



MPLS Forwarding Commands

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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 8000 Series Routers*.

hw-module profile cef stats label app-default dynamic

To increase MPLS per path statistics collection to more than 4K counters, use the **hw-module profile cef stats label app-default dynamic** command in global configuration mode. To return to the default configuration, use the **no** form of this command.

hw-module profile cef stats label app-default dynamic

This command has no keywords or arguments.

Command Default

This command is disabled.

Command Modes

Global configuration

Command History

| Release | Modification |
|----------------|--|
| Release 7.0.14 | This command was introduced. The per-path statistics collection is not supported for SR-TE, MPLS-TE, L3VPN, 6PE, and BGP-LU technologies. |

Usage Guidelines

The MPLS per-path statistics are reported for IPv4 IGP (LDP/SR) paths. For each outgoing labeled path, a counter is allocated. By default, 4K counters are supported. You can increase it up to 96K counters (thereby extending statistics collection to as many IPv4 IGP (LDP/SR) paths), by enabling this command. You can view the statistics in the **show mpls forwarding labels** command output.

After you execute the **hw-module profile cef stats label app-default dynamic** command, or use its **no** form, you must execute the **reload** command. It loads the device image afresh, and restarts the device. Else, the command will not come into effect.

This example shows how to increase MPLS per path statistics collection to more than 4K IPv4 IGP (LDP/SR) counters:

```
Router(config)# hw-module profile cef stats label app-default dynamic
..
Router# reload
```

mpls label range

To configure the dynamic range of local labels available for use on packet interfaces, use the **mpls label range** command in global configuration mode. To return to the default behavior, use the **no** form of this command.

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 <i>table-id</i> = 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 | |
|-----------------|--------------------------|
| | <i>table-id</i> : 0 |
| | <i>minimum</i> : 16000 |
| | <i>maximum</i> : 1048575 |

| Command Modes | |
|---------------|----------------------|
| | Global configuration |

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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. |
| | Labels 16 through 15999 are reserved for Layer 2 VPN static pseudowires. You should not configure Layer 2 VPN static pseudowires which fall within the dynamic range. If more Layer 2 VPN static pseudowires are required, restrict the dynamic label range using this configuration. |



| Note | |
|------|--|
| | <ul style="list-style-type: none"> Labels outside the current range and which are allocated by MPLS applications remain in circulation until released. You must understand the maximum labels that are supported for each platform versus the labels that are supported for the CLI. |



Note Restart the router after changing the mpls label range.

Task ID**Task ID Operations**

mpls-te read,
write

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
```

Related Commands

| Command | Description |
|---|---|
| show mpls label range, on page 27 | Displays the range of the MPLS local label space. |

mpls label-security

To configure the MPLS label security for the interface, use the **mpls label-security** command in interface configuration mode.

mpls label-security multi-label-packet [drop] rpf

| Syntax Description | |
|---------------------------|---|
| multi-label-packet | Handles incoming packets with multiple labels on the stack. |
| drop | Drops packets with multiple labels on the stack. |
| rpf | Checks for RPF label on incoming packets. |

Command Modes Interface configuration.

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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 This example shows how to configure MPLS label RPF check:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)#interface tunnel-te 1
RP/0/RP0/CPU0:router(config-if)#mpls label-security rpf
```

| Related Commands | Command | Description |
|------------------|--|---|
| | show mpls forwarding labels, on page 17 | Display MPLS label RPF information. |
| | show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |
| | show mpls forwarding label-security interface, on page 14 | Display MPLS label interface security information. |
| | show mpls forwarding label-security summary location, on page 16 | Displays MPLS label security information summary. |

| Command | Description |
|---|---|
| show mpls ea interfaces, on page 8 | Displays the interface label security information. |
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |

show mpls ea interfaces

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

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

| Syntax Description | location <i>node-id</i> | Displays hardware resource counters on the designated node. |
|--------------------|-------------------------|---|
|--------------------|-------------------------|---|

| Command Modes | EXEC |
|---------------|------|
|---------------|------|

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| 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 label-security interface** command and specific interface and location:

```
RP/0/RP0/CPU0:router# show mpls ea interfaces location 0/1/CPU0
Interface      IFH          MTU  Flags      Type
-----
FI0/1/CPU0    0x02000080  8000 0x01000000 0x0000001b
tt1           0x08000320  1500 0x01000000 0x00000024
```

| Related Commands | Command | Description |
|------------------|---|---|
| | show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| | show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |

show mpls forwarding tunnels

To display the contents of the **MPLS** forwarding tunnel, use the **show mpls forwarding tunnel** command in EXEC mode.

```
show mpls forwarding tunnels [detail][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). |
|--------------------|-------------------|--|
| | tunnels tunnel-id | (Optional) Displays entries either for a specified label switch path (LSP) tunnel or all LSP tunnel entries. |
| | vrf vrf-name | (Optional) Displays entries for VPN routing and forwarding (VRF). |

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

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

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

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

Examples

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

```
show mpls forwarding tunnels
```

```
RP/0/RSP0/CPU0:PE1#sh mpls forwarding tunnels 1999 detail
Thu Jul 23 22:56:09.726 PDT
Tunnel      Outgoing   Outgoing   Next Hop   Bytes
Name        Label      Interface  Next Hop   Switched
-----
-----
```

show mpls forwarding tunnels

```

tt1999          50045          BE10          point2point    0
  Updated: Jul 23 20:04:57.416
  Version: 82681, Priority: 2
  Label Stack (Top -> Bottom): { 50045 }
  Local Label: 27972
  NHID: 0x0, Path idx: 0, Backup path idx: 0, Weight: 0
  MAC/Encaps: 14/18, MTU: 1500
  Packets Switched: 0

```

```

Interface Handle: 0x0801f4a0, Local Label: 27972
Forwarding Class: 0, Weight: 0
Packets/Bytes Switched: 7045837/7116295370

```

```

RP/0/RSP0/CPU0:PE1#sh mpls forwarding tunnels 1999 detail location 0/0/CPU0
Thu Jul 23 22:56:14.526 PDT

```

```

Tunnel      Outgoing   Outgoing   Next Hop      Bytes
Name        Label      Interface  -----
-----
tt1999      50045      BE10       point2point   0
  Updated: Jul 23 20:04:57.640
  Version: 82681, Priority: 2
  Label Stack (Top -> Bottom): { 50045 }
  Local Label: 27972
  NHID: 0x0, Path idx: 0, Backup path idx: 0, Weight: 0
  MAC/Encaps: 14/18, MTU: 1500
  Packets Switched: 0

```

```

Interface Handle: 0x0801f4a0, Local Label: 27972
Forwarding Class: 0, Weight: 0
Packets/Bytes Switched: 7045837/7116295370

```

```

RP/0/RSP0/CPU0:PE1#sh mpls forwarding tunnels 1999
Thu Jul 23 22:56:19.717 PDT

```

```

Tunnel      Outgoing   Outgoing   Next Hop      Bytes
Name        Label      Interface  -----
-----
tt1999      50045      BE10       point2point   0

```

Related Commands

| Command | Description |
|--|--|
| show mpls forwarding exact-route, on page 11 | Displays the exact path for the source and destination address pair. |

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 <i>value</i> | | Displays the bottom label value. Range is 0 to 1048575. |
| 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 format. The IPv6 destination address in x::x format. |
| detail | | (Optional) Displays detailed information. |
| protocol <i>protocol</i> | | (Optional) Displays the specified protocol for the route. |
| 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. |
| hardware | | (Optional) Displays the hardware location entry. |
| ingress | | (Optional) Reads information from the ingress PSE. |
| egress | | (Optional) Reads information from the egress PSE. |

show mpls forwarding exact-route

Command Default No default behavior or values

Command Modes XR EXEC mode

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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

| 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     ID            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 1: show mpls forwarding exact-route Field Descriptions

| Field | Description |
|-------------|--------------------------------|
| Local Label | Label assigned by this router. |

| Field | Description |
|-----------------------|--|
| 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. |
| 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 label-security interface

To display the contents of the MPLS label interface security information, use the **show mpls forwarding label-security interface** command in EXEC mode.

show mpls forwarding label-security[**interface** *type interface-path-id*] [**location** *node-id*]

| Syntax Description | | |
|--------------------------------|-------------|---|
| 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. |
| location <i>node-id</i> | (Optional) | Displays hardware resource counters on the designated node. |

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| 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 label-security interface** command and specific interface and location:

```
RP/0/RP0/CPU0:router# show mpls forwarding label-security interface GigabitEthernet location
0/1/CPU0
```

| Related Commands | Command | Description |
|------------------|--|---|
| | show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |
| | show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| | show mpls forwarding label-security summary location, on page 16 | Displays MPLS label security information summary. |

show mpls forwarding label-security summary location

To display the contents of the MPLS label security information summary, use the **show mpls forwarding label-security summary location** command in EXEC mode.

show mpls forwarding label-security summary location *node-id*

| | | |
|---------------------------|--------------------------------|---|
| Syntax Description | location <i>node-id</i> | Displays label security information on the designated node. |
|---------------------------|--------------------------------|---|

| | |
|----------------------|------|
| Command Modes | EXEC |
|----------------------|------|

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | 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 label-security summary location** command and a specific location:

```
RP/0/RP0/CPU0:router# show mpls forwarding label-security summary location 0/1/CPU0
```

| Related Commands | Command | Description |
|-------------------------|--|---|
| | show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |
| | show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| | show mpls forwarding label-security summary location, on page 16 | Displays MPLS label security information summary. |

show mpls forwarding labels

To display the contents of the MPLS label RPF information, use the **show mpls forwarding labels** command in 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 both <i>low-value</i> and <i>high-value</i> are 0 to 1048575. |
| | detail | |
| | rpf | (Optional) Displays label RPF information. |

Command Modes EXEC

| Command History | Release | Modification |
|------------------------|----------------|---|
| | Release 7.0.12 | This command was introduced. |
| | Release 7.0.14 | The hw-module profile cef stats label app-default dynamic command was introduced in the global configuration mode to increase MPLS per path statistics collection to more than 4K IPv4 IGP (LDP/SR) counters. If you enable it, the show mpls forwarding labels command output will display MPLS per path statistics for more than 4k counters. |

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

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 rpf
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
```

show mpls forwarding labels

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

Examples

The following sample output shows per-path statistics information:

```
Router# show mpls forwarding labels 24016 detail

Local   Outgoing Prefix   Outgoing Next Hop   Bytes Switched
Label   Label             or ID Interface
-----
24016   24013   200.0.0.0/24   Hu0/0/0/26 10.1.2.2   32708

Updated: Mar 10 08:01:45.092
Version: 62, Priority: 3
Label Stack (Top -> Bottom): { 24013 }
NHID: 0x0, Encap-ID: N/A, Path idx: 0, Backup path idx: 0, Weight: 0
MAC/Encaps: 14/18, MTU: 1500
Outgoing Interface: HundredGigE0/0/0/26 (ifhandle 0x0f000248)
Packets Switched: 481

          24013 200.0.0.0/24 Hu0/0/0/25 10.1.1.2   32640

Updated: Mar 10 08:01:45.092
Version: 62, Priority: 3
Label Stack (Top -> Bottom): { 24013 }
NHID: 0x0, Encap-ID: N/A, Path idx: 1, Backup path idx: 0, Weight: 0
MAC/Encaps: 14/18, MTU: 1500
Outgoing Interface: HundredGigE0/0/0/25 (ifhandle 0x0f000250)
Packets Switched: 480

Total Packets/Bytes Switched: 961/65348
```

Examples

The following sample output shows per-path statistics information:

```
Router# show mpls forwarding

Local   Outgoing Prefix   Outgoing Next Hop   Bytes Switched
Label   Label             or ID Interface
-----
24016   24013   200.0.0.0/24   Hu0/0/0/26 10.1.2.2   32708
          24013   200.0.0.0/24   Hu0/0/0/25 10.1.1.2   32640
24017   24014   201.0.0.0/24   Hu0/0/0/26 10.1.2.2   32640
          24014   201.0.0.0/24   Hu0/0/0/25 10.1.1.2   32640
24018   24015   202.0.0.0/24   Hu0/0/0/26 10.1.1.2   32640
          24015   202.0.0.0/24   Hu0/0/0/25 10.1.1.2   32640
24019   24016   203.0.0.0/24   Hu0/0/0/26 10.1.2.2   0
          24016   203.0.0.0/24   Hu0/0/0/25 10.1.1.2   65280
24020   24017   204.0.0.0/24   Hu0/0/0/26 10.1.2.2   32640
          24017   204.0.0.0/24   Hu0/0/0/25 10.1.1.2   32640
```

Related Commands

| Command | Description |
|---|---|
| show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |

| Command | Description |
|--|---|
| show mpls forwarding label-security summary location , on page 16 | Displays MPLS label security information summary. |

show mpls forwarding summary

To display the contents of the MPLS label security information, use the **show mpls forwarding summary** command in 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 hardware resource counters on the designated node. |
| | no-counters | (Optional) Skips displaying counters. |
| | private | (Optional) Displays private information. |
| | rpf | (Optional) Displays label RPF information. |

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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 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 **location** keyword and a specific location:

```

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

show mpls forwarding summary

```

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

```

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

```

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

```

This table describes the significant fields shown in the display.

Table 2: show mpls forwarding summary Field Descriptions

| Field | Description |
|-----------------|--|
| Label switching | Number of Label switching Label Forwarding Information Base (LFIB) forwarding entries. |

| Field | Description |
|---------------------|--|
| 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. |

Related Commands

| Command | Description |
|--|--|
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| show mpls forwarding label-security interface, on page 14 | Display MPLS label interface security information. |
| show mpls forwarding label-security summary location, on page 16 | Displays MPLS label security information summary. |
| show mpls ea interfaces, on page 8 | Displays the interface label security information. |
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |

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 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 EXEC

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | 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-te | read, write |
| | 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   Static   Enabled
```

```

-----
TenGigE0/3/2/1          No      Yes     No      Yes
TenGigE0/3/1/1          Yes     Yes     No      Yes
TenGigE0/2/0/3          Yes     No      No      Yes
GigabitEthernet0/1/3/1  Yes     No      No      Yes
Bundle-Ether18          Yes     Yes     No      Yes
Bundle-Ether150         Yes     Yes     No      Yes
Bundle-Ether5           Yes     Yes     No      Yes
Bundle-Ether2           Yes     Yes     No      Yes
HundredGigE0/6/3/1     Yes     Yes     No      Yes
TenGigE0/5/4/2          Yes     Yes     No      Yes
HundredGigE0/6/5/0     Yes     Yes     No      Yes
HundredGigE0/6/3/1     Yes     Yes     No      Yes

```

The following shows a 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 shows a 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 shows a 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/RP0/CPU0:router# 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

```

This table describes the significant fields in the sample display.

Table 3: show mpls interfaces Command Field Descriptions

| Field | Description |
|--------|--|
| LDP | State of LDP labelling. |
| Tunnel | State of LSP Tunnel 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. |

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 EXEC mode.

show mpls label range

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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 4: 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 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-spr , 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 EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines



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

| 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 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 |

This table describes the significant fields shown in the display.

Table 5: 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. |

Related Commands

| Command | Description |
|---|--|
| show mpls forwarding labels, on page 17 | Displays entries in the MPLS forwarding table. Label switching entries are indexed by their local label. |
| show mpls lsd applications, on page 30 | 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 [**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 | EXEC | | | | | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.0.12</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | Release 7.0.12 | This command was introduced. | | | | |
| Release | Modification | | | | | | | | |
| Release 7.0.12 | 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 32 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-te</td> <td>read, write</td> </tr> <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-te | read, write | mpls-ldp | read, write | mpls-static | read, write |
| 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 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
```

This table describes the significant fields shown in the display.

Table 6: show mpls lsd applications Command Field Descriptions

| Field | Description |
|--------------|--|
| Type | LSD application type. |
| State | <p>Active</p> <p>Application registered with MPLS LSD and is functioning correctly.</p> <p>Recover</p> <p>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</p> <p>Application not reregistered 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. |

Related Commands

| Command | Description |
|---|---|
| show mpls lsd clients, on page 32 | 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.

Command Default No default behavior or values

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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                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
```

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

Table 7: 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). |
| Node | Node expressed in standard rack/slot/module notation. |

Related Commands

| Command | Description |
|--|---|
| show mpls lsd applications, on page 30 | Displays MPLS applications registered with the MPLS LSD server. |

show mpls lsd forwarding labels

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

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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 lsd forwarding labels** command using a specific location:

```
RP/0/RP0/CPU0:router# show mpls lsd forwarding labels 1 13 detail location 0/1/CPU0
```

| Related Commands | Command | Description |
|------------------|--|---|
| | show mpls forwarding summary, on page 20 | Displays the contents of the MPLS label security information. |

show mpls forwarding summary

To display the contents of the MPLS label security information, use the **show mpls forwarding summary** command in 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 hardware resource counters on the designated node. |
| | no-counters | (Optional) Skips displaying counters. |
| | private | (Optional) Displays private information. |
| | rpf | (Optional) Displays label RPF information. |

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | 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 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:
```

show mpls forwarding summary

```

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 **location** keyword and a specific location:

```

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

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

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

This table describes the significant fields shown in the display.

Table 8: show mpls forwarding summary Field Descriptions

| Field | Description |
|-----------------|--|
| Label switching | Number of Label switching Label Forwarding Information Base (LFIB) forwarding entries. |

show mpls forwarding summary

| Field | Description |
|---------------------|--|
| 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. |

Related Commands

| Command | Description |
|--|--|
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |
| show mpls forwarding label-security interface, on page 14 | Display MPLS label interface security information. |
| show mpls forwarding label-security summary location, on page 16 | Displays MPLS label security information summary. |
| show mpls ea interfaces, on page 8 | Displays the interface label security information. |
| show mpls lsd forwarding labels, on page 34 | Displays the LSD label RPF information. |

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 [ip-address] [ip-address /length] [afi-all safi-all |
unicastip-address ip-address/length] [backup-interface] [tunnel tunnel-id] [unresolved] [interface
type interface-path-id] [ipv4 safi-all | unicastip-address ip-address/length] [labels low-number
high-number] [state active | complete | partial | ready] [role head | midpoint] [summary] [location
node-id]
```

Syntax Description

| | |
|--------------------------------|---|
| <i>ip-address</i> | (Optional) IP address of the destination network. |
| <i>ip-address /length</i> | (Optional) Bit combination indicating the portion of the IP address that is being used for the subnet address. |
| afi-all | (Optional) Returns data for all specified address family identifiers. |
| safi-all | (Optional) Returns data for all sub-address family identifiers. |
| unicast | (Optional) Returns unicast data only. |
| backup-interface | (Optional) Displays entries with the specified backup interface. |
| tunnel <i>tunnel-id</i> | (Optional) Tunnel and tunnel ID to which packets with this label are going. The summary suboption is available. |
| unresolved | (Optional) Displays entries whose backup interface has not yet been fully resolved. |
| interface | (Optional) Displays entries with this primary outgoing interface. The summary keyword is available. |
| <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. |
| | <p>Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p> |
| ipv4 | (Optional) Displays only IPv4 data. |
| labels | (Optional) Displays database entries that possess in-labels assigned by this router (local labels). Specify either a starting value or a range of values. The state suboption is available. |

| | |
|--------------------------------|--|
| state | (Optional) Filters the database according to the state of the entry: |
| active | FRR rewrite is in the forwarding active database (where it can be placed onto appropriate incoming packets). |
| complete | FRR rewrite is assembled, ready or active. |
| partial | FRR rewrite is fully created; its backup routing information is still incomplete. |
| ready | FRR rewrite was created but is not in the forwarding active state. |
| role | (Optional) Displays entries associated either with the tunnel head or tunnel midpoint . The summary suboption is available. |
| summary | (Optional) Displays summarized information about the FRR database. |
| location <i>node-id</i> | (Optional) Displays hardware resource counters on the designated node. |

Command Default No default behavior or values

Command Modes EXEC

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines If the location is specified, Fast-Reroute (FRR) entries for both Point-to-Point (P2P) and P2MP tunnels are available. If the location is not specified, only P2P tunnel entries are available.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | mpls-te | read |

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

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

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



Note The Prefix field indicates the IP address where packets with this label are headed.

The following sample output displays filtering of the FRR database using the **backup-interface** keyword:

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

LSP midpoint FRR information:
LSP Identifier                Out Intf/          FRR Intf/          Status
                              Label              Label
-----
10.10.10.10 1006 [54]         Gi0/6/5/2:Pop     tt1060:Pop         Ready
```

The following sample output 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      Out intf/label    FRR intf/label    Status
-----
tt4000      PO0/3/0/0:34     tt1000:34         Ready
tt4001      PO0/3/0/0:35     tt1001:35         Ready
tt4002      PO0/3/0/0:36     tt1001:36         Ready
```

The following sample output displays 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
```

The following sample output displays 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
```

This table describes the significant fields shown in the display.

Table 9: show mpls traffic-eng fast-reroute database Command Field Descriptions

| Field | Description |
|--------|--------------------------------------|
| Tunnel | Short form of tunnel interface name. |

| Field | Description |
|----------------|--|
| Out intf/label | <p>Out interface</p> <p>Short name of the physical interface through which traffic goes to the protected link.</p> <p>Out label</p> <p>At a tunnel head, this is the label that the tunnel destination device advertises. The value “Unlabeled” indicates that no such label is advertised.</p> <p>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.</p> |
| FRR intf/label | <p>Fast reroute interface</p> <p>Backup tunnel interface.</p> <p>Fast reroute label</p> <p>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.</p> <p>At a tunnel midpoint, this has the same value as the Out label.</p> |
| Status | State of the rewrite: partial, ready, or active. |

Related Commands

| Command | Description |
|--|---|
| show mpls traffic-eng fast-reroute log, on page 43 | 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**interface-path-id* | **location** *node-id*]

| Syntax Description | interface | (Optional) Displays all FRR events for the selected protected interface. |
|--------------------|--------------------------------|---|
| | <i>type</i> | (Optional) Interface type. For more information, use the question mark (?) online help function. |
| | <i>interface-path-id</i> | Physical interface or virtual interface. |
| | Note | Use the show interfaces command to see a list of all 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 all FRR events that occurred on the selected node. |

Command Default No default behavior or values

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | mpls-te | read |

Examples

The following shows a 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  Rewrites When          Switching Time
  Interface
-----
0/0/CPU0 PO0/1/0/1 1      1      Feb 27 19:12:29.064000 147
```

This table describes the significant fields shown in the display.

Table 10: show mpls traffic-eng fast-reroute log Field Descriptions

| Field | Description |
|---------------------|--|
| Node | Node address. |
| Protected Interface | Type and interface-path-id that is being protected. |
| LSPs | LSP ⁴ 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 microseconds. |

⁴ LSP = Link-state Packet.

Related Commands

| Command | Description |
|---|--|
| show mpls traffic-eng fast-reroute database, on page 39 | Displays the contents of the FRR database. |