



MPLS Forwarding Commands

This module describes the commands used to configure and use Multiprotocol Label Switching (MPLS) forwarding.

For detailed information about MPLS concepts, configuration tasks, and examples, see *MPLS Configuration Guide for Cisco NCS 5000 Series Routers*.

- [clear mpls forwarding counters, on page 2](#)
- [mpls label range, on page 3](#)
- [show mpls ea interfaces, on page 5](#)
- [show mpls forwarding, on page 6](#)
- [show mpls forwarding exact-route, on page 11](#)
- [show mpls forwarding labels, on page 15](#)
- [show mpls forwarding summary, on page 17](#)
- [show mpls interfaces, on page 20](#)
- [show mpls label range, on page 23](#)
- [show mpls label table, on page 24](#)
- [show mpls lsd applications, on page 26](#)
- [show mpls lsd clients, on page 28](#)
- [show mpls lsd forwarding labels, on page 30](#)
- [show mpls lsd forwarding summary, on page 31](#)

clear mpls forwarding counters

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

clear mpls forwarding counters

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

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

Task ID

Task ID	Operations
mpls-ldp	read, write
mpls-static	read, write

Example:

This a test.

Examples

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

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

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched	T
18	Exp-Null-v4	33.33.33.33/32	PO0/2/0/0	10.20.2.3	17000	O

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

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched	T
18	Exp-Null-v4	33.33.33.33/32	PO0/2/0/0	10.20.2.3	16762	O

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

mpls label range

To configure the dynamic range of local labels available for use on packet interfaces, use the **mpls label range** command in XR Config mode. To return to the default behavior, 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

table <i>table-id</i>	Identifies a specific label table; the global label table has table-id = 0. If no table is specified, the global table is assumed. Currently, you can specify table 0 only.
<i>minimum</i>	Smallest allowed label in the label space. Default is 16000.
<i>maximum</i>	Largest allowed label in the label space. Default is 1048575.

Command Default

table-id: 0
minimum: 16000
maximum: 1048575

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

After configuring the **mpls label range** command, restart the router for the configuration to take effect.

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 the draft-ietf-mpls-label-encaps-07.txt for details) and cannot be included in the range using the **mpls label range** command.

The maximum allowed label limit is 1000000 when ASR 9000 Enhanced Ethernet Line Card is used.



Note

- Labels outside the current range and which are allocated by MPLS applications remain in circulation until released.
- The maximum labels that are available are 144K.
- You must understand the maximum labels that are supported for each platform versus the labels that are supported for the CLI.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples

The following example shows how to configure the size of the local label space using a *minimum* of 16200 and a *maximum* of 120000:

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# mpls label range 16200 120000
```

show mpls ea interfaces

To display the interface label security information, use the **show mpls ea interfaces** command in XR EXEC mode.

show mpls ea interface [**location** *node-id*]

Syntax Description	location <i>node-id</i>	Displays the interfaces on which MPLS is enabled.
Command Modes	XR EXEC mode	
Command History	Release	Modification
	Release 6.0	This command was introduced.
Usage Guidelines	The keywords and arguments described allow display of the interface label security information.	
Task ID	Task ID	Operations
	mpls-ldp	read
	mpls-static	read

Examples

The following sample output is from the **show mpls ea interfaces** command and specific interface and location:

```
RP/0/RP0/CPU0:router# show mpls ea interfaces location 0/1/CPU0
Interface      IFH          MTU  Flags      Type
-----
Interface      IFH          MTU
-----
Te0/0/0/1      0x08000040   1500
Te0/0/0/1.2    0x08001d90   1500
Te0/0/0/1.3    0x08001d98   1500
Te0/0/0/1.4    0x08001da0   1500
Te0/0/0/1.5    0x08001da8   1500
Te0/0/0/1.6    0x08001db0   1500
Te0/0/0/1.7    0x08001db8   1500
Te0/0/0/1.8    0x08001dc0   1500
Te0/0/0/1.9    0x08001dc8   1500
Te0/0/0/1.10   0x08001dd0   1500
Te0/0/0/1.11   0x08001dd8   1500
Te0/0/0/1.12   0x08001de0   1500
Te0/0/0/1.13   0x08001de8   1500
Te0/0/0/1.14   0x08001df0   1500
Te0/0/0/1.15   0x08001df8   1500
Te0/0/0/1.16   0x08001e00   1500
```

show mpls forwarding

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

```
show mpls forwarding [detail] [hardware{ingress | egress}] [interface type interface-path-id]
[location node-id] [labels low-value [high-value] ] [prefix{network/mask | ipv4 unicast
network/mask} ] [private] [summary] [tunnels tunnel-id][vrf vrf-name]
```

Syntax Description	
detail	(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).
hardware	(Optional) Displays the hardware location entry.
ingress	(Optional) Reads information from the ingress PSE.
egress	(Optional) Reads information from the egress PSE.
interface	(Optional) Displays information for 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 a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
labels <i>low-value</i> [<i>high-value</i>]	(Optional) Entries with a local labels range. Ranges for both <i>low-value</i> and <i>high-value</i> are 0 to 1048575.
location <i>node-id</i>	(Optional) Displays hardware resource counters on the designated node.
p2mp	(Optional) Displays only P2MP LSPs. Note This will be supported in a future release of Cisco IOS XR software.
local	(Optional) Displays only P2MP LSP MPLS output paths that are local to a line card.
unresolved	(Optional) Displays P2MP LSPs that have failures. For example, one or more MPLS output paths are unresolved or have platform failures.
leafs	(Optional) Displays P2MP LSPs that have failures on the leaf such as platform failures.

prefix <i>network / mask / length</i>	(Optional) Displays the destination address and mask/prefix length. Note The forward slash (/) between <i>network</i> and <i>mask</i> is required.
ipv4 unicast	(Optional) Displays the IPv4 unicast address.
private	(Optional) Displays private information.
summary	(Optional) Displays summarized information.
tunnels <i>tunnel-id</i>	(Optional) Displays entries either for a specified label switch path (LSP) tunnel or all LSP tunnel entries. Note This will be supported in a future release of Cisco IOS XR software.
vrf <i>vrf-name</i>	(Optional) Displays entries for VPN routing and forwarding (VRF). Note This will be supported in a future release of Cisco IOS XR software.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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



Note This router does not support label accounting for vrf labels. Instead, it supports accounting for the IGP and LDP labels. As a result, the Bytes Switched counter is 0 for the **show mpls forwarding vrf** command.



Note Even if there are multiple outgoing paths the **show mpls forwarding detail** command shows the stats in the first path only as Cisco NCS 5000 Series Router supports only one stat per local label. The statistics are counted at the ingress when a labeled packet enters.

The *node-id* argument is entered in the *rack/slot/module* notation.

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

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

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

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched
24034	Unlabelled	10.3.0.6/32	Te0/0/0/3	191.4.2.34	0
	Unlabelled	10.3.0.6/32	BE247	191.4.1.194	0
	Unlabelled	10.3.0.6/32	BE248	191.4.1.218	0
	Unlabelled	10.3.0.6/32	BE249	191.4.1.242	0
	Unlabelled	10.3.0.6/32	BE2410	191.4.2.10	0
	Unlabelled	10.3.0.6/32	Te0/0/0/43	191.4.2.58	0
	Unlabelled	10.3.0.6/32	BE247.1	191.4.1.198	0
	Unlabelled	10.3.0.6/32	BE248.1	191.4.1.222	0
	Unlabelled	10.3.0.6/32	BE249.1	191.4.1.246	0
	Unlabelled	10.3.0.6/32	BE2410.1	191.4.2.14	0
	Unlabelled	10.3.0.6/32	Te0/0/0/3.1	191.4.2.38	0
	Unlabelled	10.3.0.6/32	Te0/0/0/43.1	191.4.2.62	0
24035	24027	10.3.0.1/32	BE241	191.4.1.2	370984
	24027	10.3.0.1/32	BE242	191.4.1.26	0
	24027	10.3.0.1/32	BE243	191.4.1.50	0
	24027	10.3.0.1/32	BE241.1	191.4.1.6	0
	24027	10.3.0.1/32	BE242.1	191.4.1.30	0
	24027	10.3.0.1/32	BE243.1	191.4.1.54	0
	24027	10.3.0.1/32	Te0/0/0/79	191.4.1.74	0
	24027	10.3.0.1/32	Te0/0/0/79.1	191.4.1.78	0

The following sample output shows detailed information for the LSP:

```
RP/0/RP0/CPU0:router# show mpls forwarding prefix 10.3.0.1/32 detail
```

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched
24035	24027	10.3.0.1/32	BE241	191.4.1.2	371356
		Updated: Nov 29 12:30:14.671			
		Version: 42, Priority: 3			
		Label Stack (Top -> Bottom): { 24027 }			
		NHID: 0x0, Encap-ID: N/A, Path idx: 0, Backup path idx: 0, Weight: 0			
		MAC/Encaps: 14/18, MTU: 8986			
		Packets Switched: 4883			
	24027	10.3.0.1/32	BE242	191.4.1.26	0
		Updated: Nov 29 12:30:14.671			
		Version: 42, Priority: 3			
		Label Stack (Top -> Bottom): { 24027 }			
		NHID: 0x0, Encap-ID: N/A, Path idx: 1, Backup path idx: 0, Weight: 0			
		MAC/Encaps: 14/18, MTU: 9086			
		Packets Switched: 0			
	24027	10.3.0.1/32	BE243	191.4.1.50	0
		Updated: Nov 29 12:30:14.671			
		Version: 42, Priority: 3			
		Label Stack (Top -> Bottom): { 24027 }			
		NHID: 0x0, Encap-ID: N/A, Path idx: 2, Backup path idx: 0, Weight: 0			
		MAC/Encaps: 14/18, MTU: 9086			
		Packets Switched: 0			
	24027	10.3.0.1/32	BE241.1	191.4.1.6	0


```

Updated: Nov 29 12:30:14.671
Version: 42, Priority: 3
Label Stack (Top -> Bottom): { 24027 }
NHID: 0x0, Encap-ID: N/A, Path idx: 3, Backup path idx: 0, Weight: 0
MAC/Encaps: 18/22, MTU: 8986
Packets Switched: 0

    24027      10.3.0.1/32      BE242.1      191.4.1.30      0
Updated: Nov 29 12:30:14.671
Version: 42, Priority: 3
Label Stack (Top -> Bottom): { 24027 }
NHID: 0x0, Encap-ID: N/A, Path idx: 4, Backup path idx: 0, Weight: 0
MAC/Encaps: 18/22, MTU: 9086
Packets Switched: 0

    24027      10.3.0.1/32      BE243.1      191.4.1.54      0
Updated: Nov 29 12:30:14.671
Version: 42, Priority: 3
Label Stack (Top -> Bottom): { 24027 }
NHID: 0x0, Encap-ID: N/A, Path idx: 5, Backup path idx: 0, Weight: 0
MAC/Encaps: 18/22, MTU: 9086
Packets Switched: 0

    24027      10.3.0.1/32      Te0/0/0/79   191.4.1.74      0
Updated: Nov 29 12:30:14.671
Version: 42, Priority: 3
Label Stack (Top -> Bottom): { 24027 }
NHID: 0x0, Encap-ID: N/A, Path idx: 6, Backup path idx: 0, Weight: 0
MAC/Encaps: 14/18, MTU: 9086
Packets Switched: 0

    24027      10.3.0.1/32      Te0/0/0/79.1 191.4.1.78      0
Updated: Nov 29 12:30:14.671
Version: 42, Priority: 3
Label Stack (Top -> Bottom): { 24027 }
NHID: 0x0, Encap-ID: N/A, Path idx: 7, Backup path idx: 0, Weight: 0
MAC/Encaps: 18/22, MTU: 9086
Packets Switched: 0

```

This table describes the significant fields shown in the display.

Table 1: 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: Unlabeled No label for the destination from the next hop, or label switching is not enabled on the outgoing interface. Pop Label Next hop advertised an implicit-null label for the destination.
Prefix or Tunnel ID	Address or tunnel to which packets with this label are going.

Field	Description
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.

show mpls forwarding exact-route

To display the exact path for the source and destination address pair, use the **show mpls forwarding exact-route** command in XR EXEC mode.

```
show mpls forwarding exact-route label label-number {bottom-label value | ipv4 source-address
destination-address | ipv6source-addressdestination-address} [detail] [protocol protocol source-port
source-port destination-port destination-port ingress-interface type interface-path-id] [location
node-id] [policy-class value] [hardware {ingress | egress}]
```

Syntax Description

label <i>label-number</i>	Displays the Label Number. Range is 0 to 1048575.
bottom-label	Displays the bottom label value. Range is 0 to 1048575. Note bottom-label is not required for packets with single label.
ipv4 <i>source-address</i> <i>destination-address</i>	Displays the exact path for IPv4 payload. The IPv4 source address in x.x.x.x format. The IPv4 destination address in x.x.x.x format.
ipv6 <i>source-address</i> <i>destination-address</i>	Displays the exact path for IPv6 payload. The IPv6 source address in x::x::x format. The IPv6 destination address in x::x::x format. Note This will be supported in a future release of Cisco IOS XR software.
detail	(Optional) Displays detailed information.
protocol <i>protocol</i>	(Optional) Displays the specified protocol for the route. Note protocol is not used for load balancing.
source-port <i>source-port</i>	Sets the UDP source port. The range is from 0 to 65535.
destination-port <i>destination-port</i>	Sets the UDP destination port. The range is from 0 to 65535.
ingress-interface	Sets the ingress interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible 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 hardware resource counters on the designated node.

policy-class <i>value</i>	(Optional) Displays the policy-based tunnel selection (PBTS) to direct traffic into specific TE tunnels. The policy-class attribute maps the correct traffic class to this policy. The range for the policy-class value is from 1 to 7. Note This will be supported in a future release of Cisco IOS XR software.
hardware	(Optional) Displays the hardware location entry.
ingress	(Optional) Reads information from the ingress PSE. Note This will be supported in a future release of Cisco IOS XR software.
egress	(Optional) Reads information from the egress PSE.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The **show mpls forwarding exact-route** command displays information in long form and includes the following information:

- Encapsulation length
- Media Access Control (MAC) string length
- Maximum transmission unit (MTU)
- Packet switching information
- Label stacking information



Note

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following shows a sample output from the **show mpls forwarding exact-route** command:

```
RP/0/RP0/CPU0:router# show mpls forwarding exact-route label 24001
```

```
entropy-label 1234 ingress-interface tenGigE 0/0/0/1/0 location 0/0/CPU0
```

```
Local   Outgoing   Prefix           Outgoing   Next Hop       Bytes
Label   Label      or ID            Interface  Interface      Switched
-----
24001   64002      194.0.0.1/32    Te0/0/0/1/0.1  25.2.11.1     N/A
      Via: Te0/0/0/1/0.1, Next Hop: 25.2.11.1
      Label Stack (Top -> Bottom): { 64002 }
      NHID: 0x4, Encap-ID: N/A, Path idx: 2, Backup path idx: 0, Weight: 0
      Hash idx: 2
      MAC/Encaps: 18/22, MTU: 1500
      Outgoing Interface: TenGigE0/0/0/1/0.1 (ifhandle 0x00000500)
```

This table describes the significant fields shown in the display.

Table 2: show mpls forwarding exact-route 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: Unlabeled No label for the destination from the next hop, or label switching is not enabled on the outgoing interface. Pop Label Next hop advertised an implicit-null label for the destination.
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: Indicated 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	MTU ¹ 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 ² 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-TE fast reroute.

Field	Description
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, such as explicit-nullv4, explicit-nullv6, are installed in the forwarding plane. The label range is 0 to 15.

¹ MTU = Maximum Transmission Unit.

² LFIB = Label Forwarding Information Base.

show mpls forwarding labels

To display the contents of the MPLS label information, use the **show mpls forwarding labels** command in XR EXEC mode.

show mpls forwarding [*labels low-value high-value*] [**detail**] [**rpf**]

Syntax Description	labels <i>low-value high-value</i>	(Optional) Entries with a local labels range. Ranges for <i>low-value</i> is 0 and <i>high-value</i> is 0 1048575.
	detail	
	rpf	(Optional) Displays label RPF information.
		Note This will be supported in a future release of Cisco IOS XR software.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The optional keywords and arguments described allow display of MPLS label security and RPF information.

Task ID	Task ID	Operations
	mpls-ldp	read
	mpls-static	read

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

```
RP/0/RP0/CPU0:router# show mpls forwarding labels 24035
Local  Outgoing  Prefix          Outgoing  Next Hop      Bytes
Label  Label     or ID           Interface  Hop           Switched
-----
24035  24027     3.3.3.1/32     BE241     191.4.1.2    371896
        24027     3.3.3.1/32     BE242     191.4.1.26   0
        24027     3.3.3.1/32     BE243     191.4.1.50   0
        24027     3.3.3.1/32     BE241.1    191.4.1.6    0
        24027     3.3.3.1/32     BE242.1    191.4.1.30   0
        24027     3.3.3.1/32     BE243.1    191.4.1.54   0
        24027     3.3.3.1/32     Te0/0/0/79 191.4.1.74   0
        24027     3.3.3.1/32     Te0/0/0/79.1 191.4.1.78   0
```

show mpls forwarding labels

show mpls forwarding summary

To display the summary of the MPLS label table, use the **show mpls forwarding summary** command in XR EXEC mode.

show mpls forwarding summary [**debug**] [**location** *node-id*] **no-counters** **private** **rpf**

Syntax Description	Parameter	Description
	debug	(Optional) Displays the information for internal debugging in the command output.
	location <i>node-id</i>	(Optional) Displays the interfaces on which MPLS is enabled.
	no-counters	(Optional) Skips displaying counters.
	private	(Optional) Displays private information.
	rpf	(Optional) Displays label RPF information.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The optional keywords and arguments described allow display of an MPLS label security information.

Task ID	Task ID	Operations
	mpls-te	read
	mpls-ldp	read
	mpls-static	read

Examples

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

```
RP/0/RP0/CPU0:router# show mpls forwarding summary
Forwarding entries:
  Label switching: 1123, protected: 0
  MPLS TE tunnel head: 0, protected: 0
  MPLS TE midpoint: 0, protected: 0
  MPLS TE internal: 0, protected: 0
  MPLS P2MP TE tunnel head: 0
  MPLS P2MP TE tunnel midpoint/tail: 0
  MPLS P2MP MLDP tunnel head: 0
  MPLS P2MP MLDP tunnel midpoint/tail: 0
Forwarding updates:
  messages: 22
  p2p updates: 50
Labels in use:
  Reserved: 4
```

show mpls forwarding summary

```

Lowest: 0
Highest: 49200
Deleted stale label entries: 0

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

```

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

```

RP/0/RP0/CPU0:router# show mpls forwarding summary debug
Forwarding entries:
  Label switching: 0, protected: 0
  MPLS TE tunnel head: 0, protected: 0
  MPLS TE midpoint: 0, protected: 0
  MPLS TE internal: 0, protected: 0
  MPLS P2MP TE tunnel head: 0
  MPLS P2MP TE tunnel midpoint/tail: 0
  MPLS P2MP MLDP tunnel head: 0
  MPLS P2MP MLDP tunnel midpoint/tail: 0
Forwarding updates:
  messages: 2
  p2p updates: 4
Labels in use:
  Reserved: 4
  Lowest: 0
  Highest: 13
  Deleted stale label entries: 0

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

```

The following sample output is from the **show mpls forwarding summary** command using the **no-counters**:

```

RP/0/RP0/CPU0:router# show mpls forwarding summary no-counters
Forwarding entries:
  Label switching: 0, protected: 0
  MPLS TE tunnel head: 0, protected: 0
  MPLS TE midpoint: 0, protected: 0
  MPLS TE internal: 0, protected: 0
  MPLS P2MP TE tunnel head: 0
  MPLS P2MP TE tunnel midpoint/tail: 0
  MPLS P2MP MLDP tunnel head: 0
  MPLS P2MP MLDP tunnel midpoint/tail: 0
Forwarding updates:
  messages: 2
  p2p updates: 4
Labels in use:
  Reserved: 4
  Lowest: 0
  Highest: 13
  Deleted stale label entries: 0

```

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

```

RP/0/RP0/CPU0:router# show mpls forwarding summary private
Forwarding entries:
  Label switching: 0, protected: 0
  MPLS TE tunnel head: 0, protected: 0
  MPLS TE midpoint: 0, protected: 0
  MPLS TE internal: 0, protected: 0
  MPLS P2MP TE tunnel head: 0
  MPLS P2MP TE tunnel midpoint/tail: 0
  MPLS P2MP MLDP tunnel head: 0
  MPLS P2MP MLDP tunnel midpoint/tail: 0
Forwarding updates:
  messages: 2
    p2p updates: 4
Labels in use:
  Reserved: 4
  Lowest: 0
  Highest: 13
  Deleted stale label entries: 0
Path count:
  Unicast: 0

Pkts dropped: 0
Pkts fragmented: 0
Failed lookups: 0
fwd-flags: 0x5, ttl-expire-pop-cnt: 0

```

This table describes the significant fields shown in the display.

Table 3: show mpls forwarding summary Field Descriptions

Field	Description
Label switching	Number of Label switching Label Forwarding Information Base (LFIB) forwarding entries.
MPLS TE tunnel head	Number of forwarding entries (installed at ingress LSR) on MPLS TE tunnel head.
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, such as explicit-nullv4, explicit-nullv6, are installed in the forwarding plane. The label range is 0 to 15.

show mpls interfaces

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

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

Syntax Description	
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface.
	Note Use the show interfaces command to see a list of all possible 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 hardware resource counters on the designated node.
detail	(Optional) Displays detailed information for the designated node.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

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

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

  Interface          LDP      Tunnel  Enabled
  Interface          LDP      Tunnel  Static  Enabled
-----
Bundle-Ether241     Yes      No      No      Yes
```

Bundle-Ether242	Yes	No	No	Yes
Bundle-Ether243	Yes	No	No	Yes
TenGigE0/0/0/4	Yes	No	No	Yes
Bundle-Ether341	Yes	No	No	Yes
Bundle-Ether344	Yes	No	No	Yes
Bundle-Ether345	No	No	No	Yes
Bundle-Ether451	Yes	No	No	Yes
Bundle-Ether452	Yes	No	No	Yes
Bundle-Ether461	Yes	No	No	Yes
Bundle-Ether462	Yes	No	No	Yes
Bundle-Ether463	Yes	No	No	Yes
TenGigE0/0/0/27	Yes	No	No	Yes

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

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

```

Interface Bundle-Ether241:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether242:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether243:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface TenGigE0/0/0/4:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether341:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether344:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether345:
  LDP labelling not enabled
  LSP labelling not enabled
  MPLS ISIS enabled
  MPLS enabled
Interface Bundle-Ether451:
  LDP labelling enabled
  LSP labelling not enabled
  MPLS enabled
Interface Bundle-Ether452:
```

This table describes the significant fields in the sample display.

Table 4: show mpls interfaces Command Field Descriptions

Field	Description
LDP	State of LDP labelling.
MTU	MTU ³ of labeled packet.
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.
Static	

³ MTU = Maximum Transmission Unit.

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 XR EXEC mode.

show mpls label range

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

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

Task ID	Task ID	Operations
	mpls-te	read, write
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following shows a sample output from the **show mpls label range** command:

```
RP/0/RP0/CPU0:router# show mpls label range
Range for dynamic labels: Min/Max: 16000/144000
```

This table describes the significant fields shown in the display.

Table 5: show mpls label range Command Field Descriptions

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

show mpls label table

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

show mpls label table *table-index* [**application** *application*] [**label** *label-value*] [**summary**] [**detail**]

Syntax Description		
table-index	<i>table-index</i>	Index of the label table to display. The global label table is 0. Currently, you can specify table 0 only.
application	<i>application</i>	(Optional) Displays all labels owned by the selected application. Options are: bgp-ipv4 , bgp-spkr , bgp-vpn-ipv4 , internal , ldp , none , l2vpn , static , te-control , te-link , and test .
label	<i>label-value</i>	(Optional) Displays a selected label based on the label value. Range is 0 to 1048575.
summary		(Optional) Displays a summary of local labels.
detail		(Optional) Displays detailed information for the MPLS label table.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Labels 16 to 15999 are reserved for static Layer 2 VPN pseudowires.

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following shows a 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(A)    InUse  Yes
0        1      LSD(A)    InUse  Yes
```



```

0      2      LSD (A)      InUse Yes
0     13     LSD (A)      InUse Yes
0    24000   LDP (A)      InUse Yes
0    24001   LDP (A)      InUse Yes
0    24002   LDP (A)      InUse Yes
0    24003   LDP (A)      InUse Yes

```

This table describes the significant fields shown in the display.

Table 6: show mpls label table Command Field Descriptions

Field	Description
Table	Table ID.
Label	Label index.
Owner	Application that allocated the label. All labels displaying “InUse” state have an owner.
State	<p>InUse</p> <p>Label allocated and in use by an application.</p> <p>Alloc</p> <p>Label allocated but is not yet in use by an application.</p> <p>Pend</p> <p>Label was in use by an application that has terminated unexpectedly, and the application has not reclaimed the label.</p> <p>Pend-S</p> <p>Label was in use by an application, but the MPLS LSD (Label Switching Database) server has recently restarted and the application has not reclaimed the label.</p>
Rewrite	Number of initiated rewrites.

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 XR EXEC mode.

show mpls lsd applications [**application** *application*]

Syntax Description	application <i>application</i> (Optional) Displays all labels owned by the selected application. Options are: bgp-ipv4 , bgp-spkr , bgp-vpn-ipv4 , internal , ldp , none , l2vpn , static , te-control , te-link , and test .																																				
Command Default	No default behavior or values																																				
Command Modes	XR EXEC mode																																				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.																																
Release	Modification																																				
Release 6.0	This command was introduced.																																				
Usage Guidelines	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, on page 28 command), but not all clients are applications.																																				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>mpls-ldp</td> <td>read, write</td> </tr> <tr> <td>mpls-static</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	mpls-ldp	read, write	mpls-static	read, write																														
Task ID	Operations																																				
mpls-ldp	read, write																																				
mpls-static	read, write																																				
Examples	<p>The following shows a sample output from the show mpls lsd applications command:</p> <pre>RP/0/RP0/CPU0:router# show mpls lsd applications</pre> <table border="1"> <thead> <tr> <th>Application</th> <th>State</th> <th>RecoveryTime</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>LSD (A)</td> <td>Active 0/0</td> <td>(0)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>OSPF (A) :ospf-george</td> <td>Active 0/0</td> <td>(30)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>OSPF (A) :ospf-1</td> <td>Active 0/0</td> <td>(30)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>Static (A)</td> <td>Active 0/0</td> <td>(120)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>LDP (A)</td> <td>Active 0/0</td> <td>(15)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>PIM (A) :pim</td> <td>Active 0/0</td> <td>(300)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>PIM6 (A) :pim6</td> <td>Active 0/0</td> <td>(300)</td> <td>0/RP0/CPU0</td> </tr> <tr> <td>L2VPN (A)</td> <td>Active 0/0</td> <td>(1800)</td> <td>0/RP0/CPU0</td> </tr> </tbody> </table>	Application	State	RecoveryTime	Location	LSD (A)	Active 0/0	(0)	0/RP0/CPU0	OSPF (A) :ospf-george	Active 0/0	(30)	0/RP0/CPU0	OSPF (A) :ospf-1	Active 0/0	(30)	0/RP0/CPU0	Static (A)	Active 0/0	(120)	0/RP0/CPU0	LDP (A)	Active 0/0	(15)	0/RP0/CPU0	PIM (A) :pim	Active 0/0	(300)	0/RP0/CPU0	PIM6 (A) :pim6	Active 0/0	(300)	0/RP0/CPU0	L2VPN (A)	Active 0/0	(1800)	0/RP0/CPU0
Application	State	RecoveryTime	Location																																		
LSD (A)	Active 0/0	(0)	0/RP0/CPU0																																		
OSPF (A) :ospf-george	Active 0/0	(30)	0/RP0/CPU0																																		
OSPF (A) :ospf-1	Active 0/0	(30)	0/RP0/CPU0																																		
Static (A)	Active 0/0	(120)	0/RP0/CPU0																																		
LDP (A)	Active 0/0	(15)	0/RP0/CPU0																																		
PIM (A) :pim	Active 0/0	(300)	0/RP0/CPU0																																		
PIM6 (A) :pim6	Active 0/0	(300)	0/RP0/CPU0																																		
L2VPN (A)	Active 0/0	(1800)	0/RP0/CPU0																																		

This table describes the significant fields shown in the display.

Table 7: show mpls lsd applications Command Field Descriptions

Field	Description
Type	LSD application type.
State	<p>Active Application registered with MPLS LSD and is functioning correctly.</p> <p>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.</p> <p>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.</p>
RecoveryTime	Seconds remaining before MPLS LSD gives up or resumes the application.
Node	Node expressed in standard <i>rack/slot/module</i> notation.

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 XR EXEC mode.

show mpls lsd clients

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines 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.

Task ID	Task ID	Operations
	mpls-te	read, write
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following shows a sample output from the **show mpls lsd clients** command:

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

ID	Services	Location
0	LSD (A)	0/RP0/CPU0
1	OSPF:ospf-ospf-sr (A)	0/RP0/CPU0
2	OSPF:ospf-ospf-v4 (A)	0/RP0/CPU0
3	OSPF:ospf-core (A)	0/RP0/CPU0
4	ISIS:isis-v4 (A)	0/RP0/CPU0
5	ISIS:core (A)	0/RP0/CPU0
6	ISIS:isis-sr (A)	0/RP0/CPU0
7	Static (A)	0/RP0/CPU0
8	LDP (A)	0/RP0/CPU0
9	L2VPN (A)	0/RP0/CPU0
10	BGP-VPNv4:bgp-default (A)	0/RP0/CPU0

The following table describes the significant fields shown in the display.

Table 8: show mpls lsd clients Command Field Descriptions

Field	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).
Location	

show mpls lsd forwarding labels

To display the LSD label RPF information, use the **show mpls lsd forwarding labels** command in XR EXEC mode.

show mpls lsd forwarding [**labels** *low-value high-value*] [**location** *node-id*]

Syntax Description	labels <i>low-value high-value</i>	(Optional) Entries with a local labels range. Ranges for both <i>low-value</i> and <i>high-value</i> are 0 to 1048575.
	location <i>node-id</i>	Displays hardware resource counters on the designated node.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The optional keywords and arguments described allow display of an MPLS label security information.

Task ID	Task ID	Operations
	mpls-ldp	read
	mpls-static	read

Examples

The following sample output is from the **show mpls lsd forwarding labels** command using a specific location:

```
RP/0/RP0/CPU0:router# show mpls lsd forwarding labels 24035
```

```
In_Label, (ID), Path_Info: <Type>
24035, (IPv4, 'default':4U, 3.3.3.1/32), 8 Paths
  1/8: IPv4, 'default':4U, BE241, nh=191.4.1.2, lbl=24027, flags=0x0, ext_flags=0x0
  2/8: IPv4, 'default':4U, BE242, nh=191.4.1.26, lbl=24027, flags=0x0, ext_flags=0x0
  3/8: IPv4, 'default':4U, BE243, nh=191.4.1.50, lbl=24027, flags=0x0, ext_flags=0x0
  4/8: IPv4, 'default':4U, BE241.1, nh=191.4.1.6, lbl=24027, flags=0x0, ext_flags=0x0
  5/8: IPv4, 'default':4U, BE242.1, nh=191.4.1.30, lbl=24027, flags=0x0, ext_flags=0x0
  6/8: IPv4, 'default':4U, BE243.1, nh=191.4.1.54, lbl=24027, flags=0x0, ext_flags=0x0
  7/8: IPv4, 'default':4U, Te0/0/0/79, nh=191.4.1.74, lbl=24027,
      flags=0x0, ext_flags=0x0
  8/8: IPv4, 'default':4U, Te0/0/0/79.1, nh=191.4.1.78, lbl=24027,
      flags=0x0, ext_flags=0x0
```

show mpls lsd forwarding summary

To display the LSD label information, use the **show mpls lsd forwarding summary** command in XR EXEC mode.

```
show mpls lsd forwarding summary [location node-id]
```

Syntax Description	location <i>node-id</i>	Displays hardware resource counters on the designated node.
Command Modes	XR EXEC mode	
Command History	Release	Modification
	Release 6.0	This command was introduced.
Usage Guidelines	The optional keywords and arguments described allow display of the interface label security information.	
Task ID	Task ID	Operations
	mpls-te	read
	mpls-ldp	read
	mpls-static	read

Examples

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

```
RP/0/RP0/CPU0:router# show mpls lsd forwarding summary
Messages: 813
Forwarding updates: 17889
Rewrites: 322
  FPIs:
    Label: 322
    IPv4: 284
    IPv6: 0
    TE: 0
    PW List: 0
    DMTC Ext_Intf: 0
  MOIs: 1644
    IPv4 paths: 1640 (0 backup, 0 protected)
    IPv6 paths: 0 (0 backup, 0 protected)
    Pop-and_lookup IPv4 paths: 3
    Pop-and_lookup IPv6 paths: 1
    TEv4: 0
    Pseudo-wire: 0
    IP subscriber: 0
    DMTC Ext_Intf: 0
  RPF Nbrs:
    IPv4 Neighbors: 0
    IPv6 Neighbors: 0
    Total RWs with RPF Neighbors: 0
```

show mpls lsd forwarding summary