



# MPLS Forwarding Commands on Cisco IOS XR Software

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This chapter describes the commands that you will use to configure and use Multiprotocol Label Switching (MPLS) forwarding.

For detailed information about MPLS concepts, configuration tasks, and examples, refer to the *Cisco IOS XR Multiprotocol Label Switching Configuration Guide*.

# clear mpls forwarding counters

To clear (set to zero) the MPLS forwarding counters, use the **clear mpls forwarding counters** command in EXEC mode.

## clear mpls forwarding counters

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	No modification.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Use the **clear mpls forwarding counters** command to set all MPLS forwarding counters to zero so that you can easily see future changes.

**Examples** The following example shows sample output before and after clearing all counters:

```
RP/0/RP0/CPU0:router# show mpls forwarding

Local  Outgoing  Prefix      Outgoing    Next Hop    Bytes      T
Label  Label     or ID       Interface   Interface   Switched   O
-----
18     Exp-Null-v4 33.33.33.33/32 P00/2/0/0  10.1.2.3    1572      0

RP/0/RP0/CPU0:router# clear mpls forwarding counters

RP/0/RP0/CPU0:router# show mpls forwarding

Local  Outgoing  Prefix      Outgoing    Next Hop    Bytes      T
Label  Label     or ID       Interface   Interface   Switched   O
-----
18     Exp-Null-v4 33.33.33.33/32 P00/2/0/0  10.1.2.3    0          0
```

**Related Commands**

Command	Description
<a href="#">show mpls forwarding</a>	Displays the contents of MPLS forwarding table.

# clear mpls packet counters

To clear (set to zero) the MPLS forwarded packet counters, use the **clear mpls packet counters** command in EXEC mode.

**clear mpls packet counters** [*type instance*] [**location** *node-id*]

Syntax Description	
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>instance</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> <li>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"> <li><i>rack</i>: Chassis number of the rack.</li> <li><i>slot</i>: Physical slot number of the modular services card or line card.</li> <li><i>module</i>: Module number. A physical layer interface module (PLIM) is always 0.</li> <li><i>port</i>: Physical port number of the interface.</li> </ul> </li> </ul> <p><b>Note</b> 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"> <li>Virtual interface instance. Number range varies depending on interface type.</li> </ul> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<b>location</b> <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Use the **clear mpls packet counters** command to set all MPLS forwarded counters to zero so that you can see future changes easily.

The forwarded packet counters currently include counts for:

- Drop packets
- Failed lookup packets
- Fragmented packets

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### Examples

The following example shows sample output before and after clearing all packet counters:

```
RP/0/RP0/CPU0:router# show mpls packet counters summary location 0/1/CPU0
Pkts dropped:      0
Pkts fragmented: 10
Failed lookups:   0

RP/0/RP0/CPU0:router# clear mpls packet counters location 0/1/CPU0

RP/0/RP0/CPU0:router# show mpls packet counters summary location 0/1/CPU0
Pkts dropped:      0
Pkts fragmented:  0
Failed lookups:   0
```

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### Related Commands

Command	Description
<a href="#">show mpls packet counters</a>	Displays the contents of MPLS forwarding counters for a given interface or aggregated counters for a given location (node).

# clear mpls traffic-eng fast-reroute log

To clear the log of MPLS Fast Reroute (FRR) events, use the **clear mpls traffic-eng fast-reroute log** command in EXEC mode.

**clear mpls traffic-eng fast-reroute log**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

**Examples** The following example shows sample output before clearing the log of FRR events:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute log
```

Node	Protected LSPs Interface	Rewrites When	Switching Time (usec)
0/0/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.064000 147
0/1/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.060093 165
0/2/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.063814 129
0/3/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.062861 128

```
RP/0/RP0/CPU0:router# clear mpls traffic-eng fast-reroute log
```

Related Commands	Command	Description
	<a href="#">show mpls traffic-eng fast-reroute database</a>	Displays the contents of the FRR database.
	<a href="#">show mpls traffic-eng fast-reroute log</a>	Shows the history of recorded FRR events.

# mpls ip-ttl-propagate

To configure the behavior controlling the propagation of the IP Time-To-Live (TTL) field to and from the MPLS header, use the **mpls ip-ttl-propagate** command in global configuration mode. To restore the default behavior, use the **no** form of the command.

**mpls ip-ttl-propagate disable**

**no mpls ip-ttl-propagate**

<b>Syntax Description</b>	<b>disable</b>	Stops the propagation of IP TTL to and from the MPLS header.
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<b>Defaults</b>	This functionality is enabled.
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<b>Command Modes</b>	Global configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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By default, the IP TTL is propagated to the MPLS header when IP packets enter the MPLS domain. Within the MPLS domain, the MPLS TTL is decremented at each MPLS hop. When an MPLS encapsulated IP packet exits the MPLS domain, the MPLS TTL is propagated to the IP header. When propagation is disabled, the MPLS TTL is set to 255 during the label imposition phase and the IP TTL is not altered.

<b>Examples</b>	The following example shows how to disable IP TTL propagation:
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```
RP/0/RP0/CPU0:router(config)# mpls ip-ttl-propagate disable
```

# mpls label range

To configure the range of local labels available for use on packet interfaces, use the **mpls label range** command in global configuration mode. To revert to the platform defaults, use the **no** form of this command.

**mpls label range** [**table** *table-id*] *minimum maximum*

**no mpls label range** [**table** *table-id*] *minimum maximum*

## Syntax Description

<b>table</b> <i>table-id</i>	(Optional) Identifies a specific label table; the global label table has <i>table-id</i> = 0. If no table is specified, the global table is assumed. Currently, you can specify only table 0.
<i>minimum</i>	Smallest allowed label in the label space. Default is 16.
<i>maximum</i>	Largest allowed label in the label space. Default is 1048575.

## Defaults

*table-id*: 0

*minimum*: 16

*maximum*: 1048575

## Command Modes

Global configuration

## Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The label range defined by the **mpls label range** command is used by all MPLS applications that allocate local labels (for dynamic label switching Label Distribution Protocol [LDP], MPLS traffic engineering, and so on).

Labels 0 through 15 are reserved by the Internet Engineering Task Force (IETF) (see draft-ietf-mpls-label-encaps-07.txt for details) and cannot be included in the range using the **mpls label range** command.



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**Examples**

The following example shows how to configure the size of the local label space using a *minimum* of 200 and a *maximum* of 120000. The new range takes effect immediately. Labels outside the current range and which are allocated by MPLS applications remain in circulation until released.

```
RP/0/RP0/CPU0:router# configure
```

```
RP/0/RP0/CPU0:router(config)# mpls label range 200 120000
```

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**Related Commands**

Command	Description
<a href="#">show mpls label range</a>	Displays the range of the MPLS local label space.

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# show mpls forwarding

To display the contents of the MPLS Label Forwarding Information Base (LFIB), use the **show mpls forwarding** command in EXEC mode.

```
show mpls forwarding [prefix {network/mask | length} | labels label [maxlabel] [both-eos | eos0]
                    | interface type instance | tunnels [tunnel-id] | summary] | [detail] | [debug] | [location
                    node-id]
```

## Syntax Description

<b>prefix</b> <i>network/mask   length</i>	(Optional) Destination address and mask/prefix length. <b>Note</b> The forward slash (/) between <i>network</i> and <i>mask</i> is required.
<b>labels</b> <i>label [maxlabel]</i> [both-eos   eos0]	(Optional) Entries with a local labels range. The first label specifies the start label, and the second (optional label) specifies the end label.
<b>interface</b>	(Optional) Displays information for the specified interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>instance</i>	Either a physical interface instance or a virtual interface instance as follows: <ul style="list-style-type: none"> <li>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"> <li><i>rack</i>: Chassis number of the rack.</li> <li><i>slot</i>: Physical slot number of the modular services card or line card.</li> <li><i>module</i>: Module number. A physical layer interface module (PLIM) is always 0.</li> <li><i>port</i>: Physical port number of the interface.</li> </ul> </li> </ul> <b>Note</b> 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. <ul style="list-style-type: none"> <li>Virtual interface instance. Number range varies depending on interface type.</li> </ul> For more information about the syntax for the router, use the question mark (?) online help function.
<b>tunnels</b> [ <i>tunnel-id</i> ]	(Optional) Displays entries either for a specified label switch path (LSP) tunnel or all LSP tunnel entries.
<b>summary</b>	(Optional) Displays summarized forwarding information.
<b>detail</b>	(Optional) Displays information in long form (includes length of encapsulation, length of Media Access Control [MAC] string, maximum transmission unit [MTU], Packet switched, and label stack).
<b>debug</b>	(Optional) Displays the failure reason if “?” is displayed in the “Byte Switched” field of output. The typical reasons for failure to obtain statistics include Communication Error b/w global and per-node forwarding process, No such entry in per-node forwarding, and H/W stats error.
<b>location</b> <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

**Defaults** No default behavior or values

**Command Modes** EXEC

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

On the line card, MPLS forwarding creates entries for packets forwarding with End-of-Stack (EOS)=1 and packets with EOS=0. By default, the output from the **show mpls forwarding** command on a line card displays entries related to EOS=1. To debug hardware issues, you can match MPLS forwarding entries related to EOS1 (default), EOS0, or both. The options **both-eos** and **eos0** only work on a modular services card.

The optional keywords and arguments described allow specification of a subset of the entire MPLS forwarding table.

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

```
RP/0/RP0/CPU0:router# show mpls forwarding

Local  Outgoing  Prefix          Outgoing  Next Hop      Bytes      T
Label  Label     or ID          Interface  Interface     Switched   O
-----
22     Pop Label  10.1.2.0/24    PO0/1/0/0  10.1.1.2     0          -
23     Pop Label  10.1.3.0/24    PO0/1/0/0  10.1.1.2     0          -
24     Pop Label  22.22.22.22/32 PO0/1/0/0  10.1.1.2     0          -
25     Unlabeled  33.33.33.33/32 tt13 point2point 0          -
```

The following is sample output from the **show mpls forwarding** command using the **detail** keyword:

```
RP/0/RP0/CPU0:router# show mpls forwarding detail

Local  Outgoing  Prefix          Outgoing  Next Hop      Bytes      T
Label  Label     or ID          Interface  Interface     Switched   O
-----
26     Pop Label  100.10.20.2/32 PO0/4/0/4  142.50.32.2  0          -
      MAC/Encaps: 4/8, MTU: 4470
      Label Stack (Top -> Bottom): { Imp-Null }
      Packets Switched: 0
      Installed: Jul 22 10:41:13.521 (3d23h ago)
      <=====**
      Owner: LDP
      <=====**

      Pop Label  100.10.20.2/32  PO0/4/0/5  142.50.36.2  0          -
      MAC/Encaps: 4/8, MTU: 4470
```

## show mpls forwarding

```

Label Stack (Top -> Bottom): { Imp-Null }
Packets Switched: 0
Installed: Jul 22 10:41:13.521 (3d23h ago)
<=====**
Owner: LDP
<=====**

```

The following is sample output from the **show mpls forwarding** command using the **location** keyword and a specific node ID:

```
RP/0/RP0/CPU0:router# show mpls forwarding location 0/1/CPU0
```

Local Label	Outgoing Label	Outgoing Interface	Next Hop	Bytes Switched
22	Pop Label	PO0/1/0/0	10.1.1.2	0
23	Pop Label	PO0/1/0/0	10.1.1.2	0
24	Pop Label	PO0/1/0/0	10.1.1.2	0
25	Unlabeled	tt13	point2point	0

The following is sample output from the **show mpls forwarding** command using the **tunnels** keyword:

```
RP/0/RP0/CPU0:router# show mpls forwarding tunnels
```

Tunnel Name	Outgoing Label	Outgoing Interface	Next Hop	Bytes Switched
tt13	18	PO0/1/0/0	10.1.1.2	13200

The following is sample output from the **show mpls forwarding** command using the **summary** keyword:

```
RP/0/RP0/CPU0:router# show mpls forwarding summary
```

```

Forwarding entries:
  Label switching: 4
  IPv4 label imposition: 4
  MPLS TE tunnel head: 1
  MPLS TE fast-reroute: 0
Forwarding updates:
  42 updates, 28 messages
Labels in use:
  Reserved: 4
  Lowest: 22
  Highest: 25

```

Table 14 describes the significant fields shown in the display.

**Table 14** *show mpls forwarding Field Descriptions*

Field	Description
Local Label	Label assigned by this router.
Outgoing Label	Label assigned by the next hop or downstream peer. Some of the entries that display in this column are: <ul style="list-style-type: none"> <li>Unlabeled —No label for the destination from the next hop, or label switching is not enabled on the outgoing interface.</li> <li>Pop Label — Next hop advertised an implicit-null label for the destination.</li> </ul>
Prefix or Tunnel ID	Address or tunnel to which packets with this label are going.
Outgoing interface	Interface through which packets with this label are sent.
Next Hop	IP address of neighbor that assigned the outgoing label.
Bytes Switched	Number of bytes switched with this incoming label.
TO	Timeout: Indicates by an "*" if entry is being timed out in forwarding.
Mac/Encaps	Length in bytes of Layer 2 header, and length in bytes of packet encapsulation, including Layer 2 header and label header.
MTU	Maximum transmission unit (MTU) of labeled packet.
Label Stack	All the outgoing labels on the forwarded packet.
Packets Switched	Number of packets switched with this incoming label.
Label switching	Number of Label switching (LFIB) forwarding entries.
IPv4 label imposition	Number of IPv4 label imposition forwarding entries (installed at ingress LSR).
MPLS TE tunnel head	Number of forwarding entries (installed at ingress LSR) on MPLS TE tunnel head.
MPLS TE fast-reroute	Number of forwarding entries (installed at PLR) for MPLS traffic-engineering (TE) fast reroute.
Forwarding updates	Number of forwarding updates sent from LSD (RP/DRP) to LFIB/MPLS (RP/DRP/LC) using BCDL mechanism, indicating the total number of updates and total number of BCDL messages.
Labels in use	Local labels in use (installed in LFIB). These usually indicate the lowest and highest label in use (allocated by applications). Furthermore, some reserved labels (range: 0-15), such as explicit-nullv4, explicit-nullv6, are installed in the forwarding plane.

# show mpls interfaces

To display information about one or more interfaces that have been configured for MPLS, use the **show mpls interfaces** command in EXEC mode.

**show mpls interfaces** [*type instance*] [**location** *node-id*] | [**detail**]

Syntax Description	
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>instance</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> <li>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"> <li><i>rack</i>: Chassis number of the rack.</li> <li><i>slot</i>: Physical slot number of the modular services card or line card.</li> <li><i>module</i>: Module number. A physical layer interface module (PLIM) is always 0.</li> <li><i>port</i>: Physical port number of the interface.</li> </ul> </li> </ul> <p><b>Note</b> 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"> <li>Virtual interface instance. Number range varies depending on interface type.</li> </ul> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<b>location</b> <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation
<b>detail</b>	(Optional) Displays detailed information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

This command displays MPLS information about a specific interface or about all interfaces where MPLS is configured.

**Examples**

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

```
RP/0/RP0/CPU0:router# show mpls interfaces

Interface                LDP      Tunnel   Enabled
-----
POS0/4/0/0                Yes      Yes      Yes
POS0/4/0/1                Yes      Yes      Yes
POS0/4/0/2                Yes      Yes      Yes
```

The following is sample output from the **show mpls interfaces** command using the **detail** keyword:

```
RP/0/RP0/CPU0:router# show mpls interfaces detail

Interface POS0/4/0/0:
  LDP labelling enabled
  LSP labelling enabled (TE-Control)
  MPLS enabled
  MTU = 4474
Interface POS0/4/0/1:
  LDP labelling enabled
  LSP labelling enabled (TE-Control)
  MPLS enabled
  MTU = 4474
Interface POS0/4/0/2:
  LDP labelling enabled
  LSP labelling enabled (TE-Control)
  MPLS enabled
  MTU = 4474
```

The following is sample output from the **show mpls interfaces** command using the **location** keyword:

```
RP/0/RP0/CPU0:router# show mpls interfaces location pos 0/4/0/0

Interface                LDP      Tunnel   Enabled
-----
POS0/4/0/0                Yes      Yes      Yes
RP/0/0/CPU0:tops2-4#show mpls interfaces poS 0/4/0/0 detail
Interface POS0/4/0/0:
  LDP labelling enabled
  LSP labelling enabled (TE-Control)
  MPLS enabled
  MTU = 4474
```

[Table 15](#) describes the significant fields shown in the display.

**Table 15** *show mpls interfaces Field Descriptions*

Field	Description
LDP	Indicates state of LDP labelling.
Tunnel	Indicates state of LSP Tunnel labelling.
MTU	Maximum transmission unit (MTU) of labeled packet.

**Table 15** *show mpls interfaces Field Descriptions (continued)*

Field	Description
Caps	Capsulation switching chains installed on an interface.
M	MPLS switching capsulation/switching chains are installed on the interface and are ready to switch MPLS traffic.

**Related Commands**

Command	Description
<a href="#">interface (MPLS LDP)</a>	Enables MPLS LDP on an interface.
<a href="#">mpls traffic-eng interface</a>	Enables MPLS traffic engineering tunnel signaling on an interface.



# show mpls label range

To display the range of local labels available for use on packet interfaces, use the **show mpls label range** command in EXEC mode.

**show mpls label range**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

You can use the **show mpls label range** command to configure a range for local labels that is different from the default range.

**Examples** The following is sample output from the **show mpls label range** command:

```
RP/0/RP0/CPU0:router# show mpls label range
```

```
Range for dynamic labels: Min/Max: 16/1048575
```

Table 16 describes the significant fields shown in the display.

**Table 16** *show mpls label range* Field Descriptions

Field	Description
Range for dynamic labels	Minimum and maximum allowable range for local labels (which differs from the default range).

Related Commands	Command	Description
	<a href="#">mpls label range</a>	Configures a range of values for use as local labels.

# show mpls label table

To display the local labels contained in the MPLS label table, use the **show mpls label table** command in EXEC mode.

```
show mpls label table table-id [application application | label]
```

## Syntax Description

<i>table-id</i>	The index of the label table to display. The global label table is 0. Currently, you can only specify table 0.
<b>application</b> <i>application</i>	(Optional) Displays all labels owned by the selected application. Options are: <b>internal</b> , <b>ldp</b> , <b>none</b> , <b>rsvp</b> , <b>static</b> , <b>te-control</b> , <b>te-link</b> , <b>test</b> , <b>snmp</b> .
<i>label</i>	Selected label.

## Defaults

No default behavior or values

## Command Modes

EXEC

## Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

## Examples

The following is sample output from the **show mpls label table** command:

```
RP/0/RP0/CPU0:router# show mpls label table 0
```

```
Table Label  Owner      State  Rewrite
-----
0         0         LSD      InUse  Yes
0         1         LSD      InUse  Yes
0         2         LSD      InUse  Yes
0         3         LSD      InUse  Yes
0         16        TE-Link  InUse  Yes
```

Table 17 describes the significant fields shown in the display.

**Table 17** *show mpls label table Field Descriptions*

Value	Description
Table	Table ID.
Label	Label index.
Owner	Application that allocated the label. All labels displaying “InUse” state have an owner.
State	<ul style="list-style-type: none"> <li>In Use—Label allocated and in use by an application.</li> <li>Alloc—Label allocated but is not yet in use by an application.</li> <li>Pend—Label was in use by an application that has terminated unexpectedly, and the application has not reclaimed the label.</li> <li>Pend-S—Label was in use by an application, but the MPLS Label Switching Database (LSD) server has recently restarted and the application has not reclaimed the label.</li> </ul>
Rewrite	Number of initiated rewrites.

The following is sample output from the **show mpls label table** command using the **application** keyword:

```
RP/0/RP0/CPU0:router# show mpls label table 0 application te-link
```

```
Table Label  Owner      State  Rewrite
-----
0      16      TE-Link  InUse  Yes
```

#### Related Commands

Command	Description
<a href="#">show mpls forwarding</a>	Displays entries in the MPLS forwarding table. Label switching entries are indexed by their local label.
<a href="#">show mpls lsd applications</a>	Displays MPLS applications that are registered with the MPLS LSD server.

# show mpls lsd applications

To display the MPLS applications registered with the MPLS Label Switching Database (LSD) server, use the **show mpls lsd applications** command in EXEC mode.

## show mpls lsd applications

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

MPLS applications include Traffic Engineering (TE) Control, TE Link Management, and Label Distribution Protocol (LDP). The application must be registered with MPLS LSD for its features to operate correctly. All applications are clients (see the **show mpls lsd clients** command), but not all clients are applications.

**Examples** The following is sample output from the **show mpls lsd applications** command:

```
RP/0/RP0/CPU0:router# show mpls lsd applications
```

```
Type           State    RecoveryTime Node
-----
LDP            Active   300         0/0/CPU0
TE-Control     Active   100         0/0/CPU0
TE-Link       Active   600         0/0/CPU0
```

Table 18 describes the significant fields shown in the display.

**Table 18** *show mpls lsd applications Field Descriptions*

Value	Description
Type	LSD application type.
State	<ul style="list-style-type: none"> <li>Active—Application registered with MPLS LSD and is functioning correctly.</li> <li>Recover—Application registered with MPLS LSD and is recovering after recently restarting. In this state, the RecoveryTime value indicates how many seconds are left before the application becomes active.</li> <li>Zombie—Application not re-registered after an unexpected termination. In this case, RecoveryTime indicates how many seconds are left before MPLS LSD gives up on the application.</li> </ul>
RecoveryTime	Seconds remaining before MPLS LSD gives up or resumes the application.
Node	Node expressed in standard <i>rack/slot/module</i> notation.

#### Related Commands

Command	Description
<a href="#">show mpls lsd clients</a>	Displays MPLS clients connected to the MPLS LSD server.

# show mpls lsd clients

To display the MPLS clients connected to the MPLS Label Switching Database (LSD) server, use the **show mpls lsd clients** command in EXEC mode.

**show mpls lsd clients**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

MPLS clients include Traffic Engineering (TE) Control, TE Link Management, Label Distribution Protocol (LDP), and Bulk Content Downloader (BCDL) Agent. Not all clients are applications (see the **show mpls lsd applications** command), but all applications are clients.

**Examples** The following is sample output from the **show mpls lsd clients** command:

```
RP/0/RP0/CPU0:router# show mpls lsd clients
```

```
Id Services                Node
--  -
0  BA (p=none)             0/0/CPU0
1  A (TE-Link)             0/0/CPU0
2  A (LDP)                 0/0/CPU0
3  A (TE-Control)          0/0/CPU0
```

Table 19 describes the significant fields shown in the display.

**Table 19** *show mpls lsd applications Field Descriptions*

Value	Description
Id	Client identification number.
Services	A(xxx) means that this client is an application and xxx is the application name, BA(yyy) means that this client is a BCDL Agent and yyy is expert data. Depending on system conditions, there can be multiple BCDL Agent clients (this is normal).
Node	Node expressed in standard rack/slot/module notation.

#### Related Commands

Command	Description
<a href="#">show mpls lsd applications</a>	Displays MPLS applications registered with the MPLS LSD server.
<a href="#">show mpls lsd clients</a>	Displays MPLS clients connected to the MPLS LSD server.

# show mpls packet counters

To display the values of the MPLS forwarded packet counters, use the **show mpls packet counters** command in EXEC mode.

**show mpls packet counters** [**summary** | **interface** *type instance*] [**location** *node-id*]

Syntax Description	
<b>summary</b>	(Optional) Displays aggregate information on a given node.
<b>interface</b>	(Optional) Displays information for the specified interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>instance</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> <li>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"> <li><i>rack</i>: Chassis number of the rack.</li> <li><i>slot</i>: Physical slot number of the modular services card or line card.</li> <li><i>module</i>: Module number. A physical layer interface module (PLIM) is always 0.</li> <li><i>port</i>: Physical port number of the interface.</li> </ul> </li> </ul> <p><b>Note</b> 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"> <li>Virtual interface instance. Number range varies depending on interface type.</li> </ul> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<b>location</b> <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation

**Defaults** No default behavior or values

**Command Modes** EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.



**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

This command is used to display MPLS forwarded packet counters and currently displays counters for:

- Dropped packets
- Failed lookup packets
- Fragmented packets

**Examples**

The following is sample output from the **show mpls packet counters** command:

```
RP/0/RP0/CPU0:router# show mpls packet counters summary location 0/2/CPU0
```

```
Pkts dropped:      0
Pkts fragmented:  0
Failed lookups:   0
```

[Table 20](#) describes the significant fields shown in the display.

**Table 20** *show mpls packet counters Field Descriptions*

Field	Description
Pkts dropped	Number of packets dropped by MPLS forwarding plane.
Pkts fragmented	Number of packets fragmented by MPLS forwarding plane.
Failed lookups	Number of packets that failed label lookup. The drop count includes packets which failed lookup and were dropped accordingly.

# show mpls traffic-eng fast-reroute database

To display the contents of the fast reroute (FRR) database, use the **show mpls traffic-eng fast-reroute database** command in EXEC mode.

```
show mpls traffic-eng fast-reroute database [summary | ip-address | ip-address mask |
backup-interface [tunnel tunnel ID [summary] | unresolved] | interface interface
[summary] | labels number [number [state [active | complete | partial | ready]]] | state [active
| complete | partial | ready]] | role [head [summary] | midpoint [summary]] | state [active |
complete | partial | ready]] [location node-id]
```

## Syntax Description

<b>summary</b>	(Optional) Displays summarized information about the FRR database.
<i>ip-address</i>	(Optional) IP address of the destination network.
<i>ip-address mask</i>	(Optional) Bit combination indicating the portion of the IP address that is being used for the subnet address.
<b>backup-interface</b>	(Optional) Displays entries with the specified backup interface. The <b>summary</b> suboption is available.
<b>tunnel</b>	Tunnel and tunnel ID to which packets with this label are going. The <b>summary</b> suboption is available.
<b>unresolved</b>	(Optional) Displays entries whose backup interface has not yet been fully resolved.
<b>interface</b>	(Optional) Displays entries with this primary outgoing interface. The <b>summary</b> suboption is available.
<b>labels</b>	(Optional) Displays only database entries that possess in-labels assigned by this router (local labels). Specify either a starting value or a range of values. The <b>state</b> suboption is available.
<b>role</b>	(Optional) Displays entries associated either with the tunnel <b>head</b> or tunnel <b>midpoint</b> . The <b>summary</b> suboption is available.
<b>state</b>	(Optional) Filter the database according to the state of the entry:  <b>active</b> —FRR rewrite is in the forwarding active database (where it can be placed onto appropriate incoming packets).  <b>complete</b> —FRR rewrite is assembled, ready or active.  <b>partial</b> —FRR rewrite is fully created; its backup routing information is still incomplete.  <b>ready</b> —FRR rewrite was created but is not in the forwarding active state.
<b>location</b> <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation

## Defaults

No default behavior or values

## Command Modes

EXEC

**Command History**

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

**Examples**

The following is sample output from the **show mpls traffic-eng fast-reroute database** command:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast database
```


```
Tunnel head FRR information:
```

```
Tunnel      In-label Out intf/label   FRR intf/label   Status
-----
tt4000      Tun hd   PO0/3/0/0:34    tt1000:34        Ready
tt4001      Tun hd   PO0/3/0/0:35    tt1001:35        Ready
tt4002      Tun hd   PO0/3/0/0:36    tt1001:36        Ready
```

[Table 21](#) describes the significant fields shown in the display.

**Table 21** *show mpls traffic-eng fast-reroute database Field Descriptions*

Field	Description
Tunnel	Short form of tunnel interface name.
In-label	Label advertised to other routers to signify a particular prefix. The value “Tun hd” indicates that no label is advertised.
Out intf/label	Out interface—Short name of the physical interface through which traffic goes to the protected link. Out label: <ul style="list-style-type: none"> <li>At a tunnel head, this is the label that the tunnel destination device advertises. The value “Unlabeled” indicates that no such label is advertised.</li> <li>At a tunnel midpoint, this is the label selected by the next hop device. The value “Pop Label” indicates that the next hop is the final hop for the tunnel.</li> </ul>
FRR intf/label	Fast reroute interface—Backup tunnel interface. Fast reroute label: <ul style="list-style-type: none"> <li>At a tunnel head, this is the label that the tunnel tail selected to indicate the destination network. The value “Unlabeled” indicates that no label is advertised.</li> <li>At a tunnel midpoint, this has the same value as the Out label.</li> </ul>
Status	State of the rewrite: partial, ready, or active.

 **show mpls traffic-eng fast-reroute database**

The following command displays filtering of the FRR database using the *prefix* argument:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database 175.10.200.253
```

```
Tunnel head FRR information:
Prefix          Tunnel      In-label  Out intf/label  FRR intf/label  Status
-----
175.10.200.253/32  tu4000    Tun hd    PO0/3/0/0:34   tt1000:34       Ready
```

**Note**

The Prefix field indicates the IP address to which the packets with this label are headed.

The following command displays filtering of the FRR database using the **backup-interface** option:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast database backup-interface tunnel-te 1000
```

```
Tunnel head FRR information:
Tunnel      In-label  Out intf/label  FRR intf/label  Status
-----
tu4000     Tun hd    PO0/3/0/0:34   tt1000:34       Ready
```

The following command displays the FRR database filtered by the primary outgoing interface:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database interface pos0/3/0/0
```

```
Tunnel head FRR information:
Tunnel      In-label  Out intf/label  FRR intf/label  Status
-----
tt4000     Tun hd    PO0/3/0/0:34   tt1000:34       Ready
tt4001     Tun hd    PO0/3/0/0:35   tt1001:35       Ready
tt4002     Tun hd    PO0/3/0/0:36   tt1001:36       Ready
```

The following command shows a summary of the FRR database with the role as head:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database role head summary
```

```
Status      Count
-----
Active      0
Ready       3
Partial     0
Other       0
```

The following command shows the FRR database filtered according to the state of the entries (note that FRR is triggered):

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database state active
```

```
Tunnel head FRR information:
Tunnel      In-label  Out intf/label  FRR intf/label  Status
-----
tt4000     Tun hd    tt1000:34      Active
tt4001     Tun hd    tt1001:35      Active
tt4002     Tun hd    tt1001:36      Active
```

The following command shows the FRR database with protected midpoints:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database
```

```
LSP midpoint FRR information:
LSP identifier      In-label  Out intf/label  FRR intf/label  Status
-----
10.10.10.10 5000 [48]      18          PO0/1/0/1:18   tt2001:18       Ready
10.10.10.10 8000 [105]    19          PO0/1/0/1:19   tt2000:19       Ready
```

The following command shows the FRR database filtered according to the inbound label (this output only applies to LSP midpoint entries):

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database labels 18 18
```

LSP midpoint FRR information:

LSP identifier	In-label	Out intf/label	FRR intf/label	Status
10.10.10.10 5000 [48]	18	PO0/1/0/1:18	tt2001:18	Ready

The following output shows summarized information for the FRR database with the role as midpoint:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute database role midpoint summary
```

Status	Count
Active	0
Ready	2
Partial	0
Other	0

#### Related Commands

Command	Description
<a href="#">show mpls traffic-eng fast-reroute log</a>	Displays the contents of the FRR event log.

# show mpls traffic-eng fast-reroute log

To display a history of Fast Reroute (FRR) events, use the **show mpls traffic-eng fast-reroute log** command in EXEC mode.

**show mpls traffic-eng fast-reroute log** [**interface** *type instance* | **node** *node-id*]

Syntax Description	interface	(Optional) Displays all FRR events for the selected protected interface.
	<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
	<i>instance</i>	<p>Either a physical interface instance or a virtual interface instance as follows:</p> <ul style="list-style-type: none"> <li>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"> <li><i>rack</i>: Chassis number of the rack.</li> <li><i>slot</i>: Physical slot number of the modular services card or line card.</li> <li><i>module</i>: Module number. A physical layer interface module (PLIM) is always 0.</li> <li><i>port</i>: Physical port number of the interface.</li> </ul> </li> </ul> <p><b>Note</b> 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"> <li>Virtual interface instance. Number range varies depending on interface type.</li> </ul> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
	<b>node</b> <i>node-id</i>	Displays all FRR events that occurred on the selected node.

**Defaults** No default behavior or values

**Command Modes** EXEC

**Command History**

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

**Examples**

The following is sample output from the **show mpls traffic-eng fast-reroute log** command:

```
RP/0/RP0/CPU0:router# show mpls traffic-eng fast-reroute log
```

Node	Protected LSPs Interface	Rewrites	When	Switching Time (usec)
0/0/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.064000	147
0/1/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.060093	165
0/2/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.063814	129
0/3/CPU0	PO0/1/0/1 1	1	Feb 27 19:12:29.062861	128

[Table 22](#) describes the significant fields shown in the display.

**Table 22** show mpls traffic-eng fast-reroute log Field Descriptions

Value	Description
Node	Node address.
Protected Interface	Type and interface-id that is being protected.
LSPs	Link-state packet (LSP) associated with each interface being protected.
Rewrites	Number of rewrites initiated on the LSP.
When	Date the interface was protected.
Switching Time	Time required to switch the protected interface in micro-seconds.

**Related Commands**

Command	Description
<a href="#">clear mpls traffic-eng fast-reroute log</a>	Clears the history of recorded FRR events.
<a href="#">show mpls traffic-eng fast-reroute database</a>	Displays the contents of the FRR database.

■ `show mpls traffic-eng fast-reroute log`