPU0:router# show nsr ncd client brief

Pid   Protocol  Instance  Total   Total   Accepted
      Packets Acks     Packets/Acks
3874979 TCP        1         0     0         0
```

Related Commands

Command	Description
clear nsr ncd queue, on page 709	Clears the counters for the NSR Consumer Demuxer (NCD) queue.
show nsr ncd client, on page 740	Displays information about the clients for NSR Consumer Demuxer (NCD).
show nsr ncd queue, on page 743	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# clear nsr ncd queue all
RP/0/0/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
```

clear nsr ncd queue

```

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 enqueueing 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 enqueueing to client    : 0
Time of last clear                 : Sun Jun 10 14:44:38 2007

```

```
RP/0/0/CPU0:router# show nsr ncd queue brief
```

Queue	Total Packets	Accepted Packets
NSR_LOW	0	0
NSR_HIGH	0	0

Related Commands

Command	Description
clear nsr ncd client, on page 707	Clears the counters for the NSR Consumer Demuxer (NCD) client.
nsr process-failures switchover, on page 735	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 740	Displays information about the clients for NSR Consumer Demuxer (NCD).
show nsr ncd queue, on page 743	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 <i>node-id</i>	Clears statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/CPU0:router# clear raw statistics pcb 0x80553b0
RP/0/0/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/0/0/CPU0:router# clear raw statistics pcb all
RP/0/0/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 745	Displays information about active RAW IP sockets.
show raw statistics pcb , on page 751	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

<i>ccb-address</i>	Client Control Block (CCB) of the NSR client.
all	Specifies all the clients.
location <i>node-id</i>	(Optional) Displays client information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# show tcp nsr client brief
```

clear tcp nsr client

```

CCB          Proc Name      Instance   Sets      Sessions/NSR Up Sessions
0x482c10e0   mpls_ldp      1         2         3/1
0x482afacc   mpls_ldp      2         1         2/2

```

```

RP/0/0/CPU0:router# clear tcp nsr client 0x482afacc
RP/0/0/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 735	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 780	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# show tcp nsr brief
```

clear tcp nsr pcb

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/0/0/CPU0:router# clear tcp nsr pcb 0x482d7470
RP/0/0/CPU0:router# clear tcp nsr pcb 0x482d2844
RP/0/0/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 778	Displays the key nonstop routing (NSR) state of TCP connections on different nodes.
show tcp nsr detail pcb, on page 784	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

<i>sscb-address</i>	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 <i>node-id</i>	(Optional) Displays session set information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# show tcp nsr client brief
CCB          Proc Name      Instance  Sets      Sessions/NSR Up Sessions
0x482b5ee0   mpls_ldp      1         1         10/10

RP/0/0/CPU0:router# clear tcp nsr client 0x482b5ee0
RP/0/0/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 787	Displays detailed information about the nonstop routing (NSR) state of the session sets on different nodes.
show tcp nsr session-set brief, on page 789	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

<i>ccb-address</i>	Client Control Block (CCB) of the desired client. For example, the address range can be 0x482a4e20.
all	Specifies all the clients.
location <i>node-id</i>	(Optional) Displays client information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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/0/0/CPU0:router# clear tcp nsr statistics client all

RP/0/0/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 791	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

<i>pcb-address</i>	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 <i>node-id</i>	(Optional) Displays connection information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 occurred : 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 Message 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/0/0/CPU0:router# clear tcp nsr statistics pcb 0x482d14c8
RP/0/0/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 occurred : 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 Message 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 793	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

<i>sscb-address</i>	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 <i>node-id</i>	(Optional) Displays session set information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 occurred   :0
Last clear at: Never Cleared

RP/0/0/CPU0:router# clear tcp nsr statistics session-set all
RP/0/0/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 occurred   :0
Last clear at: Thu Aug 16 18:37:00 2007
    
```

Related Commands

Command	Description
show tcp nsr statistics session-set, on page 795	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 <i>node-id</i>	(Optional) Displays statistics summary information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# clear tcp nsr statistics summary
```

Related Commands

Command	Description
show tcp nsr statistics summary, on page 797	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		
	<i>pcb-address</i>	Clears the TCP connection at the specified PCB address.
	all	Clears all open TCP connections.
	location <i>node-id</i>	Clears the TCP connection for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.2	This command was supported.

Usage Guidelines The **clear tcp pcb** command is useful for clearing hung TCP connections. Use the [show tcp brief](#), on page 770 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/0/0/CPU0:router# clear tcp pcb 60B75E48
```

clear tcp pcb**Related Commands**

Command	Description
show tcp brief , on page 770	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 <i>pcb-address</i>	(Optional) Clears statistics for a specific TCP connection.
summary	(Optional) Clears summary statistic for a specific node or connection.
location <i>node-id</i>	(Optional) Clears TCP statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.
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 776](#) 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/0/0/CPU0:router# clear tcp statistics
```

Related Commands

Command	Description
show tcp statistics , on page 776	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 <i>all</i>	Clears statistics for all UDP connections.
pcb <i>pcb-address</i>	Clears statistics for a specific UDP connection.
summary	Clears UDP summary statistics.
location <i>node-id</i>	Clears UDP statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

Use the **clear udp statistics** command to clear UDP statistics. Use the [show udp statistics, on page 805](#) 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/0/0/CPU0:router# clear udp statistics summary
```

Related Commands

Command	Description
show udp statistics, on page 805	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

<i>port-number</i>	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

Disabled

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/CPU0:router(config)# forward-protocol udp domain disable
RP/0/0/CPU0:router(config)# forward-protocol udp tftp disable
RP/0/0/CPU0:router(config)# interface MgmtEth 0/0/CPU0/0
RP/0/0/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/0/0/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.
<i>number</i>	(Optional) Number value. Range is 1 to 2147483647.
no-limit	(Optional) Sets no limit to the number of allowable TCP small servers.
<i>access-list-name</i>	(Optional) The name of an access list.

Command Default

TCP small servers are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/CPU0:router(config)# service ipv4 tcp-small-servers max-servers 5 ac1100
```

Related Commands

Command	Description
service udp-small-servers, on page 738	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.
<i>number</i>	(Optional) Number value. Range is 1 to 2147483647.
no-limit	(Optional) Sets no limit to the number of allowable UDP small servers.
<i>access-list-name</i>	(Optional) Name of an access list.

Command Default

UDP small servers are disabled.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/CPU0:router(config)# service ipv6 udp-small-servers max-servers 10
```

Related Commands

Command	Description
service tcp-small-servers, on page 736	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

<i>PID value</i>	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 enqueueing to client    : 0
Time of last clear                : Never cleared

```

The following sample output shows brief information about all the clients:

```
RP/0/0/CPU0:router# show nsr ncd client brief
```

```

Pid   Protocol  Instance  Total  Total  Accepted
3874979 TCP        1         28    0     28

```

This table describes the significant fields shown in the display.

Table 80: 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 enqueueing 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 707	Clears the counters for the NSR Consumer Demuxer (NCD) client.
clear nsr ncd queue, on page 709	Clears the counters for the NSR Consumer Demuxer (NCD) queue.
show nsr ncd queue, on page 743	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/CPU0:router# show nsr ncd queue brief
      Queue          Total      Accepted
                Packets      Packets
```

```

NSR_LOW          992          992
NSR_HIGH         0           0

```

This table describes the significant fields shown in the display.

Table 81: show nsr ncd queue Command Field Descriptions

Field	Description
Total Packets	Total number of packets that are received from the partner stack.
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 707	Clears the counters for the NSR consumer demuxer (NCD) client.
clear nsr ncd queue, on page 709	Clears the counters for the NSR consumer demuxer (NCD) queue.
show nsr ncd client, on page 740	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	--

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/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 82: 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.
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

<i>pcb-address</i>	Displays statistics for a specified RAW connection.
all	Displays statistics for all RAW connections.
location <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.
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/0/0/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 83: 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 <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 3.2	This command was supported.
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/0/0/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 84: 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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/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/0/0/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 85: 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 711	Clears statistics for either a single RAW connection or for all RAW connections.
show raw brief , on page 745	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 761 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/0/0/CPU0:router# show sctp association brief all pcb 0x4834e088
All associations 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 86: 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 755	Displays detailed statistics that have accumulated for the specified Stream Control Transmission Protocol (SCTP) association.
show sctp pcb brief, on page 761	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 <i>node-id</i>	(Optional) Displays detailed association information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

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/0/0/CPU0:router# show sctp association detail 0x4c6c35ee
PCB 0x4834e088, Asoc 0x4c6c35ee, lport 56100, rport 5000, vrf 0x60000000, state OPEN
Local addr 0, remote addr 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
```

show sctp association detail

```

ASCONF: seqout 3132776750, seqin 166718713, STRRST: seqout 3132776750, seqin 1667187 14
Last strseq rcv 0, last stream num rcv 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 retrans 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 retrans 8, Max send retrans 10, Def net retrans 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 retrans cnt 0
Size/msg on reassemblyQ 0/0, Msg on strmbuf 0

Overall error cnt 0, Dup tsns rcv 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 87: 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 addr	Local addresses attached to the association.
rmote addr	Remote addresses attached to the association.
mtu	MTU of the association.
v4 addr legal	Attached IPv4 addresses are valid.

Field	Description
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.
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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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.

Field	Description
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.
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.

Field	Description
SACK freq	Frequency of selective acknowledgements.
Peer hmac	Peer Hash Message Authentication Code (HMAC) ID to send.
Peer supports	Peer supports the following list: <ul style="list-style-type: none"> • 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.
Send	Send is listed as one of the following types: <ul style="list-style-type: none"> • 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.

Field	Description
Overall error cnt	Total error count on this association.
Dup tsns rcv	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 753	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 753 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/0/0/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 88: 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 753	Displays brief association information for Stream Control Transmission Protocol (SCTP).
show sctp pcb detail, on page 763	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 <i>node-id</i>	(Optional) Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

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/0/0/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, associations: 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 89: 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 abort.
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 761	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
```

show sctp statistics

```

    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 doesn't allow sending
  0 max burst doesn'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 unordered 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 abandoned by close
0 send burst avoidance, already max burst in flight to net
0 send cwnd full avoidance, already max burst in flight to net
0 number of map array over-runs via fwd-tsn's

```

This table describes the significant fields shown in the display.

Table 90: 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 768	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

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	Operations
transport	read

Examples The following sample output is from the **show sctp summary** command:

```
RP/0/0/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 91: 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 765	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 <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC 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

Examples

The following is sample output from the **show tcp brief** command:

```
RP/0/0/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 92: show tcp brief Command Field Descriptions

Field	Description
TCPCB	Memory address of the TCP control block.

Field	Description
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.
State	State of the TCP connection.

Related Commands

Command	Description
clear tcp pcb, on page 727	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.
<i>value</i>	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 3.2	This command was supported.

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/0/0/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 <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 3.2	This command was supported.

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/0/0/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 <i>pcb-address</i>	(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 <i>node-id</i>	(Optional) Displays statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC 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

Examples

The following is sample output from the **show tcp statistics** command:

```
RP/0/0/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 93: show tcp statistics Command Field Descriptions

Field	Description
vrfid	VPN routing and forwarding (VRF) identification (vrfid) number.
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 729	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 <i>node-id</i>	(Optional) Displays information for all TCP sessions for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 94: 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 715	Brings the NSR down on a specified connection or all connections.
show tcp nsr client brief, on page 780	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 <i>node-id</i>	(Optional) Displays brief client information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 95: 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 713	Clears detailed information about the nonstop routing (NSR) clients.
show tcp nsr brief, on page 778	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

<i>ccb-address</i>	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 <i>node-id</i>	(Optional) Displays client information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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/0/0/CPU0:router# show tcp nsr detail client all location 1
RP/0/0/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 784	Displays detailed information about the nonstop routing (NSR) state of TCP connections.
show tcp nsr detail session-set, on page 787	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

<i>pcb-address</i>	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 <i>node-id</i>	(Optional) Displays connection information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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
```

show tcp nsr detail pcb

```

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 715	Brings the NSR down on a specified connection or all connection.
show tcp nsr detail client, on page 782	Displays detailed information about the nonstop routing (NSR) clients.
show tcp nsr detail session-set, on page 787	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

<i>sscb-address</i>	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 <i>node-id</i>	(Optional) Displays information for session sets for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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
```

show tcp nsr detail session-set

```

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 718	Clears information about session sets.
show tcp nsr detail client, on page 782	Displays detailed information about the nonstop routing (NSR) clients.
show tcp nsr detail pcb, on page 784	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/0/0/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/0/0/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 96: 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 718	Clears information about session sets.
show tcp nsr detail session-set, on page 787	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

<i>ccb-address</i>	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 <i>node-id</i>	(Optional) Displays statistics for the client for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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
```

show tcp nsr statistics client

```

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 720	Clears the nonstop routing (NSR) statistics of the client.
show tcp nsr statistics pcb, on page 793	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics session-set, on page 795	Displays the nonstop routing (NSR) statistics for a session set.
show tcp nsr statistics summary, on page 797	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

<i>pcb-address</i>	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 <i>node-id</i>	(Optional) Displays connection statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 occurred : 0
Last clear at: Sun Jun 10 13:55:35 2007
```

show tcp nsr statistics pcb

```

=====
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 occurred : 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 occurred : 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 occurred : 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 occurred : 0
Last clear at: Never Cleared

```

Related Commands

Command	Description
clear tcp nsr statistics pcb, on page 722	Clears the nonstop routing (NSR) statistics for TCP connections.
show tcp nsr statistics client, on page 791	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics session-set, on page 795	Displays the nonstop routing (NSR) statistics for a session set.
show tcp nsr statistics summary, on page 797	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

<i>sscb-address</i>	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 <i>node-id</i>	(Optional) Displays session set information for the statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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
```

show tcp nsr statistics session-set

```

Number of times switch-over occurred      :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 occurred     :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 occurred     :0
Last clear at: Sun Jun 10 13:36:51 2007
    
```

Related Commands

Command	Description
clear tcp nsr statistics session-set, on page 724	Clears the nonstop routing (NSR) statistics for session sets.
show tcp nsr statistics client, on page 791	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics pcb, on page 793	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics summary, on page 797	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 <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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/0/0/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 726	Clears the statistics summary.
show tcp nsr statistics client, on page 791	Displays the nonstop routing (NSR) statistics for the clients.
show tcp nsr statistics pcb, on page 793	Displays the nonstop routing (NSR) statistics for a given Protocol Control Block (PCB).
show tcp nsr statistics session-set, on page 795	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 <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--------------------------------	---

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

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

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
	transport	read

Examples The following is sample output from the **show udp brief** command:

```
RP/0/0/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 97: 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.
Foreign Address	Foreign address and foreign port.

Related Commands

Command	Description
show tcp brief , on page 770	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		
	<i>pcb-address</i>	Address of a specified UDP connection.
	all	Provides statistics for all UDP connections.
	location <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.2	This command was supported.
	Release 3.3.0	The command name was changed from show udp pcb to show 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/0/0/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 98: 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	Parameter	Description
	location <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> 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 3.2	This command was supported.

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/0/0/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-address*|*all*}} [**location** *node-id*]

Syntax Description

summary	Displays summary statistics.
pcb <i>pcb-address</i>	Displays detailed statistics for each connection.
pcb <i>all</i>	Displays detailed statistics for all connections.
location <i>node-id</i>	Displays information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.

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/0/0/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 cloning

This table describes the significant fields shown in the display.

Table 99: 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 731	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/0/0/CPU0:router(config)# tcp mss 1460
RP/0/0/CPU0:router(config)# exit

Uncommitted changes found, commit them? [yes]:
RP/0/0/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/0/0/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 <i>minutes</i>	(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 3.2	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/0/0/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 3.2	This command was supported.

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/0/0/CPU0:router(config)# tcp selective-ack
```

Related Commands	Command	Description
	tcp timestamp , on page 812	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

<i>seconds</i>	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 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

The following example shows how to configure the software to continue attempting to establish a TCP connection for 18 seconds:

```
RP/0/0/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 in Global 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 3.2	This command was supported.

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/0/0/CPU0:router(config)# tcp timestamp
```

Related Commands	Command	Description
	tcp selective-ack , on page 809	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 3.2	This command was supported.

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/0/0/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 *Cisco IOS XR IP Addresses and Services Configuration Guide for the Cisco XR 12000 Series Router*.

- [accept-mode](#), page 817
- [accept-mode\(slave\)](#), page 819
- [address-family](#), page 821
- [address \(VRRP\)](#), page 823
- [address global](#), page 825
- [address linklocal](#), page 827
- [address secondary](#), page 829
- [bfd minimum-interval \(VRRP\)](#), page 831
- [bfd multiplier \(VRRP\)](#), page 833
- [clear vrrp statistics](#), page 834
- [delay \(VRRP\)](#), page 836
- [interface \(VRRP\)](#), page 838
- [message state disable](#), page 840
- [router vrrp](#), page 842
- [session name\(vrrp\)](#), page 844
- [show vrrp](#), page 846
- [slave follow\(vrrp\)](#), page 851
- [slave primary virtual IPv4 address\(vrrp\)](#), page 853
- [slave secondary virtual IPv4 address\(vrrp\)](#), page 855
- [snmp-server traps vrrp events](#), page 857
- [track object\(vrrp\)](#), page 858

- [vrrp](#), page 860
- [vrrp assume-ownership disable](#), page 862
- [vrrp bfd fast-detect](#), page 864
- [vrrp bfd minimum-interval](#), page 866
- [vrrp bfd multiplier](#), page 868
- [vrrp delay](#), page 870
- [vrrp ipv4](#), page 872
- [vrrp preempt](#), page 874
- [vrrp priority](#), page 876
- [vrrp text-authentication](#), page 878
- [vrrp timer](#), page 880
- [vrrp track interface](#), page 882

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 submenu. 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

Examples

This example shows how to disable the installation of routes for the VRRP virtual addresses:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/0/CPU0:router(config-vrrp-virtual-router)# accept-mode disable
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 823	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 825	Configures the global virtual IPv6 address for a virtual router.
address linklocal, on page 827	Sets the virtual link-local IPv6 address for a virtual router.
address secondary, on page 829	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 840	Disables the task of logging the VRRP state change events.

accept-mode(slave)

To disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses, use the **accept-mode** command in the VRRP slave submenu. 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 submenu 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

Examples

This example shows how to disable the installation of routes for the VRRP virtual addresses:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 slave
RP/0/0/CPU0:router(config-vrrp-virtual-router)# accept-mode disable
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode , on page 817	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

Examples

The following example shows how to enable address-family mode:

```
RP/0/0/CPU0:router # config
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
```

Related Commands

Command	Description
interface (VRRP), on page 838	Enables VRRP interface configuration mode.

address-family

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	<i>address</i>	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

Examples This example shows how to set the primary virtual IPv4 address for the virtual router:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 3
RP/0/0/CPU0:router(config-vrrp-virtual-router)# address 192.168.18.1
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode, on page 817	Disables the installation of routes for the VRRP virtual addresses.
address global, on page 825	Configures the global virtual IPv6 address for a virtual router.
address linklocal, on page 827	Sets the virtual link-local IPv6 address for a virtual router.
address secondary, on page 829	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 840	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	<i>ipv6-address</i>	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

Examples This example shows how to add a global virtual IPv6 address for the virtual router:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv6
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 3
RP/0/0/CPU0:router(config-vrrp-virtual-router)# address global 4000::1000
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 823	Sets the primary virtual IPv4 address for a virtual router.
accept-mode, on page 817	Disables the installation of routes for the VRRP virtual addresses.
address linklocal, on page 827	Sets the virtual link-local IPv6 address for a virtual router.
address secondary, on page 829	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 840	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	
<i>ipv6-address</i>	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

Examples This example shows how to autoconfigure the VRRP IPv6 link-local address:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router (config)#router vrrp
RP/0/0/CPU0:router (config-vrrp)#interface TenGigE 0/4/0/4
RP/0/0/CPU0:router (config-vrrp-if)#address-family ipv6
RP/0/0/CPU0:router (config-vrrp-address-family)#vrrp 3
RP/0/0/CPU0:router (config-vrrp-virtual-router)#address linklocal autoconfig
RP/0/0/CPU0:router (config-vrrp-virtual-router)#
```

This example shows how to configure the virtual link-local IPv6 address for the virtual router:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router vrrp
RP/0/0/CPU0:router(config-vrrp)#interface TenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)#address-family ipv6
RP/0/0/CPU0:router(config-vrrp-address-family)#vrrp 3
RP/0/0/CPU0:router(config-vrrp-virtual-router)#address linklocal FE80::260:3EFF:FE11:6770
RP/0/0/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 823	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 825	Configures the global virtual IPv6 address for a virtual router.
accept-mode, on page 817	Disables the installation of routes for the VRRP virtual addresses.
address secondary, on page 829	Sets the secondary virtual IPv4 address for a virtual router.
message state disable, on page 840	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.
<i>address</i>	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

Examples

This example shows how to set the secondary virtual IPv4 address for the virtual router:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/0/CPU0:router(config-vrrp-virtual-router)# address 192.168.18.1 secondary
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
address (VRRP), on page 823	Sets the primary virtual IPv4 address for a virtual router.
address global, on page 825	Configures the global virtual IPv6 address for a virtual router.
address linklocal, on page 827	Sets the virtual link-local IPv6 address for a virtual router.
accept-mode, on page 817	Disables the installation of routes for the VRRP virtual addresses.
message state disable, on page 840	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	<i>interval</i>	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/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-vrrp-if)# bfd minimum-interval 100
```

Related Commands	Command	Description
	vrrp bfd fast-detect , on page 864	Enables BFD on a VRRP interface.

bfd minimum-interval (VRRP)

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	<i>multiplier</i>	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/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-vrrp-if)# bfd multiplier 10
```

Related Commands	Command	Description
	vrrp bfd fast-detect , on page 864	Enables BFD on a VRRP interface.

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.
<i>interface-path-id</i>	<p>(Optional) Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> • Physical interface instance. Naming notation is <i>rack/slot/module/port</i> and a slash between values is required as part of the notation. <ul style="list-style-type: none"> ◦ <i>rack</i>: Chassis number of the rack. ◦ <i>slot</i>: Physical slot number of the modular services card or line card. ◦ <i>module</i>: Module number. A physical layer interface module (PLIM) is always 0. ◦ <i>port</i>: Physical port number of the interface. <p>Note In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RP0 or RP1) and the module is CPU0. Example: interface mgmtEth 0/ RP1/CPU0/0.</p> <ul style="list-style-type: none"> • Virtual interface instance. Number range varies depending on interface type. <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
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/0/0/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 <i>value</i>	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload <i>value</i>	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/0/0/CPU0:router(config)# router vrrp  
RP/0/0/CPU0:router(config-vrrp)# interface mgmtEth 0/RP0/CPU0/0  
RP/0/0/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

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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 3.2	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/0/0/CPU0:router(config)# router vrrp  
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0  
RP/0/0/CPU0:router(config-vrrp-if)# vrrp 1 ipv4 192.168.18.1
```

```
RP/0/0/CPU0:router# config  
RP/0/0/CPU0:router(config)# router vrrp  
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4  
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4  
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2  
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
router vrrp, on page 842	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

Examples This example shows how to disable the logging of VRRP state change events:

```
RP/0/0/CPU0:router#configure
RP/0/0/CPU0:router(config)#router vrrp
RP/0/0/CPU0:router(config-vrrp)#message state disable
RP/0/0/CPU0:router(config-vrrp)#
```

Related Commands

Command	Description
address (VRRP), on page 823	Sets the primary virtual IPv4 address for a virtual router.

Command	Description
address global, on page 825	Configures the global virtual IPv6 address for a virtual router.
accept-mode, on page 817	Disables the installation of routes for the VRRP virtual addresses.
address secondary, on page 829	Sets the secondary virtual IPv4 address for a virtual router.
address linklocal, on page 827	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 3.2	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
interface (VRRP), on page 838	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

<i>name</i>	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

Examples

This example shows how to configure a VRRP session name.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-ipv4)# vrrp 1
RP/0/0/CPU0:router(config-vrrp-virtual-router)# name s1
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode , on page 817	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.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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.
<i>vrid</i>	(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 3.2	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:

```
RP/0/0/CPU0: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 100: 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.

Field	Description
P	Indicates whether the VRRP router is configured to preempt (default).
State	State of the virtual router.
Master addr	IP address of the master router.
VRouter addr	Virtual router IP address of the virtual router.

The following sample output is from the **show vrrp** command with the **detail** keyword:

```
RP/0/0/CPU0: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:
    Interface          State          Priority
    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 101: 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 (master or backup).
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 master router.
Advertise time	Interval (in seconds) at which the router sends VRRP advertisements when it is the master virtual router. This value is configured with the vrrp timer command.
Master Down Timer	Time the backup router waits for the master router advertisements before assuming the role of master 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.

Field	Description
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:

```
RP/0/0/CPU0: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 102: 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 master router.
VRouter addr	Virtual router IP address of the virtual router.

slave follow(vrrp)

To instruct the slave group to inherit its state from a specified group, use the **slave follow** command in VRRP slave submode.

follow *mgo-session-name*

Syntax Description	
<i>mgo-session-name</i>	Name of the MGO session from which the slave group will inherit the state.

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

Examples This example shows how to instruct the slave group to inherit its state from a specified group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 2 slave
RP/0/0/CPU0:router(config-vrrp-slave)# follow m1
```



Note Before configuring a slave 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 817	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

slave primary virtual IPv4 address(vrrp)

To configure the primary virtual IPv4 address for the slave group, use the **slave primary virtual IPv4 address** command in the VRRP slave submode.

address *ip-address*

Syntax Description	<i>ip-address</i>	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

Examples This example shows how to configure the primary virtual IPv4 address for the slave group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 2 slave
RP/0/0/CPU0:router(config-vrrp-slave)# address 192.168.10.4
```

Related Commands

Command	Description
accept-mode , on page 817	Disable the installation of routes for the Virtual Router Redundancy Protocol (VRRP) virtual addresses.

■ `slave primary virtual IPv4 address(vrrp)`

slave secondary virtual IPv4 address(vrrp)

To configure the secondary virtual IPv4 address for the slave group, use the **slave secondary virtual IPv4 address** command in the VRRP slave submode.

address *ip-address* **secondary**

Syntax Description		
<i>ip-address</i>		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 slave group must be configured.

Task ID	Task ID	Operation
	vrrp	read, write

Examples This example shows how to configure the secondary virtual IPv4 address for the slave group.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 2 slave
RP/0/0/CPU0:router(config-vrrp-slave)# address 192.168.10.4 secondary
```

Related Commands

Command	Description
accept-mode , on page 817	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.

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/0/0/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

Examples

This example shows how to configure object tracking under the VRRP virtual router submode.

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-ipv4)# vrrp 1
RP/0/0/CPU0:router(config-vrrp-virtual-router)# track object t1 2
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
accept-mode , on page 817	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

<i>vrid</i>	(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 <code>vrrp ipv4</code> command. Range is 1 to 255.
version <i>version-no</i>	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

Examples

The following example shows how to enable VRRP virtual router mode:

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 3 version 2
RP/0/0/CPU0:router(config-vrrp-virtual-router)#
```

Related Commands

Command	Description
interface (VRRP) , on page 838	Enables VRRP interface configuration mode.

vrrp assume-ownership disable

The VRRP router assumes ownership of the virtual IP Address in the master state by default. To disable this feature, use the **vrrp 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

<i>vrid</i>	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 master 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 3.2	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the accept-mode , on page 817 command.

Usage Guidelines

By default, a router that is not the IP address owner, but is the master 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 master 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:

```
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# vrrp 1 ipv4 10.0.0.101 secondary
RP/0/0/CPU0:router(config-vrrp-if)# vrrp 1 assume-ownership disable
```

Related Commands

Command	Description
vrrp ipv4 , on page 872	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

<i>vrid</i>	Virtual Router Identifier.
peer	VRRP peer for BFD monitoring.
ipv4 <i>address</i>	IPv4 address of the BFD peer interface.
ipv6 <i>address</i>	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/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/0/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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface tenGigE 0/4/0/4
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv6
RP/0/0/CPU0:router(config-vrrp-address-family)#vrrp 3 version 3
RP/0/0/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 866	Configures the BFD minimum interval value for a given interface.
vrrp bfd multiplier , on page 868	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 831 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/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-vrrp-if)# vrrp bfd minimum-interval 100
```

Related Commands

Command	Description
vrrp bfd fast-detect , on page 864	Enables BFD on a VRRP interface.

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

<i>multiplier</i>	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 833 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/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface gig 0/1/1/0
RP/0/0/CPU0:router(config-vrrp-if)# vrrp bfd multiplier 10
```

Related Commands

Command	Description
vrrp bfd fast-detect , on page 864	Enables BFD on a VRRP interface.

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 <i>value</i>	Sets the minimum delay in seconds for every interface up event. Range is 0 to 10000.
reload <i>value</i>	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 4.1.0	This command has been deprecated. This command was replaced with the delay (VRRP) , on page 836 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/0/0/CPU0:router(config)# router vrrp  
RP/0/0/CPU0:router(config-vrrp)# interface mgmtEth 0/RP0/CPU0/0  
RP/0/0/CPU0:router(config-vrrp-if)# vrrp delay minimum 10 reload 100
```

Related Commands

Command	Description
show vrrp, on page 846	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

<i>vrid</i>	Virtual router identifier, which is the number identifying the virtual router. Range is 1 to 255.
<i>ip-address</i>	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 3.2	This command was introduced.
Release 4.1.0	This command has been deprecated. This command was replaced with the address (VRRP) , on page 823 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 846	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 master VRRP router will take over as master 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 <i>seconds</i>	(Optional) Specifies the number of seconds the router delays before issuing an advertisement claiming virtual IP address ownership to be the master 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 3.2	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 master 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 master router when its priority of 200 is higher than that of the current master router. If the router preempts the current master router, it waits 15 seconds before issuing an advertisement claiming that it is the master router.

```
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 3
RP/0/0/CPU0:router(config-vrrp-virtual-router)# preempt delay 15
RP/0/0/CPU0:router(config-vrrp-virtual-router)# priority 200
```

Related Commands

Command	Description
vrrp priority , on page 876	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

<i>priority</i>	Priority of the virtual router. Range is 1 to 254.
-----------------	--

Command Default

priority : 100

Command Modes

VRRP virtual router

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

Use this command to control which router becomes the master 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:

```
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 3
RP/0/0/CPU0:router(config-vrrp-virtual router)# priority 254
```

Related Commands

Command	Description
vrrp preempt , on page 874	Configures the router to take over as master router for a VRRP virtual router if it has a higher priority than the current master 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

<i>string</i>	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 3.2	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/0/0/CPU0:router(config)# router vrrp
```



```
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 2
RP/0/0/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 master 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.	
<i>interval</i>	Time interval between successive advertisements by the master 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 3.2	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 master router to send advertisements every 4 seconds:

```
RP/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
```

```
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 3  
RP/0/0/CPU0: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

<i>vrid</i>	Virtual router identifier, which is the number identifying the virtual router to which tracking applies.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. 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.
<i>priority-decrement</i>	(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 3.2	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/0/0/CPU0:router(config)# router vrrp
RP/0/0/CPU0:router(config-vrrp)# interface TenGigE 0/3/0/0
RP/0/0/CPU0:router(config-vrrp-if)# address-family ipv4
RP/0/0/CPU0:router(config-vrrp-address-family)# vrrp 1 version 3
RP/0/0/CPU0:router(config-vrrp-virtual-router)# track interface TenGigE 0/3/0/3
RP/0/0/CPU0:router(config-vrrp-virtual-router)# track interface TenGigE 0/3/0/2
```

Related Commands

Command	Description
vrrp priority , on page 876	Sets the priority of the virtual router.



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